

ORDINANCE No.

Adopt new and amended supporting documents for an update of Portland's *Comprehensive Plan*; Accept report of the Citizen Involvement Committee (Ordinance)

The City of Portland ordains:

Section 1. The Council finds:

1. Portland's *Comprehensive Plan* describes how the City can accommodate future growth and development. To do this well the plan must be regularly updated, and these updates must be based on good facts and sound analysis.
2. Ordinance No. 150580 adopted Portland's *Comprehensive Plan* 35 years ago, on October 16, 1980. All three parts of the *Comprehensive Plan*, the Plan Map, the Plan Policies, and the List of Significant Projects, are in need of update.
3. Extensive community involvement is required and has been conducted for the update of all components of the City's *Comprehensive Plan*.

Fulfillment of Periodic Review Requirements

4. Portland's *Comprehensive Plan* is being updated within the structure of a state-mandated process called "periodic review."
5. The City undertook a self-evaluation and determined updates were warranted for all three parts of the *Comprehensive Plan*: the policies, the map and the list of projects. The City Council adopted Resolution No. 36626 on August 6, 2008, which forwarded a proposed periodic review work program to the Oregon Department of Land Conservation and Development (DLCD). The Land Conservation and Development Commission (LCDC) approved the City's proposal with minor modifications on September 30, 2009
6. Portland's work program is organized into the following five tasks.
 - Task I, Community Involvement Plan
 - Task II, Inventory and Analysis
 - Task III, Consideration of Alternatives
 - Task IV, Policy Choices
 - Task V, Implementation

7. Under Periodic Review Task I – Community Involvement Plan, a Community Involvement Committee (CIC) was established with a continuing obligation to help, “ensure, meaningful, timely, and sufficient community participation in all phases of plan update.” The CIC was charged with submitting a report to the City Council as each periodic review task is proposed for adoption (Task 1, Subtask C). With this ordinance the City Council accepts the required report from the committee, which is a combined report for Periodic Review Tasks III and IV.
8. Task II – Inventory and Analysis requires adoption of supporting documents that provided a sufficient factual basis for updating the *Comprehensive Plan*. The LCDC approved all of the City’s Task II submittal, except for five withdrawn *Economic Opportunities Analysis* documents, by Order No. 001850 (May 23, 2014). With this ordinance the City Council is adopting four official *Comprehensive Plan* supporting documents, which in total comprise a revised *Economic Opportunities Analysis* (now Task III, Subtask D).
9. Two of the LCDC-acknowledged supporting documents were maps depicting available housing and employment land (Task II, Subtask A). With this ordinance the City Council is adopting updated versions of two official *Comprehensive Plan* supporting documents – maps previously adopted by Ordinance No. 185657 on October 3, 2012 and acknowledged by Order No. 001850. They are: a Revised Inventory Map of Buildable Residential Lands and Estimate of Remaining Housing Capacity, and a Revised Inventory Map of Buildable Employment Land and Estimate of Remaining Employment Capacity.
10. Task III – Consideration of Alternatives requires a consequence analyses of alternative patterns of housing and job growth (Task III, Subtasks A, B and C). With this ordinance the City Council is adopting a *Growth Scenario Report* as an official *Comprehensive Plan* supporting document to fulfill these periodic review obligations.
11. Task IV – Policy Choices requires a new public facilities plan to meet service requirements of both existing development and twenty-years of new development allowed by the *Comprehensive Plan* map (Task IV, Subtask D). With this ordinance the City Council is adopting a *Citywide Systems Plan* as an official *Comprehensive Plan* supporting document that contains complete public facilities plan elements for water, sewer, and drainage, but not for transportation. This plan replaces and supersedes the *Public Facilities Plan* adopted by Ordinance No. 161770 on April 5, 1989. Chapters 9 and 10 of the *Citywide Systems Plan* are not being adopted as *Comprehensive Plan* supporting documents because parks facilities and other essential facilities and systems are not required elements of a public facilities plan under ORS 197. This ordinance adopts these chapters as part of the CSP in the interest of promoting more comprehensive and integrated public facilities planning.

12. The acknowledged documents, reports and maps approved by LCDC Order No. 001850, along with the additional documents reports and maps adopted by this Ordinance constitute an adequate factual base for all three components of Portland's *Comprehensive Plan*.

Proposed Modification of the Periodic Review Work Program

13. Task V – Implementation requires adoption of initial measures to implement the new Comprehensive Plan. The current periodic review work plan provides examples of possible measures that could to fulfill Task V. With consideration to the facts and supporting documents adopted with this ordinance, it is now possible to identify the most appropriate initial measures, including amendments to the zoning code and zoning map, and other programmatic non-regulatory measures. Identification of implementation projects at this stage will provide greater transparency and certainty.
14. With this ordinance the City Council also authorizes the Bureau of Planning and Sustainability to request LCDC to amend the City's Periodic Review Work Plan to clarify submission requirements for the various elements of the Transportation System Plan, and to clarify the number and types of implementation measures required for adoption under periodic review work order Task V.

Further Findings of Fact

15. The Comprehensive Plan supporting documents adopted by this ordinance must comply with all applicable provisions of Oregon land use law, the regional *Urban Growth Management Functional Plan*, the *Regional Transportation Plan*, and Title 33 of the *Municipal Code of the City of Portland Oregon*. These requirements have been met for the facts and reasons stated in Exhibit A, which is attached and made a part of this ordinance by this reference. Exhibit A also includes an expanded summary of the periodic review obligations, which helps place compliance with state and regional planning requirements within the context of periodic review.

Conclusion

16. For the reasons stated in the findings above, and the further findings in Exhibit A, this ordinance fulfills all requirements of Task III, Subtasks A through D, and the water, sewer and drainage requirement of Task IV, Subtask D, of the City's periodic review work order.

NOW, THEREFORE, the Council directs:

- a. The *Community Involvement Report* attached as Exhibit B is accepted in fulfillment of the

City's responsibilities under Task I (Subtask C) of the periodic review work program.

- b. The following maps are adopted as official *Comprehensive Plan* supporting documents and replace and supersede the maps adopted by Substitute Ordinance No. 185657 (October 3, 2012):
 - The revised Inventory Map of Buildable Residential Lands and Estimate of Remaining Housing Capacity is attached as Exhibit C.
 - The revised Inventory Map of Buildable Employment Lands and Estimate of Remaining Employment Capacity is attached as Exhibit D.
- c. The Growth Scenarios Report attached as Exhibit E is adopted as a *Comprehensive Plan* supporting document.
- d. The four documents comprising a revised *Economic Opportunities Analysis* attached as Exhibit F are adopted as *Comprehensive Plan* supporting documents and replace and supersede all earlier versions of these documents adopted by Substitute Ordinance No. 185657 (October 3, 2012).
- e. The *Citywide Systems Plan* attached as Exhibit G (with the exception of Chapters 9 and 10) is adopted as a *Comprehensive Plan* supporting document, and replaces and supersedes the *Public Facilities Plan* adopted by Ordinance No. 161770 (April 5, 1989).
- f. Chapters 9 and 10 of the *Citywide Systems Plan* attached as Exhibit G are adopted as nonbinding City policy.
- g. The population forecast and distribution adopted by Metro Council Ordinance No. 12-1292A on November 29, 2012 is accepted in lieu of directive "g" of Substitute Ordinance No. 185657 (October 3, 2012).
- h. The Bureau of Planning and Sustainability shall submit to the DLCD the documents, maps, reports and modifications referenced in directives "a" through "e" above as completed periodic review work products.
- i. The Bureau of Planning and Sustainability shall request the Land Conservation and Development Commission to approve the modifications to the Periodic Review Work Program described in Exhibit A.

Section 2. Severability

If any section, subsection, sentence, clause, phrase, diagram or drawing contained in this ordinance, or the map, report, inventory, analysis, or document it adopts or amends, is held to be deficient, invalid or unconstitutional, that shall not affect the validity of the remaining portions. The Council declares that it would have adopted the map, report, , inventory, analysis, or document each section, subsection, sentence, clause, phrase, diagram and drawing thereof, regardless of the fact that any one or more sections, subsections, sentences, clauses, phrases, diagrams or drawings contained in this Ordinance, may be found to be deficient, invalid or unconstitutional.

Passed by the Council:

Commissioner Mayor Hales
Prepared by: Al Burns, Eric Engstrom
Date Prepared: November 2, 2015

Auditor of the City of Portland
By

Deputy

EXHIBIT A

Further Findings of Fact

Glossary of Terms and Acronyms

Unless the context clearly dictates otherwise, the following terms have the following meanings in these findings of fact:

“BLI” means buildable lands inventory. This inventory consists of 51 maps adopted by Ordinance No. 185657 (October 3, 2012). These maps are summarized by two additional maps, one for employment land and another map for housing land adopted as Exhibits C and D of Ordinance No. _____. These summary maps are accompanied by reported estimates of how many new housing units and how many new jobs can accommodate by the year 2035.

“BPS” means the director of the Bureau of Planning and Sustainability, or City officials acting under the director’s instruction.

“CIC” means the Community Involvement Committee as appointed by the mayor and confirmed in their appointments by the City council

“City” means, depending on context, either the City of Portland, Oregon as a place, or officials acting under direction of the City Council.

“City Council” means the elected mayor and commissioners acting as the governing body of the City.

“DLCD” means the Director of the Oregon Department of Land Conservation and Development, or state officials acting under the director’s instruction.

“EOA” means the *Economic Opportunity Analysis* adopted by the City Council as Exhibit F of Ordinance No. _____.

“Goal” means a Statewide Planning Goal adopted by the LCDC.

“HNA” means the *Housing Needs Analysis* adopted by Ordinance No. 185657 (October 3, 2012)

“LCDC” means the Oregon Land Conservation and Development Commission.

“Metro” means the Metro Council, the elected governing body of the Metropolitan Service District, a service district formed pursuant to ORS Chapter 268. All urban and urbanizable land with the City of Portland are within the service district boundaries.

“NRI” means the natural resource inventory and maps adopted by Ordinance No. 185657 (October 3, 2012). These depict the locations of various natural resources, describe their quantity and quality, and determine their significance.

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“OHP” means the *Oregon Highway Plan* adopted by Oregon Transportation Commission.

“PSC” means the members of the City’s Planning and Sustainability Commission who are appointed by the Mayor and confirmed by the City Council.

“RTP” means the *Regional Transportation Plan* adopted by Metro.

“Rule” means an administrative rule adopted by the LCDC.

“TPR” means a particular rule, the *Transportation Planning Rule*, adopted by LCDC.

“UGMFP” means the *Urban Growth Management Functional Plan* adopted by Metro.

Expanded Summary of Periodic Review Progress to Date

Portland's *Comprehensive Plan* is being updated within the structure of a two-phased, state-mandated process called "periodic review."

The first phase in periodic review is the preparation of a work program. The City undertook a self-evaluation and determined updates were warranted for all three parts of the *Comprehensive Plan*, the policies, the map and the list of significant projects. The City Council adopted Resolution No. 36626 on August 6, 2008 which forwarded a proposed periodic review work program to the DLCD. The department approved the City's work program with minor modifications on September 30, 2009.

The second phase in periodic review is the completion of the state-approved work program. Portland's work program is organized into the following five tasks.

- Task I, Community Involvement
- Task II, Inventory and Analysis
- Task III, Consideration of Alternatives
- Task IV, Policy Choices
- Task V, Implementation

Task I of Periodic Review Obligations

Task I required appointment of a dedicated CIC for periodic review. Members were nominated by the Mayor and confirmed by the City Council (Task I, Subtask A). The appointment of the CIC was approved by DLCD Order No. 001792 on August 5, 2010. City Council Ordinance No. 184047 adopted a Community Involvement Program (Task I, subtask B) that was approved by DLCD Order 001798 on January 5, 2011. Under Task I the CIC has a continuing obligation to help, "ensure, meaningful, timely, and sufficient community participation in all phases on plan update." The CIC is charged with submitting a report to the City Council as each periodic review task is proposed for adoption.

The CIC was established as a temporary committee charged with ensuring citizen participation during the *Comprehensive Plan* update. The CIC has completed its obligation by completing reports covering all five periodic review tasks (Task 1, Subtask C) and by recommending beneficial changes to the *Comprehensive Plan* and Title 33 of the City Code (Task 1, Subtask D). Appointments to the CIC expire on December 31, 2015, by which time all duties of the CIC will have been completed. During the time the Task V implementing measures are subject to public hearing the PSC will, on an interim basis, serve as the City's designated committee for citizen involvement within the meaning of Goal 1.

Immediately after the effective date of the new *Comprehensive Plan* and its implementing measures a new CIC will be established as a permanent standing committee with oversight for

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the community involvement components of all programs of the BPS. The PSC should retain oversight of all other of the program components of the Bureau of Planning and Sustainability.

Task II of Periodic Review Obligations

Task II of the City's periodic review work program required the City to adopt "at least the following" work products by ordinance and submit them to LCDC:

- Inventory Map of Buildable Residential Lands
- Inventory Map of Buildable Employment Lands
- Inventory Map of Significant Natural Resources
- Inventory Map of Hazards
- Housing Needs Analysis
- Economic Opportunities Analysis
- Estimate of Remaining Housing Capacity
- Estimate of Remaining Employment Capacity

The City Council fulfilled all these Task II obligations on October 3, 2012, by adopting Ordinance No. 185657 that adopted the following reports and maps as official supporting documents for the *Comprehensive Plan*:

Economic Opportunity Analysis (EOA) in five documents:

Economic Opportunities Analysis, Summary – as recommended by the PSC on June 12, 2012 as amended by Council

Economic Opportunities Analysis Task 1: Trends, Opportunities and Market Factors – updated version as recommended by the PSC on June 12, 2012 as amended by Council

Economic Opportunities Analysis Task I, Appendix C, Harbor Lands Report – updated version as recommended by the PSC on June 12, 2012 as amended by Council

Economic Opportunities Analysis Task 2/3: Supply and Demand – updated version as recommended by the PSC on June 12, 2012 as amended by Council

Economic Opportunities Analysis Task 4: Alternative Choices – updated version as recommended by the PSC on June 12, 2012 as amended by Council

Housing Needs Analysis (HNA) in five documents:

Housing and Transportation Cost Study – version as recommended by the PSC in December 2010

Updates on Key Housing Supply and Affordability Trends – version as recommended by the PSC on July 12, 2011

Housing Supply – version as recommended by the PSC on July 12, 2011

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Housing Affordability – version as recommended by the PSC on July 12, 2011

Housing Demand and Supply Projections – version as recommended by the PSC on July 12, 2011

Infrastructure Condition and Capacity Analysis in one document:

Infrastructure Condition and Capacity – version as recommended by the PSC on July 10, 2012

Natural Resource Inventory (NRI) Report in two documents:

Natural Resource Inventory – version as recommended by the PSC on July 10, 2012

Natural Resource Inventory Update – version as recommended by the PSC on July 10, 2012

Buildable Lands Inventory (BLI) Report in four documents:

Buildable Lands Inventory Report – Summary of Future Development Capacity – as recommended by the PSC on June 12, 2012 as amended by Council

Buildable Lands Inventory Report, Appendix A, City of Portland Development Capacity Analysis, Development Capacity GIS model, – updated version as recommended by the PSC on June 12, 2012

Buildable Lands Inventory Report, Appendix B, Central City Development Capacity Study, – updated version as recommended by the PSC on June 12, 2012

Buildable Lands Inventory Report, Appendix C, Constraint Maps and Model Assumptions, – updated version as recommended by the PSC on June 12, 2012

BLI Maps

Fifty-one (51) maps divided into the categories of “Constraints,” “Hazards,” “Natural Resources” and “Infrastructure” – versions as recommended by the PSC on July 10, 2012.

After the City submitted Task II for state approval, but before the LCDC made a final decision, there were two significant changes in circumstances. The Port of Portland withdrew its application to annex West Hayden Island to the City of Portland, a portion of which the Port proposed to develop with a new marine industrial terminal. The Port’s action required the City to reevaluate both the industrial land need and supply described in the EOA that the Council had just recently adopted. Additionally, Metro adopted an employment forecast and jobs allocation lower than the draft Metro allocation and forecast the City relied upon to prepare its EOA. (Ordinance No. 12-1292A, November 29, 2012) This final forecast allocated to Portland the responsibility for creating 120,982 new housing units and 134,140 new jobs.

City Task II Work Withdrawn from Consideration

After the City submitted Task II for state approval, but before the LCDC made a final decision, there were two significant changes in circumstances. The Port of Portland withdrew its application to annex land to the City of Portland for a West Hayden Island marine terminal, and Metro adopted, as a final land use decision, by Ordinance No. 12-1292A on November 29, 2012, an employment forecast and jobs allocation lower than the draft Metro allocation and forecast the City relied upon to prepare its Economic Opportunities Analysis. This final forecast was 120,982 housing units and 134,140 jobs.

Because of these changes in circumstances, the City withdrew the following documents from state consideration:

Economic Opportunities Analysis, Summary – as recommended by the PSC on June 12, 2012 as amended by Council

Economic Opportunities Analysis Task 1: Trends, Opportunities and Market Factors – updated version as recommended by the PSC on June 12, 2012 as amended by Council

Economic Opportunities Analysis Task I, Appendix C, Harbor Lands Report – updated version as recommended by the PSC on June 12, 2012 as amended by Council

Economic Opportunities Analysis Task 2/3: Supply and Demand – updated version as recommended by the PSC on June 12, 2012 as amended by Council

Economic Opportunities Analysis Task 4: Alternative Choices – updated version as recommended by the PSC on June 12, 2012 as amended by Council

City Work Acknowledged as Meeting Task II

The LCDC approved all of the City's Task II submittal, except for the five withdrawn documents, on May 23, 2014 by Order 001850. The approved maps, reports, and documents, through operation of OAR 660-025-0160(8), became acknowledged supporting documents for Portland's *Comprehensive Plan*. LCDC Order 001850 also transferred the EOA requirement from Periodic Review Work Program, Task II, Subtask D, to Task III, Subtask D, and required the City to recognize the forecast and allocation adopted by the Metro Council on November 29, 2012.

Compliance Status Summary of Portland's Periodic Review Work Program

- Task I, Subtask A: Community Involvement Committee, approved by LCDC Order 001792 on August 5, 2010
- Task I, Subtask B: Community Involvement Program, approved by LCDC Order 001789 on January 5, 2011

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- Task II, Subtask A Characterization of Existing Land Supply, approved by LCDC Order 001850 on May 23, 2014
- Task II, Subtask B Estimate of Remaining Housing Potential, approved by LCDC Order 001850 on May 23, 2014
- Task II, Subtask C Coordination of Housing Forecast with Metro, approved by LCDC Order 001850 on May 23, 2014
- Task II, Subtask E Identification of Housing Needs, approved by LCDC Order 001850 on May 23, 2014

Periodic Review Products Adopted by Ordinance No. _____

City Council Ordinance No. _____ adopted the following periodic review products.

- Task I, Subtask C: Report from the CIC evaluating the involvement leading up to the adoption of periodic review products
- Task II, Subtask D Revised Residential BLI Summary Map and Revised Estimate of Remaining Housing Potential.
- Task III, Subtask A Evaluation Criteria for Alternatives Analysis
- Task III, Subtask B Thematic Alternatives Analysis
- Task III, Subtask C Detailed Alternatives Analysis
- Task III, Subtask D Revised EOA, Revised Employment BLI Summary Map, and Revised Estimate of Remaining Employment potential.
- Task IV, Subtask D. Part 1. Citywide Systems Plan (except for transportation)

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Periodic Review Products Adopted by This Ordinance

This Ordinance adopts the following periodic review products.

- Task IV, Subtask A: New Comprehensive Plan Map.
- Task IV, Subtask B Goals and Policies Comprising a New Economic Element of the Comprehensive Plan.
- Task IV, Subtask C Goals and Policies Comprising a New Housing Element of the Comprehensive Plan.
- Task IV, Subtask D. Part 2 List of water, sewer and drainage projects necessary to support the Comprehensive Plan
- Task IV, Subtask D Part 3 Policy addressing Portland International Airport Expansion.
- Task IV, Subtask D Part 4 Policy addressing Portland Heliport.
- Task IV, Subtask E Part 1, (Partial) Comprehensive Plan Goals and Policies component of the Transportation System Plan and list of transportation projects necessary to support the Comprehensive Plan.

Task IV Periodic Review Products not Adopted by This Ordinance

This Ordinance does not adopt the following Task IV Periodic Review products. The City is requesting a modification of its Periodic Review Work Program to re-designate the following as Task IV products:

- Task IV, Subtask D Part 5: Coordination with school facilities plans.
- Task IV, Subtask E Part 1, (Partial) Conform City Transportation System Plan to the Regional Transportation System Plan.
- Task IV, Subtask E Part 2 Level of Service Standards, including possible alternatives.
- Task IV, Subtask D. Part 3 Modal preferences or mode split targets.

Findings of Fact

Statewide Planning Goals that Apply to Portland

The Statewide Planning Goals that apply to Portland are:

- Goal 1, Citizen Involvement
- Goal 2, Land Use Planning
- Goal 5, Natural Resources, Scenic and Historic Areas, and Open Spaces
- Goal 6, Air, Water and Land Resource Quality
- Goal 7, Areas Subject to Natural Hazards
- Goal 8, Recreational Needs
- Goal 9, Economic Development
- Goal 10, Housing
- Goal 11, Public Facilities and Services
- Goal 12, Transportation
- Goal 13, Energy Conservation
- Goal 14, Urbanization
- Goal 15, Willamette River Greenway

Statewide Planning Goals that no longer Apply to Portland

There are approximately 560 acres of land both within Portland's municipal boundaries and beyond the regional urban growth boundary that can be classified as rural land. In 1991, as part of Ordinance No. 164517, the City Council took an exception to Goal 3 and 4, the agriculture and forestry goals, in the manner described and authorized by state law and Goal 2. As a result of the acknowledged exception, the following goals do not apply:

- Goal 3 Agricultural Lands
- Goal 4 Forest Lands

Statewide Planning Goals that do not apply to Portland

Other Statewide Planning Goals apply only within Oregon's coastal zone. The Statewide Planning Goal Glossary defines "Coast Zone" as, "The area lying between the Washington border on the north to the California border on the south, bounded on the west by the extent of the state's jurisdiction, and in the east by the crest of the coastal mountain range, with the exception of: (a) The Umpqua River basin, where the coastal zone shall extend to Scottsburg; (b) The Rogue River basin, where the coastal zone shall extend to Agness; (c) The Columbia River basin, where the coastal zone shall extend to the downstream end of Puget Island. (Formerly ORS191.110)." Since Portland is not within Oregon's coastal zone, the following goals do not apply to this decision:

- Goal 16 Estuarine Resources
- Goal 17 Coastal Shorelands
- Goal 18 Beaches and Dunes

Goal 19 Ocean Resources

Statewide Planning Goal 1 Findings

Goal 1, Citizen Involvement, requires the City to to develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process.

Goal 1 applies to all legislative land use decisions. Goal 1 requires the City to:

- Designate a citizen involvement committee;
- Adopt and publicize a program for citizen involvement that is appropriate to the scale of Portland's *Comprehensive Plan* update; and
- Implement the citizen involvement program as the plan supporting documents, plan components, and plan implementing measures are developed and proposed for adoption.

Goal 1 allows the City Council three choices: it may appoint itself as the committee for citizen involvement, it may appoint the PSC as the committee, or it may appoint a committee separate from the Council or Commission. The City Council, exercising the third option, appointed a CIC. The appointment of the CIC is Periodic Review Task I, Subtask A, and was approved by DLCD Order 001792 on August 5, 2010.

The City Council, on the recommendation of the CIC and the PSC, adopted Ordinance 184047, which adopted a Community Involvement Program for Portland's periodic review. This program is Periodic Review Task, 1 Subtask B, and was approved by DLCD Order 001798 on January 5, 2011.

Under Task I, Subtask C, of Portland's periodic review work program, the CIC has a continuing obligation to monitor and evaluate how the Community Involvement Program in being carried out. The program also provides the CIC opportunities to report its findings to City Council before a periodic review task is adopted by ordinance and submitted for state approval. The Task II report from the CIC was approved by LCDC Order 001850 on May 23, 2014. On July 28, 2015 the CIC presented a report to the PSC describing community outreach that occurred during development of the proposed comprehensive plan, and the related supporting documents. The PSC accepted that report. The Community Involvement Report for Periodic Review Tasks III and IV was accepted by City Council with Ordinance _____ [the ordinance filed for a hearing at 2:00 PM November 19, 2015].

In addition to the activities described in the CIC report, the City also provided notices of public hearings before the PSC and City Council pursuant to the legislative procedures contained in Chapter 33.740 of the City Code. Chapter 33.740 includes provisions governing public notices, issuance of reports, commission review, and hearings. In July 2014 a Proposed Draft of the Comprehensive Plan, including the CSP and List of Significant Projects was published. Public notices, including Measure 56 property owner notices, were mailed on August 18, 2014. The PSC held public hearings on September 23, October 14, October 28, and November 4, 2014. An additional hearing on transportation policy and projects occurred on February 24, 2015. On July 14, 2015 the PSC voted to accept the staff-proposed plan with a variety of amendments. City Council held a hearing to consider the recommended Comprehensive Plan on November 19,

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2015. Public notice of that hearing had been mailed on October 13, 2015. On that same day the City also mailed 28,000 Measure 56 Notices to potentially affected property owners.

Because the City appointed a CIC, adopted and implemented a program for citizen involvement, supported the CIC to completion of the program, and provided sufficient public notices, the City has complied with procedural requirements of Goal 1.

Goal 1 also requires a local advisory committee to assist with the development of an ongoing program that promotes and enhances involvement in land-use planning, assist in the implementation of the involvement program, and assist in evaluating the process being used for involvement. Local programs should enhance involvement at all phases of a project, including at the data collection stage, project scoping, the plan adoption process, and during adoption of implementation measures. Programs should ensure people can communicate and give input to decision makers and provide a mechanism for people to find out what happened to their comments. Finally, programs should make technical information available in an understandable form

The recommended new Community Involvement program and policies are consistent with Goal 1, for the following reasons:

Policy directs the creation of an ongoing CIC.

Policy 2.19 Community Involvement Committee. The Community Involvement Committee (CIC), an independent advisory body, will evaluate and provide feedback to City staff on community involvement processes for individual planning and investment projects, before, during, and at the conclusion of these processes.

Policy enhances involvement in all phases of planning, including at the data collection stage, project scoping, the plan adoption process, and during adoption of implementation measures.

Policy 2.9 Community analysis. Collect and evaluate data, including community-validated population data and information, to understand the needs, priorities, and trends and historical context affecting different communities in Portland. Policy 2.10 Community participation in data collection. Provide meaningful opportunities for individuals and communities to be involved in inventories, mapping, data analysis, and the development of alternatives.

Policy 2.14 Community influence. At each stage of the process, identify which elements of a planning and investment process can be influenced or changed through community involvement. Clarify the extent to which those elements can be influenced or changed.

Policy 2.16 Community Involvement Program. Maintain a Community Involvement Program that supports community involvement as an integral and meaningful part of the planning and investment decision-making process.

Policy 2.24 Early involvement. Improve opportunities for interested and affected

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community members to participate early in planning and investment processes, including identifying and prioritizing issues, needs, and opportunities; participating in process design; and recommending and prioritizing projects and/or other types of implementation.

Policy 2.25 Verifying data. Use data, including community-validated population data, to guide planning and investment processes and priority setting and to shape community involvement and decision-making efforts.

Policy 2.36 Process evaluation. Evaluate each community involvement process for planning or investment projects from both the City staff and participants' perspectives, and consider feedback and lessons learned to enhance future involvement efforts.

Policies ensure people can communicate and give input to decision makers.

Policy 2.8 Channels of communication. Maintain channels of communication among City Council, the Planning and Sustainability Commission (PSC), project advisory committees, City staff, and community members.

Policy 2.20 Review bodies. Maintain review bodies, such as the Planning and Sustainability Commission (PSC), Design Commission, Historic Landmarks Commission, and Adjustment Committee, to provide an opportunity for community involvement and provide leadership and expertise for specialized topic areas.

Policies provide a mechanism for people to find out what happened to their comments.

Policy 2.15 Documentation and feedback. Provide clear documentation for the rationale supporting decisions in planning and investment processes. Communicate to participants about the issues raised in the community involvement process, how public input affected outcomes, and the rationale used to make decisions.

Policies require that technical information will be available in an understandable form.

Policy 2.11 Open Data. Ensure planning and investment decisions are a collaboration among stakeholders, including those listed in Policy 2.1. The City works with the software development community, data providers, and other professionals with relevant expertise to advise on open data practices and priorities, ensure oversight, and to maximize the utility of City data sets.

Policy 2.29 Culturally-appropriate processes. Consult with communities to design culturally-appropriate processes to meet the needs of those affected by a planning or investment project. Evaluate, use, and document creative and culturally-appropriate methods, tools, technologies, and spaces to inform and engage people from under-served and under-represented groups about planning or investment projects.

Policy 2.39 Tools for effective participation. Provide clear and easy access to information about administrative, quasi-judicial, and legislative land use decisions in multiple formats

and through technological advancements and other ways.

Statewide Planning Goal 2 Findings

Goal 2 has three parts: planning, exceptions and guidelines. Since the City is not taking a Part II exception to any Statewide Planning Goal, and since the Oregon Legislature has nullified the Part III requirement to demonstrate how the planning guidelines were used to achieve the goals [see: ORS 197.015(9), *Churchill v. Tillamook County*, 29 Or LUBA 68 (1995) and *People for Responsible Prosperity v. City of Warrenton*, 52 Or LUBA 181 (2006)], only Part I of Goal 2 applies to this ordinance.

Part I of Goal 2 requires Portland's Comprehensive Plan be coordinated with the plans of other governments. The plan has been developed with the assistance of two committees composed of government partners. The first is a Periodic Review Assistance Team composed of representative of Metro, TriMet and the following Oregon agencies: Business Development Department, Department of Agriculture, Department of Aviation, Department of Environmental Quality, Department of Fish and Wildlife, Department of Forestry, Department of Geology and Mineral Industries, Department of Human Services, Department of Land Conservation and Development, Department of Parks and Recreation, Department of State Lands, Department of Transportation, Department of Water Resources, Housing and Community Services Department, and the State Historic Preservation Office.

The second committee focusing more closely of transportation modeling, issue identification, and proposed solutions is composed of representatives from Metro, TriMet and the Oregon Department of Transportation.

The City of Portland planning staff have engaged in one-on-one discussions with their counterparts in adjoining cities about the location of Portland's Urban Services Boundary on the Recommended Comprehensive Plan Map and it's alignment with the service boundaries of the adjoining cities. The list of consulted cities includes Beaverton, Gresham, Happy Valley, Lake Oswego, Milwaukie, and Tigard. The Portland City Attorney with assistance from Beaverton's and Metro's attorneys prepared a Model Interagency Agreement to recognize any future adjustments that might be needed to adjoining service boundaries.

In addition to the above the City provided timely notices adoption of the City's Comprehensive Plan Map, Comprehensive Plan, and List of Significant Projects to Clackamas, Multnomah and Washington Counties, the Cities of Beaverton, Gresham, Happy Valley, Lake Oswego, Maywood Park, Milwaukie, and Tigard, Metro, TriMet, the Port of Portland, and the Special Districts Association of Oregon.

[Reserve for response to comments provided at City Council hearing.]

For the reasons stated above the City's Comprehensive Plan Map, Comprehensive Plan, and List of Significant Projects are sufficiently coordinated, within the Meaning of Goal 2, with the plans and programs of other governments.

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Part I of Goal 2 also requires Portland's Comprehensive Plan "... include identification of issues and problems, inventories and other factual information for each applicable statewide planning goal, evaluation of alternative courses of action and ultimate policy choices, taking into consideration social, economic, energy and environmental needs." A sufficient factual base has been established and sufficient alternative courses of action have been considered in the adopted Comprehensive Plan support documents listed in the Task II and Task III parts of the "Expanded Summary of Periodic Review Progress to Date" above.

All applicable requirements of Goal 2 have been met.

Statewide Planning Goal 3 Findings

In 1991, as part of Ordinance No. 164517, the City Council took an exception to the agriculture and forestry goals in the manner described and authorized by state law and Goal 2. Since this ordinance does not change any of facts or analyses upon which the assumption is based, the exception is still valid and Goal 3 does not apply.

Statewide Planning Goal 4 Findings

In 1991, as part of Ordinance No. 164517, the City Council took an exception to the agriculture and forestry goals in the manner described and authorized by state law and Goal 2. Since this ordinance does not change any of facts or analyses upon which the assumption is based, the exception is still valid and Goal 4 does not apply.

Statewide Planning Goal 5 Findings

This ordinance does not advance the City's Goal 5 program. The City adopted a New Natural Resources Inventory (NRI) by Substitute Ordinance No. 185657, which was approved by LCDC Order No. 001850. This inventory identified the location, quantity and quality of various natural resources, and determined their significance in compliance with the initial steps of the Goal 5 process. The next steps in the Goal 5 process are to identify conflicting uses, examine the consequences of limiting conflicting uses versus conserving natural resources, make decisions to allow, limit or prohibit conflicting uses, and adopt a program to carry out any such decision. While there is an alternative analysis contained in the Growth Scenarios Report (Exhibit E), this is a Goal 2 analysis, not a Goal 5 analysis. This ordinance does not amend or repeal any existing Goal 5 program or any environmental overlay zone. Goal 5 does not apply to this ordinance because no new Goal 5 program is advanced by this ordinance and no existing Goal 5 program is changed by this ordinance.

It should be noted, however, Chapter 7 of the Comprehensive Plan contains Policies 7.19 through 7.22 that concern "Planning for Natural Resources" and 7.23 to 7.26 "Protecting Natural Resources." Since the policies will be applied in addition to, rather than instead of, similar requirements of Goal 5, and since none of these policies describe choices or decisions prohibited by Goal 5, there will be no conflicts between adopted City Comprehensive Plan policy and future application of Goal 5.

Statewide Planning Goal 6 Findings

Goal 6 prohibits regulated discharges existing development from violating state or federal environmental quality standards. The goal also prohibits projected cumulative discharges from existing and expected development from “threatening” to violate environmental quality standards.

The Citywide Systems Plan (Exhibit G) “Regulatory Compliance” section describes city facility projects and operations that are regulated by state or federal permit. In summary all facilities comply with regulations or are on a permitted path to comply.

Appendix A of the Citywide Systems Plan (Exhibit G) contain the investments strategies adopted to meet present and future service demands. The following summary of Portland’s water investment strategy is provided is an example.

Water System Program	FY 2013-2018	FY 2018-2033
Supply	\$14,291,000	\$88,500,000
Transmission and Terminal Storage	\$191,170,000	\$242,000,000
Distribution	\$244,197,288	\$461,650,000
Treatment	\$2,500,000	\$150,000,000
Regulatory Compliance	\$25,504,000	\$30,000,000
Customer Service	\$3,057,000	\$53,700,000
Support	\$10,000,000	\$50,500,000
TOTAL	\$490,719,288	\$1,076,350,000

This level of system investment is designed to achieve 100% compliance with state and federal water quality regulations.

For the reasons stated above, and for other facts and reasons included and stated within the CSP, this ordinance meets all applicable requirements of Goal 6.

In addition, Policies 7.5 and 7.7 call for continued improvement in air and water quality. This ordinance meets all applicable requirements of Goal 6.

Statewide Planning Goal 7 Findings

Goal 7 requires the City to maintain a current inventory of natural hazards, to avoid development in areas where hazards cannot be mitigated, and to prohibit essential facilities, hazardous facilities, and major structures in areas where hazards cannot be mitigated.

The LCDC approved on May 23, 2014 by Order No. 001850, as part of City’s Task II Periodic Review submittal, a complete and current inventory of natural hazards. The Goal 7 hazard inventory requirement has been satisfied. This ordinance takes the next step by adopting a CSP (Exhibit G) that identifies essential facilities.

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Ordinance No. _____ adopted an Exhibit G, which is a new CSP. This identifies natural hazards, assesses the related threat and vulnerability to the city's facilities, and recommends mitigation strategies to address high risk assets. The CSP also identifies the following types of infrastructure as important to hazard preparedness, response, and recovery:

- **Essential facilities** are necessary for continuation of operations and include police and fire stations, City Hall, the 1900 Building, the City's Emergency Coordination Center, the 911 Call Center, and the Justice Center.
- **Critical facilities** and infrastructure include "systems and assets necessary to ensure continuity of security, safety, health and sanitation services, support the area's economy and/or maintain public confidence. Incapacitation or destruction of any of these systems or assets would have a debilitating impact on the area either directly, through interdependencies and/or through cascading effects." Critical infrastructure includes public services that have a direct impact on quality of life such as communication technology (phone lines or Internet access); vital services such as public water supply, sewage treatment; and transportation facilities, such as airports, heliports, highways, bridges, tunnels, roadbeds, overpasses, railways, bridges, rail yards, depots and waterways, harbors, and dry docks.
- **Lifelines** include utility systems (potable water, wastewater, oil, natural gas, electric power facilities, and communication systems) and transportation systems (airways, bridges, roads, tunnels, and waterways). Communications facilities are also important lifelines.
- **High Potential Loss Facilities** include facilities that would have a high loss (environmental, economic, or human life and safety) associated with their failure, such as nuclear power plants, levees, dams, and military installations. In Portland, City-owned high potential loss facilities include Portland Water Bureau reservoirs, such as those at Mount Tabor and Washington Park.

The CSP identifies investments that would improve the resiliency of the City's infrastructure to natural and other hazards. These include projects to reduce risks to essential and critical infrastructure; improve and restore the city's green infrastructure; enhance the seismic resilience of facilities; and provide redundant infrastructure for assets like water and sewage pump stations.

This Ordinance goes a step further in meeting Goal 7 by adopting Comprehensive Plan contains Policies 4.73 to 4.78 that address hazard resistant urban design and development, as well as planning for post-disaster recovery. This ordinance also adopts Comprehensive Plan Policy 7.1 that calls for the prevention of "development-related degradation of natural systems and associated increases in landslide, wildfire, flooding, and earthquake risks." The prohibitions called for by Goal 7 can only be achieved through land use regulations. Consideration of land use regulations is reserved to Task V of the City's Periodic Review work program.

This ordinance meets all requirements of Goal 7 applicable to Task IV of the City's Periodic Review work program.

Statewide Planning Goal 8 Findings

Goal 8 has two parts. The first part requires the City to plan for recreational facilities in such quantity, quality and locations as is consistent with the availability of the resources to meet such requirements. These requirements have been met for the reasons stated in the Goal 8 findings for Ordinance No. _____.

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In addition the Comprehensive Plan contains the following policies that address future park needs:

Policy 3.35 Public places. Provide parks or public squares within or near Town Centers to support their roles as places of focused business and social activity.

Policy 3.39 Public places. Provide small parks or plazas within or near Neighborhood Centers to support their roles as places of local activity and gathering.

Policy 8.89 Acquisition, development, and maintenance. Provide and maintain an adequate supply and variety of parkland and recreational facilities to serve the city's current and future population based on identified level-of-service standards and community needs.

Policy 8.90 Service equity. Invest in acquisition and development of parks and recreation facilities in areas where service-level deficiencies exist.

Policy 8.91 Capital programming. Maintain a long-range park capital improvement program that balances acquisition, development, and operations; provides a process and criteria for capital improvement project selection; and emphasizes creative and flexible financing strategies.

Policy 8.92 Park planning. Improve parks, recreational facilities, natural areas, and the urban forest in accordance with current master plans, management plans, or adopted strategies that reflect user group needs, development priorities, development and maintenance costs, program opportunities, financing strategies, and community input.

Policy 8.93 Recreational trails. Establish, improve, and maintain a complete and connected system of public recreational trails, consistent with Portland Parks & Recreation's trail strategy.

Policy 8.96 Recreational facilities. Provide a variety of recreational facilities and services that contribute to the health and well-being of Portlanders of all ages and abilities.

Policy 8.97 Special recreational facilities. Establish and manage specialized recreational facilities within the park system to respond to unique, identified public needs and to take advantage of land assets. Manage specialized recreational facilities to meet cost-recovery goals, including financially self-sufficient enterprise facilities (such as for golf and motorsports).

Policy 8.98 Public-private partnerships. Encourage public-private partnerships to develop and operate publicly-accessible recreational facilities that meet identified public needs.

For the reasons stated above this Ordinance meets all applicable requirements of Goal 8.

Statewide Planning Goal 9 Findings

Goal 9 requires cities to consider economic activities vital to the health, welfare, and prosperity of Oregon's citizens. Comprehensive plans for urban areas are required to include, among other things: an analysis of economic patterns, potentialities, strengths, and deficiencies; policies concerning economic development; and land use maps that provide for at least an adequate supply of sites for a variety of industrial and commercial uses.

As required by Task III of the City's periodic review work program, a revised Economic Opportunities Analysis (EOA) was adopted by Council with Ordinance _____ [the ordinance filed for a hearing at 2:00 PM on November 19, 2015]. Statewide Planning Goal 9 also requires the City to adopt an economic development strategy that identifies and preserves adequate amounts of long term and short term supplies of industrial land and preserves prime industrial land. Chapter 6 of the Comprehensive Plan (Exhibit B) comprises the required strategy, and the required particulars are noted where relevant below.

City identification of employment needs is conducted within the context of Metro's authority under ORS 195.025 and 195.036 to forecast and distribute employment needs to metropolitan area local governments. On November 29, 2012 the Metro Council adopted Ordinance No. 1292A that allocated jobs to Portland's for the forecast period 2010 to 2035. With Ordinance _____ [the ordinance filed for a hearing at 2:00 PM on November 19, 2015], the City defined its job need as 142,000.

In its EOA the City established ten "Employment Geographies" to fulfil the Goal 9 requirement to identify "site types." They are:

- Central City Commercial
- Central City Industrial
- Columbia East
- Harbor and Airport Districts
- Dispersed Employment
- Harbor Access Lands
- Institutional
- Gateway Regional Center
- Town Centers
- Neighborhood Centers and Corridors

Each geography has a different mix of employment sector and building types, as described beginning on page 9 of Volume 2/3 of the EOA. Some types of jobs are closely associated with a particular geography, while other jobs can be accommodated within several geographies. A map of these Employment Geographies is Figure 8 on page 12 of the EOA Volume 2/3. The regional forecast growth rates of employment sectors were applied to the existing mix of sectors in each local employment geography to estimate job growth by geography. Forecast job growth by geography was then translated to building area and developable land needs through the following steps. The mix of job types within each employment geography was used to calculate a related mix of six building types. An average square-foot-per-employee figure was estimated for each of the six building types in order to calculate forecast building area in each of the ten

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employment geographies. The average intensity of development in floor area ratios were then applied to forecast building areas to calculate land needs in acres. Lands needs for marine terminals, rail yards, and airports were estimated separately from transportation throughput forecasts rather than employment forecasts. The Employment BLI provides an available supply suitable for each employment geography, also expressed in acres.

The City has an expected Year 2035 aggregated (all geographies) employment land need of 2,910 acres. With the current Comprehensive Plan, there is a land supply of 3,240 acres. With the recommended Comprehensive Plan, there is an expected land supply of 4,195 acres. The following table, taken from Figure 27 of Volume 2/3 (page 36) and Figure 2 of Volume 4 (page 5) of the EOA, summarizes need and supply by geography and aggregate geography. As noted in the table, there is a land supply shortfall with the current Comp Plan in several geographies.

Employment Geography	2035 Land Need in Acres	Existing Comprehensive Plan		Recommended Comprehensive Plan	
		2035 Land Supply in Acres	Surplus or Deficit in Acres	2035 Land Supply in Acres	Surplus or Deficit in Acres
Central City Commercial	60	201	141	201	141
Central City Industrial	90	65	-25	188	98
Harbor & Airport Districts	1,013	774	-239	1,065	52
Harbor Access Lands	207	113	-94	169	-38
Columbia East	350	356	6	416	66
Dispersed Employment	130	121	-9	141	11
Gateway Regional Center	50	137	87	164	114
Town Centers	130	304	174	381	251
Neighborhood Centers and Corridors	510	863	353	947	437
Institutions	370	306	-64	522	152
Total	2,910	3,240		4,195	
Aggregate Geography					
Central City	150	266	116	390	240
Industrial	1,700	1365	-335	1,792	92
Neighborhood Commercial	690	1303	613	1,492	802
Institutions	370	306	-64	522	152
Total	2,910	3,240		4,195	

As noted in the above table, the EOA found that existing Comprehensive Plan has a deficit of land supply relative to forecast need, in five of the employment geographies: Central City Industrial, Harbor & Airport Districts, Harbor Access Lands, Dispersed Employment, and

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Institutions. The recommended Comprehensive Plan resolves all but one of these deficits. The strategies used will be described later in this finding.

Volume 4 of the EOA describes the strategies that will be used to resolve the identified land deficits:

- **Central City Industrial Geography:** Land use changes and a recommended expansion of the Employment Opportunity Subdistrict (EOS) will enable increased employment density, as described in Section 4 of the EOA, starting on page 11.
- **Dispersed Employment Geography:** Land use changes are recommended to increase the constrained effective capacity of this geography by 9 acres. This is described in Section 4 of the EOA, on page 24.
- **Harbor & Airport Districts:** Land use and policy changes and investments are recommended to increase the constrained effective capacity of this geography by 123 acres. This includes changes to enable conversion of several golf courses to employment land in the future, if the property owners choose. The City Council is persuaded by an examination of national market trends that Portland has an oversupply of golf courses given current and projected demand. Demographic trends indicate a future Portland population ever less inclined to select golf as a recreational activity. This is described in Section 4 of the EOA, starting on page 22. Policy 6.51, Golf course reuse and development, reflects this strategy.
- **Institutions:** Land use and policy changes are recommended to create a new zoning district for 15 of the largest colleges and hospitals in Portland. The result of this new approach increases the constrained effective capacity of this geography by 216 acres. This strategy is described in Section 4 of the EOA, starting on page 35. Policies 6.55 through 6.60 reflect this strategy.

In addition, several other strategies are recommended that would create more unconstrained capacity in the Harbor and Airport, Harbor Access, Columbia East and Dispersed Employment Geographies. The estimated impact of these strategies are summarized in Volume 4 of the EOA, in Figure 4, page 16.

- **Brownfield cleanup rates:** The plan recommends taking action to increase the percent of brownfields that are cleaned up by 2035, from 40% to 60%. This adds an estimated 124 acres to the land supply, across several geographies. The City Council is persuaded that this target is realistic, based on the estimated effects of employing recommended “best practice” incentives and tools described and analyzed in the *Portland Brownfield Redevelopment Assessment, Final Report*, December 18, 2012, and the three appendices to this report: A – *Inventory and Existing Conditions Analysis*, B- *Financial Analysis Report*, and C – *Public Benefit Report*, which are made part of this finding by this reference. Policy 6.14, Brownfield redevelopment, reflects this strategy.
- **Intensification:** The plan recommends freight transportation investment and regulatory policy to facilitate more intensive use of employment land on existing developed sites (job growth on existing developed sites). This strategy is described in Section 4 of the EOA, starting on

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page 20. Policy 3.6, Land efficiency, and Policies 9.30 through 9.35 reflect this strategy.

- Land Retention: The EOA also assumes a limited amount of employment land will be converted to other uses, as described in Volume 4 of the EOA, in Figure 4, page 16. This includes anticipation of additional protection of environmentally sensitive lands identified in the City's acknowledged Natural resources Inventory, for example. To ensure loss of industrial employment land is minimal, additional policy is recommended to strengthen the City's Industrial Sanctuary policies. This strategy is described in Section 4 of the EOA, starting on page 20. Specific policies within the recommended plan include Policy 6.13, Land supply, Policy 6.39, Prime industrial land retention, and Policy 6.40, Harbor access lands.

The above-described strategies resolve all of the land supply deficits identified, except in the Harbor Access Lands. The City has documented that many of the jobs within the Harbor Access Lands geography are not dependent on access to Portland Harbor. Portland has industries in the harbor that are not "water dependent" within the meaning of Goal 15 because they were established before state planning law required water-dependency as a requirement for harbor front location. Similarly many administrative and support jobs for water-dependent industries do not require a harbor front location. The City Council is persuaded significant numbers of non-water dependent industries and jobs can, by the Year 2035, migrate into other abutting employment geographies with land supply surpluses. It is also a reasonable assumption that the rate of migration will be sufficient to erase the 38 acre deficit. This can occur because many of the existing non-water dependent jobs located in the Harbor Access lands have site needs that can be met in the other more general employment geographies.

In summary, the Year 2035 Harbor Lands deficit will range from zero to 38 acres and the aggregate industrial lands surplus will range from 54 to 92 acres. Even if none of the expected shift occurs, 38 acres is only two percent of Year 2035 land need identified for all industrial land. In addition a 38 acre shortfall is not an observable fact, only a reasonable prediction drawn from highly technical calculations. The City's supply assumptions meet Goal 9 because for nine of the ten employment geographies, and all of the aggregate geographies have reasonably forecasted land surpluses. In one employment geography the forecasted deficit is minor and technical in nature, and thus approvable under Goal 9 under the standard of review described by ORS 197.633(3)(c) and ORS 197.747.

To the degree that any of the above-cited strategies have uncertainty the recommended plan includes a policy to update the Economic Opportunities Analysis and short-term land supply strategies every 5 to 7 years (Policy 6.19 Evaluate land needs).

For the reasons stated above, the reasons stated in the City's EOA and the reasons stated in the above referenced studies, the City has satisfactorily identified employment land needs and has adopted a strategy to meet the identified needs.

Statewide Planning Goal 10 Findings

Background

This goal specifies that each city must plan for and accommodate needed housing types, such as multifamily and manufactured housing. It requires each city to inventory its buildable residential lands, project future needs for such lands, and plan and zone enough buildable land to meet those needs. It also prohibits local plans from discriminating against needed housing types.

Goal 10 contains the following five specific requirements:

- Identify future housing needs by amount, type, tenure and affordability.
- Maintain a Residential Buildable Lands Inventory (BLI) with sufficient land to meet identified needs
- Meet minimum density and housing mix requirements.
- Adopt plan policies to accommodate needed housing
- Adopt clear and objective standards for needed housing.

The City satisfactorily completed three requirements of Goal 10 with its Task II Periodic Review submittal adopted by Ordinance No. 185657 and as updated and revised by Ordinance No. _____. The first three parts of Goal 10 have been met for the reasons stated in the Goal 9 findings for Ordinance No. _____ [the ordinance filed for the hearing at 2:00 PM on November 19].

This ordinance addresses the third and fourth of these requirements by adopting a land use map and housing policies. The final requirement will apply to any implementing actions adopted in the future. The first three requirements were addressed in Ordinance _____ [the ordinance filed for the hearing at 2:00 PM on November 19].

Amount of Needed Housing

With Ordinance _____ [the ordinance filed for the hearing at 2:00 PM on November 19] the City described its 2010-2035 housing need as 123,000 units. Ordinance No. 185657 adopted a housing needs analysis, which provided more specific estimate of the types of households (by size and income) likely to be in Portland by 2035 (Exhibits B.2 – B.5 of Ordinance No. 185657). These reports provide additional facts supporting housing need by type, tenure and affordability.

Housing Capacity

With Ordinance No. 185657 the City adopted an inventory of vacant and underutilized land (Exhibit A.6 – A.9 of Ordinance No. 185657), and found that the City's existing Comprehensive Plan could accommodate well over 132,000 new housing units by the Year 2035. LCDC acknowledged that inventory methodology and capacity finding in Order 001850. The acknowledged methodology was described in a report entitled *Buildable Lands Inventory – Summary of Future Development Capacity*, dated October 2012. Appendix A of that report, entitled *City of Portland Development Capacity Analysis development capacity analysis GIS model* contained more detailed description of the technical methods used.

The 2012 inventory calculated housing capacity by considering the degree of constraint present on each vacant or underutilized parcel. Five levels of constraint were considered: none, mild,

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medium, severe, and complete. The calculations assumed full residential capacity for land with no constraints, discounted capacity for land with mild and medium constraints, and assumed there was no residential capacity on land with severe and complete constraints. Appendix C, entitled *Buildable Lands Inventory: Constraint Maps and Model Assumptions*, contained maps of each of the land constraints factored into the land inventory and capacity estimates.

With Ordinance _____ [the ordinance filed for the hearing at 2:00 PM on November 19] Council adopted a revised BLI, accurate up to July 2015. Using this revised inventory of land, and the same GIS methods acknowledged with Order 001850 and summarized above, the City estimates that the existing Comprehensive Plan map has capacity for [reserved for latest calculations] additional units, as of mid-2015. Again using the same revised inventory of land, and the same methods acknowledged with Order 001850, the recommended Comprehensive Plan map has an estimated capacity of 254,000 additional units, still well beyond the estimated need.

The narrowest possible interpretation of the LCDC Metro Housing Rule, which involves giving little meaning to the word “generally” in OAR 660-007-0005 (3), would require residential capacity calculations to exclude land with any degree of constraint, rather than simply discounting capacity by the degree of constraint. The acknowledged capacity calculation method includes an assumption that land with mild and medium constraints is “suitable and available” for residential use at a diminished capacity, and land with severe and complete constraints has no capacity. The narrowest possible interpretation assumes that land with even a mild constraint has no residential capacity.

In an abundance of caution the City has also re-calculated the residential capacity of the recommended Comprehensive Plan Map, with zero capacity assigned to the following categories of constrained land:

- Publically-Owned Land, except for land owned by the Portland Development Commission and Housing Authority of Portland/Home Forward.
- All Comprehensive Plan Map Designations for, Open Space, Institutional Campus, Employment, and Industrial
- Privately-Owned Common Space
- Submerged and Submersible Land
- Floodways and Floodplains
- The Willamette River Greenway (sum of the greenway overlay zones)
- Slopes over 25%
- All regulated natural resource areas
- All identified Significant Natural Resources
- Rural Land
- All land within the “f” Future Urban overlay zone (rural land and other land that cannot be provided urban level services).
- National Historic Districts (all properties, not just contributing resources)
- Local Conservation Districts (all properties, not just contributing resources)
- Historical and Cultural Resources
- Significant Scenic Resources
- Flood, Slope, and Slide Hazards
- Wildfire Hazard

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- Brownfields
- Soil Infiltration Limited Areas

A map of the residential land that is not within any of the above-listed areas was included with the BLI adopted with Ordinance _____ [the ordinance filed for the hearing at 2:00 PM on November 19]. The residential housing capacity of this completely unconstrained area, with the recommended Comprehensive Plan Map, is approximately 199,000 units. This is less than the capacity estimated by the discounting method already acknowledged by LCDC, but still much more than the estimated need of 123,000 housing units. This map includes a City supply of residential land sufficient to meet the housing needs within the meaning of ORS 197.307(3), Goal 10 and OAR Chapter 660, Division 7.

Because supply greatly exceeds need, even when calculated by the narrower lower yielding method, City and LCDC findings of fact and conclusions of law for the previously acknowledged periodic review subtasks are still valid (Task II, Subtasks A-E).

Housing Type, Tenure and Affordability

In addition to total housing needs, state planning law requires Portland to identify housing by type, tenure and affordability. Goal 10 and the LCDC’s Metropolitan Housing Rule, OAR 660-007-0030(1), also require that at least 50% of the City’s remaining residential capacity be available for multi-family units.

To provide framework for this analysis the City calculated the potential supply of twelve different housing types, and compared that with the needs of the eight household types identified in the acknowledged housing needs analysis (Exhibits B.2 – B.5 of Ordinance No. 185657). The following table describes the eight household types used in this analysis (taken from Table 14 on page 49 of the *Growth Scenario Report*; based on data from Exhibit B.5 of Ordinance No. 185657).

Household Income	Group Number	Expected New Households by 2035
Less than \$15,000	1	24,540
\$15,000 to \$24,999	2	23,400
\$25,000 to \$34,999	3	22,095
\$35,000 to \$44,999	4	15,896
\$45,000 to \$59,999	5	8,391
\$60,000 to \$74,999	6	6,030
\$75,000 to \$99,999	7	12,227
More than \$100,000	8	9,697
Total New Households	All	122,276

The comparison of households and housing types is provided in the *Growth Scenarios Report* (Exhibit E, pages 46 – 53). At its simplest level, the analysis provides an understanding of the share of Portland’s capacity that is available for multi-dwelling development. The table below provides a summary of these conclusions. The table includes results from the 2012 BLI (based on the existing Comprehensive Plan), and the updated 2015 inventory. The 2015 inventory provided data for both the existing and recommended Comprehensive Plan. The final column

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shows the capacity if the narrower methodology described above, which assumes that land with even a mild constraint has no residential capacity.

Housing Capacity	Existing Comp. Plan (2012 BLI adopted w. Ord. No. 185657)	Existing Comp Plan (2015 BLI)	Recommended Comp Plan (2015 BLI)	Recommended Comp Plan (2015 BLI excluding all constrained land)
Single-dwelling	35,000 (15%)	29,000	29,000 (11%)	18,000 (9%)
Multi-dwelling	198,000 (85%)	181,000	225,000 (89%)	181,000 (91%)
Total	233,000	210,000	253,000	199,000

The table above shows that Portland’s existing Comprehensive Plan easily complies with Metropolitan Housing Rule, OAR 660-007-0030(1) because far more than 50% of the City’s remaining housing capacity is available for multi-dwelling development. The recommended Comprehensive Plan similarly meets the requirement, based on both the 2012 and 2015 inventory. This goal requirement is met.

Because Portland has far more capacity for residential development than the forecast growth (253,000 units for 123,000 households), the City developed a computer model to estimate where the needed 123,000 units would most likely be built, and what form they might take. This was done in order to better understand if expected housing production would meet identified needs (type, tenure, affordability), and also to evaluate the city’s performance on other metrics (transportation modelling, environmental impacts, etc).

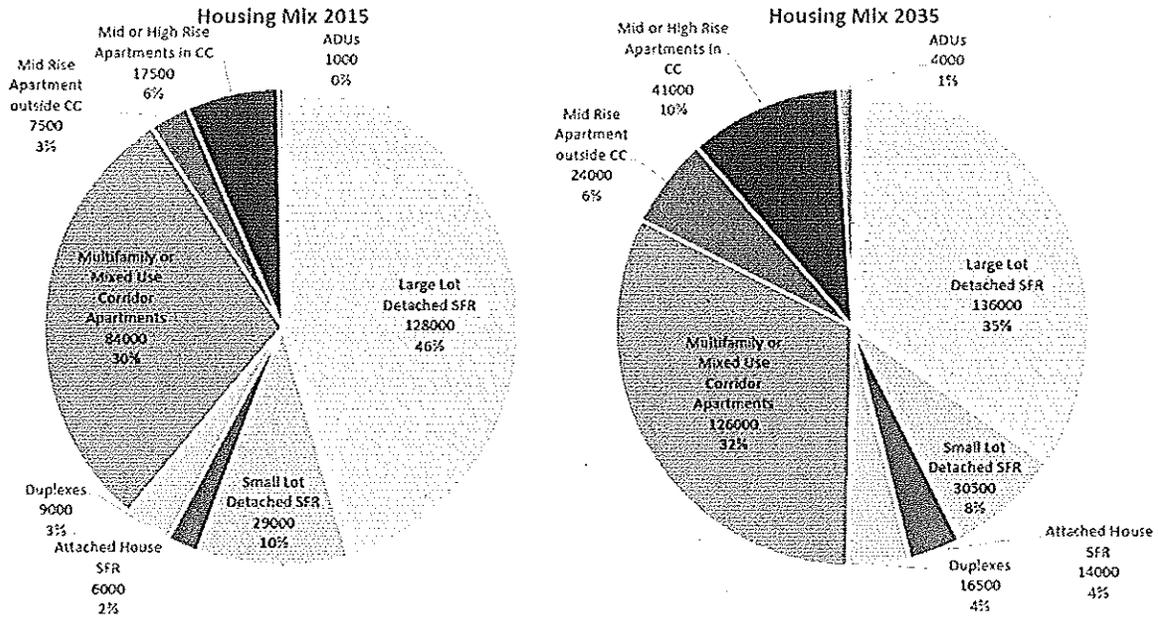
This “Housing Allocation” analysis was based on the inventory of vacant and underutilized land described above. This model creates a simulated housing allocation based on the type and density of housing allowed in each land use designation, past building permit trends, and several economic factors. The model identifies four types of single-dwelling units, seven types of multi-dwelling units, and accessory dwelling units. These types are listed in the table below and also described in the *Growth Scenario Report* (taken from Table 12 on page 47). Comprehensive Plan reports use the term “Allocation” to reference this model output, distinct from the term “Capacity.” The “Allocation” refers to the number of units that may be built in a particular area by 2035, while the “Capacity” refers to the full build out of vacant and underutilized land within the area.

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Housing Types	Type Code	New Housing Unit Allocation (2010-2035)	
		Existing Plan	Rec. Plan
Single Dwelling	SFR	25,000	26,000
Detached Single Family House	A	14,000	14,000
Small-Lot Detached Single Family House	B	3,000	3,000
Medium Density Building with Attached Single Family Units	C	5,000	5,000
High Density Building with Attached Single Family Units	D	3,000	4,000
Multi Dwelling	MFR	95,000	94,000
Duplex to Six-Unit Building	E	8,000	7,000
Four Story Corridor Apartment Building all Residential	F	16,000	14,000
Single Room Occupancy and Studio Apartment Building	G	9,000	13,000
Neighborhood Four Story, Mixed Use Building with Retail on Ground Floor	H	21,000	16,000
Mid-Rise, Small Unit, Apartment Building	I	19,000	18,000
Mid-Rise, Large Unit, Apartment Building	J	3,000	4,000
High-Rise Apartment Building	K	19,000	22,000
Accessory Dwelling Unit	ADU	3,000	3,000

The charts below illustrate how the housing mix is expected to change over the next 20 years, given the growth allocation described above. In 2015 about 40% of Portland housing units are multi-dwelling units. By 2035 that share is expected to increase, to about 53%. About 80% of new construction over the next 20 years is expected to be multi-dwelling units. This represents a continuation of established trends over the past 10 years. During the period between 2005 and 2014, only about 23% of new units in Portland were single dwelling units. As a result of these trends, and Portland's land use plan, the 2035 housing mix is expected to be more diverse than it is today.

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Housing Types A through K, and ADUs, are allowed without restriction on type of tenure and without regard to government ownership, assistance or subsidy. Manufactured homes are recognized as components of Housing Types A and B (Detached Single Family House, and Small-Lot Detached Single Family House). Manufactured homes are allowed in all residential zones. Other housing types, such as floating homes, are also allowed in the City, but since these types have not been identified as “needed,” the City has no obligation under state land use law to maintain or increase a supply of sites for these types. In 1991, as part of Ordinance No. 164517, the City Council took an exception to the agriculture and forestry goals in the manner described and authorized by state law and Goal 2. As a result of the acknowledged exception, Portland does not have an obligation to identify farmworker housing as a particular category of need. Nevertheless, housing for farmworkers and their families is allowed in all single family and multi-family units.

The City evaluated affordability by identifying typical minimum costs for each defined housing type, and by comparing that minimum housing cost to the income levels that define a cost-burdened household. That evaluation is summarized in the Growth Scenarios Report (Table 16, page 52). Using this method, the City Concludes that all housing types (A-K and ADUs) are currently affordable for Household Group 8, while only Housing Type G (single room occupancies and small studio apartments) is potentially affordable for Household Group 1. While the City has an ample supply of land available and suitable for the amounts needed for all housing types, including Type G, the cost of land, materials and labor means that the market alone cannot provide the housing needed by very low income households.

State planning law requires that housing needs be analyzed and identified by affordability, and requires that land be made available in sufficient supply to accommodate the amount of affordable housing needed. Allowing for a robust supply of inherently more affordable housing types (small studio apartments, ADUs, small-lot single family, etc.) does not mean that these housing units will actually be affordable in practice. In a market economy, housing is allocated

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to the highest bidder. If supply is limited, the price of even the more affordable housing types can be bid up. In addition, new housing is typically more expensive than older housing. Not all new households will occupy new housing units. Higher income households will often occupy new housing units, leaving older units to lower income households. If housing supply is tight, the price of older housing units can also be bid up. In light of these market dynamics, the primary impact of a Comprehensive Plan on affordability will be the extent to which it allows for an adequate overall supply, and allows for a diverse mix of housing. The facts described above show that Portland's Recommended Comprehensive Plan does this.

Oregon state laws prohibit rent control, inclusionary zoning and real estate transfer fees. These are tools that cities in other states have used, with varying degrees of effectiveness, to create and maintain more permanent/protected (regulated) supplies of affordable housing. Affordability tools available to Portland are generally limited to zoning adequate supply, appropriating funds derived from tax revenue, deferring tax revenue, allocating state and federal grants, and awarding height or floor area ratio bonuses for buildings that otherwise would not include affordable units. This ordinance takes the first steps toward identifying housing needs, but doesn't propose specific solutions to overcoming the market dynamics that impact actual affordability. Potential policies and tools to create more regulated affordable housing are addressed below.

Specific Land Use Map and Policy Changes

The Comprehensive Plan Map easily exceeds the requirement that Portland meet density of ten units per net residential acre [add calculation].

Several specific land use changes have an impact on housing and capacity, housing choice, and affordability.

- The recommended Comprehensive Plan includes a number of down-designations, where allowed residential density is being reduced. This is occurring in remote locations where urban infrastructure is lacking (no sidewalks, unpaved streets, limited sewer and water access), and where provision of such infrastructure would be expensive (steep slopes, landslide hazard areas). These locations are primarily in low density areas (R7, R10, R20). These density reductions will not impact affordable housing opportunities because development of these areas would be inherently expensive. The impact on the overall housing supply is limited because these areas are constrained, and are therefore counted at a discounted rate in the BLI.
- The recommended Comprehensive Plan includes a number of down-designations in outer East Portland. Some multi-dwelling designations are being removed and replaced with single-dwelling designations. This is occurring primarily in areas that are not close to transit, and where there is limited sidewalk infrastructure. Because these areas are not well served by transit, new residents in these areas would likely have higher transportation costs. Limited down-designations in these locations will encourage multi-dwelling development to be built in more transit-accessible locations, with a positive impact on household budgets. There is more than enough multi-dwelling capacity elsewhere to compensate for this impact.

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- The recommended Comprehensive Plan includes a new set of mixed use map designations, to replace the City's commercial designations. The new designations are based on the centers and corridor growth strategy described in the Urban Design Chapter of the plan (Chapter 3). This change re-affirms the City's intent to provide a range of mixed use housing opportunities, especially in close-in locations. The plan recommends an "Urban Center" mixed use designation for all Town Centers and all other centers and corridors close to the Central City. The Urban Center designation allows for up to 5 story mixed use or residential development. This change is consistent with recommended Policy 5.21, New development in opportunity areas.

Goal 10 and Comprehensive Plan Housing Policy

Chapter 5 of the Comprehensive Plan comprises the City's Goal 10 housing strategy. Several specific housing policies are discussed below, which address maintaining housing supply and capacity, increasing housing choice, and maintaining affordability.

Portland's existing Comprehensive Plan includes the following "no-net loss" housing policy, which was imposed during a previous periodic review process because at that time housing supply was limited relative to demand.

Policy 4.2: Maintain Housing Potential Retain housing potential by requiring no net loss of land reserved for, or committed to, residential, or mixed-use. When considering requests for amendments to the Comprehensive Plan map, require that any loss of potential housing units be replaced.

This policy was driven by the fact that, at the time, there was very little evidence of successful urban infill housing, or higher-density mixed use development. As a result, most of Portland's inventory of land available for housing consisted of large vacant single-dwelling or multi-dwelling land ("green-field" sites). The supply of large vacant sites was limited, as it still is today.

The market has changed dramatically since that time, however, with the vast majority of new residential development in Portland now occurring as infill or as part of medium- to high-density mixed use development. As a result, the current BLI includes much more land, and many smaller sites that would not have been considered developable 20 years ago. Accordingly, the City is proposing to remove the no-net loss policy, and replace it with a more targeted set of policies addressing capacity, regional share, and affordable housing.

Policy 5.1 Housing supply. Maintain sufficient residential development capacity to accommodate Portland's projected share of regional household growth.

Policy 5.2 Housing growth. Strive to capture at least 25 percent of the seven-county region's residential growth (Multnomah, Washington, Clackamas, Yamhill, Columbia, Clark, and Skamania counties).

Policy 5.3, Housing potential. Evaluate plans and investments for their impact on housing capacity, particularly the impact on the supply of housing units that can serve low- and moderate-income households, and identify opportunities to meet future demand.

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Other complementary policies provide an expanded emphasis on impact analysis related to housing affordability and fair housing, including:

Policy 5.9 Coordinate with fair housing programs. Foster inclusive communities, overcome disparities in access to community assets, and enhance housing choice for people in protected classes throughout the city by coordinating plans and investments to affirmatively further fair housing.

Policy 5.11 Impact analysis. Evaluate plans and investments, significant new infrastructure, and significant new development to identify potential disparate impacts on housing choice, access, and affordability for protected classes and low-income households. Identify and implement strategies to mitigate the anticipated impacts.

Policy 5.14 Gentrification/displacement risk. Evaluate plans and investments, significant new infrastructure, and significant new development for the potential to increase housing costs for, or cause displacement of communities of color, low- and moderate-income households, and renters. Identify and implement strategies to mitigate the anticipated impacts.

Policy 5.15 Involuntary displacement. When plans and investments are expected to create neighborhood change, limit the involuntary displacement of those who are under-served and under-represented. Use public investments and programs, and coordinate with nonprofit housing organizations (such as land trusts and housing providers) to create permanently-affordable housing and to mitigate the impacts of market pressures that cause involuntary displacement.

Policy 5.29 Housing cost burden. Evaluate plans and investments for their impact on household cost, and consider ways to reduce the combined cost of housing, utilities, and/or transportation. Encourage energy-efficiency investments to reduce overall housing costs.

Policy 5.35 Impact of regulations on affordability. Evaluate how existing and new regulations affect private development of affordable housing, and minimize negative impacts where possible. Avoid regulations that facilitate economically-exclusive neighborhoods.

Policy 5.36 Mobile home parks. Evaluate plans and investments for potential redevelopment pressures on existing mobile home parks and impacts on park residents and protect this low-moderate housing option.

Several other policies emphasize housing choice in neighborhoods, and encouraging new forms of housing:

Policy 4.15 Residential area continuity and adaptability. Encourage more housing choices to accommodate a wider diversity of family sizes, incomes, and ages, and the changing needs of households over time. Allow adaptive reuse of existing buildings, the

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creation of accessory dwelling units, and other arrangements that bring housing diversity that is compatible with the general scale and patterns of residential areas.

Policy 5.4 Housing types. Encourage new and innovative housing types that meet the evolving needs of Portland households, and expand housing choices in all neighborhoods. These housing types include but are not limited to single- dwelling units; multi-dwelling units; accessory dwelling units; small units; pre-fabricated homes such as manufactured, modular, and mobile homes; co-housing; and clustered housing/clustered services.

Policy 5.38 Compact single-family options. Encourage development and preservation of small resource-efficient and affordable single-family homes in all areas of the city.

Policy 5.45 Housing continuum. Prevent homelessness and reduce the time spent being homeless by ensuring that a continuum of safe and affordable housing opportunities and related supportive services are allowed, including but not limited to Permanent Supportive Housing, transitional housing, self-built micro housing communities, emergency shelters, temporary shelters such as warming centers, and transitional campgrounds.

A number of policies aim to expand the implementation toolbox and create a larger pool of regulated affordable housing:

Policy 5.16 Land banking. Support and coordinate with community organizations to hold land in reserve for affordable housing, as an anti-displacement tool, and for other community development purposes.

Policy 5.25 Regulated affordable housing target. Strive to produce at least 10,000 new regulated affordable housing units citywide by 2035 that will be affordable to households in the 0-80 percent MFI bracket.

Policy 5.34 Inclusionary housing. Use inclusionary zoning and other regulatory tools to effectively link the production of affordable housing to the production of market-rate housing.

These policies are aligned with the intent of Goal 10 because they promote maintaining housing supply and capacity, increasing housing choice, and maintaining affordability. They also direct address and further fair housing obligations.

A future ordinance, for periodic review Task V, will consider changes to zoning codes, and will meet Goal 10 and statutory requirements clear and objective standards for needed housing.

Goal 10 Conclusions

For the reasons stated above this ordinance meets all applicable requirements of Goal 10. The City complies with the single-dwelling to multi-dwelling capacity ratio requirement of Goal 10. The recommended Comprehensive Plan Map provides a City supply of residential land sufficient to meet identified housing needs within the meaning of ORS 197.307(3), Goal 10 and OAR

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Chapter 660, Division 7. The recommended Comprehensive Plan provides a wide range of allowed housing types, at a variety for allowed densities. As a result, the 2035 housing mix is expected to be more diverse than it is today. Recommended housing policies are consistent with Goal 10 because they address maintaining housing supply and capacity, increasing housing choice, and maintaining affordability.

Statewide Planning Goal 11 Findings

Statewide Planning Goal 11, Public Facilities, requires cities to adopt and update public facilities plans. Public facilities plans ensure that urban development is guided and supported by types and levels of water, sewer and transportation facilities appropriate for the needs and requirements of the urban areas to be serviced, and that those facilities and services are provided in a timely, orderly and efficient arrangement.

Goal 11 requires several components for a public facilities plan. The City adopted the first requirement by Ordinance No. 185657:

- An inventory and general assessment of the condition of exiting public facility systems needed to support at least the existing land uses designated in the acknowledged comprehensive plan.

Goal 11 facility plan requirements adopted by Ordinance No. _____ included:

- A list of the significant public facility projects which are to support the land uses designated in the acknowledged comprehensive plan. Public facility project descriptions or specifications of these projects as necessary;
- Rough cost estimates of each public facility project;
- A map or written description of each public facility project's general location or service area;
- Policy statement(s) or urban growth management agreement identifying the provider of each public facility system.
- An estimate of when each facility project will be needed; and
- A discussion of the provider's existing funding mechanisms and the ability of these and possible new mechanisms to fund the development of each public facility project or system.

This ordinance adopts policy statements in addition to those adopted by Ordinance No. _____. Chapter 8 of the Comprehensive Plan contains 120 public facilities and service policies. The following policies directly address Goal 11 requirements.

Policy 8.1 Urban services boundary. Maintain an Urban Services Boundary for the City of Portland that is consistent with the regional urban growth policy, in cooperation with neighboring jurisdictions. The Urban Services Boundary is shown on the Comprehensive Plan Map.

Policy 8.2 Rural, urbanizable, and urban public facility needs. Recognize the different public facility needs in rural, urbanizable and urban land as defined by the Regional Urban Growth Boundary, the City Urban Services Boundary, and the City Boundaries of Municipal Incorporation. See Figure 8-1 — Urban, Urbanizable, and Rural Lands.

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Policy 8.3 Urban service delivery. Provide the following public facilities and services at urban levels of service to urban lands within the City's boundaries of incorporation:

- Public rights-of-way, streets, and public trails
- Sanitary sewers and wastewater treatment
- Stormwater management and conveyance
- Flood management
- Protection of the waterways of the state
- Water supply
- Police, fire, and emergency response
- Parks, natural areas, and recreation
- Solid waste regulation

Policy 8.6 Interagency coordination. Maintain interagency coordination agreements with neighboring jurisdictions and partner agencies that provide urban public facilities and services within the City of Portland's Urban Services Boundary to ensure effective and efficient service delivery. See Policy 8.3 for the list of services included. Such jurisdictions and agencies include, but may not be limited to:

- Multnomah County for transportation facilities and public safety.
- State of Oregon for transportation and parks facilities and services.
- TriMet for public transit facilities and services.
- Port of Portland for air and marine facilities and services.
- Metro for regional parks and natural areas, and for solid waste, composting, and recycling facilities and transfer stations.
- Gresham, Milwaukie, Clackamas County Service District #1, and Clean Water Services for sanitary sewer conveyance and treatment.
- Multnomah County Drainage District No. 1, Peninsula Drainage District No 1, and Peninsula Drainage District No. 2 for stormwater management and conveyance, and for flood mitigation, protection, and control.
- Rockwood People's Utility District; Sunrise Water Authority; and the Burlington, Tualatin Valley, Valley View, West Slope, Palatine Hill, Alto Park, and Clackamas River Water Districts for water distribution.
- Portland Public Schools and the David Douglas, Parkrose, Reynolds, Centennial, and Riverdale school districts for public education, park, trail, and recreational facilities.

Policy 8.17 Services outside the city limits. Prohibit City provision of new urban services, or expansion of the capacity of existing services, in areas outside city limits, except in cases where the City has agreements or contracts in place.

Policy 8.18 Service district expansion. Prohibit service district expansion or creation within the City's Urban Services Boundary without the City's expressed consent.

Policy 8.19 Rural service delivery. Provide the public facilities and services identified in

Policy 8.3 in rural areas only at levels necessary to support designated rural residential land uses and protect public health and safety. Prohibit sanitary sewer extensions into rural land and limit other urban services.

For the reasons stated above, all applicable “policy statement” requirements of Goal 11 have been met by this ordinance.

Statewide Planning Goal 12 Findings

Goal 12, Background

Statewide Planning Goal 12, Transportation, requires Portland to adopt a *Transportation System Plan* (TSP) that supports safe, convenient and economical movement of people and goods, and supports a pattern of travel that will avoid air pollution, traffic and livability problems. All cities are required to provide safe and convenient motor vehicle, pedestrian and bicycle travel on a well-connected network of streets. Larger cities are required to provide for transit service and to promote more efficient performance of existing transportation facilities through transportation system management and demand management measures.

A key objective of Goal 12 is reduced reliance on single occupancy automobile use, particularly during the morning and afternoon commutes. To accomplish this, the Goal requires street connectivity and land use patterns, “that make it more convenient for people to walk, bicycle, use transit, use automobile travel more efficiently, and drive less to meet their daily needs.” The Goal allows the recognition that some parts of the City, such as downtown, pedestrian districts, transit-oriented developments and other mixed-use, pedestrian-friendly centers, are highly convenient for a variety of modes, including walking, bicycling and transit, while others parts of the City are be more auto-oriented. Nevertheless, the objective for the City as a whole, is to “avoid principal reliance upon any one mode of transportation.”

The City’s TSP must be based on an inventory of local, regional and state transportation needs; consider all modes of transportation including mass transit, air, water, pipeline, rail, highway, bicycle and pedestrian; and consider the different consequences that would result from utilizing differing combinations of transportation modes. The City’s TSP must also contain measures to minimize adverse the adverse impacts of transportation, conserve energy, and meet the needs of individuals who have difficulty in obtaining transportation because of their age, income, physical or mental disability. Goal 12 requires the City’s TSP to be coordinated with the *Oregon Highway Plan* and Metro’s *Regional Transportation Plan*. Parts, but not all of the City’s TSP, have to be adopted as part of the *Comprehensive Plan*.

Goal 12, Modelling and Consideration of Alternatives

With the *Growth Scenarios Report*, the City evaluated the existing Comprehensive Plan, the recommended Comprehensive Plan, and several other alternative growth patterns. A number of evaluation criteria were used, consistent with the requirements of the periodic review work plan (Task III). Among these evaluation criteria were several transportation-related measures:

- Access to frequent transit
- Access to low-stress bikeways
- Vehicle miles traveled (VMT)
- Commute mode share (drive alone, carpool, transit, bike, walk, etc.)
- Greenhouse gas/carbon emissions

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Vehicle volume to capacity ratios were also calculated to evaluate compliance with the ODOT Highway Plan.

To perform this analysis, the City coordinated with Metro to run the Regional Transportation Model. The City is using the adopted 2035 Financially Constrained RTP project list (adopted 2010, based on the City's 2007 TSP), the adopted 2012 Metro Urban Growth Report jobs and housing allocation for 2035, and the City's existing adopted Comprehensive Plan Map as a baseline for this modelling exercise. The performance of other subsequent model results was compared with this baseline outcome. The model was run three times, with the following parameters.

The first run measured the impact of staff-proposed land use changes, while holding transportation system constant. The parameters of this model run where:

- Land use per the proposed Comprehensive Plan
- Transportation Network based on existing adopted (2010) RTP (same as baseline).
- City of Portland preferred jobs and housing allocation for 2035 from BPS, based on Portland's emerging Proposed Draft CP map and goals, tied to Citywide 2012 Metro control totals.

The second run added the staff-proposed TSP project list, to measure the impact of project list changes. The parameters of this model run where:

- Land use per the proposed Comprehensive Plan
- New proposed (constrained) TSP Project List from PBOT
- Several City-requested transit route/frequency changes in East Portland
- City of Portland preferred jobs and housing allocation for 2035 from BPS, based on Portland's emerging proposed Comprehensive Plan map and goals, tied to Citywide 2012 Metro control totals.

The third run had the same parameters as the second, but using the updated land use and project recommendations from the Planning and Sustainability Commission. The parameters of this model run where:

- Land use per the recommended Comprehensive Plan
- New recommended (constrained) TSP Project List
- Several City-requested transit route/frequency changes in East Portland
- City of Portland preferred jobs and housing allocation for 2035 from BPS, based on Portland's recommended land use map and goals, tied to Citywide 2012 Metro control totals.

The City coordinated this modelling exercise with Metro, ODOT, and Trimet, through a series of quarterly work sessions, from late 2013 through 2015. The conclusions of this analysis is summarized below.

Access to frequent transit: The City estimated the percentage of households that will be within ¼ mile of frequent transit routes in 2035 (generally those with 20 minute headways or better). The existing Comprehensive Plan and transit system will increase this percentage by 6%, from 47% to 53%. Several other land use scenarios resulted in increases from 6% to 8%. The

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recommended Comprehensive Plan increases this percentage by 14%, to 62%. The proposed addition of north/south frequent transit on 122nd Avenue contributed the most to increasing access to frequent transit by filling in transit gap areas in East Portland. This analysis is found on pages 58 and 59 of the *Growth Scenario Report*.

Access to low-stress bikeways: The City estimated the percentage of households that will be within ¼ mile of “low-stress” bikeways in 2035 (generally those bikeways with low vehicle traffic or more protected bike facilities). The existing Comprehensive Plan and transit system will increase this percentage by 6%, from 56% to 62%. Several other land use scenarios resulted in increases from 5% to 7%. The recommended Comprehensive Plan increases this percentage by 16%, to 72%. The bike projects in the recommended TSP project list provides a 16 percent increase over the 2010 benchmark. While, low-stress bike projects in the TSP are located across Portland, the biggest increase in performance is from the emphasis on expanding the network in East Portland, along with St. Johns and parts of Northeast Portland. This analysis is found on pages 60 and 61 of the *Growth Scenario Report*.

Vehicle miles traveled (VMT): VMT is reported as a total number of miles per weekday. With the current Comprehensive Plan, model results suggested that by 2035 total daily VMT increases by 25 to 30 percent, but not as fast as the household or employment growth rates (33 and 43 percent, respectively). The result is a 2% reduction in VMT per capita by 2035. The City’s Climate Action Plan set a target of reducing 2030 per capita daily vehicle miles traveled by 30 percent from 2008 levels. Other land use scenarios studied did not have significantly different results. The recommended Comprehensive Plan performs significantly better and shows a 3% reduction in total VMT from 2010 to 2035. This translates to a 27% reduction in per capita VMT. Several factors contribute to this performance gain:

- Additional transit improvements in East Portland, connecting that population to jobs in the Columbia Corridor.
- Extensive investment in bike and pedestrian safety improvements in outer East Portland.
- Land use plans that shift more growth in the Central City and nearby corridors than was the case in the existing Comprehensive Plan.
- Additional policy emphasis on parking management and Transportation Demand Management (TDM) requirements – particularly with campus institutions, large employers, and new residential development. The second and third model runs included additional post-modelling technical analysis to quantify the impact of this policy, which is not fully factored into the regional model.
- A more balanced household to employment ratio in Portland that generates shorter trip distances.
- A post-recession shift of development from the suburbs to more compact urban areas in Portland. The 2014 and 2015 modelling uses more up-to-date data on actual 2010-2014 population changes, rather than using earlier plan projections. As a result, there are fewer trips from suburban locations than anticipated in the baseline.

Commute mode share: In 2010 about 80% of all trips were taken in an automobile (including both single occupancy and carpooling). With the current Comprehensive Plan, model results suggested that by 2035 this percentage could drop to 77%. Other land use scenarios resulted in shifts of 1% to 5% from the 2010 percentage. The recommended Comprehensive Plan performs

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significantly better and reduces the percentage of all trips were taken in an automobile to 64%. This change is driven by the same factors that contribute to VMT reduction described above. Single occupancy vehicle mode share declines 26%, while bicycle mode share increases by 10% and walking by 5%. This analysis is found on page 63 and 64 of the *Growth Scenario Report*.

The Portland Plan set an aggressive objective that 70% of commuters use transit or active transportation (biking, walking), carpool, or work from home. This modelling analysis includes all types of trips, so it is not directly comparable to the model result. The modelling, however, suggests that the recommended plan is moving this metric in the right direction.

Greenhouse gas/carbon emissions: Portland and Multnomah County have achieved considerable success in limiting the growth of greenhouse gas or carbon emissions. Land use and transportation policies have resulted in almost no increase in emissions from transportation since 1990, despite a population increase of more than 25 percent. Overall, the Climate Action Plan (CAP) set the goal of an 80 percent reduction of all types of carbon emissions from 1990 levels by 2050. While the CAP identified strategies to reduce emissions from a wide range of sectors, the growth scenarios influence the carbon emissions related to transportation and residential buildings. The transportation portion of this reduction is directly related to the VMT measure describe above.

In 2010, transportation-related carbon emissions amounted to 2,231,000 metric tons/year. Improvements in vehicle fuel efficiency standards across all vehicle classes, a reduction of the carbon content of fuels, and regional land use plans result in a projected reduction in transportation-related carbon emissions to 1,149,000 metric tons/year, even with the existing Comprehensive Plan. Given the VMT measures described above, the recommended plan would further reduce emissions to 934,000 metric tons/year. This analysis is found on page 65 of the *Growth Scenario Report*.

Goal 12, List of Significant Projects

The recommended List of Significant Transportation Projects includes a twenty-year list of Major Projects, Citywide Programs, Refinement Plans and financial projections. *The package includes:*

- Major projects: 284 major projects (those generally over \$500,000 estimated cost) that the City might be able to build with twenty years of reasonably aggressive revenues, including new local, state, and regional funding, and a list of major projects that could be funded under a more aggressive revenue assumption.
- Other agency projects: This is the list of 75 major transportation projects proposed to be led and primarily funded by agencies other than the City of Portland, such as ODOT, the Port of Portland, Multnomah County, or TriMet. The source for most of these projects is the Regional Transportation Plan (RTP), adopted in 2014.
- Flexible programs: 10 citywide programs for smaller projects (those generally under \$500,000 estimated cost), including projects from the City's 2030 Bike Plan and Pedestrian Master Plan. Programs have been allocated \$310 million within the financially constrained plan.

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- Refinement plans: Updates from the 2007 refinement plan list, plus studies added by the PSC, and an ODOT “hot spots” refinement plan list. Additional refinement plans and studies will be recommended in the next round of TSP updates in fall 2015.
- Financial plan: A new Finance chapter for the TSP, including “constrained” (reasonably aggressive) and “unconstrained” (more aggressive) revenue forecasts. Twenty-year revenue projections range from \$0.8 billion (existing revenue only) to \$2.1 billion (extensive new revenue). The financially constrained list is based on a mid-range revenue estimate of \$1.3 billion, which includes some new revenue. The major project list and recommended programs add up to \$1.6 billion, and the \$1.3 billion financially-constrained list is a subset of that list.

The spending distribution of all projects by mode, including those funded by others, is shown below. As is evident from this chart, projects funded by other (federal, state, Port, railroads, etc.) are heavily concentrated in freeway, transit and freight categories. One project, the Columbia River Crossing, dominates the spending by others. This project is likely to be reviewed by regional decision-makers in the 2018 update of the TSP, but remains in the local TSP for the sake of maintaining conformance with the RTP. Several high capacity transit improvements also involve considerable expense by others. Portland’s spending is concentrated on multimodal corridor projects, and pedestrian/bicycle improvements.

Constrained investments (20-year) by mode and agency

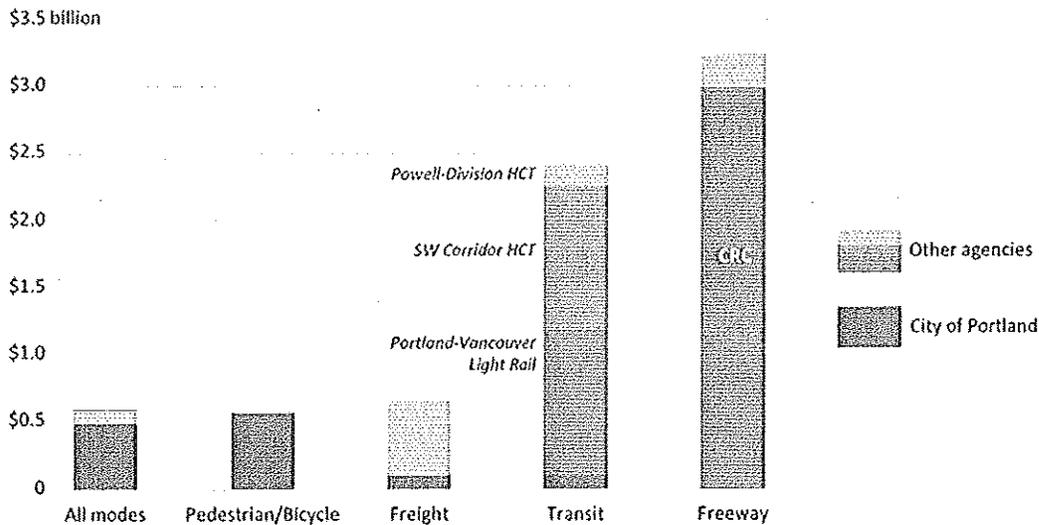


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The 10 flexible programs noted above are listed in the table below.

Program Category	Amount (\$ millions)
Safe routes to schools	\$71.5
High crash corridors	\$67.1
Pedestrian network	\$42.2
Alternative street design	\$38
Bikeway network	\$24
Neighborhood greenways	\$19.5
Transportation demand management	\$19.5
Transit priority	\$9.5
Freight priority	\$9.5
Transportation system management	\$9.5
TOTAL	\$310.3

Consistent with Goal 12, both the major project list and program list emphasize actions that reduce reliance on single occupant automobile use, and increases alternative modes of transportation. Freight spending is primarily aimed at complementing the economic development policies, and making investments to allow more intensive use of a limited industrial land supply.

Goal 12, Transportation Policies

Chapters 3, 8 and 9 of the recommended Comprehensive Plan contain more than 100 policies, which together, call for the development of a TSP that will meet or exceed the requirements of Goal 12. Several policies that specifically advance the intent of Goal 12 are described below. These policies encourage a more walkable city, establish multimodal service standards, encourage a well-connected network of streets, reduce reliance on single occupant automobile use, increase the use of other modes of transportation, and expand the use transportation demand management tools.

Chapter 3

Policy 3.33 Housing. Provide for a wide range of housing types in Town Centers, which are intended to generally be larger in scale than the surrounding residential areas. There should be sufficient zoning within a half-mile walking distance of a Town Center to accommodate 7,000 households.

Policy 3.37 Housing. Provide for a wide range of housing types in Neighborhood Centers, which are intended to generally be larger in scale than the surrounding residential areas, but smaller than Town Centers. There should be sufficient zoning within a half-mile walking distance of a Neighborhood Center to accommodate 3,500 households.

Policy 3.44 Active transportation. Enhance the role of the Inner Ring Districts' extensive transit, bicycle, and pedestrian networks in conjunction with land uses that optimize the

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ability for more people to utilize this network. Improve the safety of pedestrian and bike connections to the Central City. Strengthen transit connections between the Inner Ring Districts and to the Central City.

Policy 3.46 Connections. Improve corridors as multimodal connections providing transit, pedestrian, bicycle, and motor vehicle access and that serve the freight needs of centers and neighborhood business districts.

Policy 3.49 Integrated land use and mobility. Enhance Civic Corridors as distinctive places that are models of ecological urban design, with transit-supportive densities of housing and employment, prominent street trees and other green features, and high-quality transit service and pedestrian and bicycle facilities.

Policy 3.51 Mobility corridors. Improve Civic Corridors as key mobility corridors of citywide importance that accommodate all modes of transportation within their right-of-way or on nearby parallel routes.

Policy 3.54 Transit-oriented development. Encourage transit-oriented development and transit-supportive concentrations of housing and jobs, and multimodal connections at and adjacent to high-capacity transit stations.

Policy 3.63 Multiple benefits. Design City Greenways that provide multiple benefits that contribute to Portland's pedestrian, bicycle, green infrastructure, and parks and open space systems.

Chapter 8

Policy 8.37 Interconnected network. Establish a safe and connected rights-of-way system that equitably provides infrastructure services throughout the city.

Policy 8.38 Transportation function. Improve and maintain the right-of-way to support multimodal transportation mobility and access to goods and services as is consistent with the designated street classification.

Policy 8.48 Right-of-way vacations. Maintain rights-of-way if there is an established existing or future need for them, such as for transportation facilities or for other public functions established in Policies 8.38 to 8.41.

Policy 8.50 Public trails. Establish, improve, and maintain a citywide system of public trails that provide transportation and/or recreation options and are a component of larger network of facilities for bicyclists, pedestrians, and recreational users.

Chapter 9

Policy 9.5 Mode share goals and Vehicle Miles Travelled (VMT) reduction. Increase the share of trips made using active and low-carbon transportation modes. Reduce VMT to achieve targets set in the most current Climate Action Plan and Transportation System Plan, and meet or exceed Metro's mode share and VMT targets.

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Policy 9.10 Land use and transportation coordination. Implement the Comprehensive Plan Map and the Urban Design Framework through coordinated long-range transportation and land use planning. Ensure that street policy and design classifications and land uses complement one another.

Policy 9.16 Pedestrian transportation. Encourage walking as the most attractive mode of transportation for most short trips, within and to centers, corridors, and major destinations, and as a means for accessing transit.

Policy 9.19 Bicycle transportation. Create conditions that make bicycling more attractive than driving for most trips of approximately three miles or less.

Policy 9.22 Public transportation. Coordinate with public transit agencies to create conditions that make transit the preferred mode of travel for trips that are not made by walking or bicycling.

Policy 9.37 Automobile transportation. Maintain acceptable levels of mobility and access for private automobiles while reducing overall vehicle miles traveled (VMT) and negative impacts of private automobiles on the environment and human health.

Policy 9.46 Connectivity. Establish an interconnected, multimodal transportation system to serve centers and other significant locations. Promote a logical, direct, and connected street system through street spacing guidelines and district-specific street plans found in the Transportation System Plan, and prioritize access to specific places by certain modes in accordance with policies 9.6 and 9.7.

Policy 9.48 Performance measures. Establish multimodal performance measures and measures of system completeness to evaluate and monitor the adequacy of transportation services based on performance measures in goals 9.A. through 9.I. Use these measures to evaluate overall system performance, inform corridor and area-specific plans and investments, identify project and program needs, evaluate and prioritize investments, and regulate development, institutional campus growth, zone changes, Comprehensive Plan Map amendments, and conditional uses.

Policy 9.53 New development. Create and maintain TDM regulations and services that prevent and reduce traffic and parking impacts from new development and redevelopment. Encourage coordinated area-wide delivery of TDM programs. Monitor and improve the performance of private-sector TDM programs.

Policy 9.54 Parking management. Reduce parking demand and manage supply to improve pedestrian, bicycle and transit mode share, neighborhood livability, safety, business district vitality, vehicle miles traveled (VMT) reduction, and air quality. Implement strategies that reduce demand for new parking and private vehicle ownership, and that help maintain optimal parking occupancy and availability.

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Policy 9.57 Off-street parking. Limit the development of new parking spaces to achieve land use, transportation, and environmental goals, especially in locations with frequent transit service. Regulate off-street parking to achieve mode share objectives, promote compact and walkable urban form, encourage lower rates of car ownership, and promote the vitality of commercial and employment areas. Use transportation demand management and pricing of parking in areas with high parking demand.

Goal 12, Land Use Patterns and Transportation

As described above, and in the *Growth Scenarios Report*, the City examined several different possible growth patterns. The recommended Comprehensive Plan is a “centers and corridors” pattern, with a heavy emphasis on continued growth in and around the Central City. The recommended Comprehensive Plan can allow Portland to accommodate about 30,000 additional households within the Central City, and another 20,000 households in the other close-in centers, corridors and multifamily neighborhoods within walking distance of the Central City (referred to as the “Inner Ring” in policy). Significant growth capacity is also maintained adjacent to other major transit nodes and corridors, such as in Hollywood, Lents, Gateway, and along Interstate Avenue.

The recommended land use plan and policies describe a collection of Neighborhood and Town Centers, with specific growth objectives within ½ mile of those locations (Policies 3.33 and 3.37). These centers are located throughout the city, so that 80% of Portland households can be within a 10-minute walk of one of these centers by 2035.

With a strong central city and spatially distributed centers and corridors, the recommended land use pattern encourages shorter trips, makes it more convenient for people to walk, bicycle, use transit; and allows people to drive less to meet their daily needs.

Goal 12, Coordination with ODOT, Metro, and Trimet

Statewide Planning Goal 2 requires Portland’s Comprehensive be coordinated with the Oregon Highway Plan and the Regional Transportation Plan. The Transportation Planning Rule requires the City to prepare the TSP in coordination with Metro and the Oregon Department of Transportation. The City developed the new Comprehensive Plan Map in cooperation with these two agencies, and Trimet. Specific coordination included:

- Metro Regional Transportation Model: The City employed Metro’s regional travel model to assess transportation impacts of different spatial distributions of future jobs and housing resulting from continued utilization of the existing plan map and the new map (details described above).
- Trimet Service Enhancement Plans (aka The Future of Transit): The City has participated in Trimet’s current work to update its long term service plans. This Trimet planning process has been occurring contemporaneously with the Portland’s periodic review work plan. Trimet’s current proposals reflect City input, including input from the City’s Planning and Sustainability Commission (in a work session on March 10, 2015). In particular, the City and Trimet have jointly recommended several service improvements in outer East Portland, on 122nd, 142, and 162nd Avenues. These improvements are planned intended with sidewalk and related safety improvements on these streets, in the recommended TSP project list.

The City has also signed a joint Letter of Intent (signed September 1, 2015) outlining future transit service related work plans. Due to the capital improvement focus of public facilities planning, Comprehensive Plans typically focus on physical transit improvements, like light rail improvements, sidewalks, or shelters, rather than on levels of bus service. This letter of intent reflects the fact that Portland's land use pattern is dependent on the stability and future expansion of Trimet's bus service. The letter outlines the intent to develop future service agreements or MOUs that tie bus service future improvements to land use benchmarks and City progress on supportive facilities like sidewalk or safety improvements that improve access to transit.

- RTP Project List: The City and Metro have coordinated to ensure general consistency of the local TSP project list with the most recent adopted Regional Transportation System. The recommended TSP project list generally includes all projects that are part of the regional plan (including those identified by the Port, ODOT and Trimet) projects. There are several differences, however. Differences include:
 - The City's TSP (constrained project list) does not currently include additional streetcar projects, but it does include further studies related to the streetcar concept plan
 - The City's TSP project list does not include projects that are in the RTP related to the annexation of West Hayden Island. The City has not proposed annexation of that site within the 20-year planning horizon.
 - There are a variety of minor technical differences, in project descriptions and cost estimates.

The coordination requirement in Goal 12 does not require the two lists to match exactly at every moment, because coordination is inherently iterative, and the time horizons for the TSP and RTP are not the same. The City intends propose amendments to the RTP in 2018 to resolve these differences.

- Oregon Highway Plan Policy 1.F Mobility Targets: The City has worked closely with ODOT to evaluate the impact of the TSP and Comprehensive Plan on the state highway system. ODOT has participated as a technical advisor during the modelling process described above, and during the development of policies and project lists. Several staff work sessions occurred to identify locations of concern, based on transportation modelling results. Specific findings related to the Oregon Highway Plan are below.
- Central City MMA: ODOT and City staff have developed a draft agreement to implement a Mixed Use Multimodal Transportation Area (MMA) within the Central City, consistent with provisions in the Oregon Highway Plan. This agreement has not yet been adopted, but the recommended Comprehensive Plan includes draft policy reflecting this intent (Policy 9.50 Central City Mixed Use Multimodal Transportation Area (MMA)).

Goal 12, Oregon Highway Plan

Policy 1F of the *Oregon Highway Plan*, as amended on December 21, 2011, establishes mobility targets based volume to capacity, "v/c," ratios. These targets are "performance standards" within the meaning of Statewide Planning Goal 12, OAR 660-015-0000 (12), and the Transportation Planning Rule, OAR 660-012. The Policy 1F mobility targets only apply to highways that are

EXHIBIT A Further Findings of Fact

part of the state system. It is the policy of the State of Oregon to use highway mobility standards to maintain acceptable and reliable levels of mobility on the state highway system. These standards identify state highway mobility performance expectations for planning and plan implementation, provide a means to evaluate the impacts on state highways of amendments to transportation plans pursuant to the Transportation Planning Rule (OAR 660-12-060).

The volume to capacity ratios in Table 7 of Policy 1.F apply to all state highway sections located within the Portland metropolitan area urban growth boundary. Table 7 generally specifies a maximum volume to capacity ratio of .99 for two-hour peak operating conditions through a 20-year horizon. Ratios of 1.1 are allowed on some routes, including:

- Within the Central City, Gateway, Town Centers, Main Streets, and Station Communities.
- Banfield Freeway (from I-5 to I-205)
- I-5 North (from Marquam Bridge to Interstate Bridge)
- Highway 99E (from Lincoln Street to Highway 224 Interchange)
- Sunset Highway (from I-405 to Sylvan Interchange)
- Stadium Freeway (from I-5 South to I-5 North)

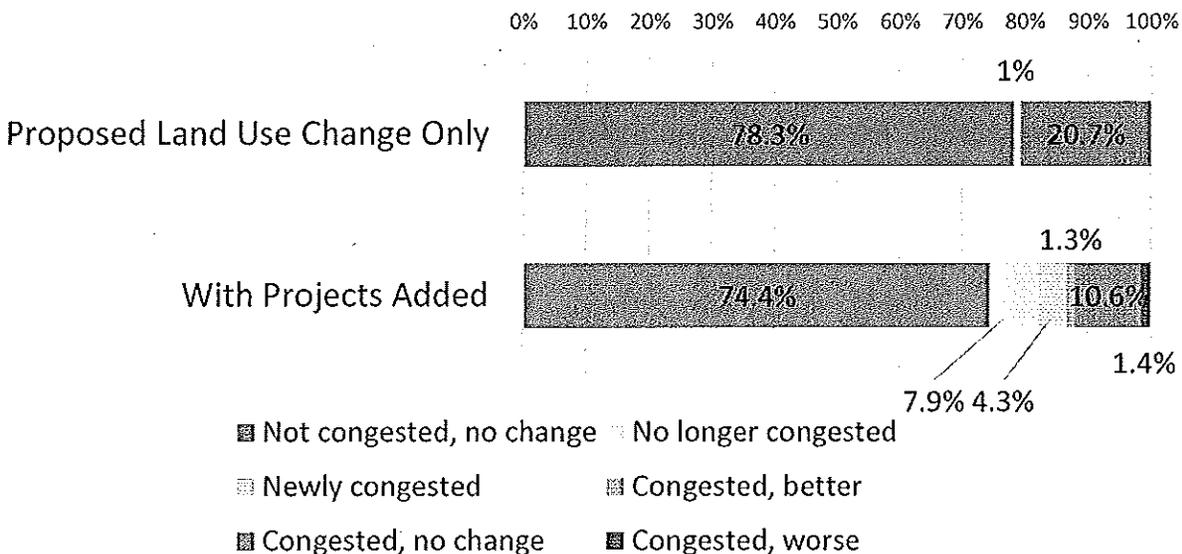
Where it would be infeasible to meet these standards in this policy, adopting alternate highway mobility is possible in some circumstances.

In order to understand impacts to the state system, the City coordinated review of transportation model results with ODOT. From these model results, impacts to state highway volume to capacity ratios was examined. Information was generated about the freeway system generally, as well as other state highways. ODOT staff reviewed model results with the City, as did Metro and Trimet staff. ODOT provided specific input related to locations of concern within the state system. Locations of concern are locations on the state system that ODOT is monitoring to determine if future improvements or other changes are needed.

As noted earlier, the first model run measured the impact of staff-proposed land use changes, while holding the transportation system constant. The second run added the staff-proposed TSP project list, to measure the impact of project list changes in isolation. The charts below were developed to understand the impact of proposed land use changes. The first chart shows impacts to the freeway system, the second shows impacts on ODOT locations of concern. The data from the first model run indicates that the 99% of freeway land miles have similar levels of congestion with both the baseline and the proposed plan (considering proposed land use changes only, without the proposed project list).

The conclusion reached from this initial data is that mobility problems were not attributable to changes in Portland's Comprehensive Plan Map, but were caused by increased population growth and the use of state highway segments within Portland for regional, exurban and intra-regional trips. These congestion problems noted are present in the baseline conditions expected in 2035, with or without proposed land use changes in Portland.

Traffic Changes on Freeways within the City (Proposed Comprehensive Plan relative to the baseline 2035 condition)



Traffic Changes at ODOT Locations of Concern (Proposed Comprehensive Plan relative to the baseline 2035 condition)

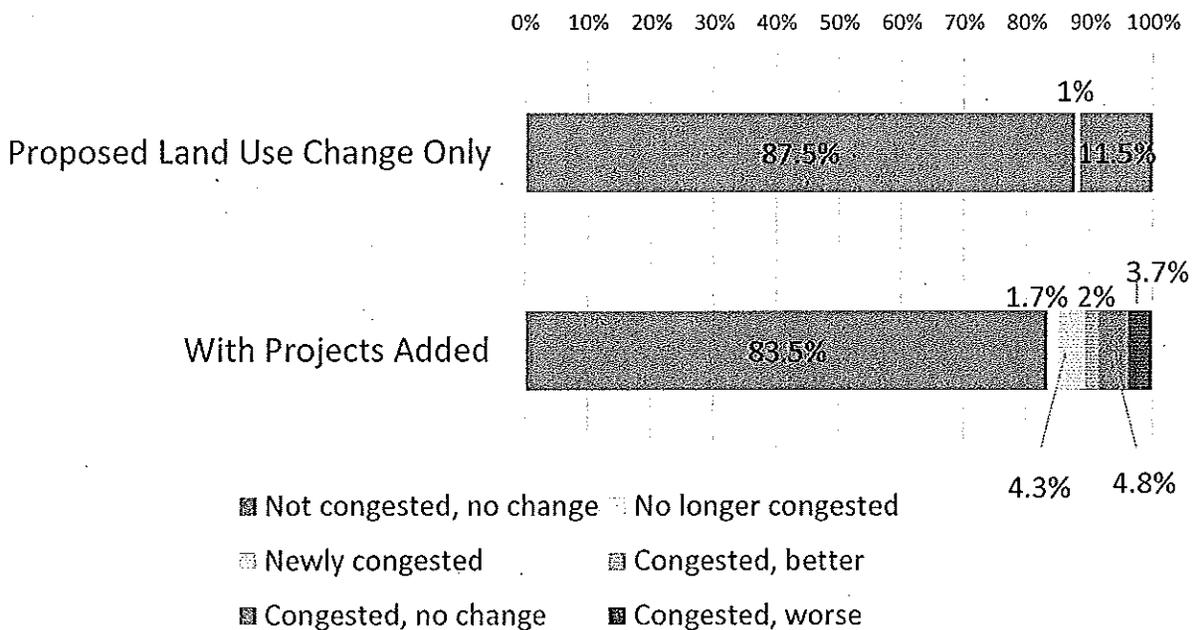


EXHIBIT A Further Findings of Fact

The proposed land use changes did not resolve anticipated 2035 congestion. That said, Goal 12 contains no requirement to scale back the land use patterns “that make it more convenient for people to walk, bicycle, use transit, use automobile travel more efficiently, and drive less to meet their daily needs” in order to make room for more traffic originating outside the City. In other words the transportation system is supposed to support a livable city - nothing in Goal 12, the other Goals, the RTP or the OHP plan requires Portland to become a less livable place so that people living outside the City may drive though the City move conveniently. Accordingly, changes to the new Comprehensive Plan Map were not identified as needed solutions to noted problems. The appropriate identified solutions were Comprehensive Plan policy, transportation improvement projects, and further refinement planning.

Another part of the solution are the transportation projects and programs identified in July 14, 2015 Transportation System Plan Update. The list contains 284 projects, each costing more than \$500,000, that the City could build within twenty years based on reasonable “financially constrained” revenue assumptions. These projects and programs are also identified as partial solutions to alleviating identified mobility problems on the state system. Data from the second model run, which measured the impact of proposed projects, shows a slight improvement, shifting 7.9% of freeway lane miles from congested to no longer congested. In other non-freeway locations, the proposed projects appear to have shifted 4.3% of ODOT locations of concern from not congested to congested. To the extent mobility concerns are not fully addressed by plan policy, projects or programs, or combinations of any two or all three of these solutions, the forthcoming TSP will include “refinement plans” designed to produce the necessary solutions.

The third run had the same parameters as the second, but using the updated land use and project recommendations from the Planning and Sustainability Commission.

[Insert third model run results when available]

Goal 12, Remaining Periodic Review Tasks

To date the City has completed the following elements of the TSP and Transportation Element of the Comprehensive Plan:

- Infrastructure conditions assessment
- Analysis of alternatives
- Transportation Goals and Policies
- Updated financial plan
- List of significant projects

Several elements have not yet been completed. These are listed below. The City is requesting clarifications to the periodic review work plan to specify that these will be completed as part of Task V.

- Updates to master street plans
- Street classification policies and maps
- Additional mode-specific objectives
- More detailed performance measures and specific mode split targets. This may include consideration of changes to V/C and LOS, and potential adoption of new multimodal measures, such as system completeness

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- Enhanced Transportation Demand Management (TDM) program details

Goal 12, Conclusions

For the reasons stated above the City has met the relevant requirements of Goal 12 and the TPR, necessary to adopt new land use map and policies, and to lay groundwork for the complete TSP update. These include:

- Recognition, acceptance and accommodation the forecast and distribution issued by Metro under ORS 195.036.
- A new Comprehensive Plan Map meeting the requirements of Goal 14, carrying out and enhancing the spatial development pattern established by the Region 2040 Growth Concept, and furthering land use patterns “that make it more convenient for people to walk, bicycle, use transit, use automobile travel more efficiently, and drive less to meet their daily needs” within the meaning of Goal 12 and the TPR.
- Comprehensive Plan Policy, consistent with Goal 12, and sufficient to guide the completion of the TSP.
- An adequate list of transportation projects and programs, consistent with the plan policy.

The TSP will be completed as part of Task V of the City’s Periodic Review Work Program.

Statewide Planning Goal 13 Findings

Goal 13 requires that any spatial changes to future patterns of allowed land uses must conserve energy.

For the facts and reasons stated above in the finding for Goal 12 above, and the findings for Goal 13 in Ordinance _____, this ordinance meets the requirements of Goal 13.

Statewide Planning Goal 14 Findings

Statewide Planning Goal 14, Urbanization, has several purposes; these include:

- Providing orderly and efficient transitions from rural to urban land uses.
- Accommodating urban population and urban employment inside urban growth boundaries.
- Ensuring efficient use of land.
- Providing for livable communities

Goal 14 and its administrative rule assign most of these functions to Metro rather than the City. The City’s role is limited to accepting the share of regional household and employment growth allocated by Metro, and demonstrating that this growth can be accommodated in an orderly and efficient manner that preserves and enhances livability. The template for this desired development pattern is the “Region 2040 Growth Concept,” which is carried out by Metro’s *Urban Growth Management Functional Plan*. The growth concept emphasizes development within designated centers and corridors.

For the facts and reasons stated above in the finding for Goal 12 above, and the findings for Goals 2, 9 and 10 in Ordinance _____, this ordinance meets the requirements of Goal 14.

EXHIBIT A Further Findings of Fact

The Goal 2 analysis performed for the *Growth Scenarios Report* (Exhibit E) provides substantial evidence that the spatial development pattern of urban jobs and housing allowed by the new Comprehensive Plan Map is compatible with the Region 2040 Growth Concept, ensures efficient use of urban land through infill and redevelopment opportunities, and will provide for more complete and livable communities.

For the facts and reasons stated above, this ordinance meets the requirements of Goal 14.

Statewide Planning Goal 15 Findings

This ordinance does not adopt an inventory of greenway resources or uses, nor adopt land use regulations that allow intensification of uses within the greenway. For these reasons, most of Goal 15 does not apply to this ordinance.

The only part of Goal 15 that applies to this ordinance concerns the Willamette River Greenway boundary. Goal 15 requires that this boundary be depicted on the Comprehensive Plan Map. Since the City is adopting a new Comprehensive Plan Map it must “re-depict,” in exactly the same place, the boundary on the repealed map on the new map. Because this has been done, this ordinance meets all applicable requirements of Goal 15.

Statewide Planning Goal 16 Findings

Because Portland is not within Oregon’s coastal zone, Goal 16 does not apply to this ordinance.

Statewide Planning Goal 17 Findings

Because Portland is not within Oregon’s coastal zone, Goal 17 does not apply to this ordinance.

Statewide Planning Goal 18 Findings

Because Portland is not within Oregon’s coastal zone, Goal 18 does not apply to this ordinance.

Statewide Planning Goal 19 Findings

Because Portland is not within Oregon’s coastal zone, Goal 19 does not apply to this ordinance.

Statutory Findings

In addition to the requirements of the Statewide Planning Goals and the LCDC’s administrative rules state law imposes additional planning requirements.

Oregon Revised Statutes (ORS) 197.303 to 197.307 defines “needed housing” and prohibits local governments from adopting plans and regulations that limit housing choices. These statutory requirements are met for the reasons stated in the findings for Goal 10 for Ordinance No.

ORS 197.712 requires cities to adopt comprehensive plans that:

EXHIBIT A Further Findings of Fact

- Include an analysis of the community's economic patterns, potentialities, strengths and deficiencies as they relate to state and national trends.
- Provide for at least an adequate supply of sites of suitable sizes, types, locations and service levels for industrial and commercial uses consistent with plan policies.

These requirements have been met for the facts and reasons stated in the findings for Goal 9 in Ordinance No. _____.

ORS 197.712 also requires cities to adopt comprehensive plans that:

- Contain policies concerning the economic development opportunities in the community.
- Provide for compatible uses on or near sites zoned for specific industrial and commercial uses.

Policy requirements have been met for the facts and reasons stated in the findings for Goal 9 above, land use regulations requiring compatibility will be part of the City's Periodic Review Task V submittal.

ORS 197.712 requires cities to adopt comprehensive plans that:

- Are supported by a public facility plan that contains rough cost estimates for needed sewer, water and transportation projects.

This has been accomplished for water, sewer and drainage projects, but not yet for transportation projects, for the facts and reasons stated in the findings for Goal 11 in Ordinance No. _____, and the findings for Goal 9 in this Ordinance.

Metro Coordination Findings

Within the Portland Metropolitan area, Metro has the authority and obligation under ORS 195.025 and ORS 195.036 to coordinate the comprehensive plans of the City, 25 other incorporated municipalities, and the unincorporated urban portions of three counties with one another. Metro accomplishes this in three ways:

- Adopting a 20- year population forecast for the entire metropolitan region
- Allocating 20-year housing and job need numbers to each of the 29 jurisdictions
- Requiring each city and county comprehensive plan to meet the allocated 20-year housing and job need numbers.

When all 29 governments change their comprehensive plans to meet their Metro allocations, the 29 plans will be sufficiently coordinated with one another within the meaning of ORS 195.036 and Statewide Planning Goal 2.

The Metro Council adopted a new regional forecast by Ordinance No. 12-1292A on November 29, 2012, and by this ordinance the City recognizes and accepts this forecast of jobs and housing through the Year 2035. For this reason, and for the facts and reasons included in the findings for Goals 2, 9, 10 and 14 in Ordinance No. _____ the City is in full accord with Metro's authorities and obligations under ORS 195.025 and ORS 195.036.

Metro Urban Growth Management Functional Plan Findings

EXHIBIT A Further Findings of Fact

Under ORS 268.380 and its Charter Metro has the authority to adopt regional plans and require city and county comprehensive plans to comply with regional plan. Metro adopted its *Urban Growth Management Functional Plan* under this authority.

In its June 2011 update to its 2010 compliance report Metro found, "The City of Portland is in compliance with all *Urban Growth Management Functional Plan* requirements in effect on December 15, 2010, except for Title 13, Nature in Neighborhoods. On January 16, 2013 the City received a letter from Metro stated that Portland had achieved compliance with Title 13.

Most of the *Urban Growth Management Functional Plan* requirements concern zones and land use regulations. This ordinance only adopts a comprehensive plan map, plan policies and a project list. The zones and land use regulations that that Metro has deemed to comply with *Urban Growth Management Functional Plan* are not repealed or amended by this ordinance and continue in effect. That said a few provision of the *Urban Growth Management Functional Plan* address plan designations, and for other provisions it is simply prudent to examine plan map designations and plan policy to determine whether any provision of the new plan would prevent future zones and regulations needed to conform to the *Urban Growth Management Functional Plan*.

Title 1, *Urban Growth Management Functional Plan* Findings

Title 1 address housing capacity, both the capacity of the city as a whole, and capacities of the individual Region 2040 design type within the City.

The findings for Goal 10 above and in Ordinance _____ demonstrate that the new Comprehensive Plan Map has more housing capacity than the map it replaces. Title 1 requires a more detailed analysis of whether, based on minimum density requirements in zoning regulations, housing has been reduced in the Central City, the Gateway Regional Center, town centers, corridors, station communities or main streets.

The new Comprehensive Plan Map controls what zoning is allowed in these mixed use areas, but does not change zoning or set any minimum densities. Plan map designations control the maximum allowed density and the City's Goal 10 findings have relayed on expected utilization of these designations (a calculated capacity very similar to a MetroScope housing distribution to a traffic analysis zone) by the Year 2035. Also, most of Portland's new housing development is occurring in commercial and mixed-use zones, zones that have no minimum residential density requirements. Clearly, Title 1 as most recently amended is intended to apply to zone and land use regulation changes not Comprehensive Plan Map changes alone.

That said, since zoned density cannot be greater than planned density, it would be prudent to examine the calculated capacities in the areas addressed by Title 1.

2040 Design Type	Existing Plan Capacity	New Plan Capacity	Change
Central City			
Gateway Regional center			

EXHIBIT A Further Findings of Fact

Town Centers			
Corridors			
Station Communities			
Main Streets			
TOTAL			

[Table cells reserved for Goal 10 Calculations by 2040 design type]

From the changes described in the table above adoption of the new Comprehensive Plan Map would reduce the amount of housing to be built in any of the design types, or require adoption of future zoning that would. Title 1 probably does not apply to this ordinance, but if it does, all applicable Title 1 requirements have been met.

Title 2, Urban Growth Management Functional Plan Findings

Title 2 addressed parking policy, but was repealed when similar provisions were added to the RTP. The former Title 2 does not apply to this ordinance.

Title 3, Urban Growth Management Functional Plan Findings

TITLE 3: WATER QUALITY and FLOOD MANAGEMENT

Title 3 addresses water quality and flood management. The City has adopted overlay zones and land use regulations that, in the June 2011 update to its 2010 compliance report, Metro found sufficient to comply with Title 3. This ordinance does not change any of these overlays or regulations, nor does it adopt policy which would require such changes. Title 3 does not apply to this ordinance.

Title 4, Urban Growth Management Functional Plan Findings

TITLE 4: INDUSTRIAL AND OTHER EMPLOYMENT AREAS

Title 4 addresses industrial and employment areas.

[Reserved for comparison of Metro Title 4 Map and Portland Comprehensive Plan Map industrial and employment designations]

Title 5, Urban Growth Management Functional Plan Findings

Title 5 addressed neighbor cities and rural reserves, but was repealed. The former Title 5 does not apply to this ordinance.

Title 6, Urban Growth Management Functional Plan Findings

Title 6 address the particular region 2040 design types: centers, corridors, station communities and main streets. These are depicted on the new Comprehensive Plan map as required by Title 6. In some cases the City has depicted more centers, or more extensive centers, than required by

EXHIBIT A Further Findings of Fact

Title 6, and in other cases the extent centers of main streets and corridors is less on the plan map than the Title 6 map. There also some differences is terms. What the City depicts as a “neighborhood center” would be a “main street” within Title 6, and “civic corridor” would be a “corridor” within Title 6. Notwithstanding slight differences in extent and terminology, [This finding would benefit from a map displaying Metro and Portland Design extents.] the new Comprehensive Plan Map provides more opportunities to live and work in mixed use areas than the map it replaces. This ordinance substantially complies with Title 6.

Title 7, Urban Growth Management Functional Plan Findings

Title 7 addresses housing choice. Metro adopted voluntary affordable housing goals for each city and county in the region for the Years 2001 to 2006, but never updated. Since this ordinance adopts a plan for the period 2015 to 2035, Title 7 does not apply. That said the new Comprehensive Plan adopts affordable housing production goals that greatly exceed those adopted by the outdated Title 7.

Title 8, Urban Growth Management Functional Plan Findings

Title 8 addresses compliance procedures. This Title requires the City to notify Metro of pending land use decisions by providing Metro a copy of the 35-Day notice required by the DLCD for proposed completion of a periodic review task. This notice was provided to Metro. Title 8 also requires the City to provide findings of compliance with the *Urban Growth Management Functional Plan*. The findings in this ordinance were also provided to Metro. All applicable requirements of Title 8 have been met.

Title 9, Urban Growth Management Functional Plan Findings

Title 9 addressed performance measures, but was repealed. The former Title 9 does not apply to this ordinance.

Title 10, Urban Growth Management Functional Plan Findings

Title contains definitions. Whenever the City had a question about a term in the *Urban Growth Management Functional Plan*, the definition in Title 10 was applied. When the Comprehensive Plan adopted by this ordinance uses a term found in Title 10 either the term has the same meaning found in Title 10, or the difference is explained in these ordinance findings. All applicable requirements of Title 10 requirements have been met.

Title 11, Urban Growth Management Functional Plan Findings

Title 11 addresses planning for new urban areas. Since no areas added to the urban growth boundary or designated as urban reserves have been assigned to Portland by Metro for planning, Title 11 does not apply to this ordinance.

Title 12, Urban Growth Management Functional Plan Findings

Title 12 addresses protection of residential neighborhoods. This title largely restricts Metro’s authority to plan and regulate, but does allow City designation of “neighborhood centers.” The

EXHIBIT A Further Findings of Fact

City has not exercised the option to designate neighborhood centers within the meaning of Title 12, but has employed the same term with a different meaning. The areas designated as a neighborhood center on the new Comprehensive Plan map are functionally equivalent to a main street designation within Title 6. Since, the City has not employed any of the optional provisions of Title 12, Title 12 does not apply to this ordinance.

Title 13, Urban Growth Management Functional Plan Findings

Title 13 addresses nature in neighborhoods. The City adopted a New Natural Resources Inventory by Ordinance No. 185657, and this inventory was approved as a completed Periodic Review Task by LCDC Order 001850. On January 16, 2013 the City received a letter from Metro stated that Portland, upon adoption of this inventory, had also achieved compliance with Title 13.

The LCDC and Metro approved inventory identified the location, quantity and quality of various natural resources, and determined their significance – including identification of significant fish and wildlife habitat areas and riparian areas regulated by Title 13. In addition to the previously approved inventory, this ordinance adopts Comprehensive Plan Policies 7.19 through 7.22 that concern “Planning for Natural Resources” and Policies 7.23 to 7.26 that concern “Protecting Natural Resources” both sets of policies are fully compatible with regulations needed to carry out Title 13.

As noted in the findings for Title 14, West Hayden Island is a Habitat Conservation Area within the meaning of Title 13. Title 13 requires, “The City of Portland shall develop a District Plan that complies with Metro Code Section 3.07.1330(B)(4)(a), in cooperation with the Port of Portland, that applies to West Hayden Island.” The City prepared such a plan, with Port participation, but when the Port objected to its adoption it was withdrawn from Council consideration. Metro Code 3.07.1330(B)(4)(a) allows the adoption of a plan that either complies with Metro Code Section 3.07.1330(B)(1) or Metro Code Section 3.07.1330(B)(2). On January 16, 2013 the City received a letter from Metro stated that Portland had also achieved compliance with Title 13 by adoption of an inventory maps that “substantially comply with the Metro Habitat Conservation Areas Map” as required by the Section 3.07.1330(B)(2) option. These maps are also adopted as official comprehensive plan supporting documents for the Comprehensive Plan adopted by this ordinance.

Because this ordinance leaves, in place and unchanged, land use regulations and inventories previously determined to comply with Title 13, and because no provision on the maps or policies adopted by this ordinance requires changes to these inventories and land use regulations, all applicable requirements of Title 13 have been met.

Title 14, Urban Growth Management Functional Plan Findings

Title 14 addresses the regional urban growth boundary. Since this ordinance does not require, nor initiate, a boundary change, Title 14 does not apply.

Summary, Urban Growth Management Functional Plan Findings

The Metro Title 10 definition of comply or compliance means “substantial” rather than absolute compliance. “Substantial compliance” means city and county comprehensive plans and implementing ordinances, on the whole, conforms with the purposes of the performance standards in the functional plan and any failure to meet individual performance standard requirements is technical or minor in nature.

In 2010 the Metro Council adopted Section 8 of Ordinance No. 10-1244B, which repealed the performance measures in the functional plan, but compliance “standards” exist within other functional plan titles. There is one arguable failure in this ordinance, the City did not apply a Title 4 compatible industrial designation to West Hayden Island. However, Title 13 of the same functional plan requires West Hayden Island to be managed as a Habitat Conservation Area. There is internal conflict in the functional plan, so any failure of the City to advance conflicting objects (one can only advance Title 4 purposes at the expense of Title 13 purposes, and vice versa) can be categorized as a “technical” in nature.

For the facts and reasons stated above this ordinance substantially complies with all *Urban Growth Management Functional Plan* requirements applicable to Task IV of Portland’s periodic review work program.

Metro Regional Transportation Plan Findings

Because the City has yet to adopt a Transportation System Plan, the RTP does not apply to this ordinance. A TSP will be adopted as part of the City’s Task V, Periodic Review submittal.

Portland Comprehensive Plan Findings

Ordinances that amend comprehensive plans have to comply with policies that are not being amended. Since this ordinance repeals and replaces all existing policy, no part of the existing comprehensive plan applies to this ordinance.

Portland City Code

Under Chapter 33.740 of the City code, the update of the *Comprehensive Plan’s* factual base is a legislative project assigned to the PSC for a public hearing and recommendation and to the City Council for a public hearing and decision. These city code requirements have been met as demonstrated by the public meeting notices, agendas, testimony and minutes. While these materials are not attached to this ordinance, they were filed with the Council Clerk and became part of the record before the City Council when this ordinance was adopted. Appendix D the CIC report accepted as Exhibit B of Ordinance NO. _____ contains a two-page list of all PSC hearings, briefings and work sessions from April 12, 2012 to July 14, 2015. The requirement of the City Code most applicable to this ordinance is, that before the City Council considers a recommendation of the PSC, individuals and organizations identified by the code must be mailed 14 days advanced notice of the City Council hearing. The hearing date for this ordinance was November 19, 2015. To test the timely receipt of these notices the City mails a notice to itself.

EXHIBIT A Further Findings of Fact

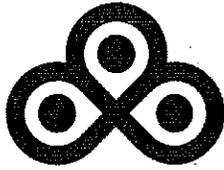
That test notice was received before October 13, 2015. The 14-day code requirement has been met. The City also mailed 28,000 Measure 56 notices to potentially affected property owners. All City Code requirements have been met.

Conclusion of Law

For the reasons stated in the findings above this ordinance fulfills, with the noted exceptions for the TSP, all requirements of City's state-mandated periodic review order for Tasks I and IV. [This Exhibit A will be substituted to respond to testimony received by City Council]

EXHIBIT B

Community Involvement Report for Tasks III and IV:



Bureau of Planning and Sustainability
Innovation. Collaboration. Practical Solutions.

MEMO

DATE: July 22, 2015
TO: Planning and Sustainability Commission
FROM: Community Involvement Committee
SUBJECT: Evaluation of Community Engagement in the Comprehensive Plan Update Process

This memo presents an overview of the community engagement activities in the process of the Comprehensive Plan Update, organized by each distinct phase of the process from 2012 to the present. This corresponds to Tasks 3 and 4 of the state-mandated Periodic Review process. Lessons learned in the process are summarized based on Community Involvement Committee members' observations and discussions, and feedback from City staff and the general public.

Foundation

The Comprehensive Plan Update (CPU) process was informed by goals and principles laid out in a number of key documents, including Goal 1 of the Statewide Planning Goals and Guidelines, City of Portland Public Involvement Principles, and the Public Participation principles in the Portland Plan. The main guide for the public involvement process is the seven principles laid out in the Comprehensive Plan Update Public Involvement Principles and Performance Measures established by the Community Involvement Committee (CIC) for the Comprehensive Plan. These are Public Involvement Advisory Council-adopted principles that the CIC embraced as the guide for the Comprehensive Plan public engagement process.

Comprehensive Plan Update Public Involvement Principles and Performance Measures

Principle 1: Partnership

Community members have a right to be involved in decisions that affect them. Participants can influence decision-making and receive feedback on how their input was used. The public has the opportunity to recommend projects and issues for government consideration.

Principle 2: Early Involvement

Public involvement is an early and integral part of issue and opportunity identification, concept development, design, and implementation of city policies, programs, and projects.

Principle 3: Building Relationships and Community Capacity

Public involvement processes invest in and develop long-term, collaborative working relationships and learning opportunities with community partners and stakeholders.

Principle 4: Inclusiveness and Equity

Public dialogue and decision-making processes identify, reach out to, and encourage participation of the community in its full diversity. Processes respect a range of values and interests and the knowledge of those involved. Historically excluded individuals and groups are included authentically in processes, activities, and decision and policy making. Impacts, including costs and benefits, are identified and distributed fairly.

Principle 5: Good Quality Process Design and Implementation

Public involvement processes and techniques are well-designed to appropriately fit the scope, character, and impact of a policy or project. Processes adapt to changing needs and issues as they move forward.

Principle 6: Transparency

Public decision-making processes are accessible, open, honest, and understandable. Members of the public receive the information they need, and with enough lead time, to participate effectively.

Principle 7: Accountability

City leaders and staff are accountable for ensuring meaningful public involvement in the work of city government.

Chronology

The following is a brief overview of the Task 3 and 4 Comprehensive Plan timeline. For more detailed information, see the memos summarizing each stage of outreach (listed in Appendix B). Tasks 3 and 4 exist within a larger multi-year Periodic Review work plan, as follows:

- **Task 1 – Community Engagement Plan.** This included creation of the CIC and development of a community engagement plan. This was acknowledged by the state in 2010 and 2011, with subsequent public involvement reporting requirements for tasks 3, 4 and 5 still outstanding.

- **Task 2 – Factual Basis.** Adopted by City Council in September 2012, this included Economic Opportunities Analysis (subsequently amended), Housing Needs Analysis, Infrastructure Condition and Capacity Analysis, Natural Resources Inventory, and Buildable Lands Inventory. This was acknowledged by the state in 2014.
- **Task 3 – Consideration of Alternatives.** This involved identifying the consequences of different patterns of development. The Growth Scenario Reports and updated Economic Opportunities Analysis recommended recently by the PSC are intended to fulfill portions of this requirement.
- **Task 4 – Policy Choices.** This is the recommended plan, including land use map, policies, and public facilities plans (Citywide Systems Plan).
- **Task 5 – Implementation.** Zoning code and map projects are underway to implement new land use designations and policies.

Periodic Review Task 3 and 4 Timeline Details			
Product	Date	What was included	Function
Initial Growth Scenarios Report	Early 2013	Performance Measures, Alternate Growth Scenarios	Establish measures for the evaluation of the draft plan alternatives, based on the Portland Plan. Present several growth alternatives to inform subsequent plan development.
Working Draft Part 1	January 2013	Draft Goals and Policies	Establish initial draft of Comprehensive Plan policy. Comments from public and PEGs on this document guided staff in the subsequent development of the Proposed Draft.
Working Draft Part 2	October 2013	Draft Map, Citywide Systems Plan	Establish initial draft of map and project lists. Comments from public and PEGs on this document guided staff in the subsequent development of the Proposed Draft.
Proposed Draft	July 2014	Goals and Policies, Citywide Systems Plan Comprehensive Plan Map, Transportation Systems Plan	Staff-written proposal to Planning and Sustainability Commission (PSC), based on feedback on Working Drafts. Testimony provided by the public informed PSC's development of the Recommended Draft.
Updated Growth Scenario Report and EOA	May 2015	Evaluation of Proposed Plan, Economic (Goal 9) Analysis	Evaluate the Proposed Draft against several possible alternatives, using performance measures selected earlier. The Updated EOA serves to document employment land supply analysis and updated conclusions, consistent with the Proposed Draft.
Recommended Draft	August 2015 (expected)	Goals and Policies, Citywide Systems Plan, Comprehensive Plan Map, Transportation Systems Plan	PSC-approved draft submitted to City Council. Testimony provided by the public will inform City Council's final Adopted Comprehensive Plan.

It is also important to note that the Comprehensive Plan was built on the foundation of the Portland Plan (adopted in April 2012), which included a substantial public involvement process. Much of the public feedback from the Portland Plan process also informed the Comprehensive Plan policy and map development.

During this time period, *Central City 2035*, a parallel comprehensive planning project for the Central City, was also underway, with its own public process. The Central City 2035 plan is expected to be an amendment to the Comprehensive Plan after its adoption.

2012: Spreading the Word

Public Involvement Objective: Collect early information to inform concept development.

Product: Working Draft Part 1 (released January 2013)

During 2012, Bureau of Planning and Sustainability (BPS) staff provided information about the Comprehensive Plan Update (CPU) process and content and took in feedback at standing meetings of neighborhood and interest-based organizations, reaching over 2000 people. Staff followed a basic rule: go to people where they are already gathered rather than asking them to come to staff. This approach was chosen deliberately to be respectful of the public's limited and valuable time, particularly given the length and depth of the Comprehensive Plan process.

The Comprehensive Plan Update webpage was created in 2012, and the monthly Comprehensive Plan E-News debuted in August 2012. By the end of the year, it had 5000 subscribers.

Eight CPU Policy Expert Groups (PEGs) were formed in May 2012 and met monthly for a year. The PEGs consisted of approximately 10 to 25 members each, representing community, professional, and agency viewpoints (about 50:50 community members and government agency staff), as well as specific skills and expertise that related to each PEG topic. The composition and the operating format of the PEGs was deliberately designed to invite stakeholders to step inside the policy development process to increase transparency and build ownership. The design of the PEGs enabled productive cross-disciplinary discussions that were valuable for vetting and elaborating on earlier drafts. Because the PEG meetings were open to the public, and all materials were posted, there was broader public participation in the review of early and emerging draft policies. The discussions at the PEG meetings informed the development of the Working Draft of the Comprehensive Plan and subsequently informed changes incorporated in the Proposed Draft of the Comprehensive Plan.

The Working Draft Part 1 was developed by staff during the last part of 2012, based on initial direction set in the Portland Plan, the adopted background reports¹, public feedback, and guidance from the PEGs.

¹ Task 2 as described above.

2013: Early Discussion

Public Involvement Objectives: Provide information about and collect public feedback on the Working Draft Parts 1 and 2, and growth scenarios, particularly focused on groups not reached by earlier outreach activities.

Product: Working Drafts Part 1 and 2.

The Working Draft of the Comprehensive Plan was released in January 2013. Comments were accepted on the Working Draft Part 1 through the end of April 2013.

The Comprehensive Plan Update community involvement activities for this phase kicked off in January 2013. Efforts focused on raising awareness and gathering community input on the Working Draft Part 1. Workshops were held at the District Coalition offices and at a business-focused event and an environmental-focused event. In this period, there were also 65 community presentations and 4 staff-tabled events with about *1,400 participants*. All of this outreach continued to take place at events and activities where people were already gathering.

The Policy Expert Groups that were formed in 2012 continued meeting through mid-2013, now crafting recommendations to staff that informed the development of the Proposed Draft.

In the spring of 2013, "District Mapping Conversations" were held to build capacity and familiarity with the Comprehensive Plan. District Liaisons led the 10 workshops, which were targeted to each specific coalition's concerns, followed by discussion, and a mapping exercise. These interactive exercises focused on topics addressed in the Comprehensive Plan such as centers and corridors, connectivity, scale, land use, and economic growth.

In the summer of 2013, BPS staff conducted targeted outreach to youth, people of color, and low-income residents. Sixteen tabling activities were held from June through August, primarily at popular community events where people would already be gathering for other activities. Tabling activities for adults, youth, and children included creating "postcards" expressing their affinity for special places, and a mapping exercise related to Comprehensive Plan policy.

In the fall of 2013, the focus shifted to the Working Draft Part 2, which included the first "Map App" and the Citywide Systems Plan (infrastructure plan). The Map App was released on October 2nd and comments were accepted through December 31, 2013. BPS staff provided information about the Working Draft at 51 community meetings, and held 33 training events on the Map App. There were also three District Mapping Conversations in the East, West, and North Districts with a focus on area-specific issues. *1,100 comments* were received from outreach during this period.

The Map App, an interactive online map display with multiple layers of information, proved to be an extremely effective outreach and engagement tool during this phase. For the first time, people could receive a tutorial and have access to a tremendous amount of data online, which they could review at their convenience. At this stage, the Map App also allowed members of the public to see comments logged by other people, which led to online conversations. The Map App was supported by a Companion Guide and a Mini Companion Guide (translated into Spanish, Russian, Chinese and Vietnamese), documents that helped the public understand and use the Map App more effectively.

During 2013, early work on Task 5 projects began. Project leads went to neighborhood associations, owners of large sites, and other stakeholders who might be particularly affected by the projects, to provide information and collect feedback.

2014: Proposed Draft Development and Public Review

Public Involvement Objective: Integrate feedback from previous stages into the Proposed Draft. Bring in early information to inform the development of alternatives for the Early Implementation projects. Bring in public feedback on the Proposed Draft.

Product: Proposed Draft

During winter and spring 2014, staff incorporated feedback into writing the Proposed Draft. During this time, staff continued to attend community meetings and provide updates on the Comprehensive Plan. District Liaisons also worked with place-based groups such as neighborhood associations to refine map proposals.

The Portland Bureau of Transportation (PBOT) convened a Transportation Expert Group (TEG) in January 2014 to advise the further development of the TSP update, building from earlier TEG work. TEG members, some of whom had been involved in the preceding PEGs (particularly the Network PEG), represent a variety of organizations and interests, including government agencies, geographic-based groups, and interest-based groups. This group met regularly throughout 2014 and 2015 to provide feedback to PBOT staff.

In early 2014, staff began research and assessment phases for early implementation projects (Task 5 of the Comprehensive Plan). Two of the projects, the Campus Institutions Zoning Project and the Mixed Use Zones Project, also formed public advisory committees which have met monthly to review the research and consider alternatives. Staff for these projects also presented to neighborhood associations, institutions, and interested community groups. For the Mixed Use Zones Project, public feedback was also collected through activities including a series of neighborhood walks and public workshops.

The Comprehensive Plan Proposed Draft, including policy and the map (showing property-specific changes), was released in July 2014. The map was integrated into a new version of the Map App, which included a form for providing legal testimony online.

In summer and fall 2014, the community involvement approach focused on increasing awareness of the Comprehensive Plan Proposed Draft and supporting community members in providing effective testimony.

- The release of the Proposed Draft, and the opportunity to provide testimony on it, was advertised through ads in community papers, content in the Comp Plan E-Newsletter, and District Liaison email distribution lists.
- Measure 56 mailings about the Proposed Draft were sent to 40,000 property owners in July and August of 2014. Mailings included information about the website and the phone number for the Comprehensive Plan Helpline.
- The Comprehensive Plan Helpline was staffed from July 2014 to the present, and is expected to remain staffed through the final adoption of the Comprehensive Plan. From July 2014 to the close of testimony, staff handled about 1,440 calls.

- Copies of the Draft Comprehensive Plan, Companion Guide and TSP were distributed to all Multnomah County library branches in the City of Portland.
- The Planning and Sustainability Commission held two briefings and five public hearings from September 2014 through February 2015. The final public hearing, in February 2015, was focused on TSP topics, and an updated project list published by PBOT in January.
- Testimony was also collected in the form of letters, emails, and online Map App comments. The public record was held open until March 2015 for additional written comments, responding to requests for additional time from several organizations.
- Five videos were posted online, illustrating key concepts of the Comprehensive Plan.
- Throughout this time staff continued to present at community meetings about the Comprehensive Plan.
- District Liaisons held “office hours” at 16 public locations in their districts.
- Three open houses were held, two in venues outside of downtown.
- An Online Open House was made available in the fall with the materials from the physical open houses, and accompanying narrative.
- District Liaisons also reached out to 12 community groups at “Learning and Commenting Sessions” about the Comprehensive Plan. Subsequently, District Liaisons worked with four non-geographic community groups to help them provide effective testimony.
- The Planning and Sustainability Commission also held hearings on the Updated Scenario Report and Economic Opportunities Analysis, in April and June of 2015.

The addition of a helpline and office hours provided a customer-service approach to answering questions and adding a human touch to the often overwhelming amount and complexity of information provided. In particular the helpline provided a way for people without computer access and/or literacy to easily learn more about the Comprehensive Plan. Many of the callers were confused or frightened by the legally-required language in the Measure 56 notices they received, and having the ability to talk with patient, helpful staff was welcome.

2015: Processing and Responding to Testimony

Public Involvement Objective: Help people to provide effective testimony on the Proposed Draft, and communicate about how the Comprehensive Plan process was unfolding.

Product: Staff reports to PSC, PSC Recommended Draft

From November 2014 through June 2015, staff resources for outreach were constrained by the need to process each piece of testimony and develop recommendations to the PSC for each of their topic-related work sessions. Over 4,000 individual pieces of testimony were received and included in the legal record.

- District Liaisons and other BPS staff continued to present at community meetings, and continued to work with individuals and organizations who had questions or concerns about the Comprehensive Plan.

- Helpline staff continued to take calls with questions about CPU content and process. About 50 calls have been handled since the close of testimony in March 2015.
- Periodic Review Task 5 projects continued to develop Concept and Discussion drafts, with ongoing advisory group meetings, focus groups, meetings with owners of major sites and other heavily-affected stakeholders, and several workshops.
- Ads encouraging people to provide feedback on the TSP ran in neighborhood newsletters in early 2015.
- An ad encouraging people to stay tuned to the Comprehensive Plan process ran in the Curbsider newsletter in June 2015, sent to all residential households throughout the city in buildings with four or fewer units.

PBOT conducted Transportation System Plan (TSP)-specific outreach in early 2015, in addition to participating in BSP community engagement activities. PBOT presented to District Coalition land use and transportation committees and other geographic-based groups in winter 2015. PBOT's public participation summary report is included in the list of memos already reviewed by the Planning and Sustainability Commission, Appendix B.

The PSC held 12 work sessions from January 2015 through July 2015. In late July 2015, the PSC will vote to recommend the Comprehensive Plan to City Council. The Recommended Draft will be released in August 2015, and City Council hearings are expected in the fall.

BPS staff will do community engagement activities over the summer and fall of 2015 with the goal of providing information about what is in the Recommended Draft and the Task 5 projects; how the process works for the different elements of the CPU; and when, where, and how community members can provide feedback most effectively.

- Legally-required notifications will be sent over the summer and fall to property owners affected by each implementation project, as well as an additional notice of upcoming City Council hearings to those affected by Task 4 Comprehensive Plan Map changes.
- Over the summer and fall, BPS staff will hold at least 12 "office hours" in community locations around the city. These events will be advertised in the legally-required notifications.
- An Open House for all Task 5 projects is expected in the fall. This event will be advertised in the legally-required notifications.
- Additional information sessions with short presentations and Q&A will be held for some of the Task 5 projects. These events will be advertised in the legally-required notifications.
- The Map App will be refreshed in late summer with layers for →Task 4 and Task 5 projects, and will include the ability to provide comments to staff or testimony to the PSC or City Council, depending on the stage of each project. The Map App will be advertised in the legally-required notifications.
- Communications about each draft release and each major public engagement activity will include media and social media announcements, and blog posts.

Challenges and Lessons Learned

In reviewing the Comprehensive Plan Update process, CIC members and staff identified some notable successes as well as several areas of improvement. Members of the public also identified concerns through the Helpline, testimony on the Proposed Draft, and other feedback venues along the way. This document was informed by the compiled memos written during the process, informal conversations with staff, and by discussions with CIC members at CIC meetings and in one-on-one conversation.

Scope

The Comprehensive Plan Update is an enormous undertaking with many complex elements. The sheer scope of this project made it difficult for community members to wrap their brains around it, even if they were already knowledgeable about land use planning. This problem was exacerbated by the interrelationships between multiple documents, including the Citywide Systems Plan, the Transportation System Plan, the Comprehensive Plan policy document, and the Comprehensive Plan map, not to mention the preceding Portland Plan process and documents.

- *Recommendation: Provide clear messaging about the process, the purpose of every part of a complex planning process, and the relationships between the documents. Present the content in both topic-based ways and geography-based ways.*

Committees/advisory groups

It is always difficult to talk about long-term planning, because it is very difficult for humans to imagine 20 years in the future. To help community members get a hold on the material and the issues, BPS offered a wide variety of engagement activities and methods, including advisory workgroups early in the process.

The early topic-based engagement through the PEGs was very successful. CIC members praised the groups for having diverse rosters (composed 50:50 of staff and community members) representing a wide variety of perspectives, and a thoughtful structure that allowed for sharing of knowledge and opinions without judgment. This represented a marked improvement from the advisory groups for the Portland Plan process, which some criticized as being opaque and exclusive. However, CIC members felt it would have been very useful to continue the PEGs longer through the CPU process (the PEGs were used only during the development of the Part 1 drafts, not during the development of the Proposed Draft). They felt that the workgroups could have been a useful tool both to monitor the further development of topical policies and map changes and also to provide an opportunity to share information and have open discussion of contentious issues.

CIC members also felt that the workgroups provided a venue for community members to hear from other people with different viewpoints, which helped remind them that the CPU must balance a variety of perspectives. If outreach and engagement occurs in too fragmented a way, with small like-minded groups kept separate from each other, the opportunity for dialogue is lost. One member suggested considering emulating the Citizen's Initiative Review Commission process of recruiting randomly-chosen, demographically-representative groups of people to review topics.

- *Recommendation: Create and maintain opportunities for facilitated dialogue among people with different perspectives and meaningful participation in process decision-making, both place-based and issue-based.*

CIC members contributed many hours of their time on a volunteer basis. Some members served on the CIC during the Portland Plan as well as the Comprehensive Plan, adding up to 6 years of CIC service. Several members felt that their participation could have been more effective with some changes. One member suggested that membership in CIC would feel more meaningful and be more productive if members were assigned to represent specific groups or places. Another member expressed that the complexity and timeline of the CPU was hard on CIC members as well as the general public, and that it sometimes felt like staff was trying to meet deadlines, not giving the CIC members enough time to work through issues.

- *Recommendation: Consider assigning community involvement committee members to work with and try to represent the interests of specific groups to which they belong. Make sure committee/advisory group members have the structure and time to consider complex issues. Ensure volunteer committee members are fully aware of project timelines.*

Issue of context

This phase of the Comprehensive Plan Update process happened to coincide with a development boom in Portland. This was in contrast to the earlier fact-finding (Task 2) phases which occurred during the great recession. This heightened building activity, particularly in neighborhoods located closer to the city center, where the physical environment had been fairly static for decades, created a lot of fear and anxiety about the future, influencing community response to and engagement with the Comprehensive Plan Update. This brought out different groups of stakeholders than had been motivated to participate during the recession.

Many community members expressed anger or concern (through testimony and other feedback) about scale/design/parking requirements of new mixed use and single family developments, demolitions, notification about demolitions and development, and use of historic lots of record to develop on smaller lots. The fact that all of these issues cannot be quickly fixed within the system to their satisfaction can lead to strong feelings of frustration and helplessness. Many people testified about development activity that is already underway, and legally beyond the reach of the longer term Comprehensive Plan map and policy decisions.

- *Recommendation: Provide opportunities and venues for people to express their concerns and work out their issues in the context of the assumption that things change. Provide support for people to figure out how, where and when to most effectively advocate about issues that are not in the purview of the Comprehensive Plan Update.*

Timeline

The Proposed Draft Comprehensive Plan was released in July 2014, and testimony was accepted through mid-March of the following year. Seventy four pieces of testimony were received during that time requesting that the testimony deadline be extended. Much of this concern arose from the coordination between the Comprehensive Plan map and the early implementation project on Mixed Use Zoning. The MUZ project established the code for new zones associated with new commercial designations assigned in the Comprehensive Plan map, and many community members were very concerned that they would not be able to see the final zoning code until after the land use designations had been approved by the Planning and Sustainability Commission.

Many people were confused by the planning process, which often involves development of policy before development of detailed regulations. The difference between policy and regulation is not always apparent to the general public. Many people were also confused by the difference between a Comprehensive Plan map and a zoning map.

Concern was also expressed through testimony and calls to the Helpline that the process is taking too much time, and regulatory changes are needed sooner. It was evident from some testimony that some audiences were experiencing process fatigue, having difficulty maintaining participation in a multi-year process. Some organizations and individuals who participated in the earlier phases of the Portland Plan or PEGs did not understand the relationship between their early involvement and the subsequent drafts.

- *Recommendation: Provide sufficient time for people to understand and respond to proposals after they are made available. Provide much clearer information about the overall planning process, and the way it is implemented through subsequent zoning.*

Messaging about process

One issue that arose during the testimony period was the need to communicate more clearly about how the feedback (comments, testimony, etc.) solicited during engagement activities would be considered and weighed in the decision-making processes. While much of the feedback that came in early on influenced and informed the development of the Proposed Draft, it was not made clear what was included and what was not. Community members who had weighed in early felt betrayed when their voice was not included in the Proposed Draft. Community members who had weighed in early on general concepts like concentrating density and growth around centers and corridors were surprised by the release of proposed property-specific changes or very specific policy items, and felt that they should have been able to weigh in on those specific proposals before they were incorporated into the Proposed Draft.

Community members were also concerned about the development of staff reports, which were provided to the Planning and Sustainability Commission to support their work sessions between January and June 2015. Because the testimony deadline was extended, additional testimony was still being received even as the PSC debated earlier testimony, and staff analysis of earlier testimony was being submitted. Some community members expressed concern that their testimony was not being given full consideration by the Planning and Sustainability Commission if it was not received in time to be

incorporated into the relevant staff report. Staff subsequently published recommendations related to later testimony.

- *Recommendation: Increase transparency in the decision-making process. Focus particularly on tracking what public feedback is received, and provide clear information about how it is considered and weighed against other variables at each stage of the process.*

Allocating resources fairly

BPS community engagement resources were allocated during this process in a responsive way. Because of this, more resources were disproportionately dedicated to some areas, some groups, and some individuals, rather than dedicated to increasing engagement with areas or groups that were not represented in the process.

- *Recommendation: Define clear parameters early in the process about how staff time and other resources will be allocated.*

General challenge of engaging people in planning

It can be very difficult to engage community members on land use planning projects unless it directly affects their neighborhood, and the earlier, broader conversations both on mapping and policy went unnoticed by many people who were jolted by the specific map proposed in July. CIC members stressed that early involvement is critical, both to bring in as many voices as possible, and also to give time for community members to understand the process and the content, and feel less overwhelmed and intimidated. CIC members also identified that fear is, unfortunately, often a strong motivator to people to bring their attention to a process.

- *Recommendation: Provide early involvement opportunities that are concrete, and when possible, geographically-specific to engage people who might otherwise not jump in to a planning process.*

Engaging under-represented communities in particular

Outreach activities specifically targeted at under-represented groups in summer 2013 were successful in making one-time contacts. CIC members recognized this effort, but noted that it should be embedded in relationship-building work.

Engaging under-represented people is difficult, and is more effectively done where trust has developed naturally over time through positive experiences and outcomes. CIC members noted that the Comprehensive Plan process has been able to use new City-developed infrastructure for engagement, such as Venture Portland, the Community Engagement Liaison program and the Diversity and Civic Leadership program, which should continue to be nurtured. BPS has also relied heavily on the District Liaison team to do engagement through existing relationships. While some of these outreach efforts resulted in substantial testimony (particularly work with the Community Alliance of Tenants), reaching under-represented communities continues to be a challenge for long-term planning. CIC members also stressed the importance of outreach to young people and renters, who are typically under-represented in planning processes.

BPS translated key documents and offered interpretation services for the Comprehensive Plan Helpline, but they were not heavily used.

- *Recommendation: Develop relationships by investing staff time and other resources in working with under-represented communities. Continue to seek more effective ways to talk about issues in ways that are relevant and meaningful to community members, particularly those who may be most affected by decisions. Continue to develop relationships with community leaders who can open doors for staff.*

The extent of CPU outreach distribution is not clearly known, because demographic information was not captured for many participants.

- *Recommendation: Collect more demographics to track the distribution of outreach.*

Inter-Agency Coordination

CIC members identified a lack of inter-bureau and inter-agency coordination as a hampering factor in outreach, reducing the clarity and effectiveness of communication. CIC members observed that the public is often confused or frustrated by what appears to be inefficiency. Even when there is behind-the-scenes coordination among bureaus and/or different public agencies, there is often an appearance of “the right hand doesn’t know what the left hand is doing.” Often, staff presents information about the particular project they’re familiar with, but is not conversant about other related City- or other agency-sponsored projects. Opportunities for outreach and education are missed when bureaus don’t coordinate their efforts – particularly because the public has limited time and appetite for public meetings. Making public meetings more versatile (in terms of what information is shared) is respectful of people’s time. Additionally, messaging about processes and projects should be more consistent and should highlight how projects are interrelated (e.g., rooted in the same set of guiding principles or policies; coincident in timing and location; etc.) to more effectively weave together seemingly disparate efforts.

- *Recommendation: Increase inter-bureau outreach coordination for large planning efforts. Any time there is an advertised gathering of people to learn about a project, staff should take advantage of the opportunity to talk about other projects under consideration, and how they are all related. Staff should take the time to coordinate with other bureaus so that messaging is consistent and conveys the interrelationship between the policy basis and desired outcomes of different projects.*

Tools

CIC members agreed that technology-based tools were very valuable in the CPU process, allowing a wider group of people to participate in a wider variety of ways. People who might not be able to come to a meeting or a hearing could make their voices heard. The Comprehensive Plan Update website was useful, but hard to find and difficult to navigate. The Map App was very well-received, and collected more than half the received testimony. BPS steadily increased use of social media throughout the process, and CIC members identified that as a valuable outreach tool.

- *Recommendation: Make project website distinctive and easy to find and navigate. Increase use of and variety of tools used for social media.*

Balancing out the technological tools, it is important to have personal, one-on-one human interactions. Tools like workshops, the Comprehensive Plan Helpline, and Comp Plan Office Hours allowed people who could not or preferred not to use technological tools to get the answers they needed and provide input to the process. While this commitment of staff time is expensive, there is clear demonstrated value.

- *Recommendation: Increase awareness of opportunities for conversations with human beings about planning projects, one-on-one help with questions about specific properties.*

Mailings sent to property owners are both an opportunity and a challenge. They provide an opportunity to communicate with people who may otherwise not be at all engaged. However, there are legal requirements for language that can create an intimidating look and tone to these mailings. Recipients need to know how to proceed with next steps without overwhelming them with too much information.

- *Recommendation: Use legally-required mailings to provide effective information and easy access to more information and engagement.*

CIC members noted that outreach at existing community events, such as farmers markets and festivals, is a good way to connect with those who would not get involved any other way. However, the one-time nature of those events makes it difficult to continue to build on that engagement or to track it, creating awareness but not depth of engagement. While many people signed up at these events to receive E-News updates, it is not known whether any of them engaged further in the Comprehensive Plan Update process.

- *Recommendation: Identify ways to follow up on one-time engagement opportunities such as street fairs.*

Appendix A: Measuring Up to the Principles

Relevant Comprehensive Plan Update Activities	Measures	Principle
<p>Staff summary memos to CIC, available on website and presented at PSC Briefings</p>	<p>Describe efforts made by City staff to report results and findings of previous outreach phases throughout the Comprehensive Plan Update process.</p>	<p>Partnership</p>
<ul style="list-style-type: none"> • 4 representatives from DCL Partners served on the Infrastructure Equity PEG • See Building Relationships and Community Capacity section above 	<p>Describe the influence of partnerships and follow-up activities conducted by staff for specialized outreach to ensure the opinions and needs of various communities are heard.</p>	
<p>This information was not collected.</p>	<p>% of people who complete evaluation forms at each stage of the process who feel positive that their feedback at events, polling, etc. is being heard.</p>	

	# of City(BPS)-hosted meetings (e.g. PEG, CIC, PSC)	<p>Comprehensive Plan Update <u>PEGs</u>: 105 meetings</p> <p><u>Community Involvement Committee</u>: 15+ meetings</p> <p><u>Planning and Sustainability Commission</u>: 19+ CPU hearings, briefings, work sessions</p> <p><u>Mixed Use Zones Project Advisory Committee</u>: 14 PAC meetings, 7 neighborhood walkabouts, 4 public open houses</p> <p><u>Institutional Zones Project Advisory Committee</u>: 10 meetings</p> <p><u>Employment Zones</u>: 4 focus groups, meetings with neighborhood associations, business associations, property owners</p> <p><u>Transportation Expert Group</u>: 10 meetings</p>
	# of non-City community meetings and events attended by staff.	579 (see Appendix C)
Early Involvement	Describe early involvement efforts to respond to community-driven issues (e.g., parking).	<ul style="list-style-type: none"> • <u>Policy Expert Groups (PEGs)</u>, convened from Summer 2012 to Fall 2013, brought up a number of community-driven issues. For example, topics covered by the PEGs included housing equity, gentrification/displacement, and building parks in underserved neighborhoods. • Early Task 5 public engagement activities included activities including focus groups, neighborhood walks, and workshops, addressing community issues such as parking and effects of new development and campuses on neighborhoods.
	Describe the CIC's role in designing the outreach process.	The CIC participated substantially in the development of the <u>Comprehensive Plan Update Community Involvement Plan</u> (January 2013). The CIC has also provided ongoing feedback on the engagement process as it evolved. The CIC reviews involvement and results, and makes recommendations to the PSC and bureau staff to help meet overall goals of the Public Involvement Work Program. The CIC also reviewed each outreach BPS staff phase memo and advised on modifications and additions to the outreach. Details can be found in the <u>CIC Meeting Minutes</u> .
	# of PEG meetings prior to release of discussion draft	46 PEG meetings were held June through Dec 2012, and the draft was released Jan 2013. PEG meetings continued through mid-2013.
	# of people recruited for PEG membership.	There were 202 PEG committee members.

Building Relationships and Community Capacity	Describe the new and existing relationships built upon during the Comprehensive Plan Update outreach process thus far.	<p>During the Comprehensive Plan Update, staff continued to build on relationships with District Coalitions, neighborhood associations, business associations, East Portland Action Plan (EPAP), PSU faculty, Portland City Bureaus (PBOT, BES, Bureau of Parks & Recreation, BDS), Portland Public Schools, Metro, affordable housing providers (REACH), Venture Portland, City Club, Portland Commission on Disabilities (PCoD), and more.</p> <p>Staff built new relationships with organizations including the Anti-Displacement and Gentrification Coalition.</p>
	% of individual participants who answered positively to a workshop evaluation question that asks whether or not they had a high level of knowledge and involvement on Comprehensive Plan issues.	This information was not collected.
	# of staff from other City bureaus and agencies who participated in Comprehensive Plan outreach effort; and number of City bureaus/agencies that devoted staff time informing and engaging their contacts and relationships in the Comprehensive Plan Update process.	<ul style="list-style-type: none"> • 43 non-BPS city staff served on PEGs • PBOT Staff participated in outreach activities throughout the process.

	# of people who responded as a 1st-time participant in a planning process.	This information was not collected.
Inclusiveness and Equity	Elaborate on the targeted outreach efforts to reach broader and more diverse groups with education and information.	<ul style="list-style-type: none"> • Staff presented at the Portland Commission on Disability (PCOD) in 2013. • BPS provided grant sponsorship for Diversity and Civic Leadership partners to participate in Infrastructure Equity PEG (11/12/12-8/7/13) • Targeted outreach to youth, low-income populations, and communities of color in Summer 2013 included tabling in a number of community events (Good in the Hood, Gateway Community Fair, National Night Out – Home Forward, National Night Out – PCC Cascade, Founders Day in Lents) and youth-focused events at SUN Schools (4 events) • Staff held a “Learning and Commenting” session and subsequently worked with the Community Alliance of Tenants, Living Cully, and PCRI in 2014 to support efforts to encourage members to provide testimony on the Comprehensive Plan. • Staff met with OEHR Community Engagement Liaisons program in 2014 to discuss Comprehensive Plan outreach. • Staff worked with the Anti-Displacement and Gentrification Coalition in 2015 on the incorporation of eleven policy changes in the Comprehensive Plan. • Other relevant tabling and presentation activities included: <ul style="list-style-type: none"> ○ Our 42nd Ave meeting (November 2013) ○ Health Equity in the Comp Plan workshop (November 2013) ○ MLK Dream Run (August 2014) ○ PAALF’s Developing Our People’s Plan: What is our community vision? Event (August 2014)
	# of targeted outreach groups engaged in the outreach phase.	See above
	# of total people reached through the Comprehensive Plan engagement process.	Notification mailings were sent to 40,000 people, and there were over 1200 contacts made during outreach activities.

	# of outreach documents translated into a non-English language (e.g., Spanish).	Brief text in the notification letters (explaining that the proposal affected properties and directing readers to call the Helpline) was translated into ten languages. A simple summary of the Proposed Draft and the CPU process was also translated into five languages and distributed at outreach activities in 2014 and 2015.
	# of times ADA accommodations were addressed (e.g., ASL interpretation, documents were designed to address readability, event location selection).	<ul style="list-style-type: none"> • ADA accessibility was considered in the selection of sites for City-hosted activities. • Infrastructure PEG provided accommodations for two members (tablet loaded with documents, ASL interpretation)
	# of events where an interpreter and/or non-English-speaking staff participated in outreach events.	<ul style="list-style-type: none"> • Spanish interpretation was provided, on request, at a PSC hearing in fall 2014. • Infrastructure PEG provided Spanish interpretation for one member
	# of cultural newspaper ads placed	Working Draft - two rounds of ads in El Hispanic News, Asian Reporter and Observer Proposed Draft - two rounds of ads in El Hispanic News, Asian Reporter and Observer

Good Quality Process Design and Implementation	Describe key CIC requests that were implemented by staff	<ul style="list-style-type: none"> • Learning from the Portland Plan’s Technical Action Groups (TAGs), the CIC recommended that the membership of the Comprehensive Plan Update’s Policy Expert Groups (PEGs) should be balanced with half city and agency partners and half with community members. (Spring 2012) • To better track the PEG public involvement approach, CIC members requested that they each have the option to serve on a PEG; therefore CIC members applied for and made up PEG membership. (Spring 2012) • With the August 2010 adoption of the City of Portland’s Public Involvement Principles, the CIC requested these replace the Portland Plan’s Public Involvement Goals and Measures of Success in evaluating and reporting back to the CIC, Planning and Sustainability Commission and others in the community. (Fall/Winter 2012-2013) • As a part of the Working Draft Part 1 workshops, the CIC recommended separate Business and Environmental Workshops and targeted outreach. (Spring 2013) • Following the Working Draft Part 1 workshops in February – March 2013, the CIC recommended the District Mapping Sessions to provide a more geographic information and discussion approach and an early involvement opportunity leading into the Working Draft Part 2. (Spring 2013) • Encouraged targeted outreach to youth through partnerships within the SUN programs. (Summer 2013) • Reviewed and provided feedback on the Mixed Use Zones Project, Campus Institutions Zones Project and Transportation Systems Plan Public Involvement Plans. (Fall 2013 – Winter 2014).
	Ask participants about the quality of their experience.	This information was not collected.
	# of meeting evaluations completed at PEG meetings and other public events.	This information was not collected.
	# of CIC evaluations completed, by phase	CIC members held an evaluation discussion at the meeting on 4/22/2015, based on the principles they had established in 2013.

	# of CIC Subcommittee meetings	Executive Committee – one meeting Outreach & Events Committee - two meetings CIC Membership Selection Process – one meeting Workshop Design Subcommittee – two meetings PEG membership selection process – one meeting
	# of Outreach and Events team meetings	Two
	% of participants who are satisfied or very satisfied with their outreach experience.	This information was not collected.
Transparency	Describe the different venues and approaches used for community involvement and engagement.	<i>See Chronology section above.</i>
	Describe the interactive tools used in the outreach effort.	<ul style="list-style-type: none"> • <i>Working Draft Part 2 Map App (V1)</i> <ul style="list-style-type: none"> ○ active: 10/2013 through 1/ 2014 • <i>Proposed Draft Map App 2 (V2)</i> <ul style="list-style-type: none"> ○ active: 7/2014 to present • <i>Map App Explorer</i> <ul style="list-style-type: none"> ○ active: 11/2014 to present • Mapping Exercises • Postcards • Online surveys

	Describe the various web-based techniques and social media networks utilized in the outreach effort and describe how utilizing social media has engaged community members and allowed for the community to provide feedback.	<ul style="list-style-type: none"> • <i>Working Draft Part 2 Map App (V1)</i> <ul style="list-style-type: none"> ○ active: 10/2013 through 1/ 2014 ○ page views: 18,000 ○ unique visitors: 8,000 ○ comments: 1,200 • <i>Proposed Draft Map App 2 (V2)</i> <ul style="list-style-type: none"> ○ active: 7/2014 to present (most visits July to September) ○ page views: 43,000 ○ unique visitors: 21,000 ○ comments: 2,500 • <i>Map App Explorer</i> <ul style="list-style-type: none"> ○ active: 11/2014 to present ○ page views: 2,000 ○ unique visitors: 1,000 • Facebook - 1,034 followers , multiple weekly posts • Twitter – 5520 followers, nearly daily posts • CPU E-News – 5000+ subscribers, monthly, read by 20-30% of recipients
	# of outlets where Comprehensive Plan Update materials were made continually available, other than internet (i.e., public libraries, universities, neighborhood coalition offices, DCL offices, etc.)	Working Part 1, Working Draft Part 2 & Proposed Draft were distributed to all Multnomah County Library branches and District Coalition offices in January 2012, October 2013 & July 2014.
	Amount of time provided for public comment on key products	Working Draft 1: 1/14-5/6/2013 Working Draft 2: 10/1-12/31/2013 Proposed Draft: 7/1/14-3/13/2015 Recommended Draft: 8/15/2015-?
	# of hits on the project website	363,271 from January 2013 to June 2015

	# of hours events or hearings at Planning and Sustainability Commission and City Council were televised on Portland Community Media	19 PSC briefings, hearings, and work sessions averaging 4.5 hours per event – each meeting was televised three times on Portland Community Media. Meetings were posted on YouTube beginning in early 2013.
Accountability	Describe how community participants might find their comments and opinions reflected in the Comprehensive Plan Update products and processes/at key milestones.	Comments to staff are reflected in the Working Draft and the Proposed Draft. Testimony to the Planning and Sustainability Commission is addressed in staff reports informing PSC work sessions in 2015.
	Describe self-evaluation efforts by staff after key milestones.	This information was not collected.
	# of people that responded that they felt engaged/heard at the event	This information was not collected.
	# of staff learning/trainings for public involvement skills	<ul style="list-style-type: none"> • OEHR Equity Trainings for PEG staff (3) and committee members (2) – Spring 2012 and Fall 2013 • CrossRoads Anti-Racism Training - Spring 2014 • Western State Center Dismantling Racism Training – Fall 2013 • Emotional Intelligence Training for Staff – Summer 2013

Appendix B: Memos Previously Reviewed

There have been six memos produced about the Comprehensive Plan Update public involvement process. These memos have already been reviewed by the Planning and Sustainability Commission, and will be included in the report for the state. The memos are listed below and are available online.

- What We Heard - 6/14/13 (covers the time period from 1/14/2013-5/6/2013)
- Spring 2013 District Mapping Conversations Summary Report - 8/13/2013 (covers the time period from May/June 2013)
- Final Summer 2013 Outreach Summary Report - 11/25/13 (covers the time period from 6/29-Aug 2013)
- What We Heard from the Public, CPU Part II - 2/19/14 (covers the time period from 10/2-12/23/13).
- Comprehensive Plan Update Public Involvement - 11/12/14 (covers the time period from 4/1/2014 to 11/4/2014)
- Transportation System Plan Public Involvement Report – 1/30/2015 (covers the time period from May 2012 to 3/10/2015)

Appendix C: Outreach Activities

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Public Involvement Advisory Council (PIAC)	4/3/2012	30	Presentation
	x		St Johns Design Committee	4/4/2012	5	Presentation
	x		Mt Scott-Arieta Neighborhood Association	4/4/2012	25	Presentation
	x		Hillsdale Neighborhood Association	4/4/2012	22	Presentation
	x		East Portland Neighborhood Office (EPNO) Neighborhood Association Chairs	4/4/2012	17	Presentation
	x		PDX Community Advisory Committee (PDX CAC)	4/5/2012	35	Presentation
	x		Richmond Neighborhood Association	4/9/2012	60	Presentation
	x		East Portland Neighborhood Office (EPNO) Land Use and Transportation Chairs	4/11/2012	8	Presentation
		x	Portland Business Alliance (PBA) Land Use Committee	4/11/2012		Presentation
	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	4/16/2012	15	Presentation
	x		Portland State University, USP 311 - Intro to Urban Planning (Elizabeth Morehead, instructor)	4/17/2012	60	Presentation
	x	x	Sullivan's Gulch Neighborhood Association	4/19/2012	15	Presentation
	x		Rebooting Democracy Conference	4/22/2012	30	Presentation
	x		Citywide Land Use Group	4/23/2012	12	Presentation
	x	x	Woodstock Neighborhood Association	4/26/2012	10	Presentation
x	x		North Portland Land Use Group (NPLUG)	4/26/2012	5	Presentation
	x		Public Involvement Advisory Council (PIAC)	5/1/2012	30	Presentation
x	x		St Johns Design Committee	5/2/2012	5	Presentation
	x		Portland State University, USP 311 - Intro to Urban Planning (Elizabeth Morehead,	5/3/2012	50	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
			instructor)			
	x		Healthy Kids, Healthy Communities Steering Committee	5/7/2012	6	Presentation
	x		Eastmoreland Neighborhood Association	5/7/2012	10	Presentation
	x		Public Involvement Advisory Council (PIAC)	5/8/2012	30	Presentation
	x		Hayhurst Neighborhood Association	5/14/2012	12	Presentation
	x		Richmond Neighborhood Association	5/14/2012	20	Presentation
	x		Hosford-Abernethy Neighborhood Development (HAND)	5/15/2012	25	Presentation
	x		Southwest Neighborhoods, Inc (SWNI), Land Use Committee	5/15/2012	6	Presentation
		x	Northwest Industrial Neighborhood Association	5/16/2012		Presentation
	x		Kaiser Permanente Community Fund Grantees' Summit	5/21/2012	50	Presentation
	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	5/21/2012	15	Presentation
	x		Northeast Coalition of Neighborhoods (NECN), Land Use & Transportation Committee	5/23/2012	15	Presentation
	x		Portland State University (PSU) First Stop Portland/University of Victoria @ British Columbia	5/23/2012	35	Presentation
	x		North Portland Land Use Group (NPLUG)	5/27/2012	5	Presentation
		x	Working Waterfront Coalition	5/29/2012		Presentation
	x		ResiliencePDX tabling	6/2/2012	30	Tabling
	x		Central Northeast Neighbors (CNN), Land Use & Transportation	6/4/2012	10	Presentation
	x		Homestead Neighborhood	6/5/2012	7	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
			Association			
	x		Public Involvement Advisory Council (PIAC)	6/5/2012	30	Presentation
		x	Central Eastside Industrial Council	6/5/2012		Presentation
	x		ABCs of Land Use - Multnomah Arts Center	6/9/2012	20	Presentation
	x		Reed Neighborhood Association Board	6/11/2012	10	Presentation
	x		Streets Reconsidered	6/13/2012	90	Presentation
	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	6/18/2012	15	Presentation
	x		Alberta Main Street Design Plan Meeting	6/21/2012	12	Presentation
	x		Northeast Coalition of Neighborhoods (NECN) Land Use & Transportation Committee	6/27/2012	10	Presentation
	x		Foster Lents Integration Partnership (FLIP)	6/27/2012	50	Presentation
	x		Multnomah County Drainage District	6/27/2012		Presentation
	x		Architectural Heritage Center	6/30/2012	28	Presentation
	x		Southwest Neighborhoods, Inc (SWNI) PEG Coordination	7/12/2012	8	Presentation
	x		Southwest Neighborhoods, Inc (SWNI) Land Use Chairs	7/19/2012	8	Presentation
	x		Sunday Parkways - Southwest tabling	7/22/2012	20	Tabling
	x		American Institute of Architects (AIA) / American Planning Association (APA) / American Society of Landscape Architects (ASLA) Urban Design Panel	8/2/2012	25	Presentation
	x		Age-Friendly Greater Portland (Metro and PSU sponsored)	8/8/2012	100	Presentation
	x		American Institute of Architects (AIA) Urban Design Committee	8/14/2012	25	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Public Involvement Advisory Council (PIAC)	8/14/2012	30	Presentation
	x		Multnomah Days tabling	8/18/2012	45	Tabling
	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	8/20/2012	15	Presentation
	x		Citywide Land Use Group	8/27/2012	20	Presentation
	x		Arbor Lodge Neighborhood Association	9/6/2012	2	Presentation
	x		Public Involvement Advisory Council (PIAC)	9/11/2012	30	Presentation
	x		Neighbors West Northwest Board (NWNW)	9/12/2012		Presentation
	x		Noise Review Board	9/12/2012	3	Presentation
	x		South Portland Neighborhood Association - LU Committee	9/17/2012	5	Presentation
	x		Sumner Neighborhood Association	9/18/2012	20	Presentation
	x		Southwest Neighborhoods, Inc (SWNI) - Joint LU and Cross PEG Committee	9/19/2012	9	Presentation
	x		Central Northeast Neighbors (CNN) NE 82nd Tour	9/19/2012	50	Presentation
	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	9/20/2012	15	Presentation
	x		Citywide Land Use Group	9/24/2012	10	Presentation
	x		Montavilla Neighborhood Association Meeting on Jurisdiction Transfer of 82nd Ave	9/24/2012	35	Presentation
	x		Our 42nd Avenue Economic Development	9/24/2012	10	Presentation
x	x		College Coalition	9/26/2012	10	Presentation
	x		Northeast Coalition of Neighborhoods (NECN), Land Use & Transportation Committee	9/26/2012	10	Presentation
	x		Homestead Neighborhood Association	10/2/2012	7	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Public Involvement Advisory Council (PIAC)	10/2/2012	30	Presentation
	x		South Portland Neighborhood Association Board	10/3/2012		Presentation
	x		ABCs of Land Use - Central Northeast Neighborhoods (CNN)	10/13/2012	25	Presentation
	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	10/15/2012	15	Presentation
	x		Age-Friendly City Advisory Council	10/22/2012	10	Presentation
	x		Northeast Coalition of Neighborhoods (NECN) Land Use & Transportation Committee	10/24/2012	13	Presentation
	x		Citywide Land Use Group	10/29/2012	25	Presentation
	x		Resiliency Northwest tabling	11/2/2012	47	Tabling
	x		42nd Avenue Walking Tour	11/3/2012	25	Presentation
	x		Central Northeast Neighborhoods (CNN) Land Use Transportation Committee	11/5/2012		Presentation
	x		Neighborhood Coalition Directors and Chairs	11/8/2012	15	Presentation
	x		PPS Jefferson Area Schools Enrollment Balancing Meeting	11/13/2012		Presentation
	x		Public Involvement Advisory Council (PIAC)	11/13/2012	30	Presentation
	x	x	Small Business Advisory Council (SBAC)	11/14/2012	25	Presentation
	x		East Portland Neighborhood Office (EPNO) Land Use and Transportation Chairs	11/14/2012	8	Presentation
	x		Fix-It Fair (Madison High School) tabling	11/17/2012	37	Tabling
	x		Downtown Neighborhood Association Land Use Committee	11/19/2012	8	Presentation
	x		Diversity and Civic Leadership	11/20/2012	8	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
			Partners	2		
	x		Citywide Land Use Group	11/26/2012		Presentation
x	x		Montavilla Neighborhood Association	11/26/2012	8	Presentation
x	x		Comp Plan Update: Campus Institutional Policy Update Community Briefing	11/29/2012	4	Presentation
	x		East Portland Action Plan (EPAP) Economic Development Subcommittee	12/3/2012	12	Presentation
	x		Public Involvement Advisory Council (PIAC)	12/4/2012	30	Presentation
	x		St Johns Truck Strategy Open House #2 tabling	12/12/2012	10	Tabling
	x		Woodstock Neighborhood Association	12/13/2012	12	Presentation
			Lloyd Center Mall	12/14/2012		Presentation
x	x		Eliot Neighborhood Association	12/17/2012	12	Presentation
x	x		Southwest Neighborhoods, Inc (SWNI) Land Use Chairs	12/18/2012	5	Presentation
	x		Linnton Neighborhood Association	1/2/2013	18	Presentation
	x		North Portland Neighborhood Services, Inc., Chairs	1/7/2013	13	Presentation
	x		East Portland Action Plan (EPAP) Economic Development Subcommittee	1/7/2013	10	Presentation
	x		Central Northeast Neighbors (CNN), Land Use Transportation	1/7/2013	6	Presentation
	x		Northwest Industrial Neighborhood Association (NINA)	1/8/2013	20	Presentation
	x		East Portland Neighborhood Office (EPNO) Land Use /Transportation	1/9/2013	8	Presentation
	x		Hayden Island Neighborhood Network	1/10/2013	20	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Immigrant and Refugee Community Organization (IRCO) all staff meeting	1/14/2013	17	Presentation
	x	x	Venture Portland	1/14/2013	20	Presentation
	x		Ashcreek Neighborhood Association	1/14/2013	10	Presentation
	x		American Institute of Architects (AIA) / American Planning Association (APA) /American Society of Landscape Architects (ASLA) Urban Design Panel	1/15/2013	18	Presentation
	x		Southwest Neighborhoods, Inc (SWNI) Land Use Committee	1/15/2013	20	Presentation
	x		PDX Community Advisory Committee (PDX CAC)	1/16/2013	30	Presentation
	x		Southwest Hills Residential League board	1/16/2013	6	Presentation
	x		Arbor Lodge Neighborhood Association	1/17/2013	20	Presentation
	x		Woodstock Neighborhood Association	1/17/2013	10	Presentation
x	x		Northeast Coalition of Neighborhoods (NECN), Land Use and Transportation Committee	1/23/2013	12	Presentation
x	x		North Portland Land Use Group (NPLUG)	1/24/2013	10	Presentation
	x		Fix-It Fair tabling	1/26/2013	46	Tabling
	x		Fix-It Fair Presentation	1/26/2013	10	Presentation
	x		Citywide Land Use Group	1/28/2013	15	Presentation
	x		Age Friendly City Advisory Council	1/28/2013	12	Presentation
x	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	1/28/2013	16	Presentation
	x		Southwest Neighborhoods, Inc (SWNI) (with reps from Crestwood, Far Southwest, Ash Creek and Markham Neighborhood Associations)	1/29/2013	5	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Laurelhurst Neighborhood Association	1/29/2013	50	Presentation
	x		University Park Neighborhood Association	1/30/2013	15	Presentation
	x	x	East Portland Action Plan (EPAP), Economic Development Subcommittee	2/4/2013	30	Presentation
	x		North Portland Neighborhood Services, Inc., Chairs	2/4/2013	14	Presentation
	x		North Portland Neighborhood Services, Inc.	2/4/2013	26	Presentation
	x		Portland State University, USP 350 - Public Participation (Richard White, instructor)	2/5/2013	45	Presentation
	x		Central Eastside Industrial Council (CEIC), Land Use Committee	2/5/2013	20	Presentation
	x		Public Involvement Advisory Council (PIAC)	2/5/2013	25	Presentation
x	x	x	Portland Freight Committee	2/7/2013	30	Presentation
	x		Superintendents' Council	2/8/2013	17	Presentation
	x		Southwest Community Center tabling	2/9/2013	15	Tabling
	x		Bridgeton Neighborhood Association	2/11/2013	15	Presentation
	x		Historic Landmarks Commission	2/11/2013	4	Presentation
	x		East Portland Action Plan (EPAP), Housing Subcommittee	2/11/2013	5	Presentation
	x		Portland Business Alliance, Transportation Subcommittee	2/12/2013	10	Presentation
	x		Bicycle Advisory Committee	2/12/2013	30	Presentation
	x		East Portland Neighborhood Office (EPNO), Land Use and Transportation Committee	2/13/2013	12	Presentation
	x		North Tabor Neighborhood Association	2/13/2013	12	Presentation
	x		Boise Neighborhood Association	2/15/2013	2	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Comp Plan Update: SW Workshop at Multnomah Arts Center	2/19/2013	40	Presentation
	x		Our 42nd Ave Annual Celebration & Design Fair tabling	2/19/2013	10	Tabling
	x		Pedestrian Advisory Committee	2/19/2013	20	Presentation
	x		Woodstock Neighborhood Association	2/20/2013	9	Presentation
	x		Southwest Hills Residential League Board	2/20/2013	11	Presentation
	x		Urban Forestry Commission	2/21/2013	25	Presentation
	x	x	Voice for Oregon Innovation and Sustainability (VOIS Alliance)	2/21/2013	40	Presentation
	x		Fix-It Fair (Ron Russell Middle School) tabling	2/23/2013	42	Tabling
			Comp Plan Update: N Workshop at De La Salle North Catholic High School	2/26/2013	26	Workshop
	x		East Portland Action Plan (EPAP)	2/27/2013	20	Presentation
	x		Comprehensive Plan Update: Southeast Workshop at Franklin High School	2/28/2013	45	Presentation
	x		Foster Lents Integration Partnership (FLIP)	2/28/2013	20	Presentation
	x		North Portland Land Use Group (NPLUG)	2/28/2013	6	Presentation
x	x	x	Oregon Trucking Association	3/1/2013	15	Presentation
	x		Comp Plan Update: E Workshop at David Douglas High School	3/2/2013	40	Presentation
	x		Age-Friendly City Advisory Council	3/4/2013	10	Presentation
	x	x	East Portland Action Plan (EPAP) Ecdev Subcommittee	3/4/2013	15	Presentation
	x		Comp Plan Update: CC Workshop at PSU Smith Memorial Union	3/5/2013	35	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Comp Plan Update: NE Workshop at Beaumont Middle School	3/9/2013	79	Presentation
	x		Healthy Kids, Healthy Communities Steering Committee	3/11/2013	10	Presentation
	x		St Johns Neighborhood Association	3/11/2013	25	Presentation
	x		East Columbia Neighborhood Association	3/12/2013	22	Presentation
x	x	x	Northwest Industrial Neighborhood Association (NINA)	3/12/2013	15	Presentation
	x	x	Small Business Advisory Council (SBAC)	3/13/2013	25	Presentation
	x		Elders in Action	3/13/2013	2	Presentation
	x		Brooklyn Action Corps	3/13/2013	15	Presentation
	x		East Portland Neighborhood Office (EPNO) Land Use & Transportation Committee	3/13/2013	20	Presentation
	x		Kenton Neighborhood Association	3/13/2013	25	Presentation
	x	x	Northeast Broadway Business Association	3/13/2013	40	Presentation
	x		Comp Plan Update: Business Workshop at Mercy Corps	3/14/2013	75	Presentation
	x		Portland Design Commission	3/14/2013	6	Presentation
	x		Diversity and Civic Leadership Partners	3/19/2013	6	Presentation
	x		Overlook Neighborhood Association	3/19/2013	25	Presentation
	x		Southwest Neighborhoods, Inc (SWNI) Land Use Committee	3/19/2013	10	Presentation
	x		Stol Rives (Steve Abel and clients)	3/21/2013	40	Presentation
	x		Citywide Land Use Group	3/25/2013	6	Presentation
	x		Homestead Neighborhood Association	4/2/2013	11	Presentation
	x		Public Involvement Advisory Council (PIAC)	4/2/2013	30	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Portland Commission on Disability (PCOD), Executive Subcommittee	4/3/2013	5	Presentation
	x		Comp Plan Update: Environmental Workshop at PSU Native American Student and Community Center	4/3/2013	70	Presentation
		x	Portland Freight Committee	4/4/2013		Presentation
	x		Tryon Creek Watershed Council	4/8/2013	9	Presentation
	x		Portland Commission on Disability (PCOD), Accessibility in the Built Environment	4/8/2013	12	Presentation
	x		Multnomah Neighborhood Association	4/9/2013	11	Presentation
	x		Cathedral Park Neighborhood Association	4/9/2013	12	Presentation
	x		Portland Commission on Disability (PCOD)	4/12/2013	25	Presentation
	x		PSU Intro to Urban Planning (Instructor Greg Schrock)	4/18/2013	60	Presentation
	x		Portland Commission on Disability (PCOD), Public Outreach and Awareness Subcommittee	4/18/2013	4	Presentation
	x		Elders in Action Commission	4/22/2013	8	Presentation
	x		Citywide Land Use Group	4/22/2013	12	Presentation
	x		University Park Neighborhood Association	4/22/2013	20	Presentation
	x		PSU Intro to Urban Planning (Instructor Greg Schrock)	4/25/2013	60	Presentation
	x		Portland Commission on Disability (PCOD), Employment Subcommittee (1:30-3:30)	4/26/2013	5	Presentation
	x	x	Sullivan's Gulch Neighborhood Association Land Use & Transportation Committee	4/27/2013	70	Presentation
	x		82nd Avenue Forum tabling	5/4/2013	70	Tabling
	x		Central Northeast Neighbors (CNN), Land Use &	5/6/2013	7	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
			Transportation			
	x		Central Eastside Industrial Council (CEIC), Land Use Committee	5/7/2013	18	Presentation
	x		West Portland Park Neighborhood Association	5/9/2013	7	Presentation
	x		Superintendents' Council	5/10/2013	10	Presentation
	x		Festival of the Birds tabling	5/11/2013	30	Tabling
	x		Comp Plan Update: District Mapping Conversation - SW #1	5/18/2013	11	Presentation
	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	5/20/2013	12	Presentation
	x	x	Portland Business Alliance, Government Affairs Committee	5/21/2013	20	Presentation
	x		Hosford-Abernethy Neighborhood Development (HAND)	5/21/2013		Presentation
	x		Southwest Hills Residential League board and association - 2035 Vision Forum	5/22/2013	25	Presentation
	x		Northeast Coalition of Neighborhoods (NECN), Land Use and Transportation Committee	5/22/2013	21	Presentation
x	x		Comp Plan Update: District Mapping Conversation - North #1	5/23/2013	21	Presentation
	x		Citywide Land Use Group	5/28/2013	11	Presentation
	x		Comp Plan Update: District Mapping Conversation - East #1	5/29/2013	19	Presentation
	x		Comp Plan Update: District Mapping Conversation - Southeast #1	6/1/2013	26	Presentation
	x		Comp Plan Update: District Mapping Conversation - Northeast #1	6/1/2013	25	Presentation
	x		Comp Plan Update: District Mapping Conversation -	6/1/2013	16	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
			Southwest #2			
	x		Foster Lents Integration Partnership (FLIP) tabling	6/4/2013	105	Tabling
	x		Public Involvement Advisory Council (PIAC)	6/4/2013	30	Presentation
	x		Beaumont-Wilshire Neighborhood Association General Meeting	6/10/2013	25	Presentation
x	x		Comp Plan Update: District Mapping Conversation - North #2	6/15/2013	14	Presentation
	x		Comp Plan Update: District Mapping Conversation - Northeast #2	6/15/2013	34	Presentation
	x		Public Utility Review Board	6/20/2013		Presentation
	x		Comp Plan Update: District Mapping Conversation - Southeast #2	6/22/2013	23	Presentation
	x		Citywide Land Use Group	6/24/2013	26	Presentation
	x		Northeast Coalition of Neighborhoods (NECN), Land Use and Transportation Committee	6/26/2013		Presentation
	x		Gateway Area Business Association Board of Directors	6/26/2013	9	Presentation
	x		Northwest District Association (NWDA) Planning Committee	6/27/2013	13	Presentation
	x		Comp Plan Update: District Mapping Conversation - East #2	6/29/2013	12	Presentation
	x		Good in the Hood tabling	6/29/2013	46	Tabling
	x	x	Our 42nd Ave NPI/42nd Ave Business Association Meeting	7/2/2013	25	Presentation
	x		Hayhurst Neighborhood Association	7/8/2013	17	Presentation
	x		Neighbors West-Northwest (NWNW) Board	7/10/2013	13	Presentation
	x		Sitton SUN Community School - Summer Camp	7/18/2013	30	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Parkrose SUN Community School - Summer Camp	7/23/2013	30	Presentation
	x		Cenntennial SUN Community School - Summer Camp	7/24/2013	43	Presentation
	x		Community Fair and Movie at Gateway Park tabling	7/26/2013	30	Presentation
	x	x	Sunday Parkways - North - tabling	7/28/2013	80	Tabling
	x		Beaumont SUN Community School - Summer Camp	7/30/2013	26	Presentation
	x		National Night Out - Lloyd District	8/6/2013		Presentation
	x		National Night Out - Home Forward in NW	8/6/2013		Presentation
	x		National Night Out - PCC Cascade in NE	8/6/2013		Presentation
	x		National Night Out - South Burlingame	8/6/2013		Presentation
	x		National Night Out - Glenfair Neighborhood Association tabling	8/7/2013	20	Tabling
	x		Sylvan Highlands Neighborhood Association	8/13/2013	5	Presentation
	x		Multnomah Days tabling	8/17/2013	70	Tabling
	x		Founders' Day in Lents tabling	8/18/2013	6	Tabling
	x		Southwest Neighborhoods, Inc (SWNI) Land Use Committee	8/20/2013	5	Presentation
	x		Sunday Parkways - Southeast	8/25/2013		Presentation
	x		Citywide Land Use Group	8/26/2013	15	Presentation
	x		The Racquet Club - Board	8/28/2013	7	Presentation
	x		Linnton Neighborhood Association	9/4/2013	15	Presentation
	x		Central Northeast Neighbors (CNN), Land Use & Transportation Committee	9/9/2013	15	Presentation
	x		Sylvan Highlands Neighborhood Association	9/10/2013	5	Presentation
	x		Public Involvement Advisory Council (PIAC)	9/10/2013	30	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x	x	Portland Development Commission	9/11/2013	8	Presentation
	x		Neighborhood District Coalitions Directors and Chairs	9/12/2013	15	Presentation
	x		HiNoon	9/16/2013	20	Presentation
	x		North Portland Neighborhood Services, Inc. - Chairs	9/16/2013	8	Presentation
	x		Southeast Uplift (SEUL) Land Use and Transportation Committee	9/16/2013	15	Presentation
	x		Southwest Neighborhoods, Inc (SWNI) LU Committee	9/17/2013		Presentation
	x		Citywide Land Use Group	9/23/2013	15	Presentation
x	x	x	Reed College	9/23/2013		Presentation
x	x	x	Columbia Corridor Association	9/25/2013	45	Presentation
	x		Southwest Neighborhoods, Inc (SWNI) Board	9/25/2013	17	Presentation
	x		Northeast Coalition of Neighborhoods, Land Use and Transportation Committee	9/25/2013	11	Presentation
		x	Columbia Corridor Association	9/25/2013		Presentation
	x		Oregon Public Health Institute - Healthy Multifamily Housing Forum	9/26/2013	40	Presentation
	x		North Portland Land Use Group (NPLUG)	9/26/2013		Presentation
	x		Age-Friendly City Advisory Council	9/30/2013	15	Presentation
	x		Public Involvement Advisory Council (PIAC)	10/1/2013	20	Presentation
x	x	x	Central Eastside Industrial Council (CEIC)	10/1/2013	25	Presentation
	x		Sullivan's Gulch Neighborhood Association Land Use & Transportation Committee	10/1/2013	12	Presentation
x	x		Sellwood Moreland Improvement League (SMILE)	10/2/2013	25	Presentation
	x		Central Northeast Neighbors (CNN), Land Use Transportation	10/7/2013	12	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x	x	East Portland Action Plan (EPAP) Economic Development Subcommittee	10/7/2013	10	Presentation
	x		East Portland Action Plan (EPAP) Land Use and Transportation Committee (LUTC)	10/9/2013	12	Presentation
	x		Kenton Neighborhood Association	10/9/2013	15	Presentation
	x		Portland Commission on Disabilities - Accessibility and the Built Environment Committee	10/14/2013	12	Presentation
	x		Powellhurst-Gilbert Neighborhood Association	10/14/2013	16	Presentation
	x		Fessenden	10/14/2013	4	Presentation
	x		St Johns Neighborhood Association	10/14/2013	25	Presentation
	x		Southwest Neighborhoods, Inc (SWNI) Land Use Committee	10/15/2013	8	Presentation
	x		American Institute of Architects (AIA) / American Planning Association (APA) /American Society of Landscape Architects (ASLA) Urban Design Panel	10/15/2013		Presentation
	x		Overlook Neighborhood Association	10/15/2013	20	Presentation
x	x		Woodstock Neighborhood Association Land Use Committee	10/16/2013	12	Presentation
	x		Development Review Advisory Committee (DRAC)	10/17/2013	25	Presentation
	x		PSU: Intro to Urban Planning (Instructor Greg Schrock)	10/17/2013	60	Presentation
		x	Northwest District Association	10/17/2013		Presentation
	x		Southeast Uplift Land Use (SEUL), Sustainability and Transportation Committee	10/21/2013	16	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Southwest Neighborhoods, Inc (SWNI) Transportation Committee	10/21/2013	17	Presentation
	x		Eliot Neighborhood Association	10/21/2013	9	Presentation
	x		Comprehensive Plan Brownbag (Portland Building)	10/22/2013	34	Presentation
	x		Mill Park Neighborhood Association	10/22/2013	13	Presentation
	x		Rose City Park Neighborhood Association	10/22/2013	48	Presentation
	x		Northeast Coalition of Neighborhoods (NECN), Land Use and Transportation Committee	10/23/2013	16	Presentation
	x		Southwest Neighborhoods, Inc (SWNI) Board	10/23/2013	25	Presentation
	x		PBOT Budget Advisory Committee	10/23/2013	8	Presentation
	x		PSU: Intro to Urban Planning (Instructor Greg Schrock)	10/24/2013	60	Presentation
	x		Comprehensive Plan Information Session (1900 Building)	10/24/2013	10	Presentation
	x		Division/Midway Alliance Neighborhood Prosperity Initiative	10/24/2013	13	Presentation
	x		North Portland Land Use Group (NPLUG)	10/24/2013	17	Presentation
		x	Parkrose Neighborhood Prosperity Initiative	10/26/2013		Presentation
x	x	x	Columbia Slough Watershed Council	10/28/2013	25	Presentation
	x		Citywide Land Use Group	10/28/2013	13	Presentation
	x		University Park Neighborhood Association	10/28/2013	15	Presentation
		x	Columbia Slough Watershed Council	10/28/2013		Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		InCight Meet Business Fair - Individuals with Disabilities meet Business/Job Fair tabling	10/29/2013	25	Tabling
	x		Comprehensive Plan Information Session Parkrose High School	10/29/2013	20	Presentation
	x		The N/NE Business Association (NNEBA)	10/30/2013	31	Presentation
		x	East Mapping Conversation	11/3/2013	14	Presentation
	x	x	East Portland Action Plan (EPAP) Economic Development Subcommittee	11/4/2013		Presentation
	x		Central Northeast Neighbors (CNN), Land Use Transportation	11/4/2013	12	Presentation
	x		North Portland Neighborhood Services, Inc. - Chairs	11/4/2013	12	Presentation
x	x	x	Portland Business Alliance, Land Use Transportation Committee	11/5/2013		Presentation
	x		Public Involvement Advisory Council (PIAC)	11/5/2013	25	Presentation
	x		Wilkes Neighborhood Association	11/5/2013	19	Presentation
		x	Portland Business Alliance (PBA)	11/5/2013		Presentation
	x		Metro Technical Advisory Committee (MTAC)	11/6/2013		Presentation
	x	x	NE 42nd Avenue Neighborhood Prosperity Initiative	11/6/2013	30	Presentation
	x		Northwest District Association (NWDA), Land Use and Transportation Committees	11/6/2013	20	Presentation
	x		East Portland Action Plan (EPAP) Neighborhood Chairs	11/6/2013	13	Presentation
x	x		Linnton Neighborhood Association	11/6/2013	18	Presentation
x	x		Kenton Business Association	11/7/2013	18	Presentation
x	x	x	Portland Freight Committee	11/7/2013	30	Presentation
x	x	x	Health Equity Comp Plan	11/7/2013	20	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
			Workshop			
	x		Community Alliance of Tenants	11/7/2013	1	Presentation
	x		Portland Design Commission	11/7/2013	7	Presentation
	x		Superintendents' Council	11/8/2013	12	Presentation
	x		Montavilla Neighborhood Association	11/11/2013	28	Presentation
		x	Northwest Industrial Neighborhood Association	11/11/2013		Presentation
x	x	x	North Industrial Neighborhood Association (NINA)	11/12/2013	15	Presentation
x	x		East Columbia Neighborhood Association tabling	11/12/2013	25	Tabling
	x		East Portland Action Plan (EPAP) Education Subcommittee	11/13/2013	10	Presentation
	x		Oregon Opportunity Network	11/13/2013	10	Presentation
	x		City Club Bicycle Transportation Advocacy Committee	11/13/2013	7	Presentation
	x		Lewis & Clark: Environmental Justice Law class (Jon Oster, instructor)	11/13/2013	12	Presentation
	x		East Portland Action Plan (EPAP) Land Use and Transportation Committee	11/13/2013	9	Presentation
x	x		Buckman Community Association Comprehensive Plan Forum	11/14/2013	45	Presentation
	x		Mappy Hour	11/14/2013	70	Presentation
	x		Urban Forestry Commission	11/14/2013	10	Presentation
	x		82nd Avenue Business Association	11/15/2013	8	Presentation
x	x		Southwest Mapping Conversation	11/16/2013	26	Presentation
	x		Southeast Uplift (SEUL) Land Use & Transportation committee	11/18/2013	18	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Infill Builder Group - Home Builders Association of Metro Portland	11/20/2013	20	Presentation
x	x	x	North Mapping Conversation	11/20/2013	31	Presentation
	x		NWNW Hill Communities	11/20/2013	2	Presentation
	x		Parkrose Business Association	11/21/2013	45	Presentation
	x		SW Trails	11/21/2013	24	Presentation
	x		Eastmoreland Neighborhood Association	11/21/2013	26	Presentation
	x		Terwilliger Plaza	11/23/2013	65	Presentation
x	x	x	Fix-It Fair - Parkrose High School tabling	11/23/2013	51	Tabling
	x		Citywide Land Use Group	11/25/2013	8	Presentation
	x		Historic Parkrose Neighborhood Prosperity Initiative	11/26/2013		Presentation
	x		Organizing People Activating Leaders (OPAL)	11/29/2013	2	Presentation
	x		Art Institute of Portland: Environmental Science class (professor Laura Nappi)	12/2/2013	20	Presentation
	x		Art Institute of Portland: Environmental Science class (professor Laura Nappi)	12/3/2013	18	Presentation
	x		Public Involvement Advisory Council (PIAC)	12/3/2013	20	Presentation
	x		Portland Parks & Recreation Board	12/4/2013	20	Presentation
	x		Center for Intercultural Organizing (CIO)	12/4/2013	2	Presentation
	x		South Portland Neighborhood Association	12/4/2013	15	Presentation
	x		Portland Freight Committee	12/5/2013	30	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Richmond Neighborhood Association - Board Meeting	12/9/2013	28	Presentation
x	x		East Columbia Neighborhood Association	12/9/2013	15	Presentation
x	x		Kenton Neighborhood Association	12/9/2013		Presentation
	x		Cully Association of Neighbors	12/10/2013	45	Presentation
	x		East Portland Neighborhood Office Land Use & Transportation committee	12/11/2013	9	Presentation
	x		Southwest Neighborhoods, Inc (SWNI) LU Committee	12/17/2013	14	Presentation
x	x		North Tabor Neighborhood Association	12/17/2013	7	Presentation
	x		Sellwood Moreland Improvement League (SMILE)	12/18/2013	15	Presentation
	x		Central Northeast Neighbors (CNN), Land Use Transportation	1/6/2014		Presentation
	x		Public Involvement Advisory Council (PIAC)	1/7/2014	25	Presentation
	x		Homestead Neighborhood Association	1/7/2014	17	Presentation
	x		East Portland Action Plan (EPAP), Technical Advisory Committee	1/8/2014	12	Presentation
	x		Irvington Community Association	1/9/2014	10	Presentation
	x		Sunnyside Neighborhood Association	1/13/2014	5	Presentation
		x	Portland Business Alliance (PBA) Land Use Committee	1/13/2014		Presentation
	x		PDX Community Advisory Committee	1/15/2014	35	Presentation
	x		Eliot Land Use & Transportation Committee	1/20/2014	12	Presentation
	x	x	Jade Steering Committee	1/21/2014	15	Presentation
	x		Parkrose/Sumner Joint Neighborhood Association meeting	1/21/2014	10	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Portland Housing Bureau - Fair Housing Advocacy Committee	1/21/2014	15	Presentation
	x		Fix-It Fair - Rosa Parks Elementary School	1/25/2014		Presentation
	x		Citywide Land Use	1/27/2014		Presentation
	x		Boise Neighborhood Association	1/27/2014		Presentation
	x		Citywide Land Use	1/27/2014	14	Presentation
	x		Linfield College Sustainability and Resiliency class (professor Robert Gardner)	1/29/2014	8	Presentation
			Transportation Expert Group	1/30/2014	10	Introduction to TEG and TSP
	x		Immigrant and Refugee Community Organization (IRCO) all staff meeting	1/31/2014	130	Presentation
	x		Public Involvement Advisory Council (PIAC)	2/4/2014		Presentation
	x		Sullivan's Gulch Neighborhood Association	2/4/2014		Presentation
	x		Sellwood Moreland Improvement League (SMILE)	2/5/2014		Presentation
	x		Public Involvement Citywide Training	2/6/2014		Presentation
	x		Powellhurst-Gilbert Neighborhood Association	2/10/2014	18	Presentation
	x		Sumner Association of Neighbors	2/18/2014	15	Presentation
	x		Ecodistrict Reps	2/19/2014	6	Presentation
	x		Rose City Park Neighborhood Association	2/20/2014	28	Presentation
	x		Powellhurst-Gilbert Neighborhood Association	3/10/2014	15	Presentation
	x		East Portland Action Plan (EPAP), Housing Subcommittee	3/10/2014	7	Presentation
	x		Cully Association of Neighbors	3/11/2014	30	Presentation
	x		East Portland Action Plan (EPAP), Land Use &	3/12/2014	12	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
			Transportation Committee			
	x		East Portland Action Plan (EPAP), Education Subcommittee	3/12/2014	11	Presentation
	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	3/17/2014	15	Presentation
	x		Sellwood Moreland Improvement League (SMILE)	3/19/2014	40	Presentation
	x		Our 42nd Ave annual event	3/31/2014	60	Presentation
	x		Public Involvement Advisory Council (PIAC)	4/1/2014	30	Presentation
	x		Reed Neighborhood Association	4/2/2014	50	Presentation
	x		East Portland Action Plan (EPAP), Education Subcommittee	4/9/2014	9	Presentation
	x		East Portland Action Plan (EPAP), Technical Advisory Committee	4/9/2014	14	Presentation
	x		East Portland Action Plan (EPAP) Land Use & Transportation Committee	4/9/2014	10	Presentation
	x		Woodstock Neighborhood Association Land Use Committee	4/9/2014	15	Presentation
	x		Sabin Neighborhood Association	4/14/2014	12	Presentation
	x		Powellhurst-Gilbert Neighborhood Association	4/14/2014	13	Presentation
	x		East Portland Action Plan (EPAP), Housing Subcommittee	4/14/2014	7	Presentation
	x		North Tabor Neighborhood Association	4/14/2014	10	Presentation
	x		Kerns Neighborhood Association	4/15/2014	20	Presentation
	x		Mt. Tabor Neighborhood Association	4/15/2014	40	Presentation
	x		Southwest Neighborhoods, Inc (SWNI) Land Use Committee	4/15/2014	8	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Montavilla Neighborhood Association Land Use & Transportation Committee	4/17/2014	5	Presentation
	x		Arbor Lodge Neighborhood Association	4/17/2014	15	Presentation
	x		Eliot Neighborhood Association Land Use & Transportation Committee	4/21/2014	12	Presentation
	x		Division Design Committee	4/24/2014	20	Presentation
x	x		Mixed Use Zones Project - Neighborhood Walk - NE Broadway	4/26/2014	22	Presentation
	x		Montavilla Neighborhood Visioning	4/28/2014	45	Presentation
	x		University Park Neighborhood Association	4/28/2014	10	Presentation
	x		Public Involvement Advisory Council (PIAC)	5/6/2014	30	Presentation
	x		Linnton Neighborhood Association	5/7/2014	8	Presentation
	x		Hayden Island Neighborhood Network	5/8/2014	20	Presentation
x	x		Mixed Use Zones Project - Neighborhood Walk - Southeast Division at 122nd	5/10/2014	8	Presentation
	x		Powellhurst-Gilbert Neighborhood Association	5/12/2014	14	Presentation
	x		Cathedral Park Neighborhood Association	5/13/2014	12	Presentation
	x		Hillsdale Alliance	5/14/2014	5	Presentation
x			Mixed Use Zones Project - Neighborhood Walk - Southeast 82nd/Jade District	5/14/2014	17	Presentation
	x		Kenton Neighborhood Association	5/14/2014	15	Presentation
	x		Brooklyn Station Areas Open House	5/15/2014	45	Presentation
	x		Piedmont Neighborhood Association	5/15/2014	12	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Southeast Uplift (SEUL) Land Use & Transportation committee	5/19/2014	20	Presentation
	x		Creston-Kenilworth Neighborhood Association	5/19/2014	15	Presentation
	x		Argay Neighborhood Association	5/20/2014	130	Presentation
	x		Southwest Neighborhoods, Inc (SWNI) Land Use Committee	5/20/2014	8	Presentation
	x		Overlook Neighborhood Association	5/20/2014	25	Presentation
x			Mixed Use Zones Project - Neighborhood Walk - N Lombard	5/22/2014	16	Presentation
	x		Lents Neighborhood Association	5/27/2014	19	Presentation
	x		Citywide Land Use	5/27/2014	15	Presentation
x	x		Mixed Use Zones Project - Neighborhood Walk - N Williams	5/29/2014	28	Presentation
	x		Public Involvement Advisory Council (PIAC)	6/3/2014	30	Presentation
x	x		Mixed Use Zones Project - Neighborhood Walk - Southeast Division St.	6/4/2014	63	Presentation
	x		St John's Neighborhood Association	6/9/2014	12	Presentation
	x		East Columbia Neighborhood Association	6/10/2014	10	Presentation
	x		East Portland Land Use & Transportation Committee	6/11/2014	8	Presentation
x	x		Mixed Use Zones Project - Neighborhood Walk - Multnomah Village	6/11/2014	15	Presentation
	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	6/16/2014	20	Presentation
	x		Hosford-Abernethy Neighborhood Development (HAND)	6/17/2014	10	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		South Portland Land Use Committee	6/17/2014	7	Presentation
	x		Portsmouth Neighborhood Association	6/17/2014	9	Presentation
	x		Summer Association of Neighbors	6/17/2014	12	Presentation
	x		Woodstock Land Use Committee	6/18/2014	15	Presentation
	x		82nd Avenue Coalition	6/23/2014	40	Presentation
	x		Laurelhurst Neighborhood Association	6/25/2014	40	Presentation
		x	Columbia Corridor Association	6/25/2014		Presentation
	x		Brooklyn Action Corps	6/26/2014	10	Presentation
	x		Powellhurst-Gilbert Neighborhood Association	6/29/2014	14	Presentation
	x		East Portland Action Plan (EPAP), Housing Subcommittee	6/29/2014	6	Presentation
		x	Portland Freight Committee	7/1/2014		Presentation
	x		Eastmoreland Neighborhood Association Land Use Committee	7/7/2014	10	Presentation
	x		Midway Business Association	7/8/2014	22	Presentation
	x		East Portland Action Plan (EPAP), Education Subcommittee	7/9/2014	9	Presentation
	x		East Portland Action Plan (EPAP), Technical Advisory Committee	7/9/2014	5	Presentation
	x		East Portland Action Plan (EPAP) Land Use and Transportation Committee	7/9/2014	10	Presentation
	x		Sunnyside Neighborhood Association	7/14/2014	8	Presentation
	x		East Portland Action Plan (EPAP), Housing Subcommittee	7/14/2014	7	Presentation
	x		Brooklyn Action Corps	7/15/2014	10	Presentation
	x		Pleasant Valley Neighborhood Association	7/16/2014	18	Presentation
	x	x	Parkrose Business Association	7/17/2014	42	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		Southeast Uplift (SEUL) Land Use & Transportation committee	7/21/2014	15	Presentation
x	x	x	Drop-in office hours at Division Midway Alliance	7/21/2014	5	Office hours
	x	x	Woodstock Community Business Association	7/22/2014	45	Presentation
	x		82nd Avenue Coalition - 82nd Ave Walk	7/28/2014	10	Presentation
	x		Citywide Land Use Group	7/28/2014	15	Presentation
	x		Parkrose Heights Neighborhood Association	7/29/2014	4	Presentation
x	x	x	Drop-in office hours at Holgate Library	7/29/2014	2	Office hours
x	x	x	Drop-in office hours at Southwest Neighborhoods, Inc (SWNI)	7/30/2014	5	Office hours
	x	x	MLK Dream Run celebration at MLK and Alberta	8/2/2014	12	Presentation
	x	x	Columbia Building Trades Council	8/5/2014	20	Presentation
	x	x	Sullivan's Gulch Neighborhood Association	8/5/2014	12	Presentation
	x	x	Sellwood Moreland Improvement League (SMILE)	8/6/2014	45	Presentation
x	x	x	Drop-in office hours at Division Midway Alliance	8/6/2014	2	Presentation
x	x	x	Drop-in office hours at Division Midway Alliance	8/11/2014		Presentation
			Powellhurst-Gilbert Neighborhood Association	8/11/2014	9	Presentation
			East Portland Action Plan (EPAP) Housing	8/11/2014	7	Presentation
x	x		Brentwood-Darlington Neighborhood Association	8/13/2014		Presentation
x	x		Neighbors West Northwest (NWNW) Special Land Use Meeting	8/13/2014	10	Presentation
x	x	x	Working Waterfront Coalition	8/14/2014	30	Presentation
x	x		Multnomah Days tabling	8/16/2014	55	Tabling

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
x	x		Portland African American Leadership Forum's (PAALF) Developing Our Peoples's Plan: What is our community vision? Tabling	8/16/2014	10	Tabling
x	x		Northwest District Association Board	8/18/2014	20	Presentation
x	x	x	Drop-in office hours at Division Midway Alliance	8/18/2014	1	Office hours
x	x	x	Drop-in office hours at Southwest Neighborhoods, Inc (SWNI)	8/19/2014	15	Presentation
x	x		Southwest Neighborhoods, Inc (SWNI) Land Use Committee	8/19/2014	10	Presentation
x	x	x	Drop-in office hours at Belmont Library	8/19/2014		Office hours
x	x		Pedestrian Advisory Committee walk on 82nd	8/19/2014	15	Presentation
x	x		Jade District	8/20/2014	5	Presentation
x	x		Urban Forestry Commission meeting	8/21/2014	20ish	Presentation
x	x		Rose City Park Neighborhood Association	8/21/2014	7	Presentation
x	x	x	Drop-in office hours at Kenton Library	8/22/2014	4	Presentation
x	x	x	Southeast Sunday Parkways tabling	8/24/2014	66	Tabling
x	x	x	Drop-in office hours at N Portland Library	8/25/2014	1	Presentation
x	x	x	North Portland Library Presentation	8/25/2014	1	Presentation
x	x	x	Drop-in office hours at Kenton FirehoUse	8/26/2014	9	Office hours
x	x	x	Northeast Coalition of Neighborhoods (NECN) Land Use & Transportation Committee	8/27/2014	22	Presentation
x	x	x	Drop-in office hours at Midland Library	9/2/2014	4	Office hours
x	x	x	Drop-in office hours at Midland Library	9/3/2014	9	Office hours

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
x	x	x	South Portland Neighborhood Association	9/3/2014	18	Presentation
x	x	x	Drop-in office hours at Northeast Coalition of Neighborhoods (NECN)	9/4/2014	5	Office hours
x	x	x	Drop-in office hours at Midland Library	9/4/2014		Office hours
x	x	x	Drop-in office hours at St. Johns Main Street	9/5/2014	5	Office hours
x	x		Powellhurst-Gilbert Neighborhood Association	9/8/2014	12	Presentation
x	x		East Portland Action Plan (EPAP) Housing Subcommittee	9/8/2014	7	Presentation
x	x		Portland Commission on Disabilities, Accessibility in the Built Environment subcommittee	9/8/2014	12	Presentation
	x		Bicycle Advisory Committee	9/9/2014	10	Presentation
x	x		Comprehensive Plan Open House	9/10/2014	26	Presentation
x	x		Central Northeast Neighbors (CNN) Land Use chairs meeting	9/10/2014	15	Presentation
x	x		Kenton Neighborhood Association	9/10/2014	15	Presentation
x	x		East Portland Land Use & Transportation Committee	9/10/2014	11	Presentation
x	x	x	Drop-in office hours at St. Johns Main Street	9/10/2014	5	Office hours
x	x	x	BPS Open House : East Portland	9/10/2014		Open House
		x	Portland Freight Committee	9/10/2014		Presentation
x	x	x	Drop-in office hours at Hollywood Library	9/11/2014	7	Office hours
x	x		Gateway Area Business Association	9/11/2014	18	Presentation
x	x		Hollywood Library Presentation	9/11/2014	9	Presentation
x	x		Southeast Uplift (SEUL) Land Use and Transportation Committee	9/15/2014	15	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
x	x		Multnomah Neighborhood Association - Land Use meeting	9/15/2014		Presentation
x	x		Overlook Village Business Association	9/16/2014	5	Presentation
x	x		Jade District Steering Committee	9/16/2014	20	Presentation
x	x		North Tabor Neighborhood Association	9/16/2014	15	Presentation
x	x	x	Drop-in office hours at Midland Library	9/16/2014	5	Office hours
			BPS Open House : Downtown	9/16/2014		Open house
			Pedestrian Advisory Committee	9/16/2014	10	Presentation
x	x		Pleasant Valley Neighborhood Association	9/17/2014	18	Presentation
x	x		Small Infill Subgroup of the Homebuilders Association	9/17/2014	15	Presentation
x	x		Piedmont Neighborhood Association	9/18/2014	14	Presentation
x	x		Alberta Main St design committee	9/18/2014	18	Presentation
x	x		Rose City Park and Roseway Neighborhood Association	9/18/2014	27	Presentation
x	x	x	BPS Open House : North Portland	9/18/2014		Open House
x	x		82nd Avenue Improvement Coalition	9/22/2014	22	Presentation
x	x		Parkrose School Board	9/22/2014	20	Presentation
x	x		Living Cully partners meeting	9/24/2014	12	Presentation
x	x		North Portland Land Use Group	9/25/2014	15	Presentation
x	x		League of Women Voters	9/26/2014	15	Presentation
x	x		Southwest Neighborhoods, Inc (SWNI) Comprehensive Plan Update meeting	9/30/2014	33	Presentation
x	x	x	Portland Freight Committee	10/2/2014	10	Presentation
		x	Parkrose Neighborhood Prosperity Initiative	10/2/2014		Presentation
x	x		Homestead Neighborhood Association	10/7/2014	10	Presentation
x	x		Wilkes Neighborhood	10/7/2014	14	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
			Association			
x	x		Public Involvement Advisory Council (PIAC)	10/7/2014	30	Presentation
x	x		East Portland Land Use and Transportation Committee	10/8/2014	9	Presentation
x	x		East Portland Action Plan (EPAP) Technical Advisory Committee	10/8/2014	9	Presentation
x	x		Bridlemile Neighborhood Association	10/8/2014	12	Presentation
x	x		Eliot Neighborhood Association	10/13/2014		Presentation
x	x		Ashcreek Neighborhood Association	10/13/2014	20	Presentation
x	x		Powellhurst-Gilbert Neighborhood Association	10/13/2014	12	Presentation
x	x		East Portland Action Plan (EPAP) Housing	10/13/2014	6	Presentation
x	x		Richmond Neighborhood Association	10/13/2014	45	Presentation
x	x		Multnomah Neighborhood Association	10/14/2014	40	Presentation
x	x		Urban Forestry Commission Policy Committee	10/14/2014	4	Presentation
x	x		Cully Association of Neighbors	10/14/2014	30	Presentation
x	x	x	Portland Business Alliance Transportation Subcommittee	10/14/2014	10	Presentation
	x		Doorknocking on Fessenden in St John's	10/15/2014	6	Doorknocking
x	x		Southwest Hills Residential League (SWHRL) General Mtg	10/15/2014	20	Presentation
x	x		Woodstock Neighborhood Association Land Use Committee	10/15/2014	10	Presentation
x	x		Northeast Coalition of Neighborhoods (NECN)	10/18/2014	23	Presentation
x	x		Southeast Uplift (SEUL) Land Use & Transportation	10/20/2014	15	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
			Committee			
x	x		Southwest Neighborhoods, Inc (SWNI) LU Committee	10/21/2014	16	Presentation
x	x		Port of Portland Community Advisory Committee (PDX CAC)	10/22/2014	40	Presentation
x	x		North Portland Land Use Group	10/23/2014	12	Presentation
x	x		Hollywood Neighborhood Association	10/23/2014	12	Presentation
x	x		Woodstock Visioning Project	10/23/2014	90	Presentation
x	x		82nd Ave Coalition	10/27/2014	19	Presentation
x	x		Multnomah Neighborhood Association Land Use Committee	10/27/2014	6	Presentation
x	x	x	North/Northeast Business Association	10/29/2014	25	Presentation
			Joint Modal Committee	11/3/2014	10	Presentation
x	x		Public Involvement Advisory Council (PIAC)	11/4/2014	30	Presentation
x	x		Mixed Use Zones Preliminary Concept Workshops	11/5/2014	90	Workshop
			Portland Freight Committee	11/6/2014	10	Presentation
x	x		Foster Powell Neighborhood Association	11/10/2014	20	Presentation
x	x		East Portland Action Plan (EPAP) Housing	11/10/2014	6	Presentation
			Budget Advisory Committee	11/10/2014	10	Presentation
x	x	x	NAI Norris, Beggs, and Simpson	11/12/2014	15	Presentation
x	x		Brooklyn Action Corps	11/12/2014	5	Presentation
x	x	x	NE Broadway Business Association	11/12/2014	10	Presentation
x	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	11/17/2014	10	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x	x	Joint Modal Committee	11/19/2014	10	Presentation
x	x		Russell Neighborhood Association	11/20/2014	17	Presentation
x	x		Fix-It Fair (Parkrose HS) tabling	11/23/2014	60	Tabling
x	x		Citywide Land Use	11/24/2014	5	Presentation
			Portland Freight Committee	12/4/2014	10	Presentation
x	x		East Portland Action Plan (EPAP) Housing	12/8/2014	7	Presentation
	x	x	Bicycle Advisory Committee	12/9/2014	10	Presentation
	x	x	Joint Modal Committee	12/9/2014	10	Presentation
	x	x	Neighborhood Coalition Directors and Chairs	12/11/2014	10	Presentation
x	x		Southwest Neighborhoods, Inc (SWNI) Land Use Committee	12/16/2014	12	Presentation
	x	x	Pedestrian Advisory Committee	12/16/2014	10	Presentation
x	x		Eastmoreland Neighborhood Association - Land Use Committee	1/5/2015	8	Presentation
x	x		Public Involvement Advisory Council (PIAC)	1/6/2015	30	Presentation
x	x		Sullivans Gulch Neighborhood Association	1/6/2015	8	Presentation
x	x		South Portland Neighborhood Association	1/7/2015	20	Presentation
			Joint Modal Committee	1/7/2015	10	Presentation
x	x		League of Women Voters	1/12/2015	75	Presentation
x	x		Foster-Powell Neighborhood Association	12-Jan	20	Presentation
x	x		Humboldt Neighborhood Association	1/13/2015	10	Presentation
	x	x	Portland Business Alliance/Transportation Subcommittee	1/13/2015	10	Presentation
x	x		Hawthorne Boulevard Business Association	1/14/2015	10	Presentation
x	x		NE Broadway Business Alliance	1/14/2015	15	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x		East Portland Neighborhood Office (EPNO) Land Use and Transportation Committee	1/14/2015	10	Presentation
		x	PDX Community Advisory Committee	1/15/2015		Presentation
x	x		Jade District Roll Out event	1/20/2015	45	Presentation
x	x		Cully Association of Neighbors - Land Use & Transportation Committee	1/20/2015	12	Presentation
	x		Southwest Neighbors, Inc. (SWNI) Transportation Committee	1/21/2015	10	Presentation
	x		Central Northeast Neighbors	1/21/2015	10	Presentation
x	x		Division Design Initiative	1/22/2015	15	Presentation
	x		Southwest Trails	1/22/2015	10	Presentation
x	x		Fix-It Fair (Rosa Parks Elementary School) tabling	1/24/2015	22	Tabling
x	x		Southeast Uplift (SEUL) Land Use and Transportation Committee	1/26/2015	15	Presentation
x	x		Eliot Land Use & Transportation Committee	1/26/2015	10	Presentation
	x		Southeast Uplift	1/26/2015	10	Presentation
	x		82 nd Avenue Improvement Coalition	1/26/2015	10	Presentation
	x		Northeast Coalition of Neighborhoods (NECN)	1/28/2015	10	Presentation
x	x		Woodstock Community Business Association	2/2/2015	35	Presentation
x	x		Homestead Neighborhood Association	2/3/2015	15	Presentation
x	x		Mt. Scott-Arleta Neighborhood Association	2/4/2015	35	Presentation
	x		Venture Portland/Portland Business Association	2/4/2015	20	Presentation
	x		Portland Freight Committee	2/5/2015	10	Presentation
x	x		St John's Neighborhood - Doorknocking	2/7/2015	20	Presentation
x	x		Richmond Neighborhood Association	2/9/2015	45	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
x	x		East Portland Action Plan (EPAP) Housing	2/9/2015	8	Presentation
x	x		Beaumont-Wilshire Neighborhood Association General Meeting	2/9/2015	20	Presentation
x	x		Multnomah Neighborhood Comp Plan Forum	2/10/2015	125	Presentation
	x		Portland Business Alliance/Transportation Subcommittee	2/10/2015	20	Presentation
	x		Bicycle Advisory Committee	2/10/2015	10	Presentation
x	x		Kenton Neighborhood Association General Meeting/Open House	2/11/2015	15	Presentation
x	x		Neighbors West-Northwest	2/11/2015	12	Presentation
x	x		East Portland Land Use & Transportation Committee	2/11/2015	15	Presentation
x	x		East Portland Land Use and Transportation Committee	2/11/2015	15	Presentation
	x		Neighbors West-Northwest Board	2/11/2015		Presentation
		x	Swan Island Business Association	2/11/2015		Presentation
x	x		Hosford-Abernethy Neighborhood Development (HAND) Special Meeting on the Comp Plan	2/12/2015	10	Presentation
x	x		Northwest District Association Land Use	2/12/2015	8	Presentation
x	x		North Portland Health Group	2/12/2015	12	Presentation
		x	Northwest District Association	2/12/2015		Presentation
x	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	2/16/2015	15	Presentation
x	x		Southeast Uplift Board	2/16/2015	20	Presentation
x	x		Southwest Neighborhoods, Inc (SWNI) Land Use & Transportation Committee	2/17/2015	12	Presentation
x	x		Southwest Neighborhoods, Inc (SWNI)	2/17/2015	15	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
	x	x	Pedestrian Advisory Committee	2/17/2015	10	Presentation
x	x		Sellwood Moreland Improvement League (SMILE)	2/18/2015	15	Presentation
x	x		Broadway-Weidler Alliance	2/19/2015	15	Presentation
	x		Northeast Broadway Business Association	2/19/2015	10	Presentation
		x	Portland Business Alliance (PBA) Land Use Committee	2/20/2015		Presentation
x	x		Northeast Coalition of Neighborhoods (NECN) Safety/Livability Committee	2/23/2015	8	Presentation
x	x		Division-Clinton Business Association	2/25/2015	6	Presentation
x	x		Mixed Use Zones Project - Concept Information Sessions	2/25/2015	40	Information Session
		x	Columbia Corridor Association	2/25/2015		Presentation
x	x		Mixed Use Zones Project - Concept Information Sessions	2/26/2015	30	Information Session
x	x		North Portland Land Use Group (NPLUG)	2/26/2015	12	Presentation
	x		North Portland Neighborhood Services, Inc.	2/26/2015	10	Presentation
x	x		Public Involvement Advisory Council (PIAC)	3/3/2015	30	Presentation
x	x		Brentwood-Darlington Neighborhood Association	3/5/2015	25	Presentation
		x	Working Waterfront Coalition	3/5/2015		Presentation
x	x		Hosford-Abernethy Neighborhood Development (HAND) Walking Tour	3/6/2015	6	Presentation
x	x		Mixed Use Zones Open House	3/10/2015	17	Presentation
x	x		Portsmouth Neighbors	3/11/2015	9	Presentation
x	x		Hosford-Abernethy Neighborhood Development (HAND)	3/17/2015	10	Presentation
x	x		Central Northwest Neighbors (CNN) Land Use Committee	3/18/2015	12	Presentation
x	x		Development Review Advisory Committee (DRAC)	3/19/2015	20	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
x	x		Citywide Land Use	3/23/2015	25	Presentation
x	x		Northeast Coalition of Neighborhoods (NECN)	3/25/2015	12	Presentation
x	x		North Portland Land Use Group (NPLUG)	3/26/2015	8	Presentation
x	x		North Northeast Business Association	4/1/2015	25	Presentation
x	x		North Northeast Business Association	4/1/2015	25	Presentation
x	x		Anti-Displacement and Gentrification Coalition	4/2/2015	10	Meeting
x	x		Public Involvement Advisory Council (PIAC)	4/7/2015	30	Presentation
x	x		Eliot Neighborhood Association Land Use and Transportation Committee	4/13/2015	8	Presentation
x	x		Sunnyside Neighborhood Association	4/13/2015	30	Presentation
x	x		Richmond Neighborhood Association	4/13/2015	25	Presentation
x	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	4/20/2015	15	Presentation
x	x		Hosford-Abernethy Neighborhood Association (HAND)	4/21/2015	25	Presentation
	x	x	Rose City Park Neighborhood Association Community Visioning Workshop	4/28/2015		Presentation
		x	Cully Neighborhood Association, Verde	5/4/2015		Presentation
x	x		East Portland Action Plan (EPAP) Housing Subcommittee	5/11/2015	8	Presentation
x	x		Reed Neighborhood Association	5/12/2015	24	Presentation
x	x		East Portland Action Plan (EPAP) Land Use & Transportation Subcommittee	5/13/2015	9	Presentation
x	x		Buckman Community Association Comprehensive	5/14/2015	40	Presentation

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
			Plan Forum			
x	x		REACH Community Development	5/18/2015	3	Presentation
x	x		Southeast Uplift (SEUL) Land Use & Transportation Committee	5/18/2015	10	Presentation
x	x		Southwest Neighborhoods, Inc Land Use Committee	5/19/2015	10	Presentation
x	x		Woodstock Neighborhood Association Land Use Committee	5/20/2015		Presentation
x	x	x	Drop-in office hours at Central Northeast Neighbors (CNN) office	5/20/2015	1	Office hours
		x	82nd Ave Business Association	5/26/2015		Presentation
x	x	x	Drop-in office hours at East Portland Police space	5/27/2015	1	Office hours
x	x	x	Drop-in office hours at Hillsdale Library	5/28/2015	0	Office hours
x	x		Homestead Neighborhood Association	6/2/2015	10	Presentation
x	x		East Portland Action Plan (EPAP) Housing Subcommittee	6/8/2015	8	Presentation
x	x	x	Drop-in office hours at Midland Library	6/13/2015	4	Office hours
x	x	x	Drop-in office hours at Southwest Neighborhoods, Inc	6/16/2015	15	Office hours
x	x		Southwest Neighborhoods, Inc Land Use Committee	6/16/2015	9	Presentation
x	x		St Johns Neighborhood Association	6/25/2015	12	Presentation
x	x		East Portland Action Plan (EPAP), Technical Advisory Committee	7/8/2015	8	Presentation
x	x	x	Drop-in office hours at Mt Scott Community Center	7/9/2015	2	Office hours
x	x	x	Drop-in office hours at East Portland Community Center	7/9/2015	2	Office hours

Task 5	Task 4	Task 3	Organization/Event	Date	# Contacts	Activity
x	x	x	Drop-in office hours at Peninsula Park Community Center	7/11/2015		Office hours
		x	Northwest Industrial Neighborhood Association	7/14/2015		Presentation

Appendix D: Planning and Sustainability Commission and Community Involvement Committee Activities

Task 3	Task 4	Task 5	Group	Date	Activity
	x		Planning & Sustainability Commission	4/12/2012	briefing
	x		Planning & Sustainability Commission	7/10/2012	hearing / recommendation
	x		Planning & Sustainability Commission	1/22/2013	work session
	x		Planning & Sustainability Commission	1/29/2013	work session
x			Planning & Sustainability Commission	2/12/2013	briefing
	x		Planning & Sustainability Commission	2/26/2013	work session
	x		Planning & Sustainability Commission	3/26/2013	work session
	x		Planning & Sustainability Commission	4/9/2013	briefing
	x		Planning & Sustainability Commission	5/7/2013	hearing
	x		Planning & Sustainability Commission	5/28/2013	work session
	x		Planning & Sustainability Commission	6/25/2013	briefing
	x		Community Involvement Committee	6/26/2013	meeting
	x		Planning & Sustainability Commission	7/9/2013	work session
	x		Community Involvement Committee	8/13/2013	meeting
	x		Community Involvement Committee	8/28/2013	meeting
	x		Planning & Sustainability Commission	9/10/2013	briefing
	x		Planning & Sustainability Commission	10/8/2013	briefing
	x		Community Involvement Committee	11/20/2013	meeting
	x		Planning & Sustainability Commission	12/10/2013	briefing
	x		Community Involvement Committee	2/26/2014	meeting
	x		Community Involvement Committee	2/26/2014	meeting
	x		Community Involvement Committee	2/27/2014	meeting
	x		Planning & Sustainability Commission	2/28/2014	briefing
	x		Planning & Sustainability Commission	3/11/2014	briefing
	x		Community Involvement Committee	5/28/2014	meeting
	x		Planning & Sustainability Commission	6/10/2014	briefing
	x		Planning & Sustainability Commission	6/24/2014	hearing
	x		Planning & Sustainability Commission	7/22/2014	briefing
	x		Community Involvement Committee	7/22/2014	meeting
	x	x	Planning & Sustainability Commission	8/12/2014	briefing
	x		Planning & Sustainability Commission	9/9/2014	hearing, briefing
	x		Planning & Sustainability Commission	9/23/2014	hearing
	x		Community Involvement Committee	9/24/2014	meeting
	x		Planning & Sustainability Commission	10/21/2014	work session, recommendation
	x		Planning & Sustainability Commission	10/28/2014	hearing
	x		Planning & Sustainability Commission	11/4/2014	hearing
	x		Planning & Sustainability Commission	11/18/2014	work session
	x		Community Involvement Committee	11/19/2014	meeting

	x		Planning & Sustainability Commission	12/9/2014	work session
	x		Planning & Sustainability Commission	1/13/2015	briefing
	x		Planning & Sustainability Commission	1/27/2015	work session
	x		Planning & Sustainability Commission	2/10/2015	work session
	x		Planning & Sustainability Commission	2/24/2015	work session
	x		Community Involvement Committee	2/25/2015	meeting
	x		Planning & Sustainability Commission	3/10/2015	work session
	x		Planning & Sustainability Commission	3/24/2015	work session
	x		Planning & Sustainability Commission	4/17/2015	briefing / work session
	x		Community Involvement Committee	4/22/2015	meeting
x	x		Planning & Sustainability Commission	4/28/2015	hearing & recommendation
	x		Planning & Sustainability Commission	5/12/2015	work session
	x		Community Involvement Committee	5/12/2015	meeting
	x		Planning & Sustainability Commission	5/26/2015	hearing /work session
	x		Community Involvement Committee	5/27/2015	meeting
	x		Planning & Sustainability Commission	6/9/2015	work session
x	x		Planning & Sustainability Commission	6/23/2015	hearing & recommendation, work session
	x		Planning & Sustainability Commission	7/14/2015	work session

Appendix E: Advisory Groups

Advisory Group	Date	Activity
Watershed Health and Environment PEG	6/18/2012	Meeting
Education and Youth Success PEG	6/18/2012	Meeting
Economic Development PEG	6/20/2012	Meeting
Community Involvement Committee (CIC) PEG	6/21/2012	Meeting
Centers PEG	6/21/2012	Meeting
Residential Development and Compatibility PEG	6/28/2012	Meeting
Infrastructure Equity PEG	7/11/2012	Meeting
Education and Youth Success PEG	7/12/2012	Meeting
Residential Development and Compatibility PEG	7/12/2012	Meeting
Economic Development PEG	7/18/2012	Meeting
Community Involvement Committee (CIC) PEG	7/19/2012	Meeting
Centers PEG	7/19/2012	Meeting
Watershed Health and Environment PEG	7/31/2012	Meeting
Infrastructure Equity PEG	8/1/2012	Meeting
Residential Development and Compatibility PEG	8/9/2012	Meeting
Economic Development PEG	8/15/2012	Meeting
Community Involvement Committee (CIC) PEG	8/16/2012	Meeting
Education and Youth Success PEG	8/20/2012	Meeting
Watershed Health and Environment PEG	8/23/2012	Meeting
Centers PEG	8/28/2012	Meeting
Infrastructure Equity PEG	9/5/2012	Meeting
Residential Development and Compatibility PEG	9/13/2012	Meeting
Education and Youth Success PEG	9/17/2012	Meeting
Economic Development PEG	9/19/2012	Meeting
Community Involvement Committee (CIC) PEG	9/20/2012	Meeting
Centers PEG	9/20/2012	Meeting
Watershed Health and Environment PEG	9/27/2012	Meeting
Infrastructure Equity PEG	10/3/2012	Meeting
Residential Development and Compatibility PEG	10/11/2012	Meeting
Education and Youth Success PEG	10/15/2012	Meeting
Economic Development PEG	10/17/2012	Meeting
Community Involvement Committee (CIC) PEG	10/18/2012	Meeting
Watershed Health and Environment PEG	10/24/2012	Meeting
Residential Development and Compatibility	11/8/2012	Meeting
Economic Development PEG	11/13/2012	Meeting
Community Involvement Committee (CIC) PEG	11/15/2012	Meeting
Centers PEG	11/15/2012	Meeting
Education and Youth Success PEG	11/19/2012	Meeting
Watershed Health and Environment PEG	11/28/2012	Meeting
Infrastructure Equity PEG	12/5/2012	Meeting
Education and Youth Success PEG	12/17/2012	Meeting
Economic Development PEG	12/19/2012	Meeting
Community Involvement Committee (CIC) PEG	12/20/2012	Meeting
Centers PEG	12/20/2012	Meeting

Infrastructure Equity	1/7/2013	Meeting
Infrastructure Equity	1/8/2013	Meeting
Residential Development and Compatibility	1/10/2013	Meeting
Community Involvement Committee (CIC) PEG	1/17/2013	Meeting
Centers PEG	1/17/2013	Meeting
Education and Youth Success PEG	1/20/2013	Meeting
Watershed Health and Environment	1/23/2013	Meeting
Infrastructure Equity PEG	2/6/2013	Meeting
Equity Work Group	2/13/2013	Meeting
Campus Institutions Project Advisory Committee	2/13/2013	Meeting
Residential Development and Compatibility PEG	2/14/2013	Meeting
Centers PEG	2/21/2013	Meeting
Infrastructure Equity PEG	3/6/2013	Meeting
Equity Work Group	3/13/2013	Meeting
Residential Development and Compatibility PEG	3/14/2013	Meeting
Education and Youth Success PEG	3/18/2013	Meeting
Economic Development PEG	3/20/2013	Meeting
Centers PEG	3/21/2013	Meeting
Infrastructure Equity PEG	4/3/2013	Meeting
Industrial Land and Watershed Health Working Group	4/5/2013	Meeting
Residential Development and Compatibility PEG	4/11/2013	Meeting
Education and Youth Success PEG	4/15/2013	Meeting
Economic Development PEG	4/17/2013	Meeting
Community Involvement Committee (CIC) PEG	4/18/2013	Meeting
Centers PEG	4/18/2013	Meeting
Watershed Health and Environment PEG	4/24/2013	Meeting
Infrastructure Equity PEG	5/1/2013	Meeting
Residential Development and Compatibility PEG	5/9/2013	Meeting
Economic Development PEG	5/15/2013	Meeting
Community Involvement Committee (CIC) PEG	5/16/2013	Meeting
Centers PEG	5/16/2013	Meeting
Education and Youth Success PEG	5/20/2013	Meeting
Watershed Health and Environment PEG	5/22/2013	Meeting
Industrial Land and Watershed Health Working Group	5/29/2013	Meeting
Infrastructure Equity PEG	6/5/2013	Meeting
Residential Development and Compatibility PEG	6/13/2013	Meeting
Economic Development PEG	6/18/2013	Meeting
Economic Development PEG	6/19/2013	Meeting
Community Involvement Committee (CIC) PEG	6/20/2013	Meeting
Neighborhood Centers PEG	6/20/2013	Meeting
Watershed Health and Environment PEG	6/26/2013	Meeting
Infrastructure Equity PEG	7/10/2013	Meeting
Neighborhood Centers PEG	7/24/2013	Meeting
Infrastructure Equity PEG	8/7/2013	Meeting
Neighborhood Centers / Residential Development and	8/13/2013	Meeting

Compatibility		
Neighborhood Centers PEG	9/19/2013	Meeting
All PEG Mtg	10/18/2013	Meeting
Centers PEG	10/18/2013	Meeting
Campus Institutions Project Advisory Committee	12/12/2013	Meeting
Transportation Expert Group	1/30/2014	Meeting
Mixed Use Zones PAC	2/19/2014	Meeting
Transportation Expert Group	2/27/2014	Meeting
Mixed Use Zones PAC	3/19/2014	Meeting
Transportation Expert Group	3/27/2014	Meeting
Campus Institutions Project Advisory Committee	4/10/2014	Meeting
Mixed Use Zones PAC	4/16/2014	Meeting
Transportation Expert Group	4/30/2014	Meeting
Transportation Expert Group	5/13/2014	Meeting
Transportation Expert Group	6/5/2014	Meeting
Campus Institutions Project Advisory Committee	6/12/2014	Meeting
Mixed Use Zones PAC	6/18/2014	Meeting
Mixed Use Zones PAC	7/16/2014	Meeting
Transportation Expert Group	7/24/2014	Meeting
Transportation Expert Group	7/31/2014	Central Eastside Tour
Campus Institutions Project Advisory Committee	8/14/2014	Meeting
Transportation Expert Group	8/28/2014	Meeting
Campus Institutions Project Advisory Committee	9/11/2014	Meeting
Mixed Use Zones PAC	9/17/2014	Meeting
Transportation Expert Group	9/25/2014	Project Evaluation meeting
Transportation Expert Group	9/25/2014	Meeting
Campus Institutions Project Advisory Committee	10/9/2014	Meeting
Mixed Use Zones PAC	10/17/2014	Meeting
Transportation Expert Group	10/23/2014	Meeting
Campus Institutions Project Advisory Committee	11/14/2014	Meeting
Mixed Use Zones PAC	12/17/2014	Meeting
Campus Institutions Project Advisory Committee	1/15/2015	Meeting
Mixed Use Zones PAC	1/21/2015	Meeting
Mixed Use Zones PAC	2/18/2015	Meeting
Mixed Use Zones PAC	3/18/2015	Meeting
Campus Institutions Project Advisory Committee	4/19/2015	Meeting
Mixed Use Zones PAC	5/20/2015	Meeting
Mixed Use Zones PAC	6/17/2015	Meeting

EXHIBIT C

Inventory Map of Buildable Residential Lands and Estimate of Remaining Housing Capacity

Buildable Lands Inventory

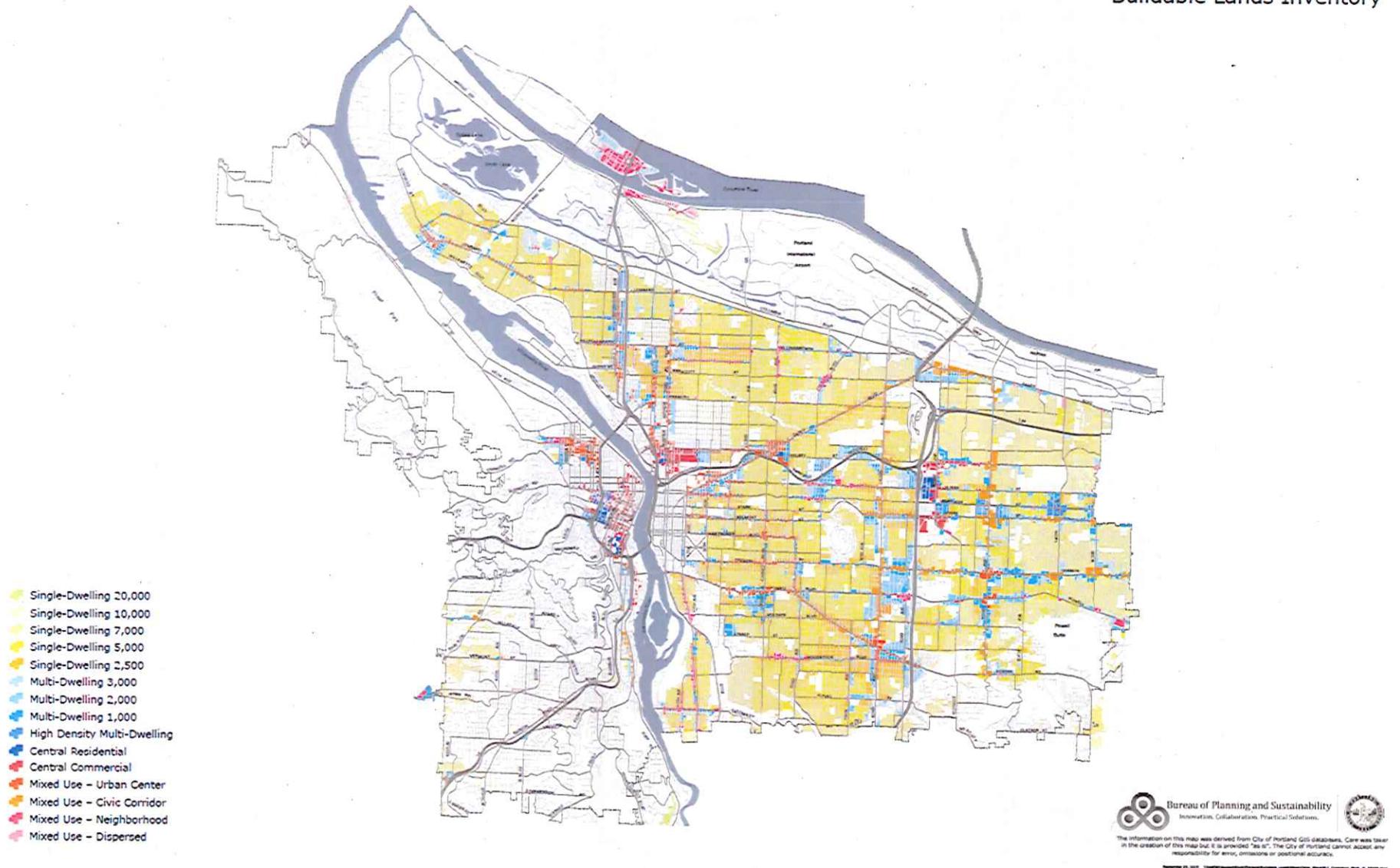
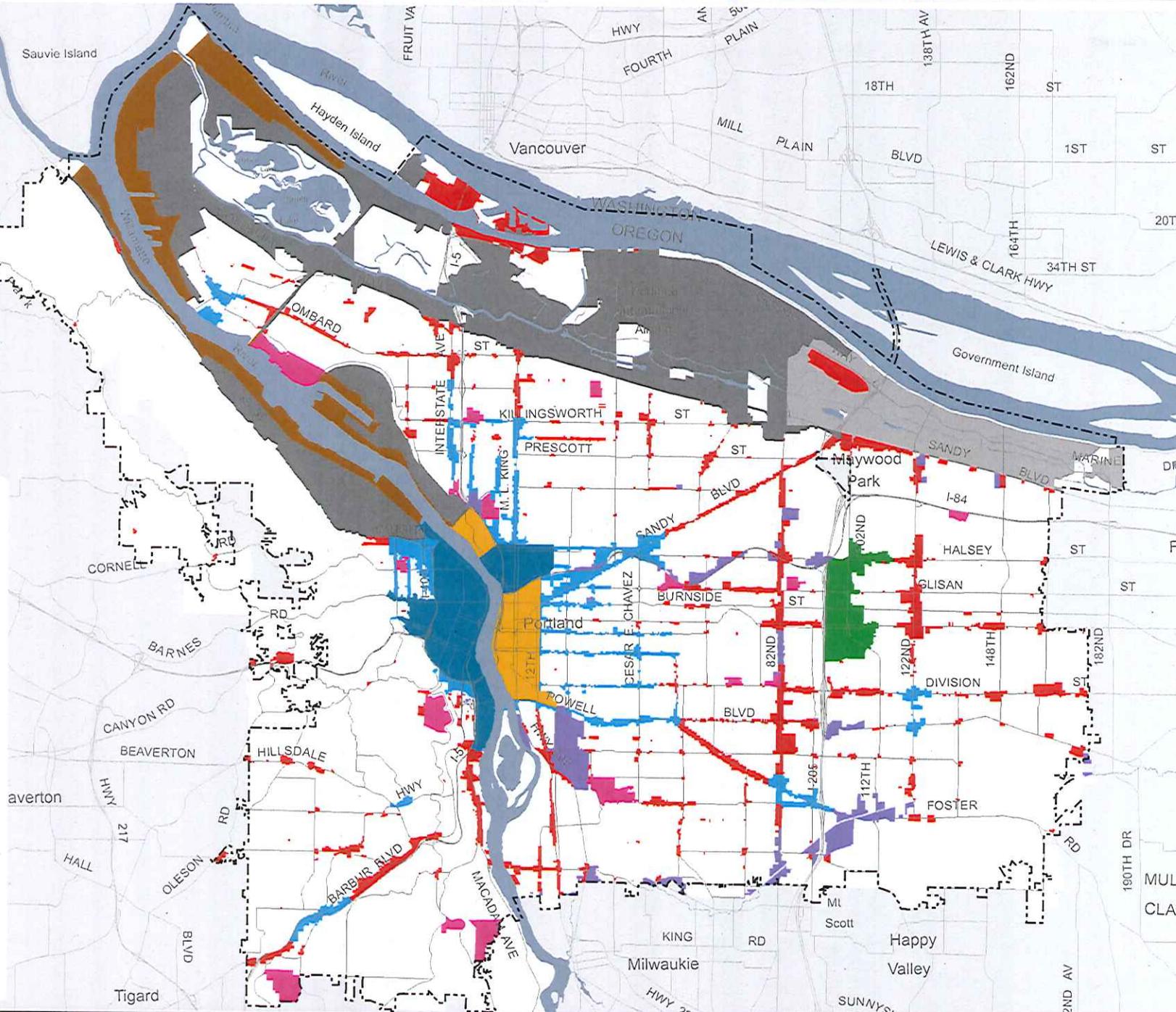


EXHIBIT D

Inventory Map of Buildable Employment Lands and Estimate of Remaining Employment Capacity

Proposed Comprehensive Plan Employment Geographies Map

- City Boundary
- Central City Commercial
- Central City Industrial
- Columbia East
- Harbor and Airport Districts
- Dispersed Employment
- Harbor Access Lands
- Institutional
- Gateway Regional Center
- Town Center
- Neighborhood Commercial



March 19, 2015

City of Portland, Oregon // Bureau of Planning & Sustainability // Geographic Information System

The information on this map was derived from City of Portland GIS databases. Care was taken in the creation of this map but it is provided "as is". The City of Portland cannot accept any responsibility for error, omissions or positional accuracy.

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City of Portland Oregon
Charter: Helen Meeker Tilton, Mayor; Susan Anderson, Director

COMPREHENSIVE PLAN UPDATE

Growth Scenarios Report



July 2015
PSC Recommended Draft



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City of Portland, Oregon
Charlie Hales, Mayor • Susan Anderson, Director

Comprehensive Plan Update

I. Acknowledgements

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III. EXECUTIVE SUMMARY

The Growth Scenarios report is a background report of the Comprehensive Plan and is a required element of [Portland's Periodic Review](#) work program (Task 3). The purpose of this report is to describe how and where Portland is expected to grow over the next 25 years and to measure the performance of different alternate growth patterns and their ability to help meet Portland's goals and objectives. This analysis is rooted in the Measures of Success adopted with the 2012 Portland Plan.

The performance of the Proposed Comprehensive Plan shows how land use and infrastructure investment can help Portland achieve our vision for a prosperous, healthy, equitable and resilient city. The report shows that most of the anticipated new growth and infrastructure investment occurs in a way that makes significant progress towards meeting the Portland Plan's 2035 Measures of Success.

- The expected growth pattern along with planned investments in parks, transit, and the bicycle and pedestrian networks will help to create more complete neighborhoods and increase the number of Portlanders that live in a complete neighborhood.
- The land use and transportation choices made in the Proposed Comprehensive Plan and Transportation System plan reduce vehicle miles traveled per capita, reducing the share of commuter trips in single-occupant vehicles, and help reduce our carbon emissions.
- The land use changes and investments in transit will help increase the number of households with convenient access to family-wage jobs.
- Portland can accommodate the future household growth and do it in ways that will help to meet our goals, but providing enough affordable housing, especially for the lowest income households, will continue to be a challenge.

Portland is expected to add approximately 260,000 people (123,000 households) and 142,000 new jobs between 2010 and 2035. From 2010-2014 Portland added approximately 15,000 households and 25,000 jobs—a rate of growth consistent with this forecast. Portland's existing zoning and Proposed Comprehensive Plan has more than enough development capacity to accommodate future residential growth. This excess capacity creates an opportunity to make choices about where to focus or prioritize that residential growth. This Growth Scenarios Report presents an evaluation of a variety of growth patterns, including the Proposed Comprehensive Plan.

In addition to analyzing the impact of different growth patterns, this report evaluates the benefits of the infrastructure investments and planned public facilities in the Citywide Systems Plan (CSP) and Transportation System Plan (TSP), which are part of the Proposed Comprehensive Plan.

Forecast growth represents only about one-third of the total households and employment in Portland in 2035. Two-thirds of the buildings that will exist in 2035 already exist today. Thus, Portland's existing development pattern defines many of the challenges in achieving the goals identified in the Portland Plan. The city's legacy development pattern has a significant impact on how well Portland will perform over the next 25 years. Large improvements in performance from land use changes will take time, and the City will need to make long term strategic investment and development decisions to meet those goals.

CHALLENGES AND OPPORTUNITIES

Two Investment Strategies – Portland needs to pursue a public investment strategy on two tracks simultaneously to meet its objectives. One strategy supports growth in high-performing areas that already have a relatively complete infrastructure support system. With the Proposed Plan, 75 percent of the new development is expected to take place in centers and corridors that are ready to accommodate this growth. The other strategy fills infrastructure gaps in historically underserved areas to reduce disparities and increase equity. This two-track strategy will allow Portland to significantly improve performance across the board by focusing growth in high-performing areas, while at the same time improving conditions in areas previously neglected.

Transportation Choice – Transportation investment priorities emphasize active transportation, transit, and freight mobility. Investing in sidewalks, bicycle facilities and transit significantly improves performance across several measures, such as reducing carbon emissions, improving affordability, and improving access to jobs for more Portlanders. Expansion of the frequent transit network will mean that 62 percent of Portland households will have convenient access to frequent transit. Investment in the low-stress bicycle network will mean that 72 percent of Portland households will live within ¼-mile of a bike facility.

The projects in the Proposed TSP create a transportation system that will decrease reliance on automobiles by reducing the single occupant vehicle (SOV) commute rate to 35 percent of trips, which in turn helps reduce per capita daily vehicle miles travelled (VMT) by 27 percent.

Complete Neighborhoods – The Portland Plan set the goal of providing most Portlanders with safe, walkable access to services. While most (77%) of the new development is expected to take place in complete neighborhoods, this goal cannot be achieved simply by only focusing growth in existing complete neighborhoods – Portland needs infrastructure investments to create more complete neighborhoods. The combination of the growth pattern and the infrastructure investments in the Proposed Comprehensive Plan increase the number of households in complete neighborhoods to 73 percent by 2035.

Reducing Carbon Emissions – The land use and transportation choices made in the Proposed Comprehensive Plan lead to a reduction in per capita daily VMT, increase in non-automobile mode share, and help make progress towards Portland's carbon reduction goals. The City of Portland and Multnomah County will need to take additional action beyond planned land use and transportation investments in order to meet our carbon reduction goals. The Climate Action Plan identifies additional policy and program actions that go beyond the Comprehensive Plan to help achieve this goal, including: carbon pricing, building energy performance reporting, renewable energy, net zero energy buildings, low carbon transportation fuels, electric vehicles, waste prevention and recovery, and green infrastructure.

A Central Role for the Central City – The Central City is expected to accommodate 30 percent of future growth. Focusing growth in and around the Central City may be the most cost-effective way to provide the greatest level of service to the greatest number of Portlanders; each incremental investment in this service-rich area has disproportionate benefits. However, in order to grow as a residential area, it will be necessary to ensure that the needs of a variety of household types can be met within the Central City.

Comprehensive Plan Update

Jobs and Better Transit Connections in East Portland – East Portland has Portland’s largest pool of affordable housing and is home to a large number of families with children. However, the area does not have many family-wage jobs, and it is not easy or quick to travel from East Portland to major job centers. Convenient and reliable access to work is one of the major contributors to job success (others include overall employment opportunities and relevant education and training). The Proposed Plan includes policies, map changes and transit investments that will increase the number of households with convenient access to. Developing more jobs in East Portland and providing better connections to and from East Portland are critical to improving household economic self-sufficiency.

More Affordable Housing – Providing enough affordable housing, especially for the lowest income households, will be a challenge. Public investments to increase services can create gentrification pressure. Portland will need to better align growth management, public investment and affordable housing development, anticipate the consequences of investments, minimize displacement and engage communities.

Prepare for the Future – While short-term development trends show a market preference for the Central City and Inner Neighborhoods, East Portland has significant growth potential and is home to many households with school-age children. Today, there is a window of opportunity to address the infrastructure gap in East Portland. The timing and location of East Portland infrastructure investments are a pressing issue.

Access to Parks – The Proposed Comprehensive Plan shows an increase in the number of households with good access to parks. This increase can be attributed to parks investment areas identified in the CSP that fill gaps in areas underserved by parks to reduce disparities, especially in East Portland.

IV. 2015 UPDATE TO THE GROWTH SCENARIOS REPORT

The Growth Scenarios report was first published in 2013. The purpose was to evaluate and compare different growth scenarios to determine how our choices of where and how growth could occur might impact our community. In addition to public input generated from visionPDX, the Portland Plan and the Comprehensive Plan Update Community Involvement Strategy, the 2013 Growth Scenarios report served to inform many policy choices and land use recommendations made with the Proposed Comprehensive Plan.

The purpose of this update is to evaluate the performance of the Proposed Comprehensive Plan as the preferred scenario to guide future growth in Portland. The 2013 report evaluated four growth scenarios—Default, Centers, Corridors, and Central City-focused. The original 2013 Growth Scenarios Report created a framework for a preferred growth scenario (the Proposed Plan). This new report serves to summarize how well the Proposed Plan performs relative to the scenarios identified in 2013.

The Proposed Comprehensive Plan (the preferred scenario) is different from other scenarios:

- **The preferred scenario combines three scenarios.** Relative to the Default scenario, the land use changes in the Proposed Comprehensive Plan accommodate more growth in Centers, along some Corridors and in the Central City and surrounding inner neighborhoods. Density reductions have been proposed in locations farther from identified Centers and Corridors, particularly in outer East Portland.
- **The preferred scenario incorporates infrastructure changes.** If land use changes shape the regulations about where growth can and cannot occur, infrastructure investments shape the capacity to accommodate growth. The Transportation System Plan (TSP) and the Citywide System Plan (CSP) identify which infrastructure projects the City will undertake.

Accounting for comprehensive plan map changes and infrastructure investments – The 2013 Growth Scenarios Report provided a starting point for a community discussion about how and where Portland can accommodate future growth. In particular, the performance measures have provided a framework for evaluating different growth and investment options. The Proposed Comprehensive Plan reflects the community discussion of where and how Portland should grow and how to make investments to advance goals and reduce disparities.

Model the Effects of Infrastructure Investments – The scenarios in the first version of this report modeled the likely effects of 25 years of growth (the location of new jobs and housing), but not infrastructure investments. In this update, the corresponding infrastructure investments that are identified in the TSP and CSP have been evaluated.

Transportation System Plan (TSP) – The update to this report accounts for the financially constrained TSP project list. The TSP projects have increased performance significantly for transportation related performance measures including; low-stress bike network, frequent transit, complete neighborhoods, mode share and greenhouse gas emissions. Examples of projects that have increased performance are north-south frequent transit service on 122nd Avenue, neighborhood greenways and dedicated bicycle facilities in East and North Portland.

Comprehensive Plan Update

Transportation Modelling – The evaluation of transportation related performance measures relied heavily on information from Metro’s regional transportation model. Transportation model outputs for 2035 mode split and vehicle miles traveled (VMT) were adjusted further to reflect program investments that support the pedestrian and bicycle network and transportation demand management policies.

Citywide Systems Plan (CSP) – The Citywide Systems Plan is a coordinated 20-year plan for the City of Portland’s infrastructure (sewer, water, parks) systems that will be necessary to serve anticipated growth. The update to this report reflects the modeled results of infrastructure investments in the CSP where applicable. Accounting for CSP projects has significantly increased performance in the park access and complete neighborhoods measures.

Community Mapping – The District Liaison team at BPS has worked with community members to identify Comprehensive Plan map changes to advance goals identified in the Portland Plan. Map changes have resulted in net positive changes to performance evaluation. The most significant positive outcomes can be attributed to focusing density in identified centers and corridors, bringing non-conforming commercial uses into conformance, and creating or augmenting dispersed commercial areas in neighborhoods with limited access to services.

1. INTRODUCTION

Portland is growing and will continue to grow over the next 25 years. By 2035, there will be approximately 260,000 more people and 142,000 new jobs in Portland.¹ While the forecasted growth rate is consistent with Portland's historical growth rates, these numbers still raise important questions about how and where Portland will grow and the effect that growth will have on Portlanders' quality of life.

PURPOSE

This report is intended to provide information about the potential implications of growth that will help answer key questions like:

- Where will new housing will be built?
- What types of development will be seen on Portland streets?
- Where will new businesses be located?
- Will existing businesses be able to expand?
- How will this growth affect carbon emissions?
- How will this growth affect significant natural resources?
- Will this growth help reduce disparities and improve access to opportunity for more Portlanders?
- Where and how can Portland focus investments in public facilities and services to improve how well the city functions?

In addition to facilitating discussions about the questions listed above, this report will:

- Provide comparative alternative growth scenarios that illustrate the potential locations and intensity of growth over the next 25 years, given Portland's existing development pattern and development capacity.
- Measure the performance of the alternative growth scenarios, including their effect on the city's ability to meet goals and objectives based on the Portland Plan's Measures of Success.²
- Evaluate a Preferred Growth Scenario for the City of Portland (now developed into the Proposed Comprehensive Plan).
- Provide the basis for developing an infrastructure investment approach that will improve Portland's ability to meet its identified goals and objectives (the TSP and CSP).
- Meet the requirements of Task 3 of the City of Portland's State of Oregon-approved Periodic Review Work Program, which calls for the development and analysis of alternative growth scenarios.³

¹ Metro Regional Forecast, January 2013. Forecasts indicate that Portland will grow by approximately 123,000 new households between 2010 and 2035. The average household size in 2010 was 2.35; however, it is expected that Portland's average household size will decrease in coming decades. A proxy household size of 2.1 was used in the calculation.

² The Portland Plan is a citywide strategic plan to promote prosperity, education, health and equity. It includes guiding policies, a five-year action plan and measures of success. The goals and objectives used to evaluate the scenarios are adapted from the Portland Plan's Measures of Success. The Portland Plan was adopted in 2012.

³ In November 2007, the Oregon Department of Land Conservation and Development (DLCD) informed the City of Portland that its Comprehensive Plan is subject to Periodic Review. DLCD has the authority to

ORGANIZATION

This report has five primary sections: Introduction, Context, Scenario Alternatives, Performance Measures and Key Findings.

- The **Introduction** provides a brief overview of the report's purpose and organization, as well as basic background and process information.
- The **Context** section provides detailed information on existing conditions, development trends, development capacity and housing and employment growth forecasts.
- The **Scenario Alternatives** section provides information on each of the four growth scenarios considered and their implications.
- The **Performance Measures** addresses how well the four scenarios affect Portland's ability to meet established goals and objectives, as well as options for improving performance. With this updated report, this section now also includes an evaluation of the impacts of the proposed Comprehensive Plan, and planned infrastructure investments (the TSP and CSP)
- The **Key Findings** provides a summary of the lessons learned from this analysis.

The **Appendices** provide additional detailed information on how different areas of the city perform under each of the four alternative growth scenarios, and under the Proposed Plan.

BACKGROUND AND PROCESSES

What are growth scenarios?

Growth scenarios reflect choices about growth. They are illustrations of where Portland could choose to grow and develop in different parts of the city over the next 25 years. The scenarios are an opportunity to test how different growth patterns will affect different aspects of livability for Portlanders, such as access to transit, jobs, parks and commercial services. The performance evaluation also looks at carbon emissions, tree canopy, housing affordability and risk of gentrification.

Why develop growth scenarios?

Growth scenarios help inform decisions in the Proposed Comprehensive Plan. These are decisions about where to focus housing and job development, where to conserve and protect land, where to develop, and where and when to invest to improve services to increase equity, improve performance, and maintain and improve overall quality of life.

As a nearly fully developed city that is both largely surrounded by other cities and in a region with an urban growth boundary, Portland cannot expand by annexing substantial tracts of land outside the city limits, or by developing large areas of vacant land. As a result, nearly all of Portland's growth will occur on smaller underdeveloped parcels or through the redevelopment of previously developed properties.

compel a local jurisdiction to enter Periodic Review (ORS 197.628 to 197.650 and OAR 660-25). Periodic Review is a substantial evaluation and revision of a local Comprehensive Plan, the purpose of which is to ensure that a city's Comprehensive Plan is up-to-date and responsive to local, regional and state conditions, complies with the Statewide Planning Goals and provides necessary provisions for economic development, needed housing, transportation and urbanization or growth needs.

PORTLAND'S GROWTH SCENARIOS

This report includes four previously evaluated growth scenarios as well as the evaluation of the Proposed Comprehensive Plan.

Default – The Default Scenario is based on existing development patterns and development trends. This scenario distributes future growth in the same places Portland has seen growth over the past 15 years.

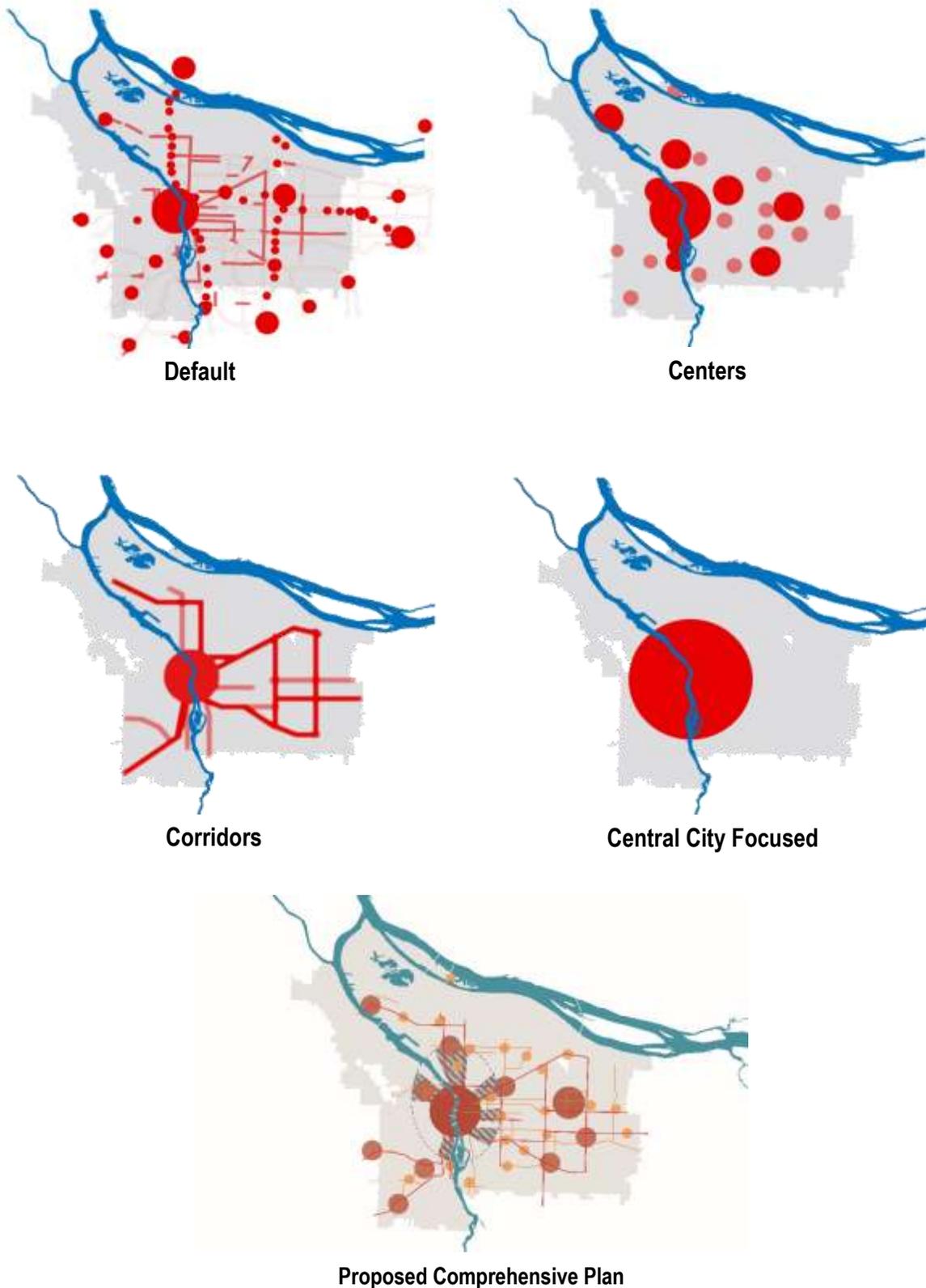
Centers – The Centers Scenario focuses more growth in areas like Lents, Hillsdale and Gateway and less growth along the length of commercial and mixed-use streets.

Corridors – The Corridors Scenario focuses more development along streets like SE Powell, SE Foster, SW Barbur and N Lombard and less growth in centers.

Central City Focused – The Central City Focused Scenario concentrates nearly all new growth in the Central City and the inner neighborhoods near the Central City, both east and west of the Willamette River.

Proposed Comprehensive Plan – This report has been updated to evaluate the performance of the Proposed Comprehensive Plan. The evaluation of the Proposed Comprehensive Plan The proposed Comprehensive Plan Update 2035 combines Centers, Corridors and Central City scenarios and incorporates infrastructure investment from the Citywide Systems Plan (CSP) and Transportation Systems Plan (TSP). Relative to the Default scenario, the land use changes in the Proposed Comprehensive Plan accommodate more growth in Centers, along Corridors and in the Central City and surrounding inner neighborhoods. Density reductions have been proposed in locations farther from identified Centers and Corridors, particularly in outer East Portland.

Figure 1: Growth Scenario Alternatives



HOW ARE THE SCENARIOS AND PROPOSED PLAN EVALUATED?

Each scenario is evaluated according to how well it performs with respect to the following Portland Plan objectives and the associated performance measures.

Performance Measures

- Access to Family-Wage Jobs
- Housing Mix and Affordability
- Risk of Displacement/Gentrification
- Complete Neighborhoods
- Access to Frequent Transit
- Access to Low-Stress Bikeways
- Vehicle Miles Traveled
- Mode Share
- Greenhouse Gas/Carbon Emissions
- Access to Parks
- Watershed Health
- Tree Canopy
- Access to Nature

For each scenario, and the Proposed Comprehensive Plan, a performance evaluation is used to help answer the following questions:

- Does this development pattern help the city move closer to its goals? For example: Does the Central City Focused scenario make it more likely that the percentage of Portlanders who live in complete neighborhoods will increase? Will it increase the likelihood that more Portlanders will have access to family-wage jobs?
- How do the performance results for each scenario compare to those of the other scenarios? For example: Do the Centers and Corridors scenarios each provide the same mix of affordable housing?

The performance evaluation focuses on how well each scenario performs at the citywide level. Evaluations of how well each scenario performs at the district scale (East, North, Southeast, West and Central City) or neighborhood scale are provided in the appendix.

HOW ARE THE SCENARIO EVALUATIONS BEING USED?

The evaluations in the 2013 report have been used to support discussions about policies and investments related to issues such as land use, environmental conservation, affordable housing, urban design, and public infrastructure. The evaluations will prompt discussions to consider the following:

- Is there a form of growth that will help Portland advance prosperity, health equity and resilience?
- What investments are needed to support that pattern?
- How do the anticipated development patterns help achieve the goals?
- What problems will these patterns create?
- How and where can investments help to meet specific performance goals?
- Which scenarios bring the greatest benefit to different parts of the city?

This analysis and public input was used to develop a Preferred Development Scenario (the Proposed Comprehensive Plan). This process informed the development of the Comprehensive Plan Map, the Transportation System Plan, the Citywide Systems Plan and the List of Significant Projects.

2. CONTEXT

Developing future growth scenarios involves looking at forecasts of future growth and learning from how the city is performing today in terms of conditions and trends. Portland's existing built environment, recent development trends and current plans and policies have a tremendous influence on how the city will develop and perform in the future.

The history of the past 30 years shows that thoughtful and intentional land use policies, regulations and investments can help improve quality of life for many. It also offers proof that people who live in areas without high-quality services may find it harder to meet their full potential. Growth often brings challenges, but it also offers opportunities to bring more transportation, housing, employment and neighborhood services to more Portlanders.

This section of the report provides the background information needed to review the growth scenarios and make recommendations about growth and investments to improve livability for all Portlanders. The information includes an overview of the local growth forecasts; a primer on Portland's existing land use patterns, development trends and performance; information on existing development capacity; and ideas about the ways in which new development may benefit different parts of Portland.

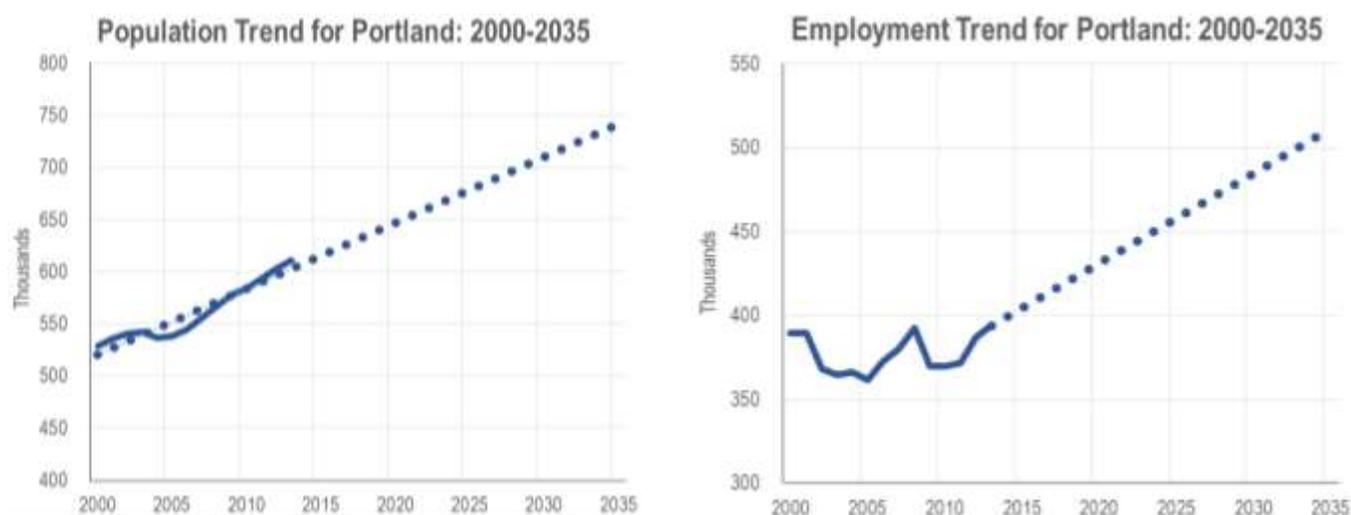
GROWTH FORECASTS

Metro forecasts that the Portland metropolitan region will grow by 410,000 new households and 518,000 new jobs between 2010 and 2035. Metro expects Portland to accommodate 30 percent of that new household growth with 123,000 new households and to create 27 percent of the new regional employment growth with 142,000 new jobs in Portland⁴. The Metro forecasted growth rates are consistent with historical trends. From 2010-2015 Portland has added approximately 15,000 households and 25,000 jobs—a rate of growth consistent with this forecast.

Metro develops the forecast and allocates the forecasted growth to each of the jurisdictions within its boundaries. Each local jurisdiction is responsible for determining how to best manage and direct that growth within its boundaries. This means that Portland must figure out how and where to accommodate the future growth forecast.

⁴ The original Growth Scenarios Report cited a draft 2010 Metro forecast, which was slightly higher. This new report cites the adopted Metro Regional Forecast, January 2013. Forecasts indicate that Portland will grow by approximately 123,000 new households between 2010 and 2035.

Figure 2: Population and employment trends for Portland, 2000-2025.



Household Forecast

In 2010, Portland had 270,000 households with an average of 2.3 persons per household. Of those households, 28 percent included children. Both the average size of Portland households and the percentage of households with children are expected to continue to decline. By 2035, the average household size is expected to be just over 2 persons per household and the percentage of households with children is expected to decline to 25 percent of all households. At the same time, a greater proportion of Portlanders will be older. These anticipated demographic changes are consistent with national trends and will affect the demand for different types of housing.⁵

In 2010, about 60 percent of the dwellings in Portland were single family detached homes. Although little change is expected to the character of Portland's predominantly single family residential neighborhoods (they will remain single family residential neighborhoods), single family homes are expected to make up a smaller share (47 percent by 2035) of the housing mix in coming years.

In addition to the trend of smaller household size, a decreasing share of the population can qualify for a mortgage. Across the nation, job growth tends to be concentrated in high- and low-wage jobs with little expansion of family-wage jobs. In addition, banks and other lenders have been restructured following the housing bust, which has led to more conservative lending practices. This has made it increasingly difficult for Portlanders to secure mortgages to purchase homes and will have long-term consequences for homeownership.

The demographic and economic changes described above are driving increased demand for multifamily dwellings, particularly apartments. Estimates suggest that 80 percent of all new housing built in Portland between now and 2035 will be multifamily housing. This change can already be seen in recent development trends: Between 2010 and 2014, 67 percent of new housing units built in Portland were multifamily dwellings. Similarly, the majority of new growth between 2010 and 2035 within the Urban Growth Boundary (61%) will be multifamily dwellings.

⁵ More information is available in the [Housing Demand and Supply Background Report](#).

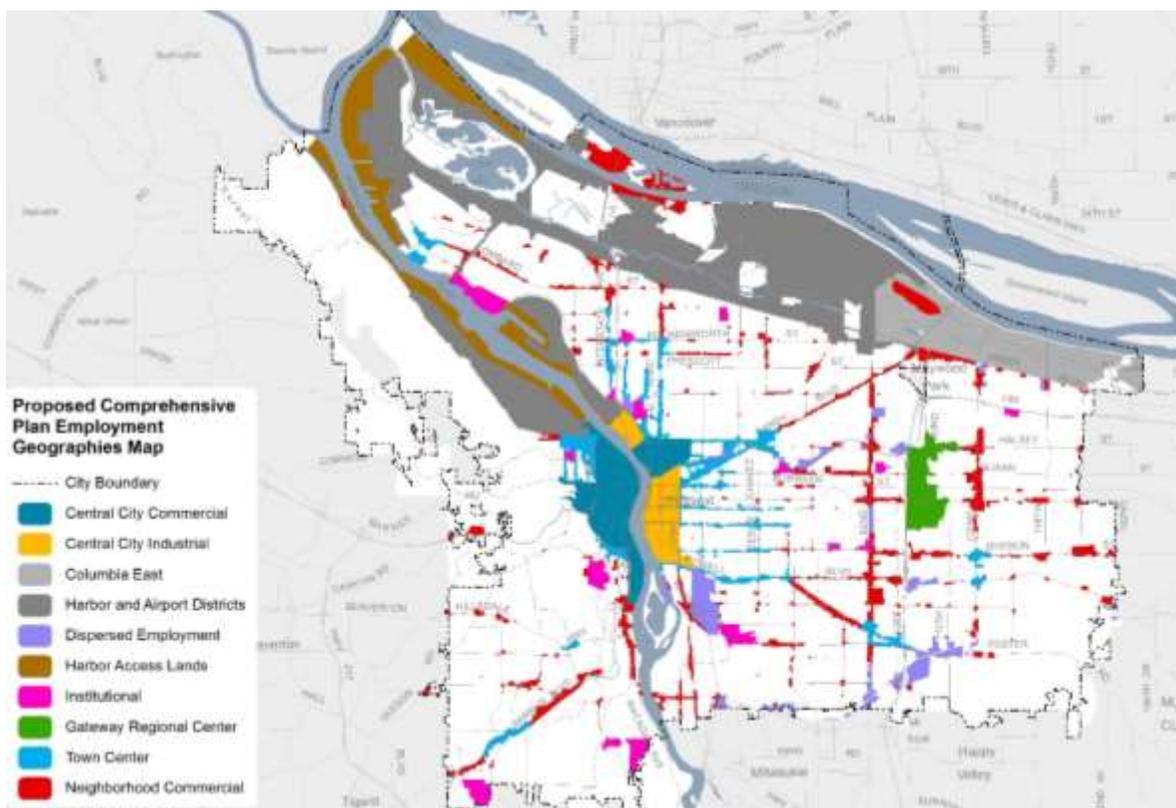
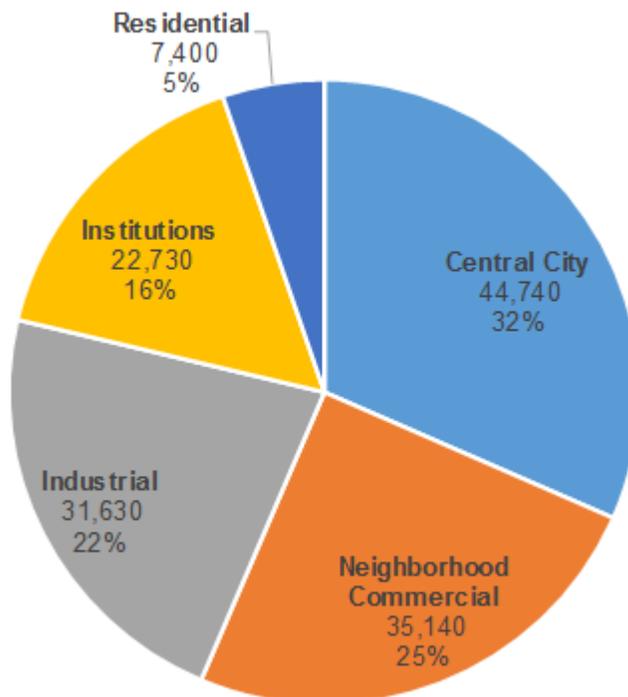
Employment Demand

Portland is expected to add 142,000 new jobs by 2035, which is a 26 percent capture rate of the regional job growth – similar to Portland’s historical 25 percent capture rate.

These new jobs are anticipated to be distributed across the city in a manner similar to the current distribution of employment. The Central City will see the largest share (44,740 jobs) of the job growth, with neighborhood commercial areas (35,140) and industrial areas (31,630) seeing significant growth.

Institutional campuses are a strong growth sector (22,730), and home-based employment in residential areas (7,400) remains a relatively small share of future employment growth.⁶

Figure 3: Employment Growth by Geography, 2010-2035.



⁶ More information is available in the [Economic Opportunities Analysis](#).

CURRENT PLANS AND DEVELOPMENT CAPACITY

Metro 2040 Growth Concept and Portland's Comprehensive Plan

Growth in the Portland metropolitan region is guided by regional land use and transportation plans developed by Metro, including the Metro Regional Framework Plan and the Metro 2040 Urban Growth Concept. The Metro plans provide the region with a preferred regional urban form.⁷

As with the growth forecasts, each jurisdiction is responsible for implementing the regional growth concept in local comprehensive plans.

The core ideas in the Metro 2040 Growth Concept, which are also reflected in Portland's Comprehensive Plan, include:

- A hierarchy of mixed-use, pedestrian friendly centers. The mixed-use centers identified in both the Metro 2040 Growth Concept and Portland's current Comprehensive Plan include: the Central City, Gateway Regional Center and the Hollywood, St. Johns, Lents, Hillsdale and West Portland town centers.
- Corridors and main streets that are connected to each other and the centers by high-capacity and high-quality transit.
- A multi-modal transportation system that emphasizes transit, bicycle and pedestrian systems to ensure continued mobility of more people and goods throughout the region.
- A jobs/housing balance in centers, protected industrial sanctuaries and stable residential neighborhoods, outside of mixed-use centers, corridors and main streets.

The principles that support Metro 2040 and that are embodied in Portland's current Comprehensive Plan were not new when they were initially adopted. They were built on Portland's legacy and historical development pattern. These principles and Portland's historical development pattern will continue in the Proposed Comprehensive Plan and will continue to influence the physical development of Portland over the next 25 years.

Development Capacity

Development capacity is defined as the likely number of new dwelling units or jobs that can be accommodated in the city under existing regulations, and considering existing and planned infrastructure.

The Buildable Lands Inventory (BLI) is the estimate of the development potential that is possible under current plans and zoning after considering infrastructure and physical constraints, like

Figure 4: Metro 2040 Growth Concept Zoomed to Portland



⁷ For more information, please visit Metro's website: www.oregonmetro.gov.

Comprehensive Plan Update

steep slopes.⁸ The BLI identifies lands that could potentially be available for development should a market demand exist.

Residential Capacity

The BLI shows that under the current Comprehensive Plan and existing zoning, Portland's estimated residential capacity is 230,000 dwelling units, which is more than sufficient capacity to accommodate Metro's 2035 housing growth forecast of 123,000 households for Portland.

With the Proposed Comprehensive Plan, the estimated residential capacity is 267,000 dwelling units⁹. The increase in total residential capacity in the Proposed Comprehensive Plan is the result of land use changes identified in the mixed use zones in some centers and corridors, a variety of community map changes, and the removal of development constraints that occurred as the result of infrastructure planned with the TSP and CSP.

The surplus capacity enables Portland to accommodate and manage growth and support a development pattern that helps to achieve the goals and objectives. The scenarios explore different ways to use that development capacity to accommodate 25 years of future growth.

Most of this capacity (70 percent) is in mixed-use corridors and neighborhood centers. The Central City (with capacity for 32,000 additional dwellings) has significant growth capacity. Other areas with high growth capacity are the Gateway Regional Center, North Interstate Corridor, the Lents Town Center and some parts of East Portland.

Areas with the least capacity for additional growth are parts of Northeast Portland and most of West Portland. Portland's predominantly single family residential neighborhoods (the areas outside of the centers and corridors) will see limited new housing development, and will remain single family residential neighborhoods. About 11 percent of the development capacity is in land available for single-dwelling residential development (detached or attached homes on their own lot).

Figure 5: Residential Development Capacity (Proposed Plan).



⁸ City of Portland, Bureau of Planning and Sustainability, [Buildable Land Inventory](#) (2012).

⁹ This is the capacity of the Comprehensive Plan designations – not all zoning matches these designations. Some areas are zoned for less intensive development than the Comprehensive Plan would allow.

Figure 6: BLI Housing Development Capacity (Proposed Plan)



Employment Capacity

The employment capacity analysis uses the same approach as the residential capacity analysis. The estimated employment development capacity is about 100 million square feet of new employment floor area citywide. In general, there is adequate capacity in the Central City; a surplus capacity in the neighborhood commercial areas; and shortfalls in industrial areas and for campus institutions, such as colleges and hospitals. The existing Comprehensive Plan provides capacity for 316,100 jobs while the Proposed Comprehensive Plan provides capacity for 391,400 jobs. The increase in employment capacity in the Proposed Comprehensive Plan reflects capacity increases as the result of the new Mixed Use and institutional designations, changes anticipated in the Central Eastside Industrial District, and other land use changes to address employment land shortfalls identified in the EOA.

Table 1: Employment Allocation

Aggregate Geography	Existing Share	Share in 2035 (Existing Comp Plan)	Share in 2035 (Proposed Comp Plan)
Central City	33.4%	32.9%	32.9%
Neighborhood Commercial	25.1%	27.0%	25.0%
Industrial	23.5%	21.9%	23.2%
Institutions	8.6%	9.9%	10.7%
Residential	9.4%	8.2%	8.2%

More important than the total job capacity, the Comprehensive Plan must provide capacity for the different types of jobs and economic activity that exists in different employment geographies. Table 2 compares the existing Comprehensive Plan and Proposed Comprehensive Plan, in terms of how well they provide needed land in each employment geography.

Table 2: Employment Capacity.

Aggregate Geography	% of Needed Capacity Provided (Existing Plan) ¹⁰	% of Needed Capacity Provided (Proposed Plan) ¹¹
Central City	177%	260%
Neighborhood Commercial	189%	216%
Industrial	80%	105%
Institutions	83%	141%

Figure 7: BLI Employment Development Capacity (Proposed Plan).



¹⁰ See Figure 27 of Section 2/3 of the Economic Opportunities Analysis, March 2015.

¹¹ See Figure 1 of Section 4 of the Economic Opportunities Analysis, March 2015.

PORTLAND'S EXISTING LAND USE PATTERN

Portland and the surrounding areas within our Urban Services Boundary are already urbanized. Portland is located at the center of a larger metropolitan region. There are few opportunities to expand Portland's physical boundaries into rural undeveloped lands. Therefore, new growth and development will primarily occur through infill and redevelopment. Portland's existing development patterns provide the framework for managing future growth and development. A brief description of the overall land use pattern, as well as more detailed information on Portland's "Pattern Areas," is provided below.

Citywide Development Pattern

Portland's overall development pattern includes a strong Central City, a series of centers (e.g. Hollywood, St. Johns and Hillsdale), and main streets and corridors (e.g. NE Sandy and N Interstate) that connect areas like Hollywood and Hillsdale to the Central City and beyond. The centers and corridors contain a mix of commercial and residential uses. The pattern also includes large swaths of residential development between the centers and corridors and across all areas of the city. Residential areas vary from predominantly single family dwellings to areas with greater concentrations of multifamily dwellings. For detailed information on Portland's existing development pattern, please review the [Urban Form Background Report](#).

Figure 8: Existing Residential Density.



Figure 9: Existing Employment Density.



DEVELOPMENT TRENDS

Growth and development have shaped, and will continue to shape, the character of Portland’s neighborhoods, streets, commercial areas, and other key places. Three broad trends have defined development over the past 15 years:

- Robust growth and development have occurred in the Central City.
- East Portland experienced a period of particularly strong residential development activity in the 1990s and early 2000s. This growth occurred after annexation of East Portland and much of this development included multifamily residential development and new subdivisions.
- In the late 2000s, coincident with the deep recession, development activity shifted from East Portland to the Inner Neighborhoods surrounding the Central City. The most intensive development has occurred along frequent transit lines, such as SE Division, North Williams, and North Interstate Avenue. Rising property values and rents have led to some displacement of lower income residents.

Figure 10: Areas with High Development Activity.

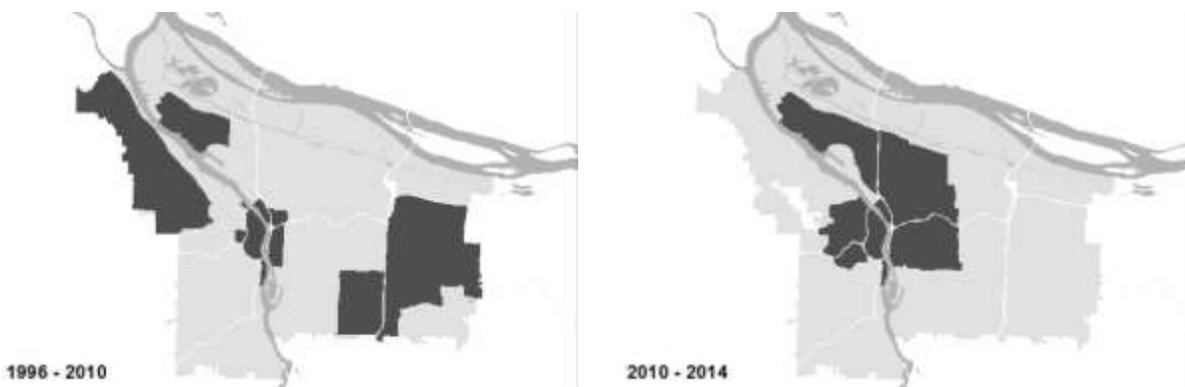


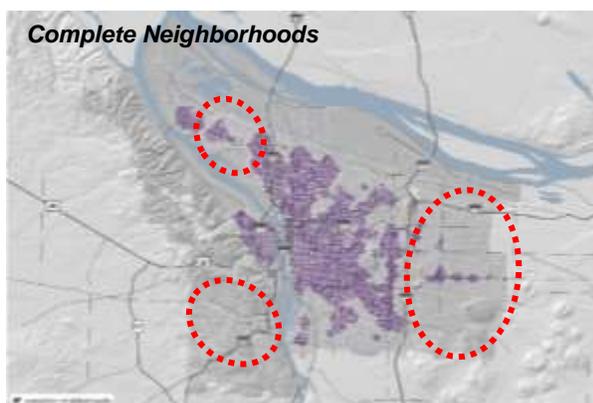
Table 3: New Dwelling Units by Portland Plan Analysis Area.

15 Year Trend: 1996-2010				5 Year Trend: 2010-2014			
Rank	Analysis Area	New Units	Share	Rank	Analysis Area	New Units	Share
1	Central City	12,214	25%	1	Central City	4,430	30%
2	122nd-Division	3,759	8%	2	Belmont-Hawthorne-Division	1,834	12%
3	Lents-Foster	3,013	6%	3	Interstate Corridor	1,522	10%
4	St. Johns	2,931	6%	4	Northwest	955	6%
5	Gateway	2,793	6%	5	Hollywood	821	6%
6	Glenfair-Wilkes	2,045	4%	6	MLK-Alberta	805	5%
7	Forest Park-Northwest Hills	2,012	4%	7	St. Johns	460	5%
Citywide		48,116	100%	Citywide		14,768	100%

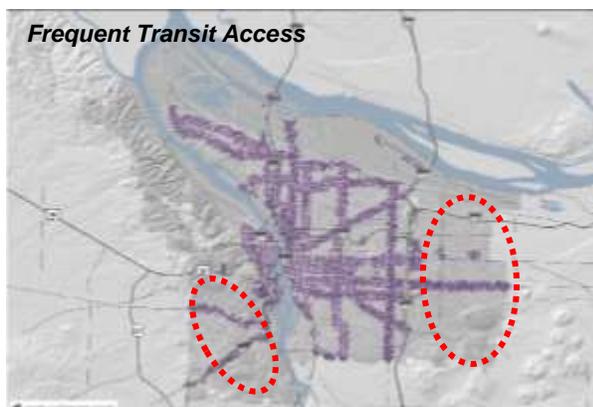
WHERE AND HOW CAN GROWTH BENEFIT THE CITY IN THE FUTURE?

Growth brings change, but it also offers opportunities to solve problems and bring more services to more Portlanders—making it easier for people to get to work by bus or train, walk to the grocery store or school and get to the park or community center. A few of Portland’s key land use and infrastructure-related challenges are highlighted below.

Complete Neighborhoods: Today, only 63 percent of Portland households are in complete neighborhoods, with significant gaps in East and Southwest Portland.



Frequent Transit Access: Currently, 47 percent of Portland households are located within a convenient (1/4-mile) walk to the frequent transit network. While the Central City and most of the Inner Portland



neighborhoods have good access to transit, there are significant gaps in coverage in East and Southwest Portland. Access to transit also is an important component of complete neighborhoods and access to employment.

Access to Jobs: Households in most of East Portland and parts of North Portland may have a more than 60-minute commute to locations with family-wage jobs.



A good job is one of the keys to household prosperity. The opportunity for a good job is dependent on three major factors: overall employment, education and workforce training, and access – the ability to get to the job. Currently, 82 percent of Portlanders have adequate access (a 60-minute transit trip) to a number of family-wage jobs.

These are some of the many performance measures against which the growth scenarios will be evaluated. For more information, please review the Portland Plan Measures of Success at www.pdxplan.com.

The challenges highlighted on these maps are but a few of the issues that need to be addressed through the Comprehensive Plan update process.

PATTERN AREAS

Portland has five distinct areas or “Pattern Areas,” each with unique needs and characteristics: Central City, Inner Neighborhoods, Eastern Neighborhoods, Western Neighborhoods and the Industrial and River Area.

Pattern Areas are defined by characteristics such as topography and physical features; street, land use, and block pattern; form and intensity of development; character, size, and function of natural resource areas; and the period in which the area was developed. Each area also has conditions and challenges related to its physical environment, development, history and the histories of the people who live there.

Figure 11: Portland's Five Pattern Areas.



Central City

Central City includes the Downtown core, South Waterfront, portions of the east and west banks of the Willamette River, the Central Eastside Industrial District, the Lloyd District and Rose Quarter, Old Town/Chinatown and the Pearl District. The Central City is the region’s business center, with an intensely urbanized built form. It also includes some of the city’s industrial sanctuaries and higher education institutions. Today, more than 34,000 people live in the Central City, making it Portland’s most densely populated residential area. It is a regional cultural hub—home to numerous concert halls, performance venues, museums, schools and universities. The Central City must remain an attractive and highly functional office, education and residential location.

Figure 12: Central City 2035.



New development in the Central City may:

- Strengthen its role as the region’s center for innovation by increasing education and new entrepreneurial business opportunities.
- Contribute to the region’s densest clusters of office, employment and residential districts.
- Enhance the fine-grain patterns of blocks and buildings offering a highly connected system of sidewalks and pathways.
- Improve connections to the Willamette River.

Inner Neighborhoods (North, Northeast, Southeast)

From Lents to St. Johns to Northwest Portland, this area primarily includes neighborhoods that were developed in a “streetcar era” pattern. The area is characterized by compact development, a highly connected grid of streets and sidewalks, active main street business districts, buildings that face the streets, street trees and a relatively pedestrian- and bicycle-friendly transportation system. With more than 140,000 households, more than half of Portland’s population lives in the Inner Neighborhoods.

In the past 15 years, housing in Inner Neighborhoods has become increasingly expensive. As a result, many long-time residents have needed to move to less expensive, but also less service-rich parts of the Portland region. At the same time, new multifamily residential development has been built along mixed-use corridors, like N Interstate, N Mississippi and SE Hawthorne and SE Division. These trends highlight the need to provide a greater variety of housing types at a much wider variety of prices, to expand and upgrade existing community facilities, like parks and sports fields, and to increase pedestrian and gathering spaces in the public right-of-way.

New development may

- Make it easier for residents to meet their daily needs. More residents can support a broader range of neighborhood-serving businesses.
- Provide more housing at a range of prices, so that more Portlanders can afford to live in areas with access to services and transit.
- Create plazas and community gathering places.

Figure 13: Inner Neighborhoods 2035.



The Impact of Community Amenities on Development Feasibility

Metro conducted a series of studies on how investments in public amenities, such as parks, sidewalks, bike facilities, and transit affect development feasibility. The studies showed that investment in public amenities can help attract people to a neighborhood, which in turn can increase rents by 10 to 20 percent and can increase sales prices enough to make new development financially feasible, especially for higher density development types.

In the July 2012 report, *Development Feasibility in Portland’s 20-Minute Neighborhoods*, Fregonese Associates found that development feasibility dramatically increases with increasing amenities and rents. For example, in the Interstate neighborhood, Fregonese found that amenity investments that resulted in a 10 percent increase in rents increased development potential by 35 percent. However, the analysis also showed that in some neighborhoods with lower property values, amenity investments alone are not enough to spur a significant amount of new development.

As a result, public investments like this can lead to increased property tax revenue to pay for needed urban services, and (in the absence of affordable housing programs) also lead to displacement of the lowest income residents.

Fregonese Associates. Development Feasibility in Portland’s 20-Minute Neighborhoods. July 2012.

Eastern Neighborhoods

This area includes neighborhoods east of I-205. Most of this area was annexed into the City of Portland after the adoption of the 1980 Comprehensive Plan. The Eastern Neighborhoods have a mix of urban and semi-rural development, with towering Douglas firs and multiple buttes. Despite being home to one-quarter of the City's population (about 50,000 households), the area has nearly 40 percent of Portland's youth. During the late 1990s and early 2000s East Portland saw rapid residential growth. This growth highlighted many infrastructure deficiencies in the area, including the need for sidewalks, paved roads, safer street crossings and more frequent transit connections. Development in East Portland dramatically increased the area's population, changed the demographic makeup of the community, and highlighted remaining infrastructure deficiencies. School districts in East Portland have struggled to accommodate the corresponding growth in student enrollment.

Other issues highlighted by growth in East Portland include the need for developed parks and more neighborhood-serving businesses, so that residents can meet their needs close to home, and the need to provide a way to support local entrepreneurs and small businesses.

Figure 14: Eastern Neighborhoods 2035.



New development may:

- Help provide needed public infrastructure, such as parks and sidewalks.
- Create safer and friendlier pedestrian environments along major streets.
- Increase the viability of commercial services in areas that have limited access to goods and services.
- Provide space for community markets, business incubators, and start-up space for businesses and entrepreneurs.

Portland Infrastructure Investment Pilot Study

The Portland Infrastructure Investment Study examined existing conditions in the Lents and Powellhurst-Gilbert neighborhoods and the potential for public investments to leverage private investment and enhance community livability.

The study assessed the cost of providing the basic infrastructure needed to make each area a more “complete community” (e.g., sidewalks, safe pedestrian crossings, etc.). The study also looked at development readiness indicators, such as housing mix, rents/prices and long-term growth forecasts. A Return on Investment (ROI) analysis compared the cost of providing basic infrastructure with fiscal revenues (property taxes, SDCs, utility revenues, etc.) from forecasted development.

The study found that strategic public investments to provide basic infrastructure, especially pedestrian, bicycle and street networks improvements, are likely to have a net positive fiscal impact for the City, while also improving public health, safety, and neighborhood livability. Opportunity areas that currently have average scores on development readiness indicators are likely to have the greatest potential return on investment.

Western Neighborhoods

This area includes neighborhoods west of the Willamette River. The Western Neighborhoods have a mix of urban corridors (including SW Barbur Boulevard, Beaverton-Hillsdale Highway, and SW Capitol Highway) and more suburban development patterns that respond to challenging topography, sensitive natural areas, and lower densities. The Western Neighborhoods' most prominent characteristics are the hilly topography, streams, ravines, forested slopes, variably sized lots, and curvilinear street patterns.

Other issues highlighted by growth in West Portland includes the improved transportation options, more neighborhood-serving businesses so residents can meet their needs close to home, and the need to provide a way to support local vibrant activity centers and support a diversity of small businesses.

Figure 15: Western Neighborhoods 2035.



New development can:

- Improve watershed health by daylighting streams and restoring other natural features that builds on the distinctive topography and environmental character of the west side.
- Increase tree canopy by developing green setbacks with new trees and other plants to build on the area's green character and create buffers from busy streets.
- Improve safety for pedestrians, bicyclists, transit riders and motorists where there are limited streets through the hilly topography.

Industrial and River Area

This pattern area serves a key role as a location for port facilities, the airport, major land-based freight transportation networks such as pipelines and railroads, industry and other employment centers, and river habitat. Hayden Island, Bridgeton and scattered riverfront and houseboat communities have unique identities and a strong river orientation.

3. ALTERNATE GROWTH SCENARIOS

HOW WERE THE SCENARIOS DEVELOPED?

The scenarios are based on the existing development pattern; current and Proposed Comprehensive Plan designations; the [Buildable Lands Inventory](#) (BLI). The BLI provides information on how much land and which land is likely to be redeveloped given market conditions, development constraints and the current level of investment in properties and recent development trends. The scenarios are also based on Metro's 2040 Growth Concept. The different scenarios emphasize different aspects of existing plans. For example, which of these regionally designated centers are expected to develop over the next 25 years, and how much growth is expected in each?

Recognizing the significant influence of the current development and infrastructure, like bridges and light rail lines, each of the scenarios is a variation of Portland's current development pattern:

Default – The Default Scenario is based on existing development patterns and development trends. This scenario distributes future growth in the same places Portland has seen growth over the past 15 years.

Centers – The Centers Scenario focuses more growth in distinct hubs like Lents, Hillsdale and Gateway and less growth along the length of commercial and mixed use streets.

Corridors – The Corridors Scenario focuses more development along streets like SE Powell, SE Foster, SW Barbur and N Lombard and less growth in centers.

Central City Focused – The Central City Focused Scenario concentrates nearly all new growth in the Central City and the inner neighborhoods near the Central City, both east and west of the Willamette River.

How was the Proposed Comprehensive Plan scenario evaluated?

Proposed Comprehensive Plan – The proposed Comprehensive Plan combines Centers, Corridors and Central City scenarios and incorporates infrastructure investment from the Citywide Systems Plan (CSP) and Transportation Systems Plan (TSP).

Housing Growth Allocations

Although each scenario assumes the same level of household growth, the distribution of that growth varies in each scenario. Using the Proposed Comprehensive Plan scenario for comparison, the range of household growth in each district can be significant, especially in the Central City and East Portland. The Proposed Comprehensive Plan household growth allocation reflects land use changes that have increased capacity in some areas while decreasing capacity in others.

Table 4: Residential Growth Forecast Allocation.

District	Existing Comprehensive Plan (Default Scenario)	Proposed Comprehensive Plan	Household Change – Existing Comprehensive Plan to Proposed Comprehensive Plan	Other Scenarios
Central City ¹²	24,000	36,000	12,000	24,000 – 40,000
East	39,000	27,000	-12,000	19,000 – 39,000
North	17,000	13,000	-4,000	11,000 – 17,000
Northeast	13,000	15,000	2,000	12,000 – 19,000
Southeast	20,000	22,000	2,000	20,000 – 24,000
West	10,000	10,000	-	10,000 – 10,000

Growth Factor

In addition to looking at the number of new households, it can also be helpful to look at the magnitude of expected growth. The magnitude of growth, or growth factor, quantifies the potential amount of change anticipated in a given area. A growth factor of 1.0 means there is little or no growth or change potential. A growth factor of 2.0 is equal to a 100 percent growth rate or doubling of the number of housing units in a given location. For Portland as a whole, the Metro forecast projects a 50 percent increase in the number of households, which is a growth factor of 1.5 (or 123,000 new dwelling units).

If the Metro-projected growth were to be proportionately distributed across Portland, then each district would have a growth factor of 1.5. However, development capacity is not evenly distributed across the city, nor is it expected that growth will be evenly distributed across Portland. Therefore, the scenarios do not assume an even growth pattern across the city. The Central City, East Portland, and North Portland see higher growth factors in most of the scenarios.

¹² The Central City district includes the Northwest District Association to provide accurate comparisons to analyses in the first version of the Growth Scenarios Report.

Table 5: Growth Factor Comparison by Scenario.

District	Default	Centers	Corridors	Central City Focused	Proposed Plan
Central City	1.9	2.2	2.2	2.5	2.4
Southeast Portland	1.3	1.3	1.3	1.3	1.3
Northeast Portland	1.3	1.3	1.3	1.4	1.3
North Portland	1.6	1.6	1.6	1.4	1.5
East Portland	1.7	1.6	1.6	1.3	1.5
West Portland	1.2	1.2	1.2	1.2	1.2
Citywide Average	1.5	1.5	1.5	1.5	1.5

* All scenarios and the Proposed Plan scenario use 2010 as a base year to compute growth estimates. Between 2010 and 2014, about 15,000 new housing units were built in the city. Those units have been incorporated into the forecast growth allocation for the Proposed Plan, with each unit being attributed to the geography where it is located. As a result, only about 110,000 units are allocated using the Buildable Land Inventory and related forecast models.

Employment Allocation

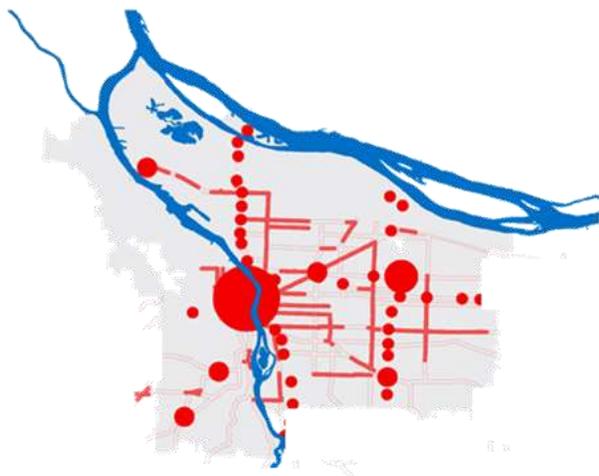
The five growth scenarios also address the potential location of neighborhood commercial job growth. The distribution of jobs in each scenario does not vary much because many of the employment locations are essentially fixed in place; the Central City, campus institutions and industrial areas are not expected to move or relocate, so all of the scenarios use the same job distribution for these geographies. Instead, it is the employment in neighborhood commercial areas that changes with each scenario. Neighborhood commercial areas will capture about 25 percent of the employment growth in the period of 2010–2035.

Therefore, new neighborhood commercial jobs are allocated to employment areas that are also residential focus growth areas for each scenario. For example, in the Centers scenario, neighborhood commercial jobs are located in centers. This assumption is based on the premise that new employment growth follows new household growth. New households bring more disposable income to an area, which in turn drives the demand for goods and services that creates the employment. Consequently, the scenario descriptions are focused on the differences in residential growth.

The other employment, such as the industrial areas and campus institutions, has been allocated across Portland based on the current employment distribution as identified in the [Employment Opportunities Analysis](#) (EOA) 2012 adopted report and the 2015 Update. The scenarios do not address the industrial and campus institution development capacity shortfalls identified in the EOA. These shortfalls are being addressed through map changes in the Comprehensive Plan Update and the Campus Institution Zoning Project.¹³The evaluation of the Proposed Comprehensive Plan accounts for land use changes to address these shortfalls.

¹³ <https://www.portlandoregon.gov/bps/article/408240>

DEFAULT SCENARIO



The growth distribution in the Default scenario is based on Portland’s 15-year development trends (1996-2010). As a result, in this scenario a significant amount of growth is allocated to both East Portland (39,000 new households). However, less growth is allocated to the Central City (24,000).

In East Portland, much of the projected growth is located in Gateway and near SE 122nd Avenue and SE Division Street.

In the Inner Neighborhoods, most growth is expected along corridors and in centers, like Hollywood.

Figure 16: Default Scenario: New Household Growth Distribution.



Table 6: Default Scenario: New Household Growth Distribution.

District	New Growth	2035 Total	Growth Factor
Central City	24,000	50,000	1.9
Southeast Portland	20,000	90,000	1.3
Northeast Portland	13,000	59,000	1.3
North Portland	17,000	44,000	1.6
East Portland	39,000	95,000	1.7
West Portland	10,000	54,000	1.2
Citywide	123,000	392,000	1.5

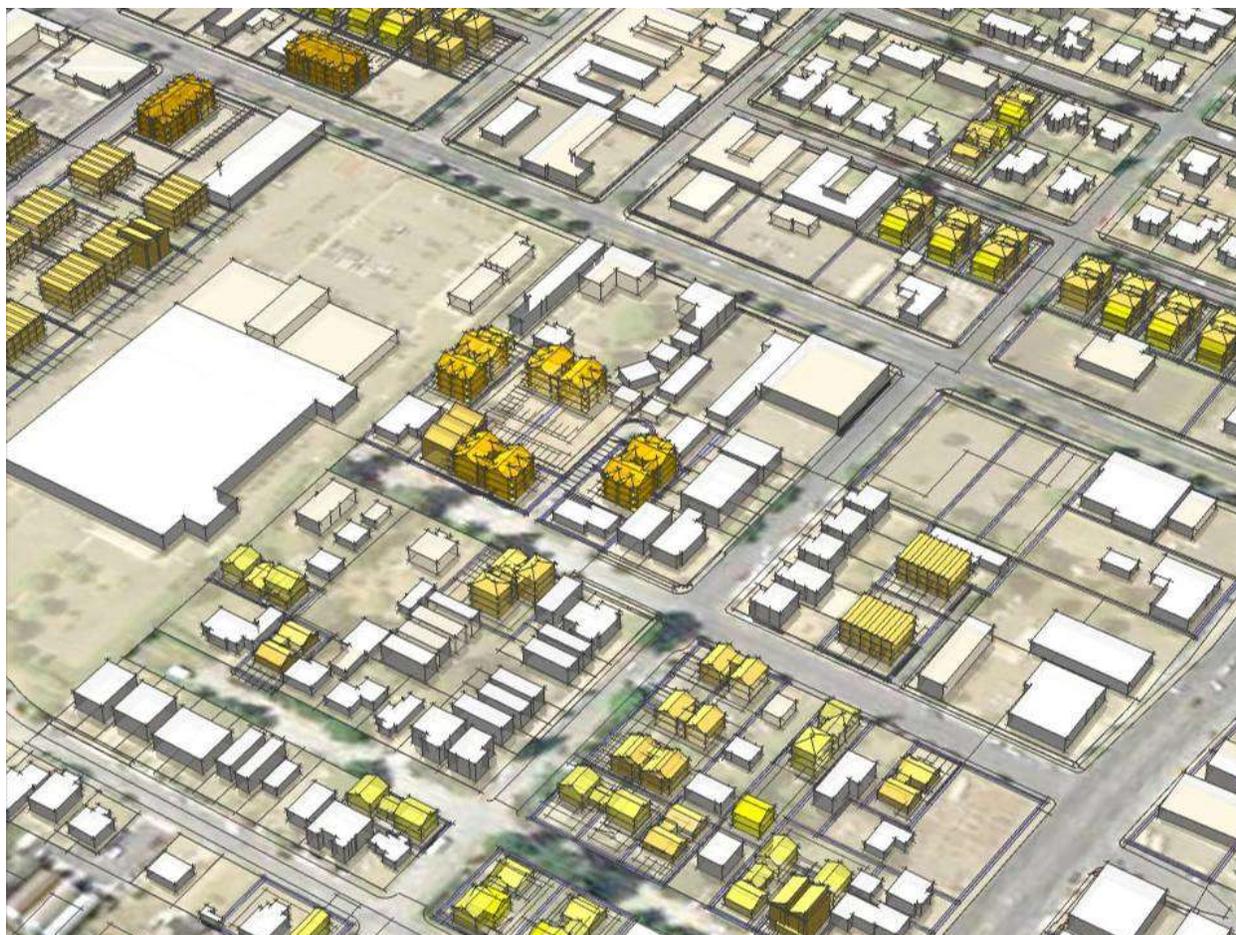


Figure 17: Default Scenario: 2035 Development Pattern.

Default Scenario Development Pattern

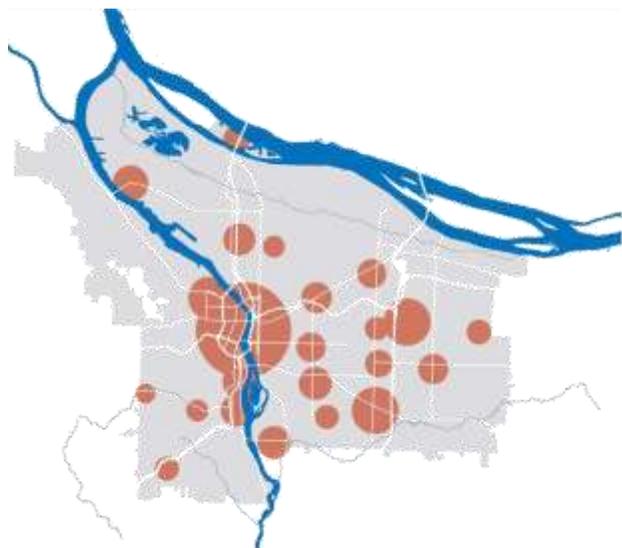
The resulting development pattern is relatively dispersed. It does not have significant concentrations of mixed-use areas. This dispersed pattern may make it more difficult to provide most Portlanders with walkable access to services, make cost-effective infrastructure investments and provide enhanced transit access.

Complete Neighborhoods – Widely distributed growth makes it less likely there will be the critical mass of activity needed to support the development of highly functioning mixed-use centers. Without mixed-use centers, fewer residents will have safe and walkable access to needed goods and services.

Infrastructure Investment – This growth pattern may also make it more difficult and less efficient to provide needed infrastructure services to all Portlanders. With a dispersed development pattern, there will be fewer residents within service areas, increasing the need to provide more facilities and services, without increases in financial resources.

Access to Transit and Jobs – Transit service is more efficient when there are concentrations of jobs and housing. This pattern will necessitate more transit lines, and may result in less frequent service.

CENTERS SCENARIO



In this scenario, growth is focused in Centers. Centers are compact mixed-use, walkable areas with shops and services that are well served by transit and connected to employment centers. Centers also have a housing mix that provides a range of choices for various household sizes and income levels. The Centers scenario builds off of the Healthy Connected City strategy in the Portland Plan, as well as the current Comprehensive Plan and Metro’s 2040 Growth Concept, all of which prioritize growth in centers.

This scenario has a more compact growth pattern than the Default. It directs approximately 80 percent of new multifamily household growth into a more limited set of existing and emerging urban centers, including SE Lents, St. Johns and Hillsdale, the Central City and SE Hawthorne-Division-Belmont, among others.

Figure 18: Centers Scenario: New Household Growth Distribution.



Table 7: Centers Scenario: New Household Growth Distribution.

Districts	New Growth	2035 Total	Growth Factor
Central City	30,000	56,000	2.2
Southeast Portland	20,000	90,000	1.3
Northeast Portland	12,000	58,000	1.3
North Portland	17,000	44,000	1.6
East Portland	34,000	90,000	1.6
West Portland	10,000	54,000	1.2
Citywide	123,000	392,000	1.5



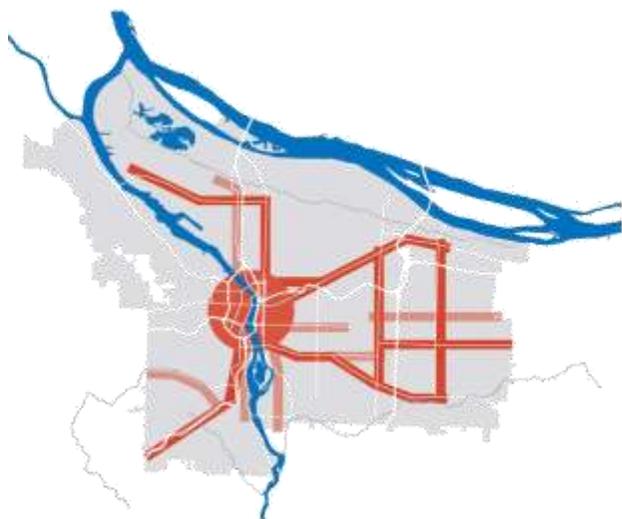
Figure 19: Centers Scenario: 2035 Development Pattern.

Centers Scenario Development Pattern

The Centers scenario yields a series of compact, walkable, mixed-use areas with commercial services and residential buildings. Residential areas within centers will see more development, but residential areas outside centers will remain largely unchanged from today.

In order to encourage private development in Centers, the City and other agencies may need to invest in infrastructure facilities, like sidewalks, to improve safety and access to transit and streetscape improvements to create more pleasant walking environments and gathering spaces. These improvements will increase the attractiveness of centers and make it easier for residents in surrounding neighborhoods to safely and easily walk, bike or roll to local services to meet their household needs.

CORRIDORS SCENARIO



This scenario prioritizes growth along Civic Corridors. Civic Corridors are typically long and significant streets that link different parts of the city together. They have frequent transit service and have the potential for a high level of development on either side.

The Corridors scenario builds off a significant component of the Healthy Connected City strategy in the Portland Plan, as well as the current Comprehensive Plan and Metro’s 2040 Growth Concept.

This scenario allocates approximately 80 percent of new multifamily household growth into corridors, such as SW Barbur Boulevard,

North Interstate, 82nd Avenue, and 122nd Avenue.

Figure 20: Corridors Scenario: New Household Growth Distribution.



Table 8: Corridors Scenario: New Household Growth Distribution.

Districts	New Growth	2035 Total	Growth Factor
Central City	30,000	56,000	2.2
Southeast Portland	20,000	90,000	1.3
Northeast Portland	12,000	58,000	1.3
North Portland	17,000	44,000	1.6
East Portland	34,000	90,000	1.6
West Portland	10,000	54,000	1.2
Citywide	123,000	392,000	1.5



Figure 21: Corridor Scenario: 2035 Development Pattern.

Corridor Scenario Development Pattern

This scenario results in a linear growth pattern with much development along major streets, but with minimized impacts to established single family neighborhoods. It supports distinctly urban corridors with more intense uses and levels of activity than there are today or in the Default.

A corridor growth pattern may improve watershed health by shifting growth from more environmentally sensitive areas into redevelopment of already urbanized corridors. It also may be more cost effective to serve with sewer and water infrastructure.

CENTRAL CITY FOCUSED



This scenario focuses most future household growth into the Central City and Inner Neighborhoods within 3 miles of the Central City (a short transit or bike trip). Some additional growth is also directed to Gateway. This scenario reflects Portland’s more recent (2008-2012) five-year development trends.

With this scenario, 16000 more households would be directed to the Central City than in the Default. Inner Southeast and Northeast Portland would see 10,000 more households than in the Default. This distribution alleviates growth pressures in East Portland.

Figure 22: Central City Focused Scenario: New Household Growth Distribution.



Table 9: Central City Focused Scenario: New Household Growth Distribution.

Districts	New Growth	2035 Total	Growth Factor
Central City	40,000	66,000	2.5
Southeast Portland	24,000	94,000	1.3
Northeast Portland	19,000	65,000	1.4
North Portland	11,000	38,000	1.4
East Portland	19,000	75,000	1.3
West Portland	10,000	44,000	1.2
Citywide	123,000	392,000	1.5



Figure 23: Central City Focused Scenario: 2035 Development Pattern.

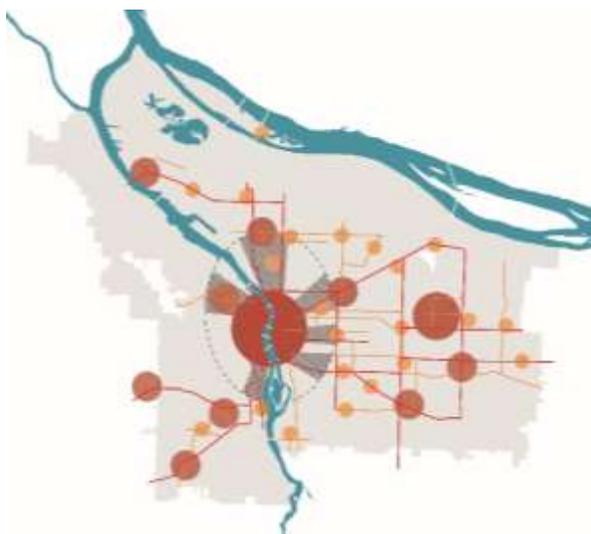
Central City focused development pattern

The overall land development pattern includes a highly developed Central City, with more tall buildings and significantly more residential development than today. Some additional development in the Central City may be achieved by encouraging the use of height and density bonuses. This scenario also includes developed mixed-use corridors within 3 miles of the Central City.

This scenario represents an opportunity to capitalize on existing infrastructure – these areas have a complete street network and good access to existing bicycle and transit networks. It may require less expensive infrastructure investment with a focus on amenities such as community centers and schools.

At the same time, the decrease in development pressure on East Portland may provide the opportunity to invest in much-needed infrastructure, such as schools and sidewalks.

PROPOSED COMPREHENSIVE PLAN



This scenario reflects the policies and actions supported by the Proposed Comprehensive Plan. This is a blend of three growth strategies – Centers, Corridors and Central City. It takes advantages of the mixed-use, walkable areas that can be created in centers and along Civic Corridors. The Proposed Plan also focuses more future household growth into the Central City and Inner Neighborhoods within 3 miles of the Central City (a short transit or bike trip). Some additional growth is also directed to Gateway and other town centers. This scenario also reflects Portland’s most recent (2010-2014) development trends.

With this scenario, 12,000 more households would be directed to the Central City than in the

Default. Inner Southeast and Northeast Portland would see 4,000 more households than in the Default. Density reductions have been proposed in locations farther from identified Centers and Corridors, particularly in outer East Portland.

Figure 24: Proposed Comprehensive Plan Scenario: New Household Growth Distribution.

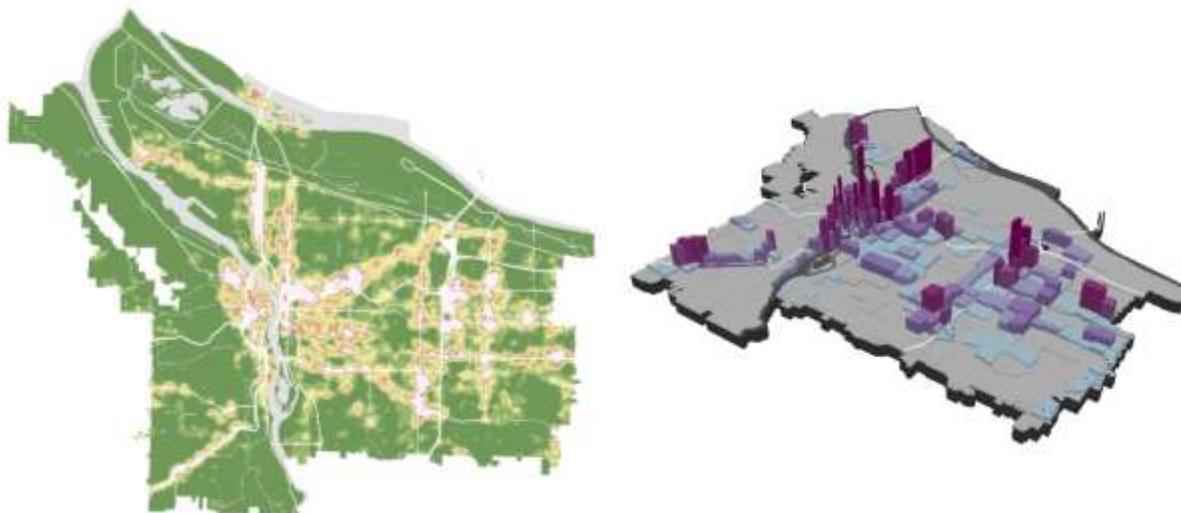


Table 10: Proposed Comprehensive Plan Scenario: New Household Growth Distribution.

Districts	Existing	New Growth	2035 Total	Growth Factor
Central City	26,000	36,000	62,000	2.4
Southeast Portland	70,000	22,000	92,000	1.3
Northeast Portland	46,000	15,000	61,000	1.3
North Portland	27,000	13,000	40,000	1.5
East Portland	56,000	27,000	83,000	1.5
West Portland	44,000	10,000	54,000	1.2
Citywide	269,000	123,000	392,000	1.5



Figure 25: Proposed Comprehensive Plan Scenario: 2035 Development Pattern.

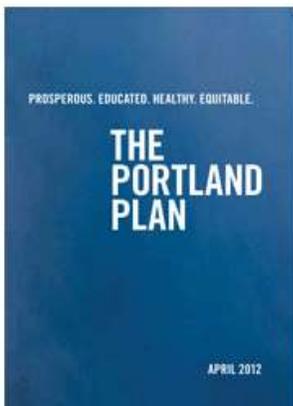
Proposed Comprehensive Plan development pattern

The overall land development pattern includes a highly developed Central City, a series of compact, walkable, mixed-use centers with commercial services and residential buildings and some linear growth along major streets and transit corridors. This development pattern supports distinctly urban areas of development with more intense uses and levels of activity than exist today.

This scenario represents an opportunity to capitalize on existing infrastructure – these areas have a complete street network and good access to existing bicycle and transit networks. In order to encourage private development in prioritized centers and corridors, City bureaus and other public agencies will need to invest in infrastructure facilities, like sidewalks, to improve safety and access to transit and streetscape improvements to create more pleasant walking environments.

A critical component of the Proposed Comprehensive Plan Scenario is to accommodate growth by taking advantage of existing infrastructure efficiencies in well served inner neighborhoods while investing to reduce disparities in centers and corridors in East Portland.

4. PERFORMANCE MEASURES



The primary purpose of this report is to establish a framework to evaluate the alternative growth scenarios against a set of performance measures. This framework will allow Portlanders to weigh the tradeoffs between different growth patterns and investment priorities, and evaluate the relative performance of the Proposed Plan.

The performance measures are based on the Portland Plan's Measures of Success and cover a wide range of subjects, from complete neighborhoods to watershed health. This list of measures provides a snapshot or overall sense of current conditions and where Portland will be in 2035. The evaluation identifies challenges and gaps to achieving the performance goals as well as the potential impact of different infrastructure investments. The scenarios also provide an opportunity to evaluate performance at different scales – citywide, district and neighborhood.

Finally, these measures are a starting point. They are not intended to provide a complete analysis of the issues, and some Portland Plan measures, such as high school graduation rates, are not directly dependent on the geographic distribution of growth.

LONG-TERM VALUE

This evaluation framework was used throughout the development of the Proposed Comprehensive Plan Map.

The preferred growth strategy of the Proposed Comprehensive Plan is also reflected in the Urban Design Framework and the policies, infrastructure projects and maps in the adopted Comprehensive Plan. The performance measures informed those decisions and serve as a framework for ongoing monitoring and evaluation of the plan's implementation. The information in this background report focuses primarily on housing growth in Portland, with an emphasis on highlighting the performance of existing infrastructure and highlighting key opportunities and the relationships between Portland's existing deficiencies and potential future gaps. The evaluation has been used to identify actions to address gaps in performance. This updated analyses summarizes approaches used to overcome performance gaps through the Proposed Comprehensive Plan.

The purpose of this section is to outline to what degree different scenarios affect performance on a series of measures. These measures evaluate how well existing infrastructure and zoning perform under different growth patterns. The results of these measures begin to indicate performance gaps. This, in turn, served to clarify Comprehensive Plan goals, policies, infrastructure, investments, programs and partnerships that can best help Portland to reach performance targets.

Table 11: Portland Plan Performance Measures.

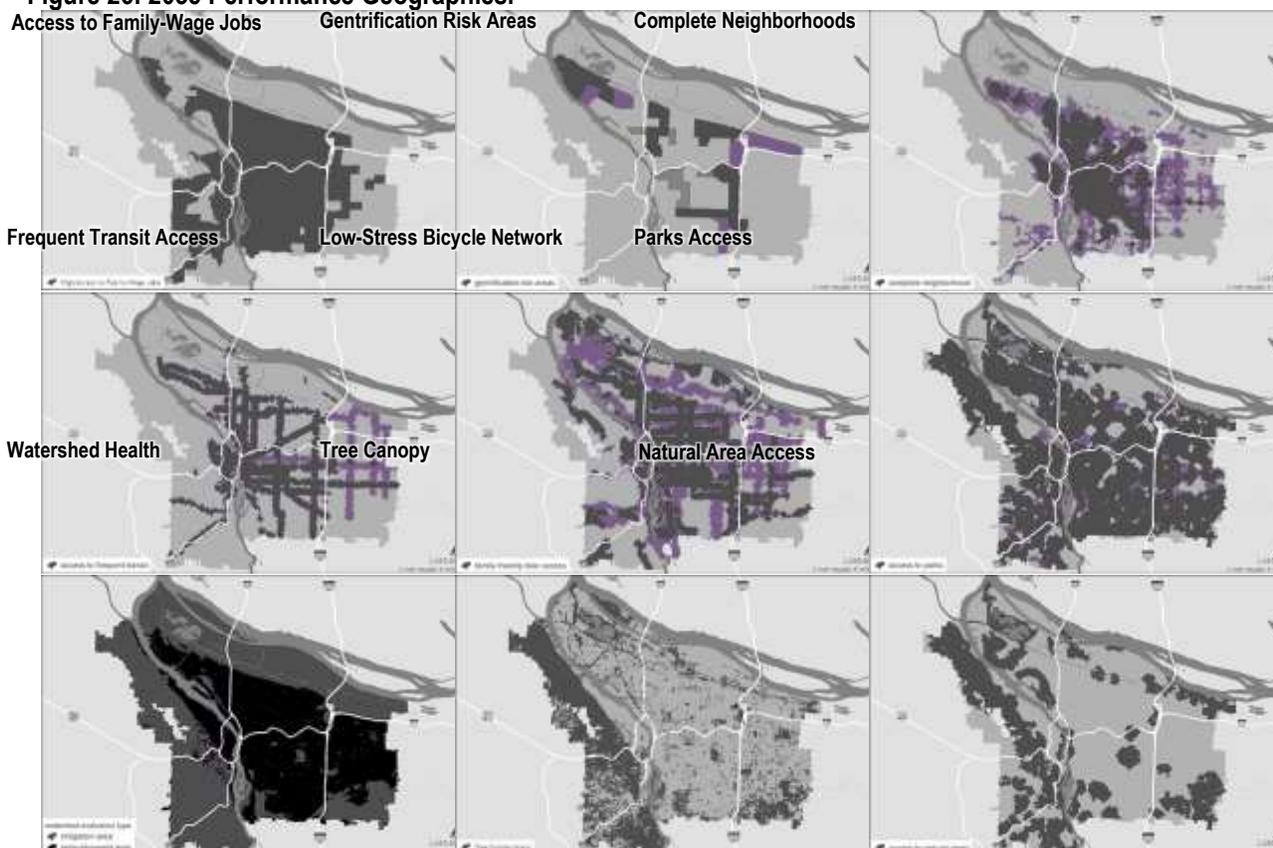
Portland Plan Objective	Performance Measure
Prosperity and Affordability	
By 2035, extend upward mobility pathways so that at least 90 percent of households are economically self-sufficient. By 2035, Portland has 27 percent of the region’s new jobs, more of which provide a living wage, and continues to serve as the largest job center in Oregon.	Access to Family-Wage Jobs
By 2035, preserve and add to the supply of affordable housing so that no less than 15 percent of the total housing stock is affordable to low-income households, including seniors on fixed incomes and persons with disabilities.	Housing Mix and Affordability
By 2035, no more than 30 percent of city households (owners and renters) are cost burdened, which is defined as spending 50 percent or more of their household income on housing and transportation costs.	Risk of Displacement/ Gentrification
Healthy Connected City	
By 2035, 80 percent of Portlanders live in a complete neighborhood with safe and convenient access to the goods and services needed in daily life.	Complete Neighborhoods
By 2035, Portlanders have reduced the number of miles they travel by car to 11 miles per day on average and 70 percent of commuters walk, bike, take transit, carpool or telecommute to work. By 2035, Portland’s transportation-related carbon emissions are 50 percent below 1990 levels, and effective strategies to adapt to climate change are in place and being implemented.	Access to Frequent Transit Access to Low-Stress Bikeways Vehicle Miles Traveled (VMT) Mode Share GHG/Carbon Emissions
By 2035, all Portlanders live within a half-mile safe walking distance of a park or greenspace. By 2035, all Portlanders can conveniently get to and enjoy the Willamette and Columbia Rivers. The regional Trail System is substantially complete and is an integrated component of a Healthy Connected City network.	Access to Parks Access to Natural Areas
By 2035, watershed health is improved, and the Willamette River and local streams meet water quality standards. Tree canopy covers at least one-third of the city and is more equitably distributed. Fewer homes and businesses are at risk from flooding. A diversity of critical habitats (including floodplains, riparian areas, wetlands, oak groves, native forests and remnant meadows) are protected, connected and enhanced to support a rich diversity of native and migratory wildlife. High-quality trees are routinely preserved and planted on development sites.	Watershed Health Tree Canopy

METHODOLOGY

Most of the performance measures can be mapped as an area or geography that represents a part of Portland that meets the performance objective. This evaluation analyzes the amount of growth and the total number of 2035 households that occur within the high-performance geography. The evaluation includes the existing (2010) households, the 2010-2035 growth, and the total (existing plus growth) 2035 households for each scenario and the Proposed Comprehensive Plan. For example, the Complete Neighborhoods geography represents the parts of Portland that are relatively complete based on an index that measures walkable access to shops, services and civic amenities. The 2035 Portland Plan objective is that 80 percent of Portland households are located in a “complete neighborhood.” The performance evaluation shows that 63 percent of current (2010) households are located in complete neighborhoods and the scenarios show a 2 to 6 percent increase for the different scenarios, without considering infrastructure investments. The Proposed Comprehensive Plan brings this number to 73% through a combination of land use changes, and investments to create more complete neighborhoods where they do not currently exist (adding parks, transit, sidewalks, etc. as described in the TSP and CSP).

The dark areas on the maps represent the high-performance geography. For the most part, these measures are positive indicators, which means increasing performance by maximizing the number of households in these geographies or expanding the coverage area of the geographies. The Gentrification Risk Areas is the one exception, where there is not a clear positive or negative associated with the information.

Figure 26: 2035 Performance Geographies.



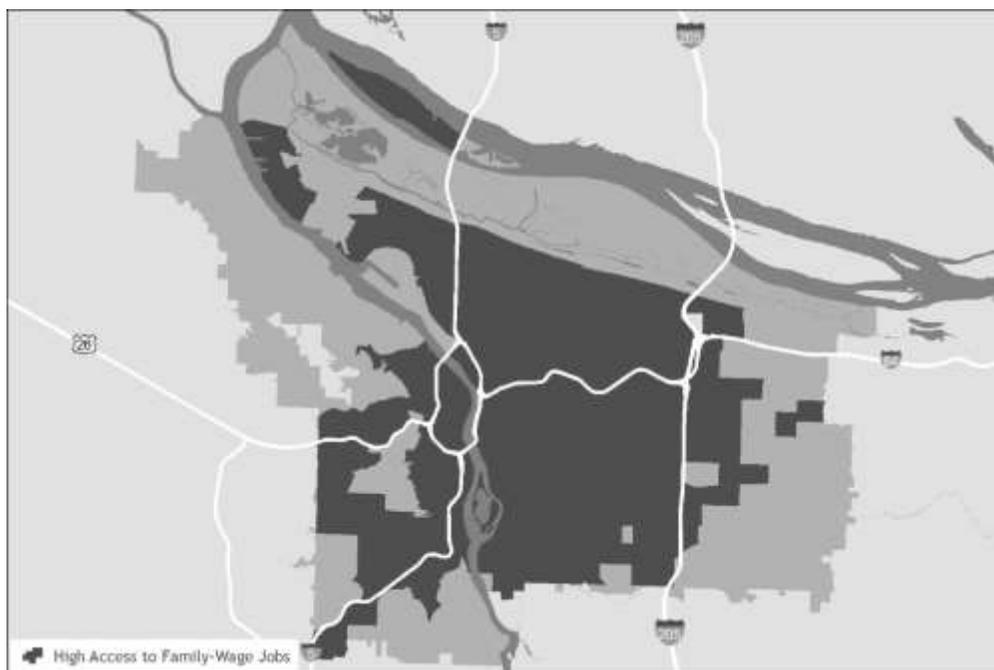
ACCESS TO FAMILY-WAGE JOBS

PORTLAND PLAN

By 2035, extend upward mobility pathways so that at least 90 percent of households are economically self-sufficient.

By 2035, Portland has 27 percent of the region's new jobs, more of which provide a living wage, and continues to serve as the largest job center in Oregon.

Locating housing with access to a variety of higher paying jobs is a critical component of household prosperity. This performance measure is based on the number of family-wage jobs accessible within a 60-minute transit trip. A family-wage job is one that can meet the basic needs of a single-income household of one adult, one infant and one preschooler. In Multnomah County, the family-wage employment threshold is \$47,244 per year. This basic measure only accounts for access to the quantity of jobs as an indicator of opportunity, without considering skills, qualifications or education attainment levels. While this analysis is influenced by proximity to the Central City, the region's largest job center, it also accounts for employment destinations accessible by transit in cities throughout the region.

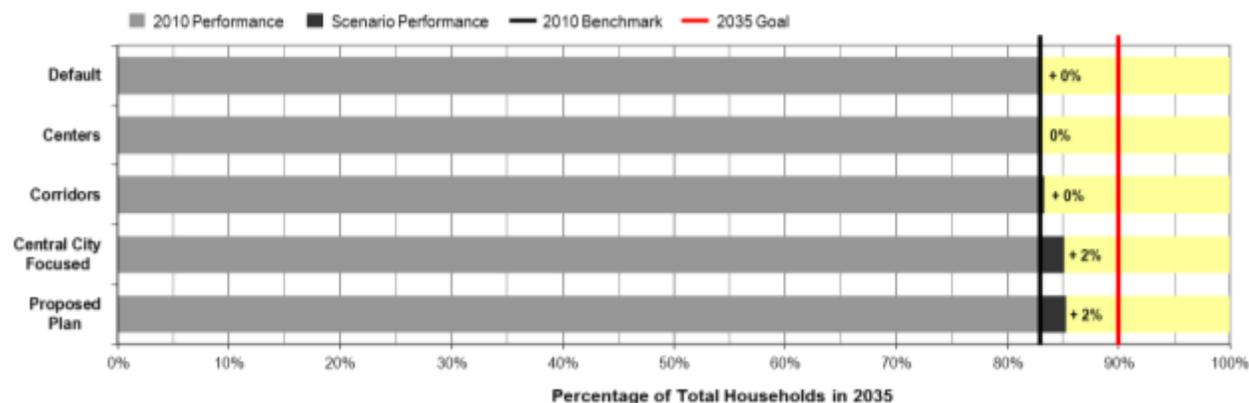


■ **Family-Wage Job Access Areas** are places where households have good transit access and are reasonably close to employment centers with concentrations of jobs. Prioritizing development, especially affordable housing, in these areas will be beneficial to household prosperity by increasing the number of family-wage jobs that are accessible to a household with reduced dependence on an automobile.

■ **Family-Wage Job Gap Areas** are places where households have reduced access to family-wage jobs. Focusing public investments to increase access to transit or to support business growth to increase employment opportunities in or near these areas will help to expand the access to family-wage jobs.

Comprehensive Plan Update

Chart 1: Performance Measure: Access to Family-Wage Jobs – Households in Job Access Area¹⁴



Performance of the Proposed Comprehensive Plan

The performance goal is a translation of the Portland Plan objective that 90 percent of households are economically self-sufficient – in order to be a prosperous household, wage-earners need access to family-wage jobs. In 2010, 82 percent of Portland households were located in areas with good transit access to family-wage jobs. Policy and investment decisions in the Proposed Comprehensive Plan increase transit access to family-wage jobs by 2 percent. Comprehensive Plan map changes in the Gateway Town Center, along 82nd Avenue and elsewhere in East Portland, as well as the transit and active transportation investments in the TSP will contribute to better access to family-wage jobs in East Portland. Proposed changes in transit service to better connect 122nd Avenue with the Columbia Corridor had a particularly strong impact on this number.

Options for Improving Performance

In order to meet the 90 percent goal, approximately 38,000 additional households need to have improved access to family-wage jobs. This change could be accomplished by increasing access to transit or creating more job opportunities in or near these low-access areas.

Increase Transit Service in East Portland

This measure is a function of transit travel time to employment centers. One strategy is to increase transit service in East Portland to provide faster or more direct connections to regional employment centers, especially the Columbia Corridor.

Increase Employment Opportunities in East Portland

Another option is to support business growth in order to increase job opportunities, especially middle-skill, family-wage jobs in East Portland. This business growth could be achieved through continuation and expansion of PDC's Neighborhood Prosperity Initiative. It also could be achieved through zoning changes to increase the amount of land available for light industrial uses and manufacturing.

Lesson Learned: More Jobs in East Portland

If our pool of family-wage jobs is too far away from the pool of affordable housing, access to opportunity is reduced. East Portland is Portland's largest pool of affordable housing, but it lacks access to family-wage employment.

¹⁴ Performance of the Proposed Plan is will increase in the future as new employment uses are built in new dispersed employment areas in East Portland and new frequent transit service is added. A transit matrix analysis will be updated when new frequent transit stops are identified by Trimet.

HOUSING CHOICE

PORTLAND PLAN

By 2035, preserve and add to the supply of affordable housing so that no less than 15 percent of the total housing stock is affordable to low-income households, including seniors on fixed incomes and persons with disabilities. By 2035, no more than 30 percent of city households (owners and renters) are cost burdened, which is defined as spending 50 percent or more of their household income on housing and transportation costs.

Housing choice is a complex issue that is shaped by household preferences based on factors such as age, family size and income level. Additionally, discrimination in the housing market influences choice. Such complexities make it difficult to assess the housing choice impact of different scenarios. The housing choice analysis encompasses the mix of housing types (buildings) and how those types are expected to meet forecasted demand for different households (people). On a basic level, Portland has the zoned capacity to enable the private sector to produce a sufficient supply of new housing units to meet forecasted demand. The scenarios also allow for a wide range of housing types that are expected to meet a wide range of household needs. The differences are in the minor shifts in the unit mix of housing types that can affect affordability and gentrification risk.

Expanding housing choice is dependent on three key components:

Location Diversity – Location matters. Housing choice in Portland always takes place within the context of the larger regional housing market, which offers different amenities and opportunities. Portland can increase location diversity by (1) targeting growth into key centers and corridors, and (2) creating more complete neighborhoods by improving services and access in areas that are currently not well served.

Unit Affordability – Affordability is a function of two components: housing cost/rent and household income. A mismatch between these two factors can result in a cost-burdened household, wherein 50 percent or more of household income is spent on housing and transportation costs. For many low-income households, affordable housing is difficult to find in the private market and they must rely on public programs to keep housing costs below the burden level. Affordability can also be affected by supply and demand. Failing to enable mixed-income housing development in high-demand areas can create tight market conditions, driving prices up.

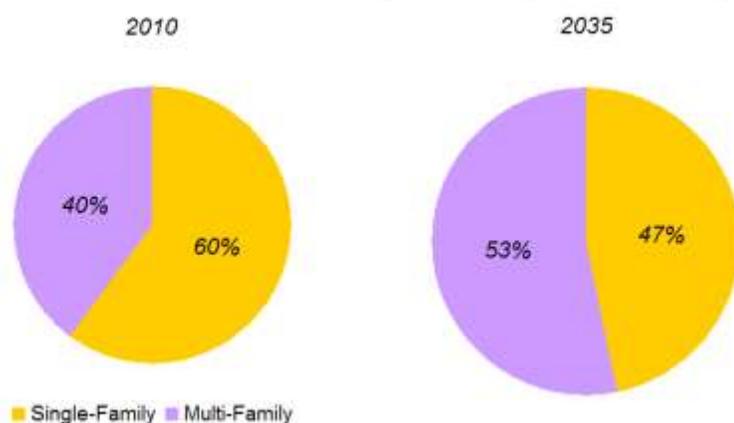
Unit Diversity – Housing unit diversity in an area can support a range of housing choices that respond to changing household needs such as larger family-sized units or multifamily rental opportunities adjacent to established single family neighborhoods.

The interaction of these components affects the level of housing choice available to each household differently. It is important to note that choice can be expanded independent of affordability by building more housing units and creating more complete neighborhoods (attractive locations). These issues have impacts on Portland's performance to the degree that Portland continues to grow. Housing unit diversity offers regional and citywide benefits, including lessening the burden of automobile travel across the region (resulting in fewer vehicle miles traveled), using existing infrastructure efficiently and supporting regional transportation corridors and employment centers.

Housing Mix

Overall, Portland provides a relatively balanced mix of housing types. Currently, single family houses make up nearly 60 percent of Portland’s housing stock. As a result of Portland being already urbanized, with limited opportunities for single family residential development, the vast majority (80 percent) of new housing units are expected to be in multifamily units. The supply of multifamily units is expected to grow by 95,000 units, far exceeding the expected single family growth of 26,000 units. Even though the new growth is skewed toward multifamily housing types, the overall mix in 2035 is still relatively balanced, with 47 percent being single family houses.

Chart 2: Single-Family–Multi-Family Unit Split.



Although the housing mix will shift, the share of the land area zoned within the City of Portland will remain consistent, with Single Family Residential covering about 42 percent of Portland’s land area. The mixed-use commercial areas and multifamily residential areas make up only about 10 percent of the land area, with the balance largely in industrial areas and open space.

Figure 27: Land Area by Zoning Designation.

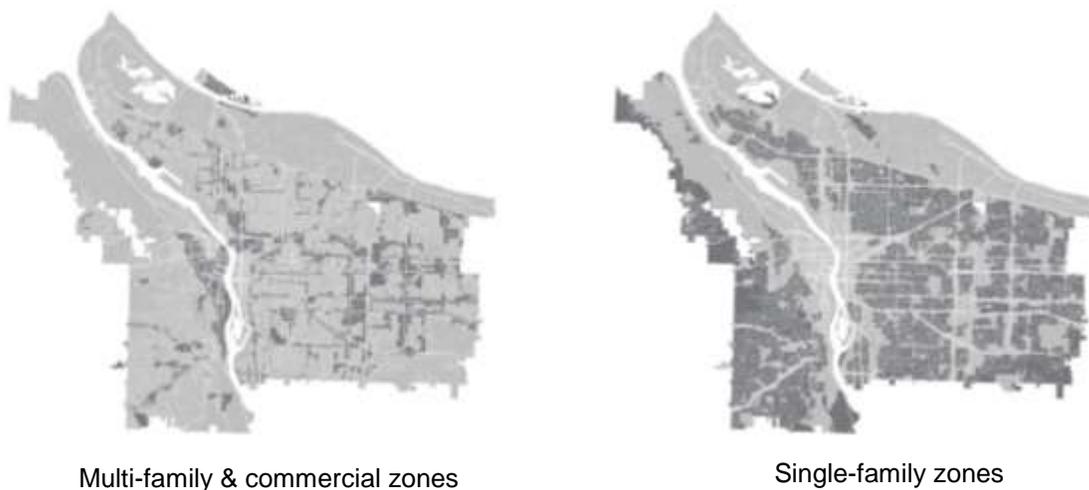


Table 12: Housing Types.

SINGLE FAMILY RESIDENCES		CORRIDOR APARTMENTS	
	<p>Detached House</p> <p>A one- to three-story detached, single family dwelling on its own lot. Typically, lot size is more than 5,000 square feet.</p>		<p>Plex</p> <p>A dwelling having apartments with separate entrances to six or more units. This includes two-story houses having a complete apartment on each floor and side-by-side apartments on a single lot that share a common wall.</p>
	<p>Small Lot Single Family Residence</p> <p>A one- to three-story detached, single family dwelling on its own lot, but a smaller (2500 sq foot) lot.</p>		<p>Corridor Apartment</p> <p>A four-story residential apartment building, typically with one on-street entrance and internal entrances to individual units.</p>
	<p>Attached House (Medium Density)</p> <p>Characterized by individual units that share a common wall, with each unit on its own lot. Examples include townhomes and rowhouses.</p>		<p>Neighborhood Mixed Use</p> <p>A four-story residential apartment building with commercial uses on the ground floor.</p>
	<p>Attached House (High Density)</p> <p>Characterized by individual units that share a common wall. Many high-density attached houses include shared open space amenities in backyards or courtyards. Examples include duplexes, triplexes and units with shared courtyards.</p>		<p>Single Room Occupancy Unit (SRO)</p> <p>A studio apartment that does not have its own washing, laundry and kitchen facilities. Examples include affordable housing projects, assisted living facilities and college dormitories.</p>
MID- TO HIGH-RISE APARTMENTS			
	<p>Mid-Rise Mixed Use (Small Units)</p> <p>A six- to ten-story building with ground floor office or retail uses. Allocated units of this type tend to be predominantly studios and one-bedroom units and tend to have smaller units.</p>		<p>Mid-Rise Mixed Use (Large Units)</p> <p>A six- to ten-story building with ground floor office or retail uses. Typical units are larger, one- to four-bedroom units, and have a smaller number of studio units as part of the overall mix.</p>
	<p>High-Rise Tower</p> <p>A 10+ story building containing residential apartments or condominium units. In addition to spectacular views, most high rises offer their residents a full range of amenities. Building features may include 24-hour concierge service, swimming pools, spas, saunas, tennis courts, exercise areas, party rooms and guest suites.</p>		

Chart 3: Housing Type Production by Scenario.

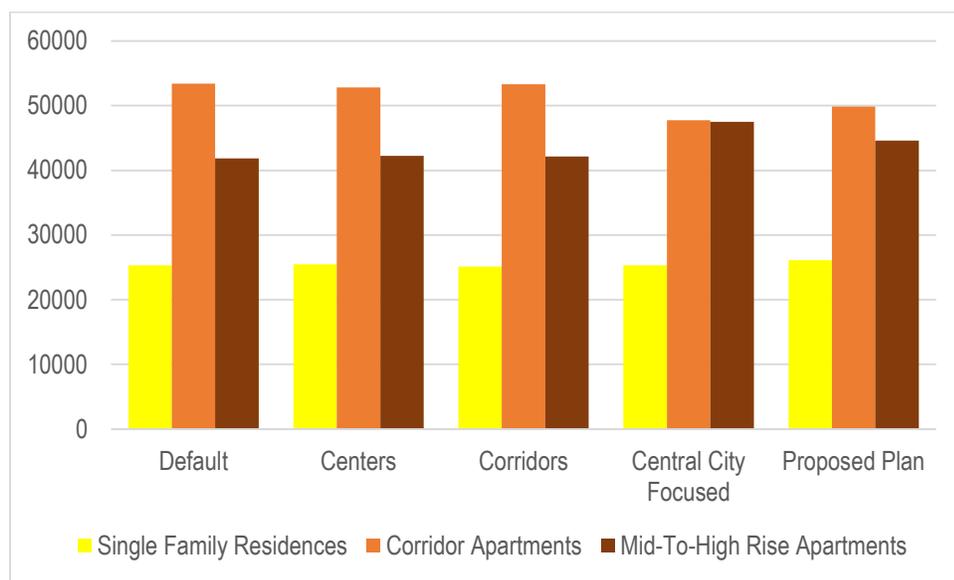


Table 13: Housing Type Production by Scenario.

	Default	Centers	Corridors	Central City Focused	Proposed Comprehensive Plan
SINGLE FAMILY RESIDENCES					
Detached Houses	14,000	14,000	13,000	14,000	14,000
Small-Lot Houses	3,000	3,000	3,000	3,000	3,000
Attached Med Density	5,000	5,000	5,000	5,000	5,000
Attached High Density	3,000	4,000	4,000	4,000	4,000
CORRIDOR APARTMENTS					
Plexes	8,000	8,000	7,000	6,000	7,000
Corridor Apts	16,000	16,000	16,000	11,000	14,000
SRO/Studios	9,000	9,000	10,000	10,000	13,000
Neighborhood Mixed Use	21,000	20,000	21,000	21,000	16,000
MID-TO-HIGH RISE APARTMENTS					
Mid-Rise (small units)	19,000	19,000	21,000	15,000	18,000
Mid-Rise (large units)	3,000	3,000	3,000	2,000	4,000
High-Rise	19,000	19,000	18,000	30,000	22,000
ACCESSORY DWELLING UNITS					
ADUs	3,000	3,000	3,000	3,000	3,000

Housing Types

Housing types found in Portland fall into three broad categories: single family residential, neighborhood and corridor apartments, and mid- to high-rise units. These categories are based on building types and include both rental and ownership/condos. The analysis shows that Portland expects to produce a wide range of housing types, with all of the scenarios producing a similar mix. The one exception is the Central City Focused scenario, which produces more high-rise towers and fewer plexes and corridor apartments, which could negatively affect housing affordability.

Household Types

Housing preference is usually shaped by the size and needs of a household. However, the actual choice and eventual place of residence for a household is significantly influenced by household income. Metro’s Metroscope model groups current (2010) and future households (2035) into eight different types (See Table 14) based on income, age, and size across the metro region. This grouping is helpful in estimating current and future affordable housing needs by helping identify and describe the household types that are most likely to struggle to meet the cost of housing based on their income.

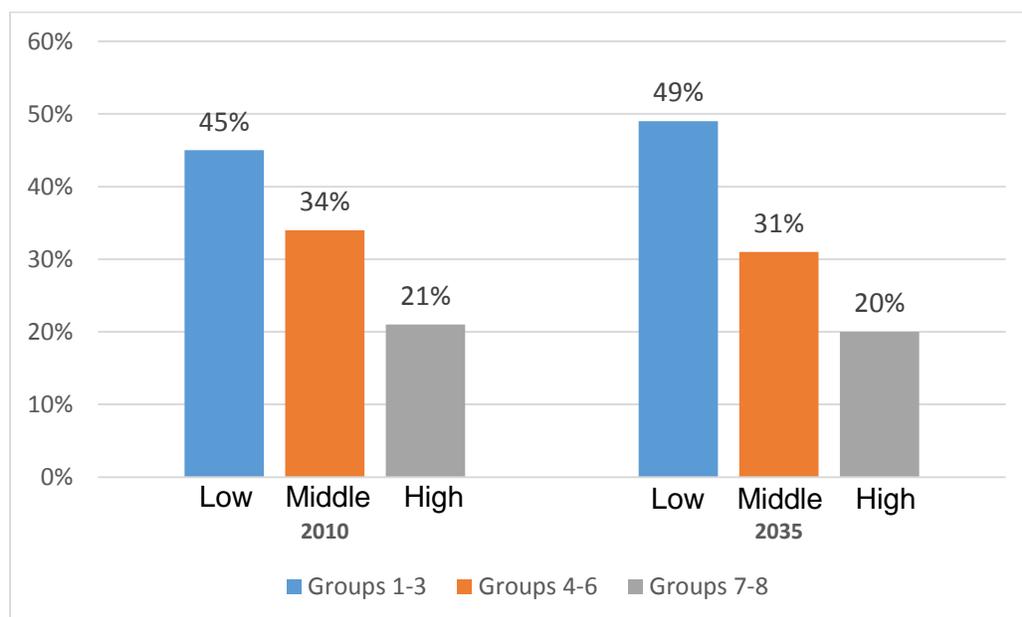
Metro’s most recent household projections provide insight regarding the share and number of households that struggle to find suitable housing today and are likely to face the same challenge through 2035. As can be noted from following table (Table 14), Groups 1, 2, & 3, are households that generally make less than 80% MFI and made-up 45% of households in Portland in 2010. By 2035, the share these household groups is projected to grow an additional three percent. The number of households in the lowest income group alone is projected to grow by 25,000.

Table 14: Households by Income Type (2010–2035)

	Household Type	Income	2010 Share	2010 Households	2035 Share	2035 Households	Percent Change	Amount Increase
Low	Group 1	<\$15,000	17%	43,004	18%	67,544	1%	24,540
	Group 2	\$15,000-\$24,999	13%	32,885	15%	56,285	2%	23,400
	Group 3	\$25,000-\$34,999	15%	37,944	16%	60,039	0%	22,095
Middle	Group 4	\$35,000-\$44,999	13%	32,885	13%	48,781	0%	15,896
	Group 5	\$45,000-\$59,999	13%	32,885	11%	41,276	-2%	8,391
	Group 6	\$60,000-\$74,999	8%	20,238	7%	26,268	0%	6,030
High	Group 7	\$75,000-\$99,999	10%	25,296	10%	37,523	0%	12,227
	Group 8	\$100,000+	11%	27,826	10%	37,523	-1%	9,697
	Total	-	100%	252,963	100%	375,239	-	122,276

Source: Metroscope, Gamma 2012

Figure 28: Household Types



Affordability and Cost Burden by Household Type

The nature of the housing stock, both existing and new, will influence the housing choice that households make today and in the future. Not every new household will be matched to a new unit. Older housing stock tends to be more affordable than new construction in many areas, and Portland’s existing housing stock will continue to be the predominant housing stock in the market. Market demand, amenity level and location can put increased market pressure on these areas due to low vacancy rates and lack of choice within a particular segment of stock (i.e. family housing, studios, etc.).

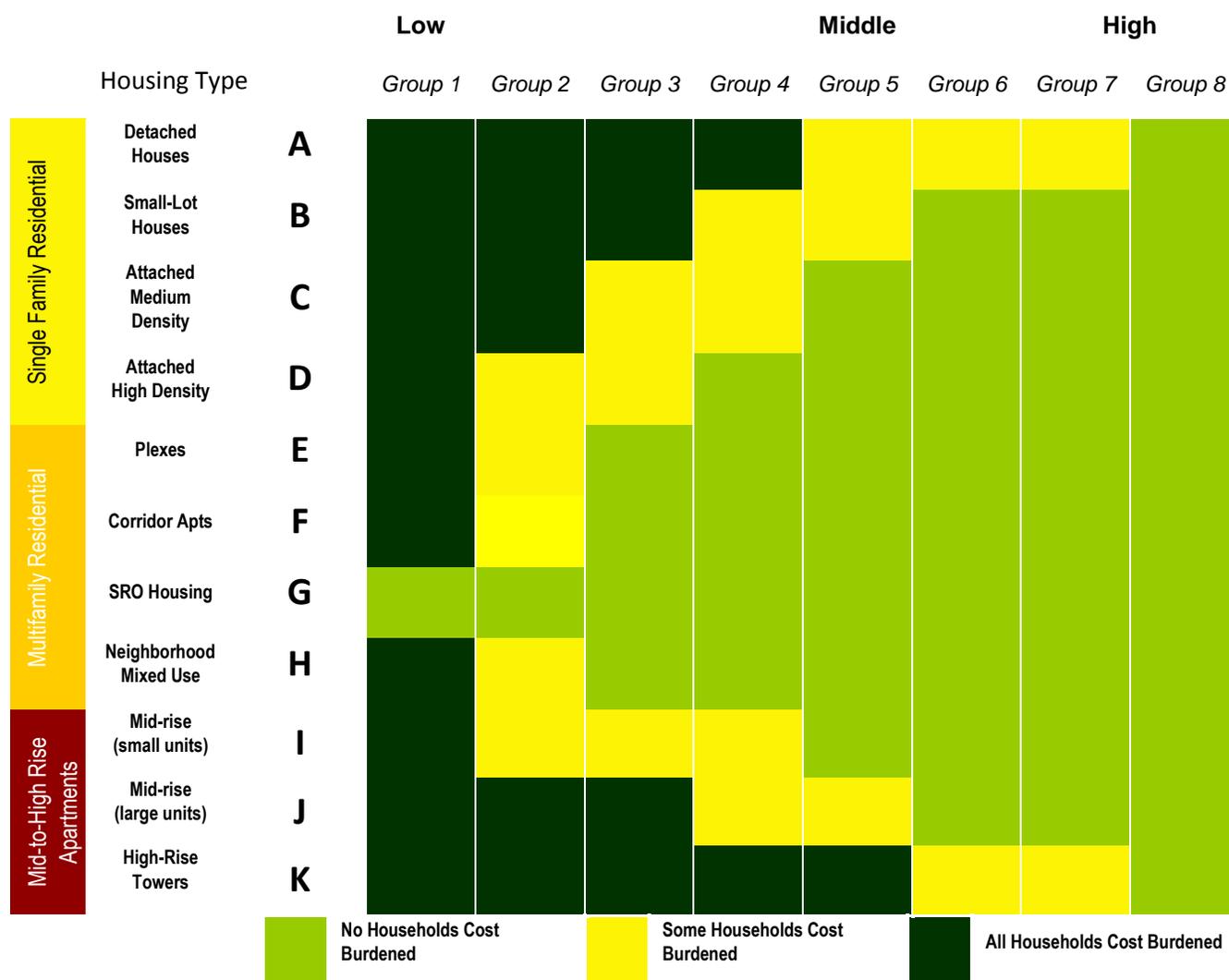
In general, the diversity of the housing type production should be sufficient to produce enough housing units to meet the future demand, except for the low-income groups, which will have fewer choices from new development. The illustration (Table 14) provides a cross match between housing unit types and the eight household types based on prevalent housing costs to help us understand the need for types of affordable housing units that will be required. For example, the number of Group 1 households is expected to grow by 25,000, but the scenarios expect to develop only another 8,000-10,000 units of SRO/small studio housing (the only housing type projected to be affordable to that group). This gap will put pressure on the existing affordable units and increase the number of cost-burdened households in this category. For Groups 2 and 3, the housing situation is a little better – they are expected to grow by another 45,000 households by 2035 with the expectation that an additional 68,000 housing units will be developed in categories that could be suitable and affordable to them. However, these households will face competition for that housing from the other higher income groups that will limit their housing choices. Ensuring that excess capacity exists in those housing types could help protect against upward price pressure.

Table 15: Household Types

<p>GROUP 1 <\$15,000</p>	<p>These are the lowest income households, whether they are renters or owners. Of the renters in this group, all live alone, and most are elderly. Among owners in Group 1, age and the number of people in the household are more evenly distributed. Example: A woman in her seventies renting an apartment, living alone on a very low income.</p>
<p>GROUP 2 \$15,000<\$25,000</p>	<p>These households can be any age, but their income is among the lowest. There are more renters than owners. About two-thirds are childless. However, one-third of the renter households in this group have school-age children, while only about one in six of the owners in this group have school-age children. Example: A family renting a home, two adults working at low-wage jobs, raising young children.</p>
<p>GROUP 3 \$25,000<\$35,000</p>	<p>With a bit more income than Group 2 households, these people are primarily in the 25-44 age bracket. The renters are mostly single-person households. Among owners, about half are two-person households, approximately one-third of which are families with school-age children. Example: Two thirty-somethings, both of whom work, and who have just bought their first home.</p>
<p>GROUP 4 \$35,000<\$45,000</p>	<p>With a broad age distribution, these households are usually childless, especially if they are renters. Owner households in Group 4 have more residents than renter households, and almost 40 percent of the group include school-age children. Example: Two people renting a home, both working, and with children who are grown up and living elsewhere.</p>
<p>GROUP 5 \$45,000<\$60,000</p>	<p>Group 5 households are larger and wealthier. People in the renter households of this category are not only older than those in the owner households, but also have smaller household sizes. The owners are more likely than not to have children. Example: Two parents in their late thirties, living in a home they own with children in junior high and high school.</p>
<p>GROUP 6 \$60,000<\$75,000</p>	<p>With more income than Group 5 households, almost half of the people in this group are between 25 and 44. Although the majority do not have school-age children, two- and three-person households are most common. The owner households are larger and more likely to have school-age children. Example: Two adults with well-paying jobs, one working full-time, the other part-time, raising elementary-school-age children and living in a home they own.</p>
<p>GROUP 7 \$75,000<\$100,000</p>	<p>Mostly without children, these households include the very high-income couples, especially for owners. Interestingly, the renter households in Group 7 are more likely to have children than the owner households in the group. Example: Two early-fifties adults working at well-paying jobs, owning their home.</p>
<p>GROUP 8 >\$100,000</p>	<p>Among owners, most of these households have children; about 60 percent of renter households have children. They are the highest earners, in their prime earning years. Example: A family with two parents in their late forties or early fifties, both working fulltime in high-paying jobs, raising children who are still in school and living with them in the home they own.</p>

Source: City of Portland. [Housing Demand and Supply Background Report](#), October 2012

Table 16: Housing Affordability by Household Type.



Performance of the Proposed Comprehensive Plan

The Proposed Comprehensive Plan does not yet ensure a supply of affordable units to the lowest income groups.

For example, while the projected supply of SRO/studio sized apartments has increased slightly relative to other scenarios, it is not yet meeting projected demands. The projected increase in SRO/Studio units can be attributed to the creation of the Campus Institution Zone which significantly increases the capacity for student housing at educational institutions and supportive housing for medical institutions. Additional increases in SRO/Studio units can be attributed to recent development trends in centers and corridors (such as the increasing number of studio and micro apartments being built) that are reflected in the allocation of housing through the Mixed Use Zones project.

Down-designations from R5 to R7 in the Proposed Plan have slightly reduced the supply of more affordable small lot single family development. Down-designations in East Portland and Southeast Portland have also decreased the capacity for duplexes, townhomes, and lower

Comprehensive Plan Update

density multifamily development types. However, these down-designations were made to respond to infrastructure capacity challenges in East Portland including David Douglas School District capacity issues, access to frequent transit, and access to daily needs services.

Ideally these reductions in the supply of affordable single family and low-cost multifamily options would be offset by increasing the amount of land available for this kind of development in more opportunity-rich locations. For example, adding more R2.5 or R2 zoning near neighborhood centers could increase the supply of small lot single family homes, duplexes, townhomes, and low density multifamily development types. This should be a consideration as refinement plans are developed for centers and corridors.

Options for Improving Performance

Affordability will continue to be an issue that will need to be addressed, especially to meet the needs of low-income households, communities of color, aging populations and people with disabilities.

Keep Housing Affordable

The City needs to focus on keeping housing affordable and increasing the ability of the most vulnerable households to live in complete neighborhoods. This can be achieved through meeting the housing needs of households which will not be met by the market, building more affordable units in accessible amenity-rich locations, lowering transportation costs and increasing household prosperity, and improving services in areas that are affordable but not well served.

Create a Wide Range of Housing Choices

Producing a diverse supply of housing creates diverse communities with the opportunity for households to remain in their neighborhood as their lifestyles and housing needs change, especially in allowing older adults to age within their community.

Support Development of New and Innovative Housing Types

Changing household needs and preferences will create demand for new and different housing types. Recently, Portland has seen the development of innovative housing types such as co-housing, micro-apartments and accessory dwelling units.

School Enrollment

A growing community raises concerns about school enrollment and the impact on school facilities. The share of households with children is expected to decline by 3 percent, but given the overall growth in households, the total number of children is expected to increase. Forecasting accurate long-range school enrollment is complicated, but to meet the anticipated need it will be important to align strategies to expand choice for households with children while making upgrades to existing school facilities. The Bureau of Planning and Sustainability has been working closely with Portland Public Schools and David Douglas Schools to coordinate growth forecasts.

GENTRIFICATION RISK AREAS

PORTLAND PLAN

By 2035, no more than 30 percent of city households (owners and renters) are cost burdened, which is defined as spending 50 percent or more of their household income on housing and transportation costs.

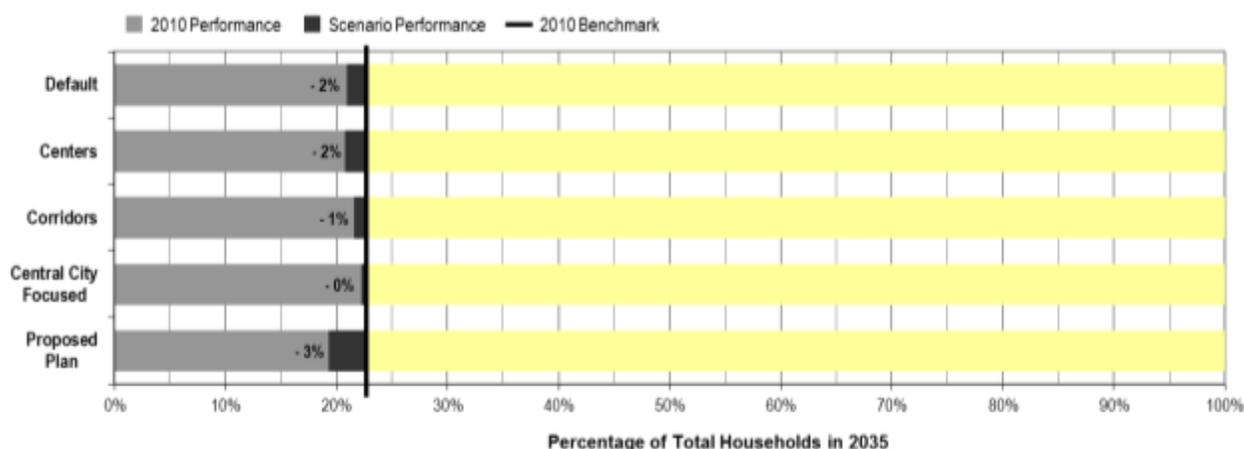
The Portland Plan provides new direction on the issue of balancing neighborhood revitalization with the ability of residents to stay in place to enjoy the new amenities and benefits of that revitalization. The City has committed to ensuring that all communities are prosperous, healthy and accessible—but with increasing numbers of highly educated and more affluent newcomers coming to Portland, housing pressures rise. As some neighborhoods become more desirable, long-time residents with lower incomes, particularly in communities of color, have found themselves priced out and moving out—often to areas with fewer services, amenities and institutions. A risk assessment based on demographic and housing market changes that are indicators of changes in neighborhood character has identified areas of Portland that are at increased risk of gentrification or displacement. This performance measure assesses the level of risk based on the number of households that are in these areas.



■ **Gentrification Risk Areas** identify places where there is risk of gentrification or displacement.

■ **Stable Neighborhoods** identify places where the risk of gentrification is less. These areas represent areas that have had relatively consistent indicators on property values, ownership and rental rates, household income and diversity.

Chart 4: Performance Measures: Gentrification – Households in Gentrification Risk Areas.



Performance of the Proposed Comprehensive Plan

In 2010, the risk of gentrification posed to households was 22 percent. Relative to other scenarios, the Centers and Corridors growth strategy of the Proposed Comprehensive Plan spreads growth allocation more evenly across all parts of Portland with marginally less impact to communities at risk of gentrification. The City of Portland must continue to evaluate the impacts that investment decisions have on communities at risk of gentrification, develop and implement tools to increase the production of affordable housing, and support equitable economic development initiatives.

Options for Improving Performance

Develop more affordable housing

Development of affordable housing is at the heart of displacement mitigation strategies. The City should focus on creating more affordable housing and increasing the ability of low-income and minority households, and the most vulnerable households, to have the opportunity to stay in the neighborhood.

Lesson Learned: More Affordable Housing

Making investments to focus growth in high-performing areas can create more gentrification pressure. This means Portland will need to do a better job of aligning growth management and public investment strategies with affordable housing strategies.

Business development

As development or public investment occurs in at-risk neighborhoods, businesses facing gentrification need assistance through programs such as the City’s Neighborhood Prosperity Initiative. The City also could focus workforce development and job training programs to enable lower income residents to qualify for a better job that would enable them to afford the increased housing costs.

Tracking and Program Evaluation

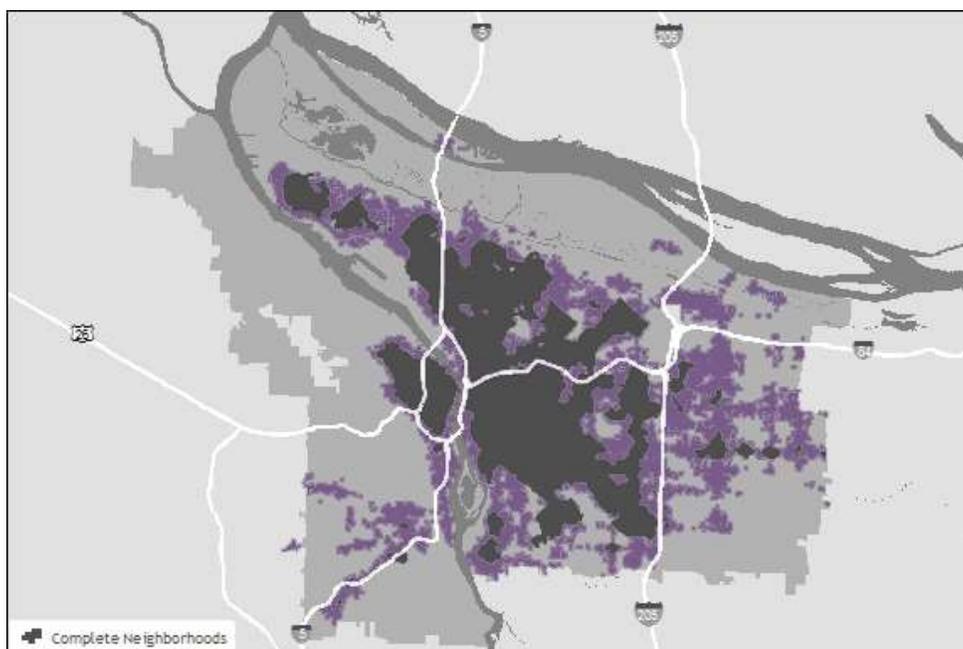
Using the Portland Plan’s Framework for Equity as a guide to track neighborhood change, including changes in race, age, disability, ownership and other factors, could help the City anticipate the impacts of new policies and programs.

COMPLETE NEIGHBORHOODS

PORTLAND PLAN

By 2035, 80 percent of Portlanders live in a complete neighborhood with safe and convenient access to the goods and services needed in daily life. At least 80 percent of Portland’s neighborhood market areas are economically healthy. They promote economic self-sufficiency of households through the strength and performance of local retail markets, job and business growth, and access to transit and nearby services that lower household

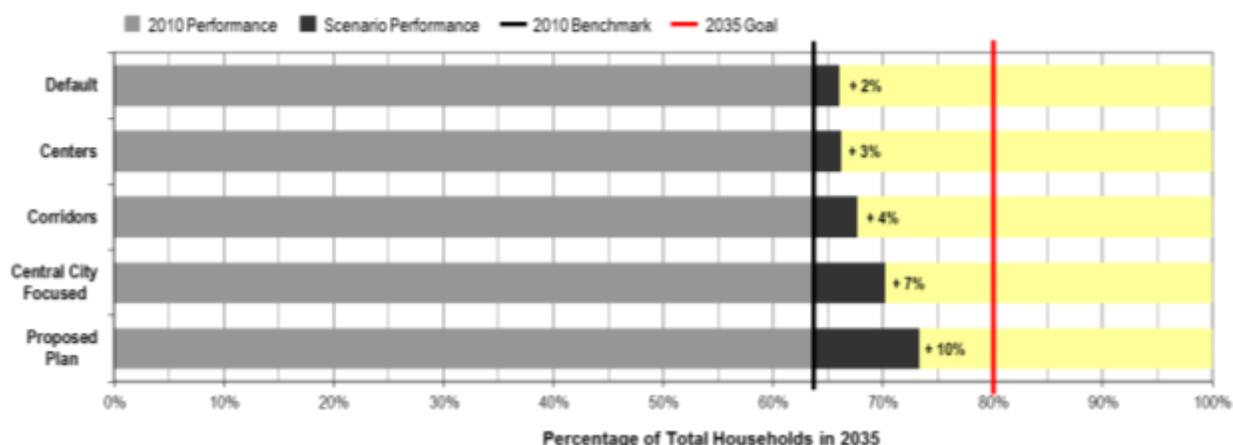
A “complete neighborhood” is a neighborhood where people have convenient access to the goods and services needed in daily life, which includes a variety of housing options, grocery stores and other commercial services, high-quality public schools, public open spaces, active transportation options and civic amenities. Providing more opportunities for more households to live in complete neighborhoods can help reduce household transportation costs, improve public health by making it easier to incorporate exercise into daily life and reduce carbon emissions. This performance measure is based on the City’s 20-minute neighborhood index. The performance measure is based on the number of households located in a complete neighborhood.



■ **Complete Neighborhoods** identify places that are considered relatively complete on the 20-minute neighborhood index. Prioritizing development in these high-performing areas will take advantage of the existing infrastructure and services. These areas have a good active transportation system that connects neighborhood business districts, schools, parks and other amenities.

■ **Complete Neighborhood Gap Areas** identify places that lack access to one or more of the key components of a complete neighborhood. Some areas lack a strong neighborhood business district. Other areas lack a complete transportation system (sidewalks are missing, streets are unimproved, etc.), which can make it take longer or be more difficult to access the services one needs for daily living.

Chart 5: Performance Measures: Complete Neighborhoods – Households in a Complete Neighborhood.



Performance of the Proposed Comprehensive Plan

Today, nearly two-thirds (63 percent) of all Portland households live in complete neighborhoods. Performance of the Proposed Comprehensive Plan increased significantly relative to this measure. This 10% increase in complete neighborhoods is the result of several things. First, the proposed plan places more growth in existing complete neighborhoods than some of the other scenarios. Second, the proposed plan brings more non-conforming commercial uses into conformance - expanding access to commercial services. Finally, investments in frequent transit, the low-stress bike network and parks in parks deficient areas (in the CSP and TSP) also increased the complete neighborhood measure. Completeness increased the most in East Portland due to these investments in infrastructure.

Lesson Learned: More Complete Neighborhoods
 Portland’s legacy development pattern means that to fully achieve this goal requires creating more complete neighborhoods, especially in East and Southwest Portland.

Options for Improving Performance

Create More Complete Neighborhoods in East Portland

The success in meeting this performance measure is dependent on creating more complete neighborhoods in East Portland, by providing more frequent transit, more sidewalks and bikeways and stronger business districts that serve neighborhood needs.

Create More Complete Neighborhoods in Southwest Portland

Much of Southwest Portland is challenged by topography, densities too low to support frequent transit, a relative scarcity of neighborhood commercial services and an incomplete street network. However, there are opportunities to create more complete neighborhoods along the Barbur Boulevard corridor and existing neighborhood business districts in Hillsdale, Multnomah Village and West Portland.

Expand Access and Create More Housing Options in Complete Neighborhoods

An important element of a complete neighborhood is that it has housing options to accommodate the needs of people of all ages and abilities. Neighborhoods in areas of North, Northeast and Southeast Portland present an opportunity to increase access to existing neighborhood business districts that will expand the coverage of complete neighborhoods. Also, encouraging the development of a range of housing types in these areas can expand the diversity of households that live in these areas.

FREQUENT TRANSIT ACCESS

PORTLAND PLAN

By 2035, Portlanders have reduced the number of miles they travel by car to 11 miles per day on average and 70 percent of commuters walk, bike, take transit, carpool or telecommute to work

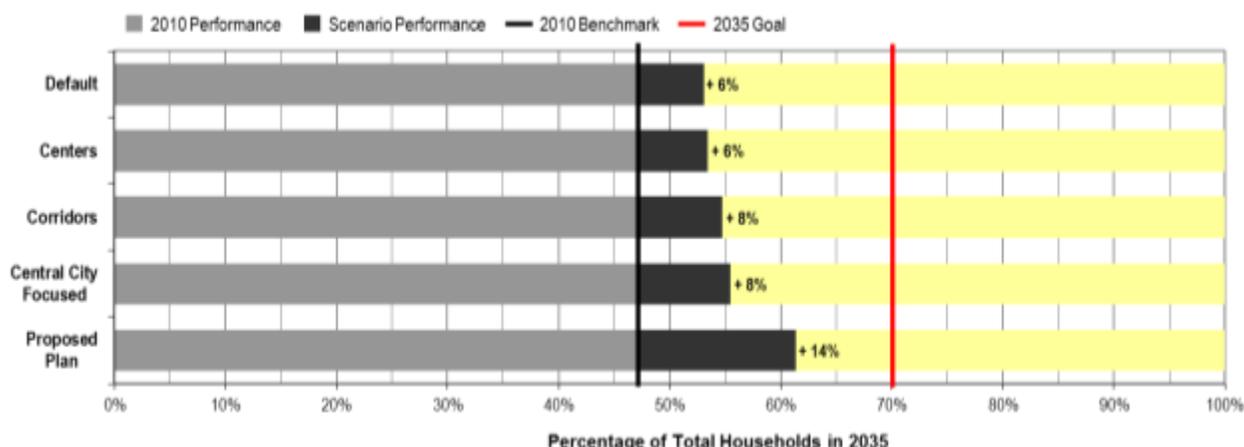
Portland has adopted policies to increase the share of trips made using active transportation modes and to make transit the preferred mode for longer commute trips. The goal of having 70 percent of commuters use active transportation is rooted in the climate action/carbon reduction, air quality and public health goals. The performance measure is based on convenient access to the highest quality elements of the transit network – MAX, Portland Streetcar and frequent TriMet bus service. Providing access by a short, ¼-mile walk can make it convenient for residents to use the transit system for many of their daily needs. This measure is a simple method of determining access to transit based on proximity to the frequent transit network.



■ **Frequent Transit Access Areas** identify places within ¼ mile of the frequent transit, which represents the best service that Portland has to offer. Development in these areas will have better access and presumably greater transit use than in other areas of the city.

■ **Transit Access Gap Areas** identify places that lack access to the frequent transit network. A bus route may be available in some areas, but the service levels or frequency may not be enough to represent a true alternative to the automobile.

Chart 6: Performance Measures: Frequent Transit Access – Households within ¼ Mile of Frequent Transit.



Performance of the Proposed Comprehensive Plan

In 2010, 47 percent of Portland households had good access to the frequent transit network. Expansion of the network through projects identified in the TSP increased access to frequent transit by 8 percent over the Default scenario. This analysis shows that 62% of households in 2035 will be within ¼ mile of frequent transit. The proposed addition of north/south frequent transit on 122nd Avenue contributed the most to increasing access to frequent transit by filling in transit gap areas in East Portland. Active transportation and safety projects also play a significant role in connecting residents from housing to frequent transit through the creation of low-stress and dedicated bike facilities, sidewalks, and other pedestrian safety projects.

Options for Improving Performance

Expand the Frequent Transit Network

The existing network does not cover all parts of Portland, even if people are willing to walk longer distances. Even with increased service on 122nd Avenue, there are significant gaps in East Portland, especially on north-south routes such as 136th Avenue and 148th Avenue.

Lesson Learned: More Transportation Choices

Increasing transportation choices has multiple benefits beyond the transportation system. Access and mobility play a significant role in creating complete neighborhoods and increasing access to family-wage jobs.

Provide Better Access to Transit

Completing a network of sidewalks and bicycle facilities to and from transit routes can make it easier and more convenient for people to ride transit and can extend the coverage area of a frequent transit route.

LOW-STRESS BIKE NETWORK ACCESS

PORTLAND PLAN

By 2035, Portland residents have reduced the number of miles they travel by car to 11 miles per day on average and 70 percent of commuters walk, bike, take transit, carpool or telecommute to work.

By 2035, all Portlanders have safe and reliable transportation choices.

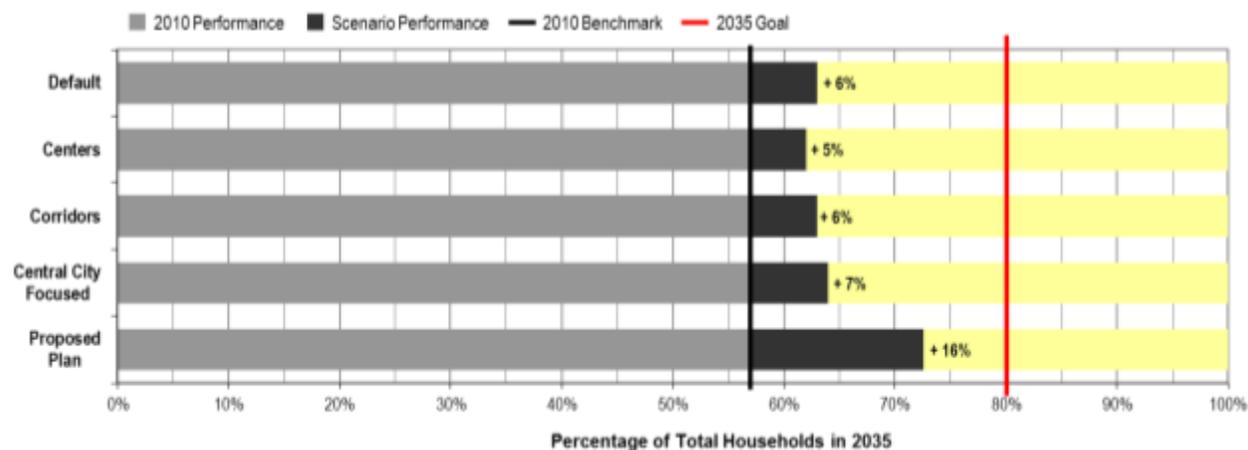
The Portland Bicycle Plan for 2030 sets the goal that all Portlanders have equal access to the benefits of bicycling. A low-stress or family-friendly bicycle network, based on the best design practices of great bicycling cities around the world, creates safe, comfortable and attractive bikeways that can carry more bicyclists and serve all types and ages of users. In many parts of Portland, the common destinations of daily life are already within a 20-minute bicycle ride, but some areas lack the bicycle facilities to support such trips. When supported by a well-designed network, the bicycle offers residents a transportation alternative that allows them to access basic services safely and efficiently without reliance on an automobile. Adopted City policies seek to increase the share of trips made using green and active transportation modes and to make bicycling more attractive than driving for short trips. A comprehensive bike network provides equity and access to viable, affordable transportation options and creates fun, vibrant and livable neighborhoods. The performance measure is based on convenient (¼-mile) access to the highest quality elements of the bicycle network.



■ **Low-Stress Bikeway Access Areas** identify places that are within ¼-mile of a low-stress bike facility that support the widest range of users. These facilities include separated bikeways, neighborhood greenways, and trails.

■ **Low-Stress Bikeway Gap Areas** identify places where bicycle facilities may be missing, connectivity is poor or the existing bike infrastructure may be attractive only to more confident cyclists due to safety concerns.

Chart 7: Performance Measures: Low-Stress Bike Network – Households within ¼ Mile of Low-Stress Bike Network.



Performance of the Proposed Comprehensive Plan

The share of Portland households in 2010 that had good access to the existing low-stress bicycle network was 56 percent. The bike projects in the TSP project list provides a 16 percent increase over the 2010 benchmark. While, low-stress bike projects in the TSP are located across Portland, the biggest increase in performance is from expanding the network in East Portland, along with St. Johns and parts of Northeast Portland.

Options for Improving Performance

Expand Neighborhood Greenways and Bikeway Network to Fill Gaps

The Bicycle Plan for 2030 identifies a network of low-stress facilities to ensure that all neighborhoods have adequate low-stress bicycle facilities that connect to neighborhood commercial corridors and centers so that local residents can safely and comfortably access the destinations by bicycle or on foot.

Strategic Considerations (Age, Income, Communities of Color)

Designing these low-stress facilities to meet the needs of the communities they serve may emphasize connections to neighborhood business districts, parks and open spaces, or community destinations like banks, places of worship and community centers. These considerations will ensure that these places will support transportation choice, recreational opportunities that lead to better health outcomes and expanded access to services or transit.

TRANSPORTATION: VEHICLE MILES TRAVELED AND MODE SHARE

PORTLAND PLAN

By 2035, Portlanders have reduced the number of miles they travel by car to 11 miles per day on average and 70 percent of commuters walk, bike, take transit, carpool or telecommute to work.

For Portland to achieve the health and carbon reduction goals in the Portland Plan and the Climate Action Plan (CAP), more Portlanders will need to choose alternatives to driving a car to meet their transportation needs. Today, approximately 29 percent of Portland residents walk, bike, take transit to work or work from home, which is a higher level than many other U.S. cities, but it is far below leading cities in Europe and North America.

Performance measures tracking the growth scenario impacts on the transportation system include vehicle miles traveled and mode share. Vehicle miles traveled (VMT) is a measure that is commonly used to describe automobile use on a daily or annual basis. It incorporates both the number of vehicle trips and the length of those trips by residents and businesses (excluding buses, heavy trucks and through trips). Mode share describes the number of trips or the percentage of travelers using a particular mode (or type) of transportation, such as driving alone, carpooling, walking, biking or riding transit.

These measures are calculated using the Metro and City of Portland’s transportation models to estimate the changes in travel behavior that result from the different development patterns.

Vehicle Miles Traveled (VMT)

VMT is reported as a total number of miles per weekday. With all of the previous scenarios, the model results suggested that by 2035 total daily VMT increases by 25 to 30 percent, but not as fast as the household or employment growth rates (33 and 43 percent, respectively). The Proposed Plan performs significantly better than previously evaluated scenarios and shows a 3% reduction in VMT from 2010 to 2035.

Table 17: Total Change in Vehicle Miles Traveled 2010 to 2035.

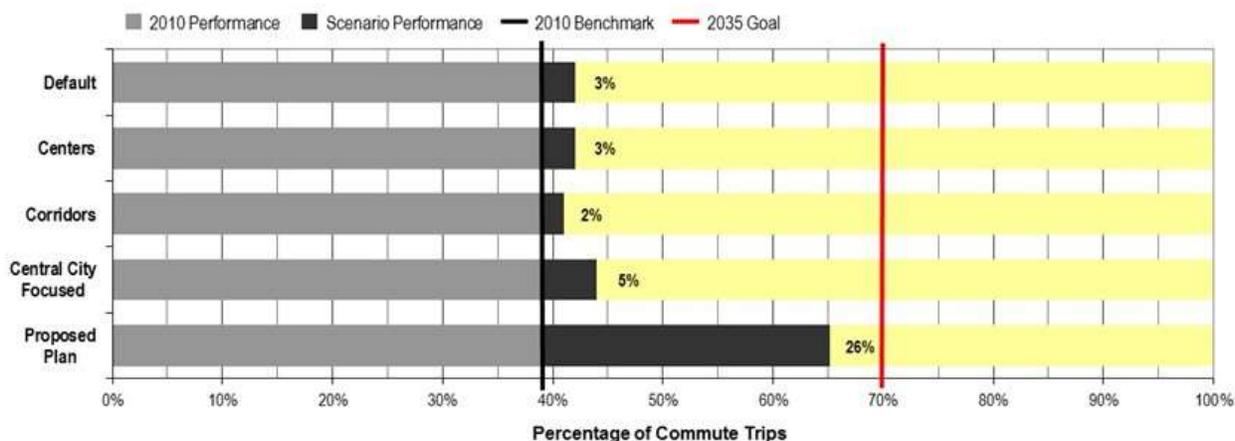
	Daily VMT	2010-2035 Change	Daily per Capita VMT	2010-2035 Change
2008	19,300,000	-	-	-
2010	16,210,000	-	27.8	-
2035				
Default	21,148,000	+ 30%	27.3	-2%
Centers	20,786,000	+ 28%	26.9	-3%
Corridors	20,754,000	+ 28%	26.8	-3%
Central City Focused	20,337,000	+ 25%	26.3	-5%
Proposed Comprehensive Plan	15,707,000	- 3%	20.3	-27%

The Climate Action Plan set a target of reducing 2030 per capita daily vehicle miles traveled by 30 percent from 2008 levels. This reduction must occur in addition to vehicle fuel efficiency improvements and the development of cleaner fuels. Model results project that VMT on a per capita basis drops 27 percent for Portland from 2010 to 2035.

Mode Share

Mode share measures the share of Portland’s travel that is made by different modes of transportation, including driving alone (single-occupancy vehicles), carpooling, transit, biking and walking. In this case, mode share is defined as the share of trips that are not single occupancy vehicle trips. The Portland Plan set an objective that 70 percent of commuters use transit or active transportation, carpool, or work from home. The simple model analysis includes all types of trips, but uses the same overall goal of 70 percent mode share for transit, active transportation and carpool trips. The Proposed Plan indicates a significant increase in mode share for transit, active transportation and carpool trips in 2035.

Chart 8: Performance Measure: Mode Share – Percent of Trips by Transit, Active Transportation or Carpool



Performance of the Proposed Comprehensive Plan

The Proposed Comprehensive Plan performs significantly better than all other scenarios for total change in VMT by 2035. The Proposed Plan indicates a 3% decrease in VMT while accounting for a 33 percent increase in population over the same period of time. Per capita VMT declines by 27 percent of total trips from 2010 to 2035 through the Proposed Plan. Decreases in VMT for the Proposed Plan compared to other scenarios can be attributed to the following changes in development trends and infrastructure investment:

- A post-recession shift in new development from the suburbs to more compact urban areas in Portland
- Continued changes in vehicle ownership patterns. Car ownership rates are declining for younger generations and new residents in Portland.
- Significant investments in bike and transit networks in the TSP. TSP projects that decrease VMT include new low stress bikeways, SW Corridor Rapid Transit, Powell-Division Rapid Transit, and new/enhanced transit service in East Portland.
- A more balanced household to employment ratio in Portland that generates shorter trip distances. Increased housing demand and production in the Central City and inner neighborhoods in close proximity to Central City employment and new employment land in and near East Portland in close proximity to housing.

Table 18: Change in Automobile Commute Mode Share 2010 to 2035

	Share of Trips by Automobile	Change from 2010
2010	79.6%	-
2035		
Default	77.2%	-2.4%
Centers	76.7%	-2.9%
Corridors	77.8%	-1.8%
Central City Focused	74.6%	-5.0%
Proposed Plan	64.3%	-15.3%

The model results project a 15 percent decrease in auto mode share (including both single occupancy and carpool trips) between 2010 and 2035. Single occupancy vehicle mode share declines 26% while bicycle mode share increases by 10% and walking by 5%.

Options for Improving Performance

Reducing vehicle miles traveled and increasing non-automobile mode share can be achieved by shifting vehicle trips to active transportation trips — walking, bicycling and taking transit — and by shortening trips by providing more destinations close to households.

A variety of land use and transportation strategies, including better transit services, bicycling facilities, pedestrian facilities and amenities, can make these modes more attractive than autos. These measures are closely related to the Complete Neighborhood measure in that improving connectivity and providing more attractive destinations will have complementary impacts on VMT and mode share.

GREENHOUSE GAS EMISSIONS

PORTLAND PLAN

By 2035, Portland’s transportation-related carbon emissions are 50 percent below 1990

Portland and Multnomah County have achieved considerable success in limiting the growth of greenhouse gas or carbon emissions. Land use and transportation policies have resulted in almost no increase in emissions from transportation since 1990, despite a population increase of more than 25 percent. Overall, the Climate Action Plan (CAP) set the goal of an 80 percent reduction of all types of carbon emissions from 1990 levels by 2050. While the CAP identified strategies to reduce emissions from a wide range of sectors, the growth scenarios influence the carbon emissions related to transportation and residential buildings. There are a variety of other City actions that influence emissions, which are outlined in the 2015 Climate Action Plan.

Transportation

Reducing per capita VMT while maintaining the mobility of Portlanders will require significant increases in walking, bicycling and transit. This shift is expected to produce community health and economic benefits as well. Portland-area residents and businesses reap a “green dividend” of more than \$1 billion annually in reduced transportation costs as a result of people driving less than do residents of other comparable American cities. Similarly, evidence is increasingly emerging of the health benefits of reducing vehicle miles traveled, both in terms of improved air quality and increased levels of physical activity.

Total VMT decreased 3% below 2010 levels as the result of the land use and transportation investments in the Proposed Plan. Additionally, improvements in vehicle fuel efficiency standards across all vehicle classes and a reduction of the carbon content of fuels result in a projected 55 percent reduction in carbon emissions from cars and light trucks. While the CAP set a goal of reducing per capita VMT by 30 percent by 2030, the Proposed Plan results show a per capita VMT reduction of 27% by 2035.

Table 19: Transportation Emissions.

	Carbon Emissions (metric tons/year)	Percentage Reduction from 2010
1990	2,231,000	
2010	2,340,000	
2035		
Default	1,149,000	-51%
Centers	1,128,000	-52%
Corridors	1,127,000	-52%
Central City Focused	1,105,000	-53%
Proposed Comprehensive Plan	934,000	-60%
2050 Target	596,000	-80%

Household energy

Buildings are the single largest contributor to carbon emissions in Multnomah County, accounting for more than 40 percent of total emissions. Reducing carbon emissions from building energy use can result from two types of changes: improving energy efficiency and reducing the carbon intensity of energy supplies, such as by increasing renewable sources of electricity like solar and wind power.

The different variations in housing types in each scenario impacts the overall carbon emissions. The trend to more multifamily housing types leads to lower carbon emissions because those types of units are more likely to be small and have shared walls, which is more energy efficient. There is no significant difference in the projected overall housing mix for each of the scenarios. For the Proposed Plan, this analysis suggests that total residential carbon emissions will increase by only 9 percent, which is far less than the anticipated 45 percent increase in the number of households.

Table 20: Residential Carbon Emissions

	Carbon Emissions (metric tons/year)	Share of 2035 Carbon Emissions
1990	1,292,000	
2010		
Existing Single Family	905,000	54%
Existing Multifamily	328,000	19%
2010-2035		
New Single Family	111,000	9%
New Multifamily	226,000	18%
2035 Total	1,343,000	
2030 CAP Target	517,000	

It is important to note that the majority of Portland’s 2035 residential carbon emissions are expected to come from the existing (pre-2010) housing stock, which is not affected by the different growth scenarios. The key to meeting the CAP residential reduction goals is through home energy efficiency retrofits on existing housing. Achieving the combination of objectives identified in the CAP could make it possible to reduce residential building carbon emissions by 36 percent, while the number of households increases by 45 percent.

Table 21: Strategies to Reduce Residential Sector Carbon Emissions.

	CAP Reduction Goal	Carbon Emissions (metric tons/year)
Existing Building Retrofits	25%	400,000
Onsite Renewable Energy	10%	190,000
Energy Code Improvements	20%	140,000
Net Zero Buildings after 2030		100,000
Total		830,000

Performance of the Proposed Comprehensive Plan

The share of housing allocation to single family development types and multifamily development types remains largely the same and performs similar to scenarios that were previously evaluated. The Proposed Plan shows slight performance increases for household energy due to the removal of single family housing capacity that was re-allocated to more energy efficient multifamily housing types in the Central City, centers. And corridors. Mode split and VMT performance scores 4 percent better for the Proposed Plan which reduces the carbon footprint relative to the previous Comprehensive Plan. Additional opportunities to reduce greenhouse gas emissions are accounted for through actions in the CAP through existing building retrofits, onsite renewable energy, energy code improvements, and new standards for energy efficiency in new construction.

Options for Improving Performance

Over the long term, land use and transportation planning can greatly influence transportation-related carbon emissions. Emissions reduction depends critically on coordinated land use policies and the development of infrastructure for low-carbon modes of transportation.

Expand Complete Neighborhoods

A critical and basic step to reducing automobile dependence is to ensure that residents live in complete neighborhoods, meaning that they can comfortably fulfill most of their daily needs within a 20-minute walk from home. This means providing a wide range of destinations near a diversity of housing types that are connected by a network of sidewalks, bicycle facilities and transit service. Expanding complete neighborhoods involves (1) identifying the land use planning changes and infrastructure investments, including public-private partnerships that are needed for each mixed-use center to achieve a highly walkable and bikeable neighborhood, and (2) developing an implementation action plan.

More Active Transportation Trips

Expanding pedestrian and bicycle facilities as well as transit service will make these modes more attractive, especially for short trips. Shifting trips to active transportation modes will help reduce emissions. This network expansion also can decrease travel costs for lower income households.

More Efficient Homes

Because buildings last for many decades, efforts to reduce emissions by improving the energy efficiency of existing buildings will be critical to meeting the reduction goals. The City of Portland, Energy Trust of Oregon, Oregon Department of Energy, utilities and other organizations already have undertaken significant work to increase energy efficiency and decrease energy-related carbon emissions. Much work remains to be done, and it will be important to leverage existing efforts and expertise to accelerate this work.

Maximize Energy Performance of New Buildings

Buildings that have been designed and built with low-carbon performance as a primary goal can significantly outperforming similar, previously built buildings that have been retrofitted for efficiency. Because total emissions from buildings must be reduced by more than can be accomplished with retrofits alone, it is critical that buildings built after 2030 generate more energy from clean sources than they consume, resulting in a net emissions reduction. The CAP has a goal of net-zero energy use for all new buildings after 2030.

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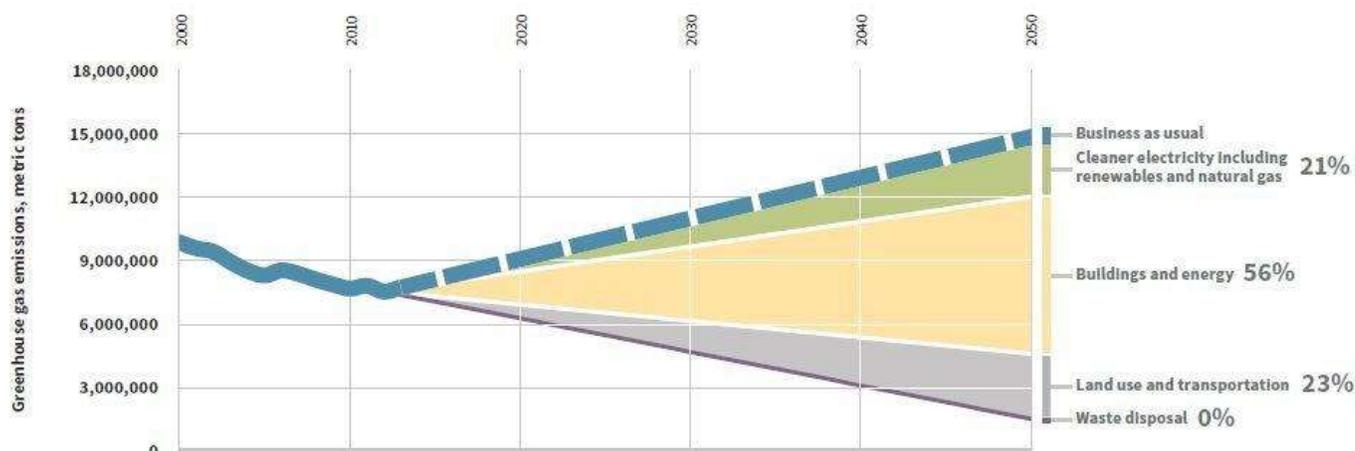
Onsite Renewable Energy

In parallel with the improvements to the building stock, CAP objectives seek to produce 10 percent of the total energy used from on-site renewable sources and clean district energy systems. District- and neighborhood-scale energy systems, as well as on-site renewables and distributed generation sources, also provide opportunities for efficiency gains by reducing transmission losses.

Connection to the Climate Action Plan

This report finds that land use choices made in the Proposed Comprehensive Plan and investments made in the TSP significantly improve performance for VMT reduction, carbon emission reduction and mode share goals. The Climate Action Plan identifies additional City and County actions to reduce emissions and move Portland closer to the 2050 goal of an 80 percent reduction in carbon emissions below 1990 levels. The City of Portland and Multnomah County must take additional actions beyond planned land use and transportation investments. The CAP identifies many additional policy and program actions including; carbon pricing, building energy performance reporting, renewable energy, net zero energy buildings, low carbon transportation fuels, electric vehicles, waste prevention and recovery, and green infrastructure.

Figure 28: Sources of Energy Reduction in Portland for Meeting CAP's 80% Reduction Target.

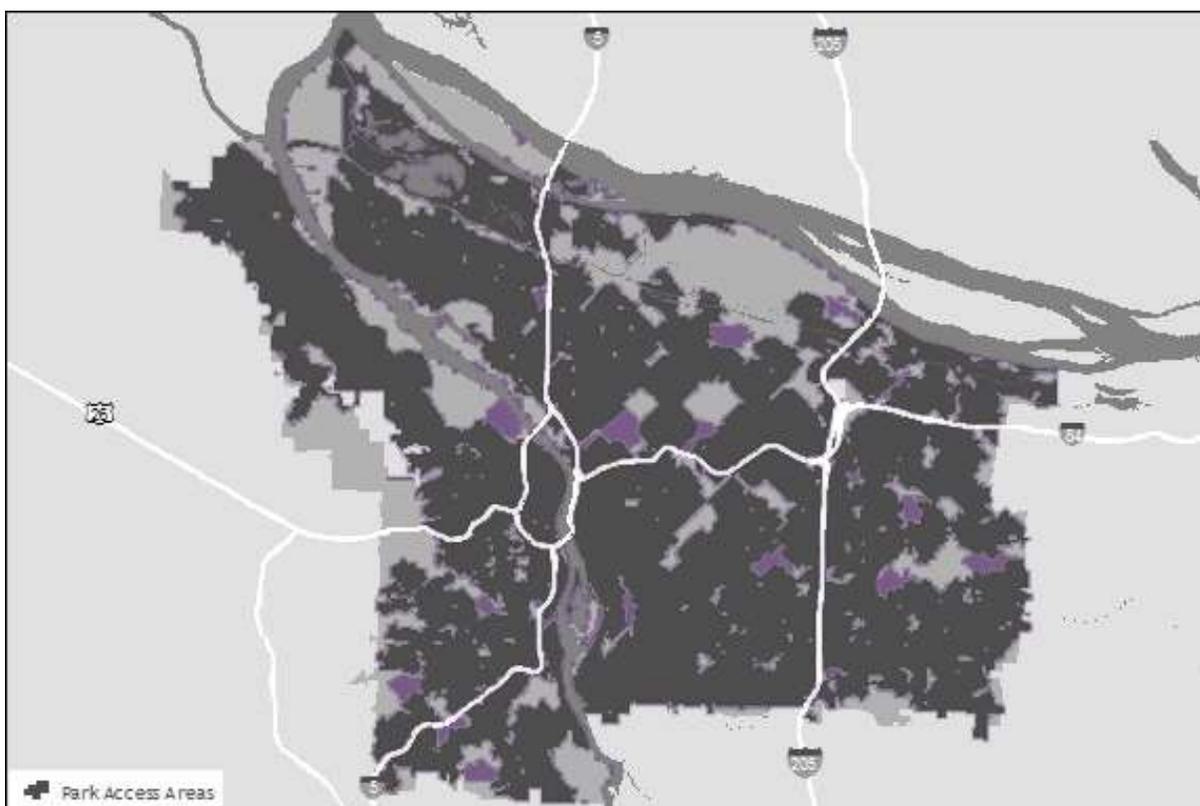


PARKS ACCESS

PORTLAND PLAN

By 2035, all Portlanders live within a half-mile safe walking distance of a park or greenspace. All Portlanders can conveniently get to and enjoy the Willamette and Columbia Rivers. The regional Trail System is substantially complete and is an integrated component of a Healthy Connected City network.

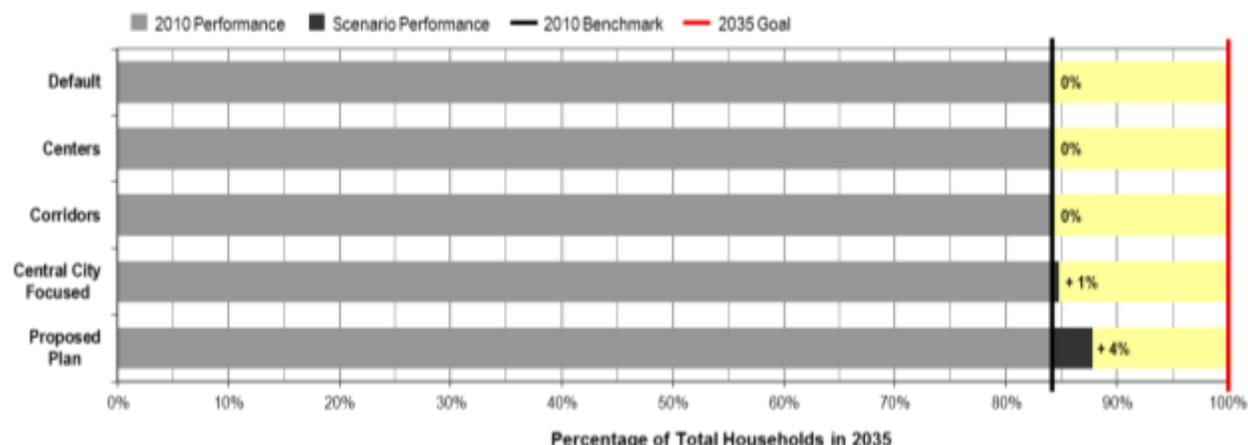
Access to parks and greenspace is a critical component of a healthy complete neighborhood. Nearby parks and natural areas give Portlanders places to recreate, relax and spend time with friends and family. The City of Portland's Parks 2020 Vision set the goal of providing all Portlanders with a recreational opportunity – such as a developed park or access to a natural area – within a ½-mile walk (approximately 15 minutes). The performance measure is about access and is based on the number of households located within a convenient, ½-mile walking distance to a park or greenspace. Parks and greenspace areas used in this analysis are more than one-eighth of an acre and include existing parks, as well as land acquired by Portland Parks and Recreation that will be developed as parks in the future. Public school playgrounds and playing fields are not included in this analysis, although they do supplement the City's park system. Distance was determined from park and greenspace public access points via streets and trails.



■ **Park Access Areas** identify places with walkable ½-mile access to parks. These areas take into account network connectivity and true walking distance.

■ **Park Gap Areas** identify places that are lacking convenient access.

Chart 9: Performance Measures: Parks Access – Households within ½ Mile of a Park or Natural Area.



Performance of the Proposed Comprehensive Plan

The Proposed Comprehensive Plan shows an increase in performance for access to parks. This increase can be attributed to parks investment areas identified in the CSP that fill gaps in areas underserved by parks to reduce disparities, especially in East Portland. The Proposed Comprehensive Plan and CSP indicates priority for East Portland to increase access to parks.

Options for Improving Performance

Develop Parks in Gap Areas

New park development will help fill gaps and meet the needs of rapidly developing areas. As well-served areas experience growth, existing parks may require more maintenance or re-designed for higher-intensity uses. They will be used more heavily, require additional operations and serve more people.

Create Opportunities for Urban Plazas and Community Gathering Areas

Development of urban plazas and squares can fill gaps in areas where larger parcels may not be available. These smaller community gathering areas can fill in gaps where park needs are high and where other options are not feasible.

Increase Access to Parks through Transit, Trails, Sidewalks and Bicycling Facilities

Improving sidewalks, bicycle lanes, and transit can enable park users to more safely and conveniently access existing park facilities.

Parks in Emerging Centers

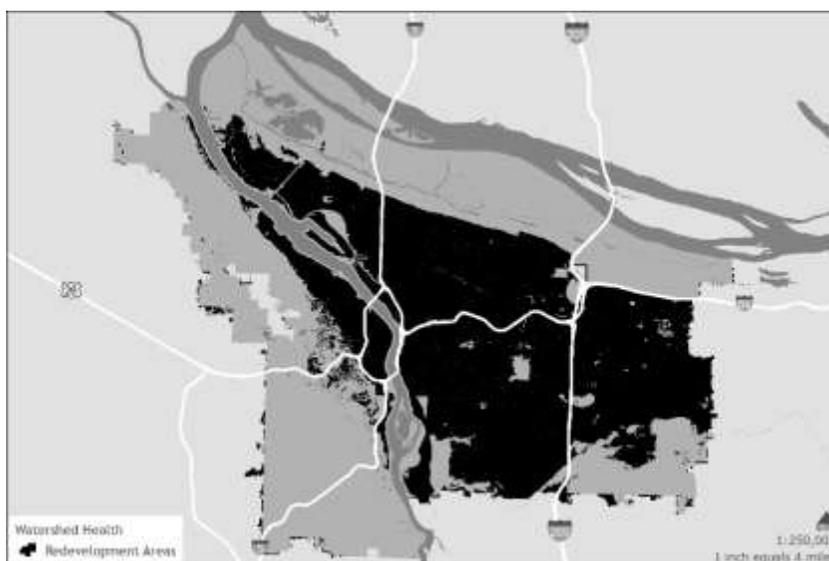
Places like Gateway, Hollywood and the Lloyd District have access convenient access to parks, but these higher density mixed-use neighborhoods may need additional park space or consider park designs intended for more high-intensity use.

WATERSHED HEALTH

PORTLAND PLAN

By 2035, watershed health is improved, and the Willamette River and local streams meet water quality standards. Tree canopy covers at least one-third of the city and is more equitably distributed. Fewer homes and businesses are at risk from flooding. A diversity of critical habitats (including floodplains, riparian areas, wetlands, oak groves, native forests and remnant meadows) are protected, connected and enhanced to support a rich diversity of native and migratory wildlife.

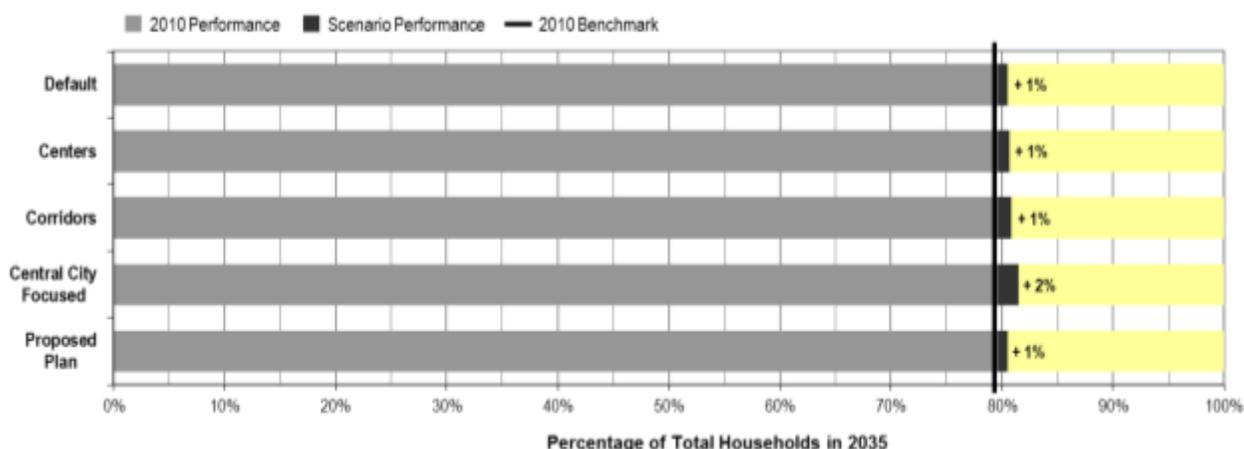
Healthy watersheds support clean air and water, help moderate temperatures, reduce the risk of flooding and landslides, preserve places to enjoy nature, and help the city adapt to climate change. Many factors affect the health of Portland's watersheds: the interaction of rainwater with the land, the amount of impervious surface covering the land, chemicals and bacteria that are carried into groundwater and streams, the extent and characteristics of the tree canopy and the number and type of invasive species. This performance measure identifies parts of Portland where, from a watershed health perspective, development may improve conditions by incorporating sustainable stormwater management and other citywide greening efforts. The performance measure is based on the number of households located in these development opportunity areas.



■ **Development Opportunity Areas** identify places that in general have the ability to accommodate additional growth without significant impact. Future development would trigger stormwater management requirements that would improve conditions by increasing on-site sustainable stormwater infiltration, tree canopy and vegetation.

■ **Constrained Areas** identify places where natural resources and green infrastructure, such as streams, wetlands, soils and vegetation- have limited capacity to accommodate new growth without detrimental impacts on watershed health. In the most sensitive areas, encroachment from development would likely have negative impacts on natural ecological functions, habitat connectivity and the risk of landslides or flooding.

Chart 10: Performance Measure: Watershed Health – Households in Development Opportunity Areas.



Performance of the Proposed Comprehensive Plan

Most of the available growth capacity would be accommodated in urbanized areas that have a high proportion of existing impervious surface. The majority of development capacity is located in the Central City, Centers and along Corridors. Some household growth is allocated to single family residential areas, the majority of which are located in development opportunity areas. Evaluation of the Proposed Plan shows that no significant growth capacity was increased in constrained areas and that 81 percent of growth from 2010 to 2035 will occur in Development Opportunity Areas.

Options for Improving Performance

Limit Development Impacts in Constrained Areas

Growth in constrained areas needs to be carefully considered because of drainage and infiltration issues, the risk of natural hazards and potential adverse impacts on significant natural resources. Development impacts could be avoided by limiting development in these areas. Where development is allowed, impacts could be minimized by encouraging ecologically sensitive site design, purchasing of land from willing sellers or using of conservation easements.

Encourage Growth in Development Opportunity Areas

Overall, much of North, Northeast and Southeast Portland is well-suited to accommodate new development because of natural conditions and the availability of infrastructure. The City can encourage growth in Development Opportunity areas by promoting development on underutilized sites through a combination of land use plans, infrastructure investments, and by establishing public-private partnerships, such as the EcoDistrict efforts.

Shift in Development Approaches

Some development types are better suited to reducing impacts than others. Focusing growth in key centers and corridors could relieve pressure on the most sensitive environmental areas and take full advantage of existing infrastructure. The City can facilitate this by designing with nature, updating development standards and streamlining permitting for ecologically sensitive development. Additional tools include incentives such as the Portland Ecoroof Incentive Program.

TREE CANOPY

PORTLAND PLAN

By 2035, watershed health is improved, and the Willamette River and local streams meet water quality standards. Tree Canopy covers at least one-third of the city and is more equitably distributed. Fewer homes and businesses are at risk from flooding. A diversity of critical habitats (including floodplains, riparian areas, wetlands, oak groves, native forests and remnant meadows) are protected, connected and enhanced to support a rich diversity of native and migratory wildlife. High quality trees are routinely preserved and planted on development sites.

Portland's trees provide more than a sense of identity as a "green city" – they help manage stormwater, reduce pollution, capture carbon dioxide, decrease flooding and erosion, cool and clean the air and water, provide wildlife habitat and improve neighborhood appearance. The Portland Watershed Management Plan (2005) and the Climate Action Plan (2015) call for protecting and expanding the urban forest to improve watershed health and reduce greenhouse gas emissions. The Urban Forestry Management Plan (2004) establishes tree canopy targets for different types of development in Portland. The performance measure is based on the number of households located in areas that do not meet these tree canopy targets.

Development in these Canopy Opportunity Areas would have less of an impact on Portland's existing tree canopy than development in areas with more existing canopy and should help add tree canopy over time through new development standards that require additional tree planting.

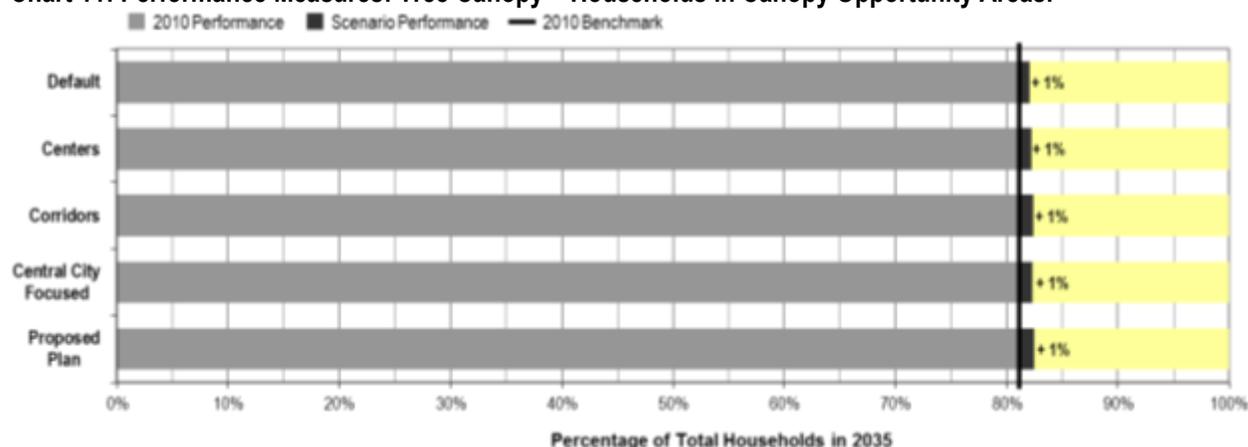


■ **Tree Canopy Areas** are places that meet or exceed tree canopy targets identified in the Urban Forestry Plan. Development in these areas may result in loss of tree canopy that could hamper the ability to meet citywide tree canopy targets.

■ **Canopy Opportunity Areas** are places that do not currently meet the tree canopy targets and where development may result in an increase in canopy over time through tree preservation and mitigation planting. Focusing development in these areas will have less impact on the existing canopy.

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Chart 11: Performance Measures: Tree Canopy – Households in Canopy Opportunity Areas.



Performance of the Proposed Comprehensive Plan

Like previously evaluated scenarios, the Proposed Plan locates the majority of new growth in Canopy Opportunity Areas. In many cases redevelopment of underutilized paved areas leads to an increase in tree canopy as new street trees and on-site landscaping standards. With the Proposed Comprehensive Plan:

- 72 percent of the growth capacity is on land with less than 10 percent tree canopy coverage.
- 30 percent of the residential capacity is in the Central City, which has about a 6 percent canopy coverage.
- Half of the City's growth capacity is in the mixed use zones, which as a whole have slightly above a 7 percent canopy coverage.
- In contrast, the R5 zone land has only 2 percent of the total residential growth capacity, but has a 21 percent canopy coverage.
- The other lower density single family zones (R7-RF) represent only 3 percent of the residential growth capacity, but typically have high canopy coverages from 30 to 65 percent. This points to the importance of having tree codes that apply in non-development situations, and rules that prevent needless tree removal on large lots.

Options for Improving Performance

Plant and Preserve

Many established single family neighborhoods across the city could increase the level of canopy with more tree planting. As development occurs in high-canopy areas, the City can promote design solutions that seek to preserve and maximize the existing canopy.

Shift Growth to Canopy Opportunity Areas

Focusing development in low canopy areas helps preserve the existing canopy while potentially increasing canopy on development sites. As key civic corridors and centers develop, tree plantings can support place-making, enhance the street experience, shade and cool the street and extend the benefits of trees into more urban areas

Design with Nature

New development can provide opportunities to incorporate new tree plantings onto the site and streetscape. Focusing development along key corridors that lack significant tree canopy, like SW Barbur Boulevard and NE Sandy Boulevard, could increase tree coverage.

NATURAL AREA ACCESS

PORTLAND PLAN

By 2035, all Portlanders can conveniently get to and enjoy the Willamette and Columbia Rivers. All Portlanders live within a half-mile safe walking distance of a park or greenspace. The regional Trail System is substantially complete and is an integrated component of a Healthy Connected City network.

Access to natural areas is a critical component of a healthy complete neighborhood. Nearby natural areas give Portlanders places to recreate, relax and spend time with friends and family. The Portland region's 40-mile loop and other elements of The Intertwine — the regional trail park system — provide access along rivers and through major natural areas like Forest Park, Johnson Creek and the Columbia Slough. However, this system of trails is incomplete and has few connections to neighborhoods. This performance measure is similar to the Park Access measure but is more focused on access to nature and is based on the number of households located within a convenient, ½-mile walk of a natural area or river.



■ **Natural Area Access Areas** identify places within a ½-mile walkable distance of natural areas, including the Willamette and Columbia Rivers and Portland's large natural area parks.

■ **Natural Area Gap Areas** are outside of a ½-mile walkable distance to a major river or a natural area. These areas present a range of opportunities to improve transportation and trail access to natural areas and weave nature into the neighborhoods.

Chart 12: Performance Measures: Natural Area Access – Households within ½ Mile of a River or Natural Area.



Performance of the Proposed Comprehensive Plan

Overall, only 25 percent of Portland households in 2010 had convenient access to a river or natural area. Like other scenarios, the Proposed Comprehensive Plan locates the majority of new growth in mixed-use corridors and centers away from natural areas. Access to Natural Areas decreased under all scenarios, including the Proposed Plan. This decrease in access is due to the fact that the majority of new growth is allocated to amenity rich locations with a more urban character throughout Portland that are further away from Natural Areas. Additionally, some down designations have been applied to reduce density in areas near Natural Areas such as Powell Butte that have decreased overall access.

Lesson Learned: Connect to Nature

Development in more urban locations means less impact on natural habitat areas and sensitive watersheds. But these urban locations do not provide direct access to nature for residents. We will need to do more in the future to create other opportunities for Portlanders to experience nature.

Options for Improving Performance

Weave Nature into the City

Developing habitat corridors, promoting backyard habitats and enhancing neighborhood tree canopy can weave nature into the city. Actions could include enhancement of existing parks through native plantings and creation of habitat for birds, pollinators and other beneficial wildlife.

Habitat Enhancement in Large Parks

Large neighborhood parks can serve as anchor habitats that provide significant natural functions within the city. For example, Mt. Tabor, Powell Butte and Oaks Bottom all are important habitat areas that also provide access to nature for many Portlanders. Coverage gaps between these areas are an opportunity to create connections between places like Alameda Ridge and Rocky Butte.

Development of Neighborhood Greenways and Transit Connections

Neighborhood greenways and civic corridors should be designed to improve public access to Portland’s largest natural areas and improved public access to the Willamette and Columbia Rivers. Greenways can provide park-like experiences along streets, paths and trails that emphasize large trees and green streets, modeled after programs like Tabor to the River, which integrate the function of natural areas into urban environments and assist the movement of people, water and wildlife.

5. KEY FINDINGS

The Portland Plan set the expectation that there will be more strategic and more intentional actions in how growth and public investment are made to achieve the vision for a future Portland. The Measures of Success adopted with the Portland Plan established some specific numerical goals. This report examines how growth management can influence those outcomes over the long term and how the Proposed Comprehensive plan advances these goals through land use and infrastructure investment.

Choices for Prioritizing Growth – Portland’s existing zoning allows for more than enough development capacity to accommodate the future growth forecast of 123,000 new households. This capacity creates an opportunity to make choices about where to focus or prioritize that growth.

A Legacy Landscape – As an already urbanized city, Portland’s existing development pattern defines many of the challenges. The forecasted growth represents roughly one-third of the total households and employment that will make up Portland in 2035, which means that two-thirds of the future built environment is already in place. This legacy development pattern will have a significant impact and moderating influence on how well future development patterns perform over the next 25 years. Large improvements in performance from land use changes will take more time. Other interventions will be necessary to achieve the goals identified in the Portland Plan.

Investment Priorities – The performance of the Proposed Comprehensive Plan shows that most of the anticipated new growth occurs in a way that provides significant progress towards meeting the objectives. However, it also shows that additional planning and investment is needed in order to meet the Portland Plan’s 2035 Measures of Success.

Two Investment Strategies – Through the Comprehensive Plan Update, Portland has identified a two track public investment strategy to meet multiple objectives. One strategy supports growth in high-performing areas that already have a relatively complete infrastructure support system. The other fills infrastructure gaps in historically underserved areas to reduce disparities and increase equity. This two track strategy will allow Portland to improve performance across the board by focusing growth in high-performing areas, while at the same time improving conditions in areas previously neglected.

Transportation Choice – Transportation investment priorities emphasize active transportation, transit, and freight mobility. Investing in sidewalks, bicycle facilities and transit significantly improves performance across several measures, such as reducing carbon emissions, improving affordability, and improving access to jobs for more Portlanders. Expansion of the frequent transit network will mean that 62 percent of Portland households will have convenient access to frequent transit. Investment in the low-stress bicycle network will mean that 72 percent of Portland households will live within ¼-mile of a bike facility.

The projects in the Proposed TSP create a transportation system that will decrease reliance on automobiles by reducing the single occupant vehicle (SOV) commute rate to 35 percent of trips, which in turn helps reduce per capita daily vehicle miles travelled (VMT) by 27 percent.

Complete Neighborhoods – The Portland Plan set the goal of providing most Portlanders with safe, walkable access to services. While most (77%) of the new development is expected to

Comprehensive Plan Update

take place in complete neighborhoods, this goal cannot be achieved simply by only focusing growth in existing complete neighborhoods – Portland needs infrastructure investments to create more complete neighborhoods. The combination of the growth pattern and the infrastructure investments in the Proposed Comprehensive Plan increase the number of households in complete neighborhoods to 73 percent by 2035.

Reducing Carbon Emissions – The land use and transportation choices made in the Proposed Comprehensive Plan lead to a reduction in per capita daily VMT, increase in non-automobile mode share, and help make progress towards Portland’s carbon reduction goals. The City of Portland and Multnomah County will need to take additional action beyond planned land use and transportation investments in order to meet our carbon reduction goals. The Climate Action Plan identifies additional policy and program actions that go beyond the Comprehensive Plan to help achieve this goal, such as: carbon pricing, building energy performance reporting, renewable energy, net zero energy buildings, low carbon transportation fuels, electric vehicles, waste prevention and recovery, and green infrastructure.

A Central Role for the Central City – The Central City is expected to accommodate 30 percent of future growth. Focusing growth in and around the Central City may be the most cost-effective way to provide the greatest level of service to the greatest number of Portlanders; each incremental investment in this service-rich area has disproportionate benefits. However, in order to grow as a residential area, it will be necessary to ensure that the needs of a variety of families can be met within the Central City.

Jobs and Better Transit Connections in East Portland – East Portland has Portland’s largest pool of affordable housing and is home to a large number of families with children. However, the area does not have many family-wage jobs, and it is not easy or quick to travel from East Portland to major job centers. Convenient and reliable access to work is one of the major contributors to job success (others include overall employment opportunities and relevant education and training). The Proposed Plan includes policies, map changes and transit investments that will increase the number of households with convenient access to jobs by at least 2 percent. Developing more jobs in East Portland and providing better connections to and from East Portland are critical to improving household economic self-sufficiency.

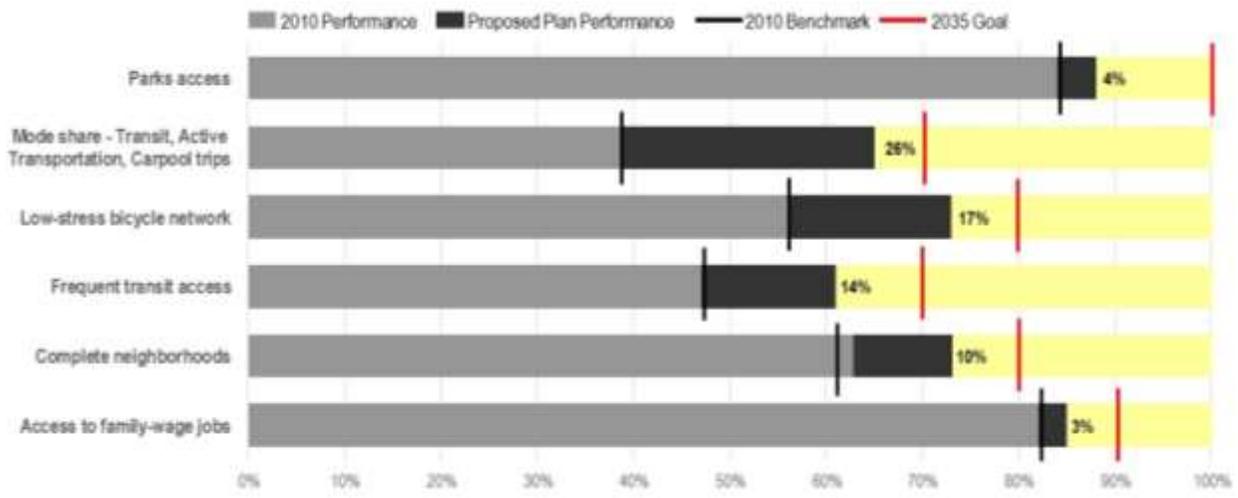
More Affordable Housing – Providing enough affordable housing, especially for the lowest income households, will be a challenge. Public investments to increase services can create gentrification pressure. Portland will need to better align growth management, public investment and affordable housing development, anticipate the consequences of investments, minimize displacement and engage communities.

Prepare for the Future – While short-term development trends show a market preference for the Central City and Inner Neighborhoods, East Portland has significant growth potential and is home to many households with school-age children. Today, there is a window of opportunity to address the infrastructure gap in East Portland. The timing and location of East Portland infrastructure investments are a pressing issue.

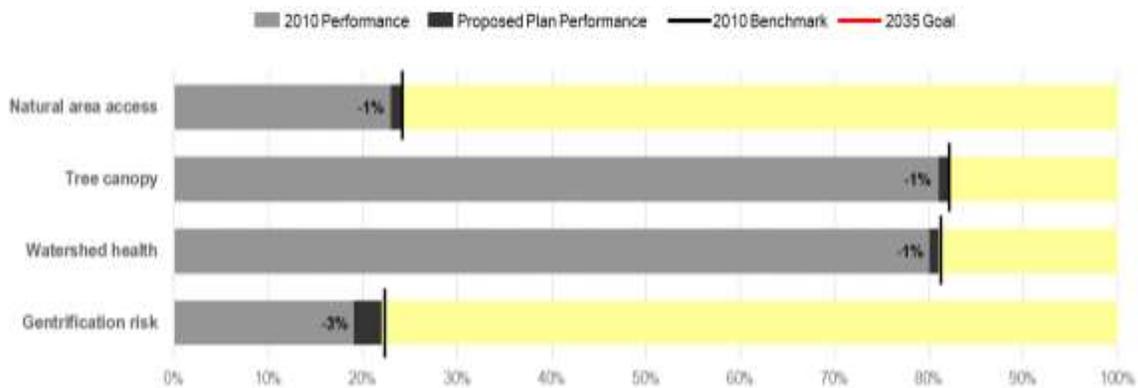
Access to Parks – The Proposed Comprehensive Plan shows an increase in the number of households with good access to parks. This increase can be attributed to parks investment areas identified in the CSP that fill gaps in areas underserved by parks to reduce disparities, especially in East Portland.

SUMMARY OF PERFORMANCE MEASURES

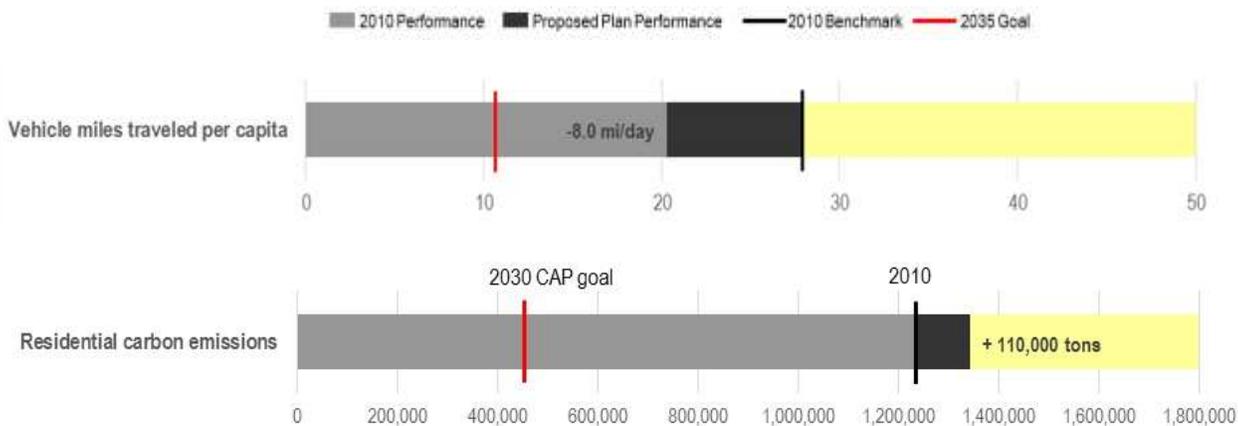
Household Performance Measures



Track and Monitor Performance Measures



Carbon Reduction Performance Measures



CITY OF PORTLAND

ECONOMIC OPPORTUNITIES ANALYSIS:

Section 1. Trends, Opportunities & Market Factors



Prepared for:

City of Portland Bureau of Planning & Sustainability

AUGUST 2015 Recommended Draft

This EOA report has been funded through a grant from the State of Oregon Department of Land Conservation and Development.

E. D. Hovee & Company, LLC

Economic & Development Services



EXECUTIVE SUMMARY

The EOA is an analysis of the 20-year supply and demand for employment development and land in the city. It is prepared according to State Administrative Rule OAR 660-09-0015 and consists of four sections:

1. Trends, Opportunities & Market Factors
2. Long Range Employment Forecast (Demand)
3. Buildable Land Inventory (Supply)
4. Community Choices (Comprehensive Plan proposals to meet employment land needs)

This report is Section 1 and provides a review of national, regional, and local employment trends, opportunities and market factors. The report documents existing conditions and current trends in employment that will serve as a basis for the future employment forecast.

KEY FINDINGS

- National employment trends indicate leading job growth in health, education and professional and business services.
- The 2000-2008 business cycle was a period of unusually slow job growth, not only for Portland but for the 7-county metro region and the nation. However, the pace of job growth in the 2008-2013 period, averaging 1.3% per year in Portland and 1.4% in the region, has already exceeded the previous business cycle. Despite the depth of job losses during the great recession (2008-2010), the city and region have since led the state's economic recovery.
- A pivotal question is whether the city will continue to generate a stable share of the region's job growth, outperforming national job-sprawl trends. Multnomah County's long-term 25% capture rate of regional job growth over the 1980-2008 period has fluctuated widely since 2000. Portland had a nearly flat 5% capture rate of regional growth during the sluggish 2000-2008 business cycle and then rebounded to 23% capture rate in the 2008-2013 period.
- It is apparent that the "hot spot" locations where job growth is occurring within the City have shifted in recent years. Business districts with the most robust job growth rates since 2000 have been the hospital and college campuses, Central City's subdistricts outside of Downtown, some town centers with substantial health care and education employment, and the Columbia Corridor east of 82nd Avenue.
- Industrial employment declined in the 2000s at the same time that the city experienced increases in industrial land development, freight volumes, and added value of manufacturing products. Industrial employment is also a primary source of middle-wage jobs that have been shrinking nationally and regionally since 1980.

- The EOA identifies ten categories of employment areas (locations, sites and types of space) referred to in the report as “employment geographies”. Among these, the institutional geography is experiencing the strongest job growth, followed by urban centers (primarily due to institutional growth) and then the Central City, neighborhood commercial and industrial geographies.

NATIONAL TRENDS & FORECAST REVIEW

Following a period of relatively rapid growth in the 1980s, the rate of job growth slowed in the 1990s and further slowed in the early part of this decade. Job growth picked up after 2010 during a period of economic recovery, but is then projected to further slow to about 0.9% annual growth between 2025 and 2035.

Manufacturing is projected to decline from about 16% of all non-farm jobs in 1990 to between 6% and 7% by 2035. Service sector jobs have increased from about 67% of the nation’s non-farm job base in 1990 to 73% as of 2005. While all service sectors are expected to add jobs, only professional services, education and health are projected to increase their share of the employment base over the next 25 years.

REGIONAL EMPLOYMENT TRENDS

The pattern of the 7-county Portland metro area (PMSA) employment has followed that of the nation, slowing considerably post-2000 to a rate of approximately 0.8% per year (to 2008). Metro has prepared an updated forecast of job growth to 2040 (with 2035 established as the pertinent growth target for the City of Portland). Metro’s regional forecast indicates a more robust job growth rate averaging 1.8% per year from 2010 to 2035, consistent with long-term trends. PMSA employment grew at an average annual rate of 2.1% from 1980 to 2008, spanning the last three business-cycle periods. Job growth rates are expected to range from 0.6% for manufacturing to 2.3% for professional services and 2.6% to 2.7% in education and health services in the 2010-2035 period.

PORTLAND EMPLOYMENT TRENDS

In 2013, there were 393,742 covered jobs in Portland, equivalent to 38% of the 1.02 million employment base of the 7-county PMSA. To understand long term growth trends, the EOA focused on the 1980-2008 and 2000-2008 periods, since they reflect the peak-to-peak periods of the recent business cycles – timeframes that reduce the short-term business cycle distortions of the growth trend. From 1980 to 2008, Multnomah County added approximately 114,800 new jobs, resulting in a 1.1% average annual growth rate and a 25% capture rate of PMSA job growth. The city’s share of Multnomah County employment increased slightly in this period. After 2000, both region and city job growth slowed substantially.

From 2000-2008, Portland employment increased by approximately 3,120 jobs. This reflects a 5% capture rate of PMSA job growth in that period and an overall job growth rate averaging only about 0.1% per year. In comparison, statewide and PMSA job growth rates averaged 0.8% per year. However, local job growth has rebounded since 2008, recovering the 23,000 jobs lost in Portland and 63,000 jobs lost in the region from 2008 to 2010. In the 2008-2013 period,

Portland had 1.3% average annual job growth, compared to 1.4% in the region, and the city’s capture rate was 23%.

The 2000-2008 period also provides an insight into shifts between different employment sectors within the region. Manufacturing jobs declined by about 3.3% per year, with all industrial employment dropping at an annual rate of 2.6%. At the same time, the city experienced increases in industrial land development, freight volumes and added value of manufacturing products. Retail jobs also declined. Employment in education and health care sectors increased at a rate averaging 2.3% per year. The loss of the share of employment in the industrial sectors may be exaggerated due to 2001 changes in the way employment data is classified.

When looking at *geographic subareas*, Portland’s Central City commercial areas accounted for 27% of the city’s employment base as of 2008; regional and town centers (or urban centers) accounted for 5%; neighborhood commercial areas comprised another 18%; industrial districts represented 30%; and with institutional and residential areas each contributing 9-10%. As noted, institutional areas experienced the city’s strongest job growth, adding 8,800 jobs at an average annual rate of 3.6%.

However, employment varies greatly within these broad geographic groupings. For example, in the Central City, employment declined somewhat in the downtown and South Waterfront subareas, while increasing for the River and Lloyd Districts. Within industrial areas, employment has declined within Harbor and Airport Districts and Harbor Access Lands while increasing for Columbia East of 82nd, the Dispersed Employment areas, and for the Central City Industrial (or incubator) districts of Central Eastside and Lower Albina.

For urban centers, strong gains have been experienced for Hollywood, Gateway and Lents, focused in health care and education, while St. Johns, Hillsdale and West Portland have experienced stable or declining employment. Of the neighborhood commercial areas, employment within dispersed commercial areas has increased while the job count has declined for commercial corridors and nodes.

DEMAND ANALYSIS ISSUES – FOCUS GROUP INPUT

In 2009, the City organized six focus groups involving 58 participants to provide input on the demand for different types of employment - central city office, close-in incubator, manufacturing and distribution, neighborhood commercial, transit oriented development/mixed use corridors, and campus institutional. The findings included the following:

- *Recent trends*- Despite relatively slow employment growth over the last several years, the mid-decade was relatively good for Portland’s major employment generators – at least up to the point of the economic downturn starting in 2007-08.
- *Emerging trends* - the overarching theme is “change”. There is a promising long-term outlook provided that the pending economic recovery proves sustainable with the view that the City and region respond to shape this change in ways that keep Portland competitive for added investment and employment. Specific types of change include:

- ✓ The Central City office market becoming more diverse with strong growth in lower cost incubator space.
- ✓ Industry concerns that skilled workforce development and the freight transportation system will not be able to keep pace with their changing needs.
- ✓ Neighborhood commercial corridors seeing more mixed-use development and high densities along major transit streets.
- ✓ Health care providers expect “tremendous” growth.
- *Business space and location needs* – Expected space needs are relatively diverse, and there seem to be growing opportunities for more mixed-use and denser commercial space versus more traditional manufacturing and distribution activity.
- *Density and redevelopment* – Opinions on the potential for greater density uses and redevelopment of existing uses ranged from extreme caution expressed by manufacturing and distribution focus group participants to bullish support from /mixed-use corridor participants. All the focus groups discussed the practical implications and means by which employment uses could grow up rather than out.
- *Economic prosperity and creative vitality* – There are different strategies for creating and maintaining prosperity. A key challenge is to harness these diverse interests into a coherent whole. For example:
 - ✓ Emphasizing the Central City as a critical component to a healthy regional economy.
 - ✓ Balancing goals of sustainability and job growth.
 - ✓ Small neighborhood businesses as a primary economic engine.
- *Public role in economic development* – Participants argued that public strategies should emphasize a more business-friendly environment in general with more flexible regulations, more reliance on public-private partnerships, new business incentives, and less “picking winners” with targeted efforts.

DEMAND ANALYSIS ISSUES – DATA ASSESSMENT

Key findings:

- *High rise office development* – There is solid potential for additional mid to high-rise development primarily in the Central City but also elsewhere. Mid-/high-rise development outside the Central City has been limited to adaptive reuse in close-in areas and medical/health care facilities at campus institutions and urban centers such as Gateway and Hollywood. Proximity to retail and housing is increasingly important for future office development. The Central City reports a relatively slow overall job growth rate (0.3%) from 2000-08 – with strongest growth in the River and Lloyd Districts and some employment loss in the CBD.
- *Incubator and manufacturing districts* – These two types of space can contribute to future export-oriented job growth in Portland. Harbor and Airport Districts and Harbor Access Lands remain strongly oriented to manufacturing, transportation and distribution but service employment has been the dominant source of job growth in recent years. The Central City incubator districts of Central Eastside and Lower Albina have a more

diverse job base and have been experiencing job growth above the citywide rate – albeit concentrated in service sector activities together with information/design and construction. Overall, employment within industrial areas declined slightly.

- *Neighborhood commercial districts* – These dispersed concentrations of employment space have been a significant contributor to the city’s job base, but with somewhat surprising job loss indicated over the 2000-08 time period, primarily within residential zones and along commercial corridors. Commercial corridors (including those with TOD/mixed use potential) still account for 27% of jobs outside of the city’s urban centers and industrial areas, despite a net loss of nearly 5,200 jobs from 2000-08. Neighborhood-serving services and retail generally appear well distributed throughout the city; with just a few gaps.
- *Institutional development* – These sites include 7 colleges and 10 hospitals (each on 10+ acre sites) but excluding Portland State University and Adventist Medical Center which are included with in the Central City and Gateway employment geographies respectively. These 17 institutions together accounted for about 35,200 in-city jobs as of 2008 and represent the city’s fastest growing employment geography.

LOCAL SECTOR SPECIALIZATION

Two related analyses were conducted that are relevant to this EOA. Metro evaluated the region’s comparative advantage in *employment* relative to the nation, finding that this region has a comparative advantage in manufacturing despite net job losses. Overall, non-manufacturing sectors show little to any substantial comparative advantage relative to the rest of the nation. However, Metro is projecting increased regional capture of national employment for finance activities, education and health care, and some management and personal services.

ECONorthwest also evaluated the City of Portland comparative advantage based on industry *value added* rather than employment. This analysis corroborates the results of the regional employment-base analysis. Both analyses indicate that Portland’s comparative advantages are higher in the manufacturing sectors. Although, these sectors make up smaller shares of total economic activity, they generate larger overall economic impacts in value added and export value added, particularly professional services, wholesale trade, and management of companies. Consequently the ECONorthwest analysis indicates that the manufacturing sector’s output may be insufficient as an *exclusive engine* for continued economic growth into the future.

EOA IMPLICATIONS

Key implications for subsequent EOA work tasks include:

- Long-term job growth trends have fluctuated and create uncertainty for forecasting growth in the coming decades. The 2000’s were a period of relatively slow job growth not only for Portland but for the metro region and nationally. Despite an economic downturn experienced just after 2000, followed by modest growth and a major recession at end of the decade, Metro is projecting that the nation and region should expect to return to a more normalized pattern of job recovery and stronger growth over the long-term horizon of next 25 years.

- For Portland, another question is whether the city will maintain the 25% capture rate of regional job growth that Multnomah County experienced over the 1980-2008 period. Portland’s capture rate fell to 5% in the 2000-2008 business cycle and has since rebounded to 23% in the 2008-2013 period.
- Finally, it is apparent that the “hot spot” locations where job growth is occurring within the City have shifted in recent years. The focus of added Central City job gains has shifted from the traditional downtown core toward adjacent areas in the River and Lloyd commercial / mixed use districts and the emerging incubators of the Central Eastside and Lower Albina. Similar shifts are occurring within and between the City’s industrial, urban center and neighborhood commercial areas. In numerical terms, by far the strongest growth has been in Portland’s institutions.

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I. INTRODUCTION

The City of Portland is required to complete an Economic Opportunities Analysis (EOA) to comply with Oregon Statewide Planning Goal 9 and supporting administrative rules. State statutes also require the City’s Comprehensive Plan to be coordinated with Metro’s regional population and employment forecasts and allocations. The EOA rules also allow Portland the opportunity to shape its plan in a way that fits not only state and regional goals but also locally determined priorities and choices.

The intent of this EOA is to address both current and emerging market trends while at the same time addressing distinctive state, regional and City-defined policy objectives for employment and associated land development requirements. The economic analysis also addresses short-term employment demand and resulting land supply needs consistent with Goal 9 and reconciles buildable land supply with demand over a longer term time horizon to 2035.

APPROACH

This report covers economic trends, opportunities and market factors, including an assessment of local sector specializations, submarket real estate analysis, freight terminal demand, and wage distribution.

The analysis has drawn from a review of quantitative economic data for the U.S., state of Oregon, and Portland metro region as well as data specific to the City of Portland. The analysis also considers qualitative information affecting future opportunities and market factors, including results of six focus groups organized around demand analysis issue topics.¹

Subsequent EOA reports are informed by the results of this initial trends analysis.

ORGANIZATION OF TRENDS, OPPORTUNITIES, AND MARKET FACTORS ANALYSIS

The remainder of this Task 1 report is organized to cover the following topics:

- National Trends & Forecast Review
- Portland Employment Trends
- Demand Analysis Issue – Focus Group Input
- Demand Analysis Issues – Data Assessment
- Local Sector Specializations
- Intensification Analysis
- Multiplier Analysis
- EOA Implications

¹ Information in this report has been drawn from sources generally deemed to be reliable. However, the accuracy of information from third party sources is not guaranteed, and is subject to change.

The observations and findings contained in this report are those of the authors. They should not be construed as representing the opinion of any other party prior to their express approval, whether in whole or part.

II. NATIONAL TRENDS & FORECAST REVIEW

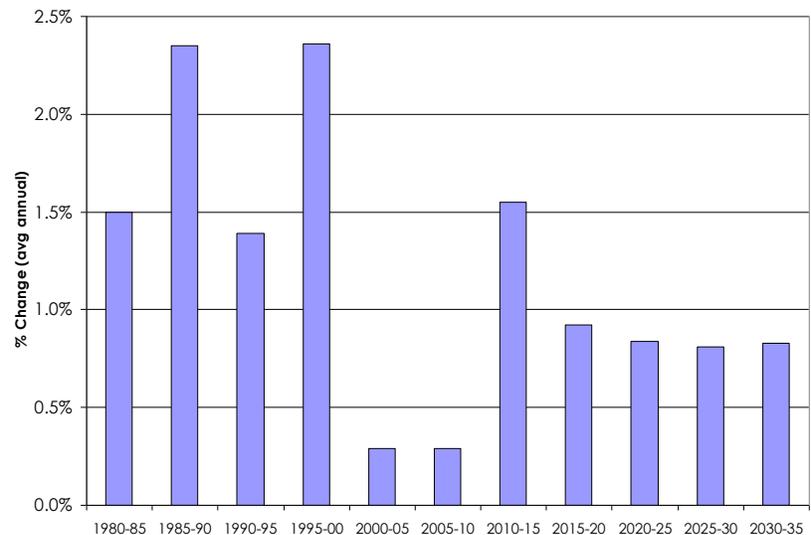
Consistent with Oregon Administrative Rules (OAR 660), Portland’s EOA is set within the context of nationwide trends and projected future employment. Recent and forecast conditions are considered first for total employment, then with more detailed discussion of employment by sector.

NATIONAL EMPLOYMENT TREND & FORECAST

From 1980 to 2005, the nationwide job count grew by 48% to approximately 133.7 million non-farm jobs in 2005:

- Over the 25 year period of 1980-2005, employment across the U.S. increased at an average annual rate of 1.6% per year, reflecting a particularly rapid 1.9% rate of job growth during the 1980s. The 1980-90 time period also coincided with entry of a large baby boom cohort into the job market.
- Since 1990, job growth nationally has slowed to a more modest 1.3% annual rate from 1990-2005. During the first half of this decade (2000-2005), job growth was even more modest averaging 0.3% per year, reflecting a post-2001 period of economic contraction followed by a slow recovery.
- The national forecast predicts an economic recovery period for 2010-2015 with relatively strong anticipated job growth (1.5-1.6% per year) that declines over time to a rate of about 0.9% by 2025-2035. At these rates of projected employment growth, the U.S. would have about 173.5 million non-farm jobs by 2035, an increase of just under 40 million jobs (or 30% gain) compared to 2005 conditions.

Figure 1. U.S. Non-Farm Employment Growth Rates (1980-2035)



Source: Global Insight, 2008 QR US Long-Term Outlook, as compiled by Metro.

Employment Sector Growth

When viewed by major employment sector, the most noteworthy change has been the continued shift of the nation’s economy to less industrial and more service-related employment. This trend is expected to continue through 2035. However, several caveats are noted related to this shift.

Past employment sector shifts are difficult to quantify due to a 2001 change in how industries are classified in (from the Standard Industrial Classification system to the North American Industrial Classification System). The new NAICS system created two new sectors, management of companies and information, which are considered services but which encompass firms (or portions of firms) previously classified as industrial. While employment data from the year 2000 has been converted to NAICS (by the Oregon Employment Department), this conversion was not perfect. Some portion of the reported employment shift away from manufacturing is attributable to this change in job classification, although the exact portion is unknown.

Also of note is that while the focus of this trends assessment is employment, manufacturing has in many regions held a steadily increasing share of GDP. At least since 2000, there appears to be a contradictory relationship between industry output and industry employment. Consequently, job growth represents only one lens through which to assess an industry’s economic contribution. Other measures of economic activity are addressed later in this report.

That said, the following changes are reported for job trends within the manufacturing sector nationwide:

Manufacturing:

- Nationally, manufacturing has declined from just over 16% of all non-farm jobs in 1990 to 10-11% of non-farm jobs in 2005 and is projected to decline to 6-7% of employment by 2035.
- Manufacturing has been declining not just as a share of the total but also in terms of numbers of jobs – from close to 18 million jobs in 1990 to just over 14 million in 2005 and to a projected 11 million by 2035.
- Every major manufacturing category except lumber experienced job losses between 1990 and 2005, and all sectors are forecast for job loss through 2035. Durable goods manufacturing, which tends to be more capital intensive, has experienced less rapid job loss than non-durables.

Other Industrial-Related Employment:

- With the exception of natural resources, all other *industrial-related* sectors experienced job growth from 1990-2005 and are projected for continued job growth through 2035. These other sectors include natural resources, construction, wholesale trade, transportation/warehousing/utilities (TWV), and information.²

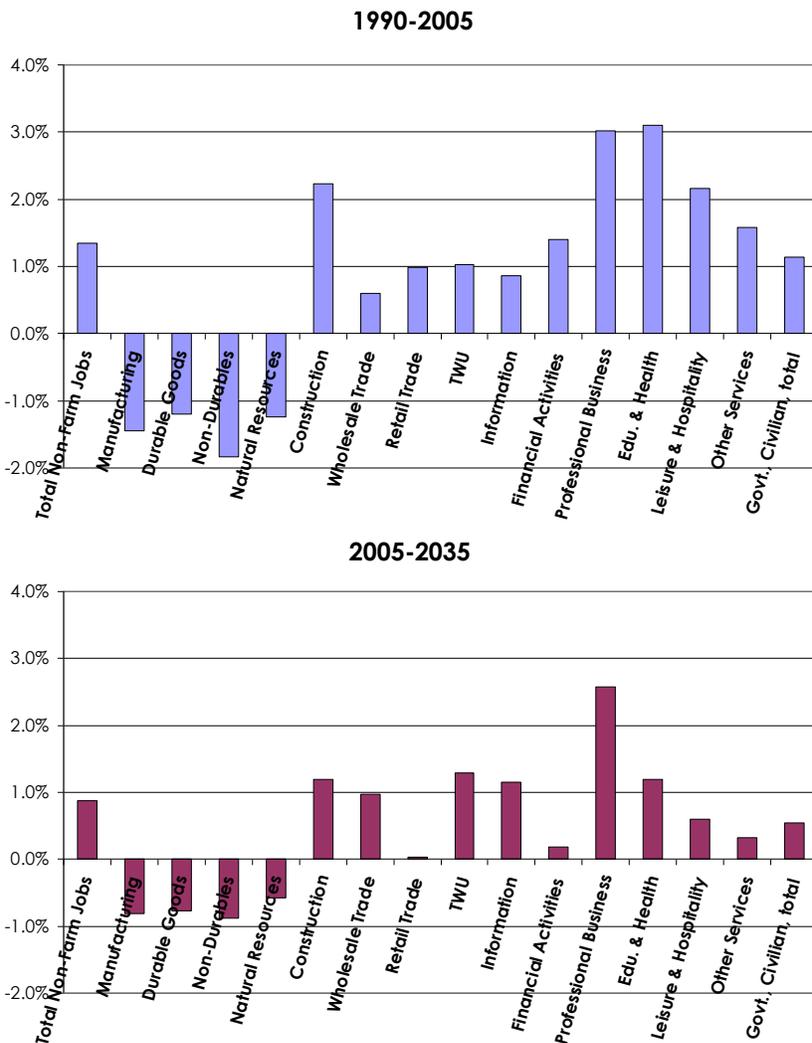
² Information is a new sector defined by NAICS that includes some previous industrially related SICs such as printing combined with more service sector related functions such as internet and software.

- Between 1990 and 2005 the other industrial-related sectors declined slightly in total employment share, from 16.6% to 16.2%, as growth was below rates experienced in non-industrial (service) sectors. However, through 2035 the non-manufacturing industrial sectors are projected to increase their share of the nation’s employment to 17.4% by 2035.
- From 1990-2005, the fastest growing industrial sector was construction, with jobs increasing an average of 2.5% per year. From 2005-2035, the biggest gainer is forecast for jobs in transportation/warehousing/utilities (at 1.3% annually), followed closely by the construction and information sectors.

Service Sector Employment:

- Service sector jobs have increased rapidly since 1990. The most rapid growth rates are reported for education and health (up by 3.1% per year) and professional services (3%). The slowest growing service job sectors have been retail (up by just 1.0% per year) and government (1.1%). Finance, leisure and hospitality, and other services have increased at rates of 1.4%, 2.2% and 1.6% respectively.
- Overall, these service sectors have increased from about two-thirds (67%) of the nation’s non-farm employment in 1990 to 73% as of 2005. The largest single service-related sector is government at 16.3% as of 2005.

Figure 2. Forecasted U.S. Job Growth Rates (1990-2035)



Source: Global Insight, 2008 QR US Long-Term Outlook, as compiled by Metro.

- While all service sectors (except retail) are expected to add jobs, only professional services, education and health are projected to increase their share of the employment base over the next 25 years. Declining shares (slower growth) are projected for retail trade, financial activities, leisure and hospitality, and government.

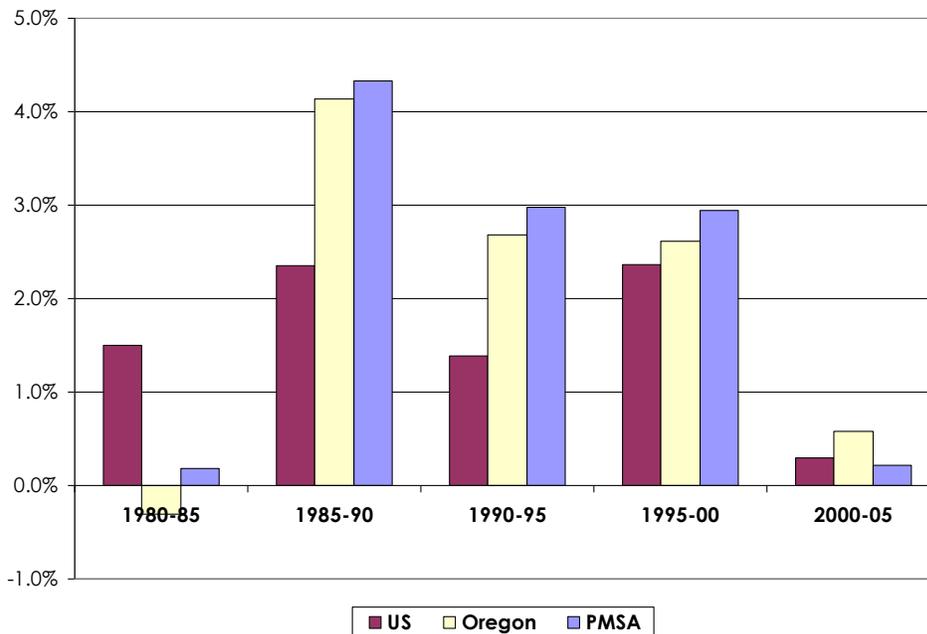
STATEWIDE & REGIONAL EMPLOYMENT CONTEXT

Statewide & Metro Area Employment Growth Trends

Over a 25-year period extending from 1980-2005, patterns of employment growth for the nation, Oregon, and the Portland metro area have been similar. Exceptions include:

- In the first half of the 1980s, Oregon and the Portland metro area were harder hit than the nation during a period of overall economic slowdown. In the latter half of the decade, this pattern was reversed as employment growth rates accelerated, exceeding 4% per year both statewide and for the metro region.

Figure 3. Employment Growth Rates – U.S., Oregon & Portland PMSA (1980-2005)



Source: Metro, Oregon Employment Department, and E. D. Hovee & Company, LLC.

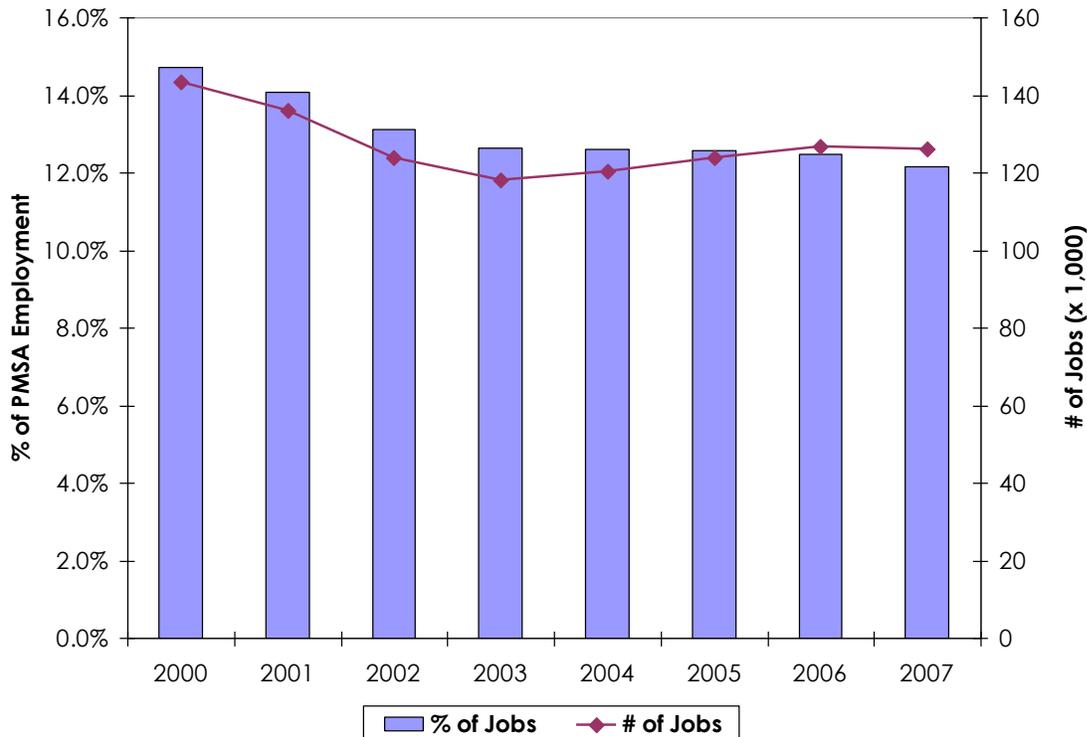
- This pattern of strong employment growth statewide and regionally continued (though at somewhat slower rates) through the 1990s, with the nation nearly catching up to the state and region in the latter half of that decade.
- In the 2000s, employment stagnated – nationally, statewide and regionally – through a recession with a slow job recovery. While at fairly modest levels, employment growth statewide exceeded that of the PMSA, the only such 5-year period since 1980.

Manufacturing Focus?

Manufacturing often receives particular attention because of its historic role as a pivotal traded sector and as source of relatively high wage jobs, both nationally and in this region. As a share of PMSA employment, manufacturing has not reversed its declining share of the region’s job base – at best holding its own from 2003-2005 at 12.6% of total non-farm jobs (Figure 4). The experience of the last several years offers the hint of a possible opportunity for slowing the now decades long slide in U.S. manufacturing. This is illustrated by a year-to-year review of manufacturing employment in the Portland metro area from 2000-07. This period is chosen as it essentially extends from the recession just after 2000 back to a subsequent peak in 2006.

As indicated by the following graph, the metro region experienced a sharp drop in manufacturing jobs during the economic recession of 2001-2003. This was then followed by a post-recovery increase of about 7% back to a peak year of 2006. This recovery nationally was aided by a weak dollar encouraging added exports, especially for durable goods manufacturing.

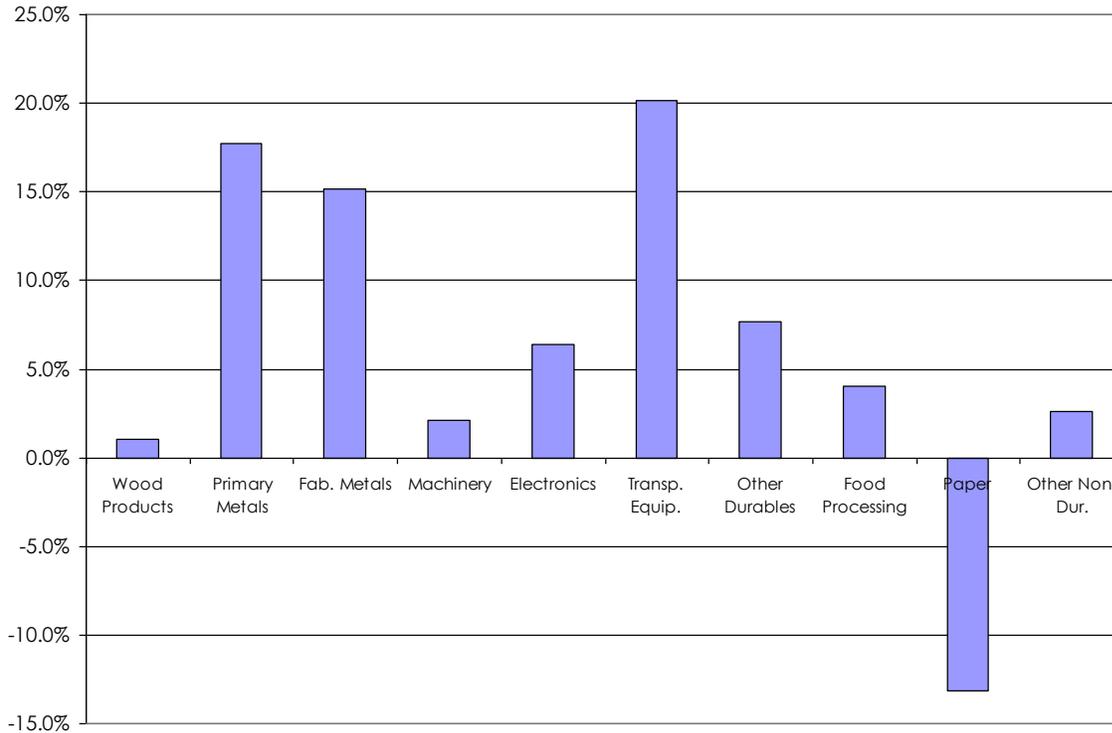
Figure 4. Portland PMSA Manufacturing Job Trend (2000-2007)



Source: Metro.

A more detailed look at the 2003-2007 period shows the differences in this manufacturing employment resurgence by sector. While there was considerable employment contraction in the 2000-2003 time period, the strongest post-2003 gains were indicated for transportation equipment and primary/fabricated metals, followed by more modest gains for electronics and food processing.

Figure 5. Portland PMSA Manufacturing Job Surge (2003-2007)



Source: Metro.

A key question with economic recovery in the years ahead is whether this resurgence proves to be temporary. Alternatively the question is whether there are opportunities for continued longer lasting competitive gains for durable goods as with metals, transportation equipment and/or electronics.

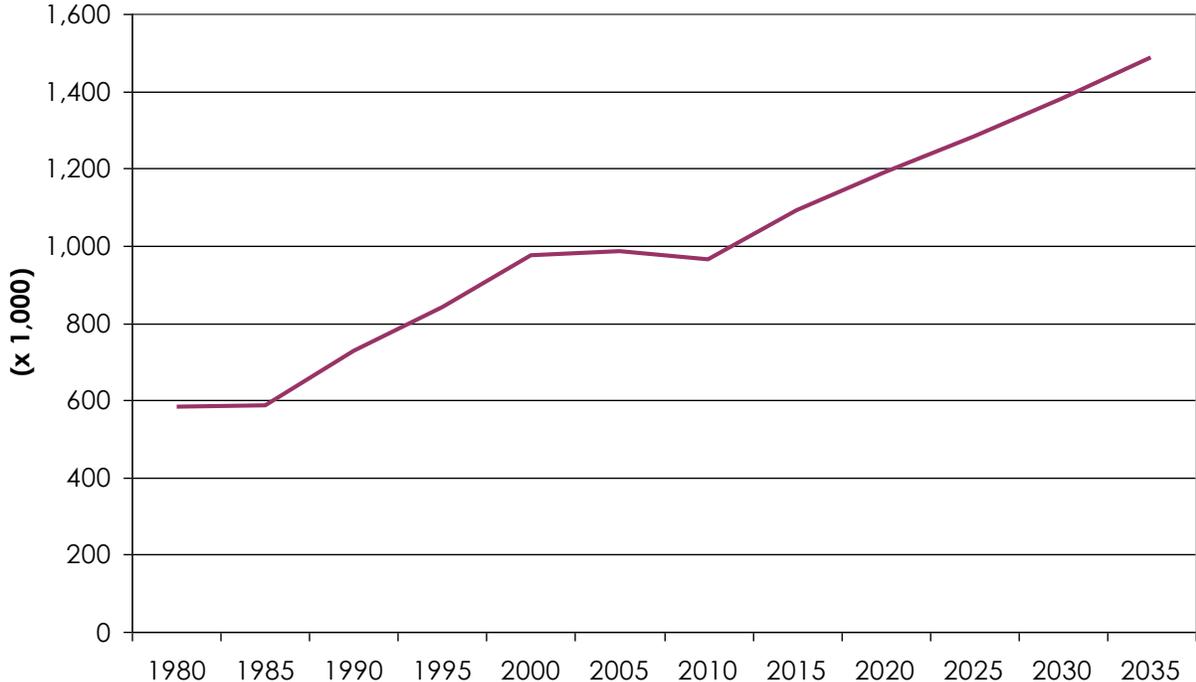
With non-durables, a question is whether the recent observed growth in regional food processing can be sustained. Opportunities may be linked to greater emphasis on consuming products grown and manufactured closer to home.

Metro projects that manufacturing’s share of the region’s total job base will be 8.3% of total employment by 2035. The total number of manufacturing jobs is projected to stabilize at between 120,000 and 125,000 between over the 2020-35 time period.

Metro Area Employment Growth Forecast

Looking to the future, Metro developed a range of low, moderate and high growth employment forecast alternatives to the year 2040 and has selected an official forecast slightly less than the moderate forecast. The following chart displays trends from 1980 to 2005, and then resulting revised forecast to 2035 (the forecast period for this EOA).

Figure 6. Portland PMSA Employment Forecast Range (to 2035)



Source: Metro. Data for 2010 reflect BLS actual employment, with subsequent years as Metro forecast results.

With the baseline forecast, Portland PMSA non-farm employment would increase from recession dampened figure of less than 1 million jobs in 2010 to nearly 1.5 million in 2035, a gain of over 520,000 (for 54% job growth) with an average annual growth rate in the range of 1.7% per year over the 2010-2035 time period.

III. PORTLAND EMPLOYMENT TRENDS

This section analyzes recent City of Portland employment trends within the national and regional context. While some citywide changes parallel those of the nation and/or region, it is clear that Portland’s position as the largest city in the region and state has created distinctive market niches as well as future opportunities and limitations.

Topics covered by this initial data review are:

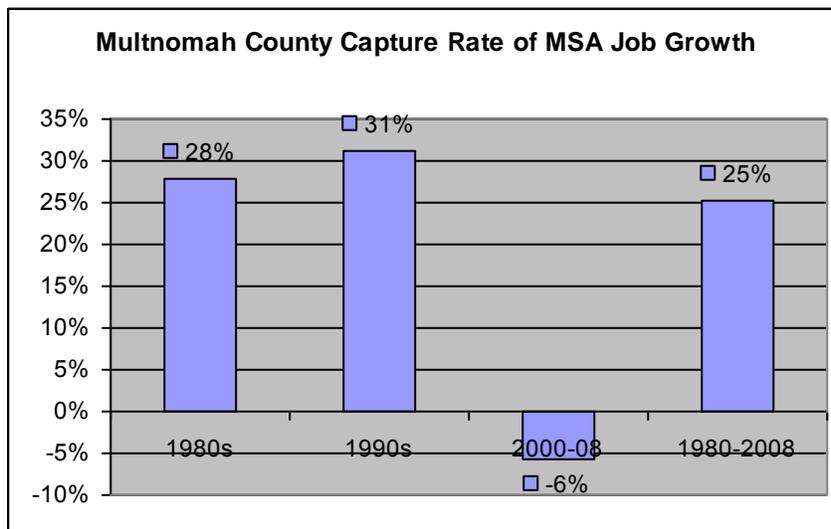
- Citywide Employment Trends
- Detailed Development & Employment Trends:
 - ✓ Employment by City Subarea
 - ✓ Employment & Development by Expansion Type
 - ✓ Development by Valuation, Density & Site Type

Geographic and sector employment trends will be used to inform the distribution of projected employment in later tasks for this EOA.

CITY AND COUNTY EMPLOYMENT TRENDS

The following long-term employment trends analysis is based on county data because reliable, comparable city data is not available before 2000, due to changes in data reporting and major city annexations in the 1980s and 1990s. Figure 7 shows that the short-term (2000-08) job losses are inconsistent with long-term trends.

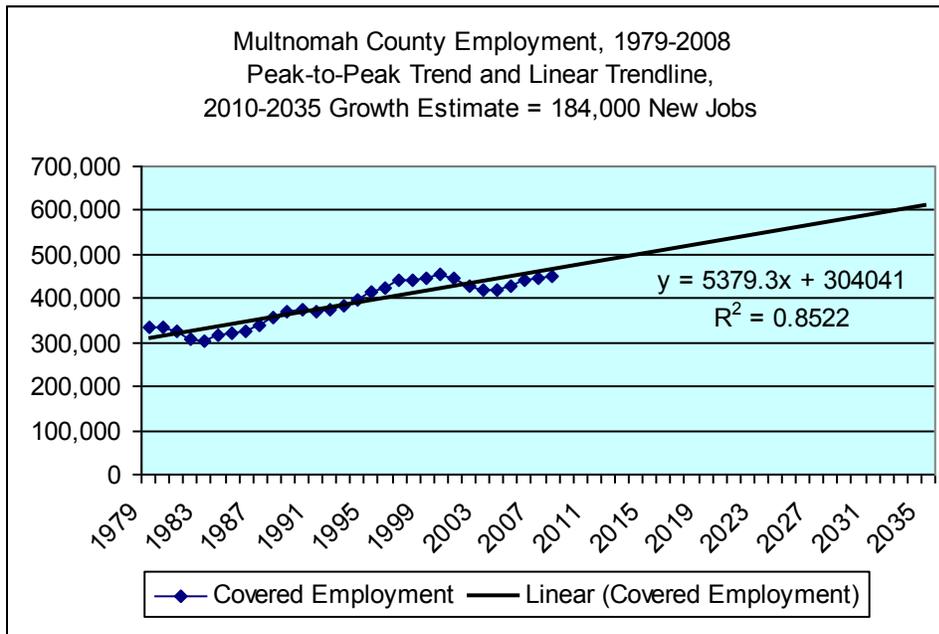
Figure 7. Multnomah County Capture Rate of Regional Job Growth (1980-2008)



Source: Bureau of Planning and Sustainability from Oregon Employment Department QCEW data.

Despite slower job growth after 2000, long-term employment trends in Multnomah County reveal a general linear growth pattern, as shown in Figure 8. Given this linear pattern, a commonly used forecasting method is a linear trendline, which is a best-fit straight line through a series of historical data points (regression analysis). The trendline shown in Figure 8 is based on 1979-2008 annual employment data, representing county peak-to-peak data periods of the last three business cycles. A trendline is most reliable when its R-squared value is at or near 1, and this trendline results in a generally close-fit R-squared value of .85. The years when actual employment levels varied most from the trendline resulted particularly from the employment fluctuations of short-term business cycles.

Figure 8. Multnomah County Employment Trendline, 1979-2035

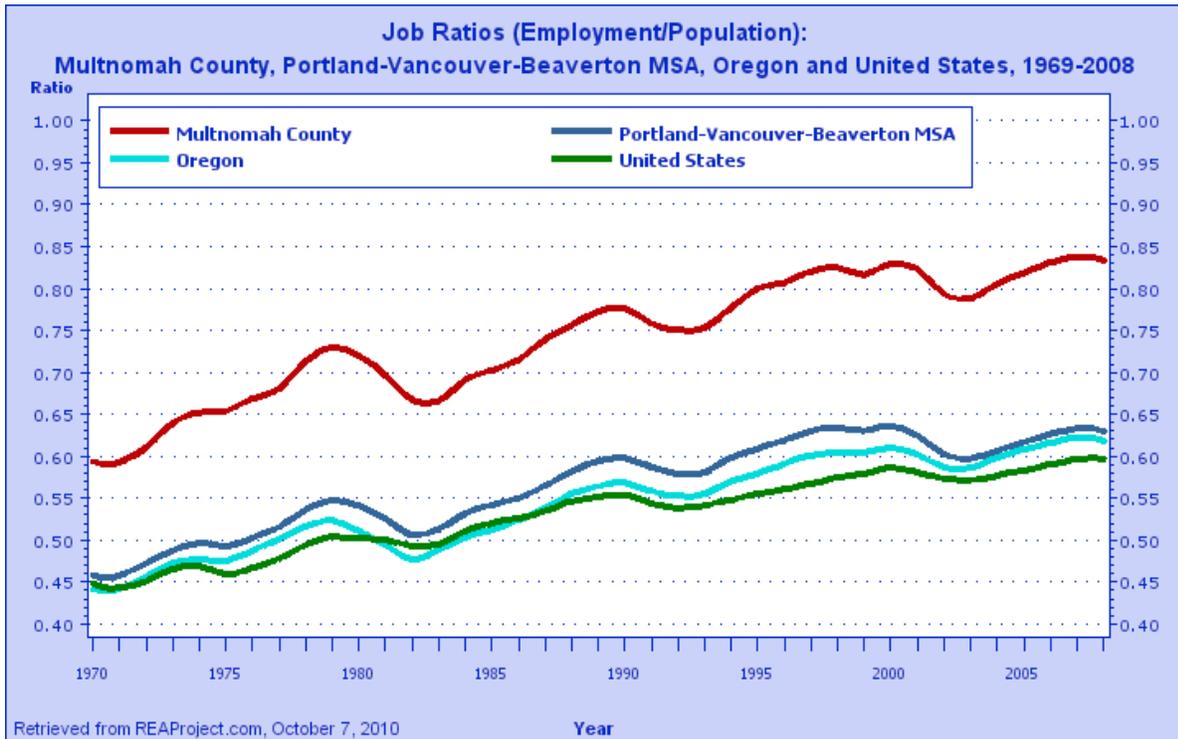


Source: Bureau of Planning and Sustainability from Oregon Employment Department QCEW data.

If Multnomah County’s long-term linear job growth pattern continues along this trendline, 184,000 new countywide jobs will be added between 2010 and 2035, which reflects a 34% county capture rate of new PMSA Covered Employment in this forecast period. In 2008, the City of Portland accounted for 87% of Multnomah County employment, up from 86% in 2000. Assuming a slightly declining city share of county jobs over time, estimated at 82% of new Multnomah County jobs from 2010 to 2035, the trendline in Figure 8 indicates that 151,000 new Portland jobs will be added in the forecast period. This growth level would represent a 28% city capture rate of PMSA job growth to 2035.

Employment trends are also linked to population trends at the regional level, but Multnomah County has long been a job center in the region and has substantially more jobs than resident workers, such as shown on the following graph.

Figure 9. Employment-to-Population Job Ratios



Source: Oregon Regional Economic Analysis Project from U.S. Bureau of Labor Statistics data.

Geocoded (mapped) employment data is available for 2000 and 2008, allowing a review both of citywide and sub-city employment trends. This employment dataset is based on jobs covered by unemployment insurance, which generally equates to an estimated 85% of the total workforce.

2008-2013 Employment Trends

In 2013, there were 393,742 covered jobs in Portland, equivalent to 38% of the 1.02 million employment base of the 7-county PMSA. Since 2000, employment in Portland has fluctuated substantially. Analysis of recent City employment trends in this report focuses on the 2000-2008 period, because it is the most recent complete business-cycle. However, the 2000-2008 business cycle was a period of unusually slow job growth, averaging 0.1% annual growth in Portland, 0.8% in the 7-county metro region, and 0.5% nationally. However, the pace of job growth in the 2008-2013 period has already exceeded the previous business cycle, averaging 1.3% per year in Portland and 1.4% in the region. Despite the depth of job losses during the great recession (2008-2010), the city and region have since led the state’s economic recovery. Portland had a nearly flat 5% capture rate of regional growth during the sluggish 2000-2008 business cycle and then rebounded to 23% in the 2008-2013 period.

2000-08 Employment by Sectors

Figure 10 reports employment at the detailed sector level with the 2008 distribution and net change both in terms of numerical change and annual average growth rate (AAGR). Throughout the remainder of the report, employment sectors are aggregated to broader categories to provide a more manageable amount of information.

Figure 10. Portland Citywide Employment (2000-2008)

NAICS		2000	2008	2008 Distrib.	Change Net	AAGR
Industrial	11 Agriculture	180	210	0%	30	1.9%
	22 Utilities	3,960	2,580	1%	(1,380)	-5.2%
	23 Construction	19,840	18,380	5%	(1,460)	-1.0%
	31 Man: food, textile, apparel	5,990	5,800	1%	(190)	-0.4%
	32 Man: wood, petrol, chemicals	9,120	6,740	2%	(2,380)	-3.7%
	33 Man: metal, machine, computer	24,670	17,800	5%	(6,870)	-4.0%
	<i>Manufacturing subtotal</i>	<i>39,780</i>	<i>30,340</i>	<i>8%</i>	<i>(9,440)</i>	<i>-3.3%</i>
	42 Wholesale Trade	25,510	20,380	5%	(5,130)	-2.8%
	48 Transportation	19,770	15,650	4%	(4,120)	-2.9%
	49 Transport & Warehousing	9,160	8,010	2%	(1,150)	-1.7%
<i>Industrial subtotal (21-42, 48,49)</i>	<i>118,200</i>	<i>95,550</i>	<i>24%</i>	<i>(22,650)</i>	<i>-2.6%</i>	
Retail	44 Retail	22,130	22,200	6%	70	0.0%
	45 Retail: Dept, misc.	14,940	10,830	3%	(4,110)	-3.9%
	<i>Retail subtotal (44,45)</i>	<i>37,070</i>	<i>33,030</i>	<i>8%</i>	<i>(4,040)</i>	<i>-1.4%</i>
Services	51 Information	12,350	11,570	3%	(780)	-0.8%
	52 Finance & Insurance	21,390	18,810	5%	(2,580)	-1.6%
	53 Real Estate	9,870	8,580	2%	(1,290)	-1.7%
	54 Prof., Scientific, Tech Services	25,530	27,200	7%	1,670	0.8%
	55 Management	6,820	14,590	4%	7,770	10.0%
	56 Admin Support, Waste	14,020	21,770	6%	7,750	5.7%
	61 Education	29,640	35,510	9%	5,870	2.3%
	62 Health & Social Asst.	40,960	49,150	13%	8,190	2.3%
	71 Arts, Enter., Recreation	6,200	6,280	2%	80	0.2%
	72 Accommodation & Food	30,410	35,770	9%	5,360	2.0%
81 Other Services	17,190	17,210	4%	20	0.0%	
<i>Service subtotal (51-81)</i>	<i>214,380</i>	<i>246,440</i>	<i>63%</i>	<i>32,060</i>	<i>1.8%</i>	
Public	92 Public Administration	17,110	17,500	4%	390	0.3%
Other	99 Unclassified?	2,760	120	0%	(2,640)	-32.4%
Total		389,520	392,640	100%	3,120	0.1%

Source: Oregon Employment Department, E. D. Hovee & Company, LLC. Employment in all categories has been rounded to the nearest 10 employees.

Observations

The 2000-2008 time period corresponds to the most recent complete economic cycle of the region and nation, representing a peak-to-peak period in Multnomah County employment. This has been a period of economic downturn early in the decade, followed by rebounding job growth through mid-decade and then substantial job losses with the recession after 2008.

Consequently, for the entire 2000-08 time period, job growth was experienced at relatively low rates for the city as well as for the state and nation, certainly in comparison with the prior decade of the 1990s:

- Within the City of Portland, post-2000 job growth has occurred at a rate of just 0.1% annually. Oregon’s statewide growth rate post-2000 was at 0.8% per year, comparable to a similar growth rate in both non-farm and covered employment for the 7-county metro area (PMSA) over the same time period.
- Over this time period, Portland captured only about 5% of the net job growth in the region, a pattern of performance better than that of Multnomah County but well below city and county rates of job growth capture in prior decades.
- As of 2008, the City of Portland reported about 392,640 covered jobs, representing 38% of the 1.02 million employment base of the 7-county PMSA. This represents a relatively nominal increase of about 3,120 jobs over a six year period in Portland. Job declines are reported across multiple sectors, including every industrial sector for which data is provided.
- Taken together, the industrial sectors report job declines averaging 2.6% per year over the eight year period (for a combined loss of 22,650 jobs), despite a brief resurgence experienced mid-decade. There was a somewhat more rapid shift away from manufacturing employment – a subset of the overall industrial sector – of 3.3% annually, equating to a total loss of 9,440 manufacturing jobs over the 2000-2008 period. It is notable, however, that the Portland region lost a smaller share of its manufacturing jobs than the nation as a whole did. In addition, the value of manufacturing output rose by more than \$9 billion for the 7-county region (Figure 23). The region's manufacturing sector is growing, but is becoming less labor intensive.
- Over this eight year period, retail employment in Portland changed little – with a nominal gain of about 70 jobs.
- The growth sectors – strong enough to more than offset industrial job losses – occurred across service sectors. The sector showing the strongest growth was health and social assistance (up by 8,190 jobs), followed by management, administrative support and waste management, education, accommodation and food, and professional/scientific/technical services – with minor gains noted for arts, entertainment and recreation.
- A major portion of the growth occurring within the administrative support sector has been for temporary employment agencies. While reported with this NAICS job classification, temporary employees actually may be placed in any sector and also likely serve to offset at least some portion of the reported industrial employment decline. Also noted is that much of the growth in the management sector is likely related to business sector reclassifications with new NAICS coding coming into place between 2000 and 2008.

- Not all service sectors experienced employment growth over the past decade. Loss of 2,580 jobs is indicated through 2008 for finance and insurance, with job losses also noted for the real estate and information sectors.³

Data Limitations

While the Quarterly Census of Employment and Wages or QCEW (also known as ES202) data is the most comprehensive and timely source available, there are at least two important data limitations, as they may affect the portrayal of job change over time:⁴

- 1) Employment has been parceled out to sites for employers with multiple sites, and this process may be more or less accurate in one of the two years for which data is drawn (with a tendency towards greater accuracy in more recent years).
- 2) Inconsistent NAICS classification by individual firms within the two comparison years, as industry classification largely represents self-reporting by firms to the Oregon Employment Department (OED).

A second set of issues related to changing employment classification is perhaps of greater concern:

- National changeover from the Standard Industrial Classification (SIC) to North American Industry Classification System (NAICS) occurred between 2000 and 2008, leading to new classifications and an inexact bridge between the two systems.
- The net result of this change in classification systems has been to accentuate a reported shift away from the industrial sectors, as the newly added service sectors of management of companies and information both encompass firms that often were previously classified as industrial. It is unknown exactly what portion of the shift away from what is reported manufacturing is attributable to the new NAICS system.
- There is also a trend toward companies reporting more than one NAICS, with a separate NAICS assigned to groups of employees. It is likely that this greater detail has led to the reported jump in employment within the NAICS category “management of companies”. This trend results in a shift away from the industrial sectors, as employment appears to be increasingly split between a company’s “primary” industry (e.g. warehousing, manufacturing) and other classifications (such as management or headquarters operations), which falls within the service sectors.
- Companies self-report NAICS, and sometimes are inconsistent over time.

³ The Information sector was established with the transition from the Standard Industrial Classification (SIC) to North American Industry Classification System (NAICS) from what were a mix of industrial and service components.

⁴ Alternative data sources include the Covered Employment Statistics, a sample survey-based time series that is adjusted to match ES 202 data, and the Economic Census, completed once every five years (with a several year lag before data release and not available at a sub-regional level).

Because of these issues, sector-level changes (for instance, the reported decline in manufacturing jobs and increase in service jobs) are best understood as shifts in the nature of the region's employment rather than necessarily as job growth or decline within individual firms. Employment data should also be viewed as most reliable when summed within a geographic subarea or to broad sector groupings, rather than when detailed sector-level data is compared over time.⁵

PORTLAND EMPLOYMENT GEOGRAPHIES

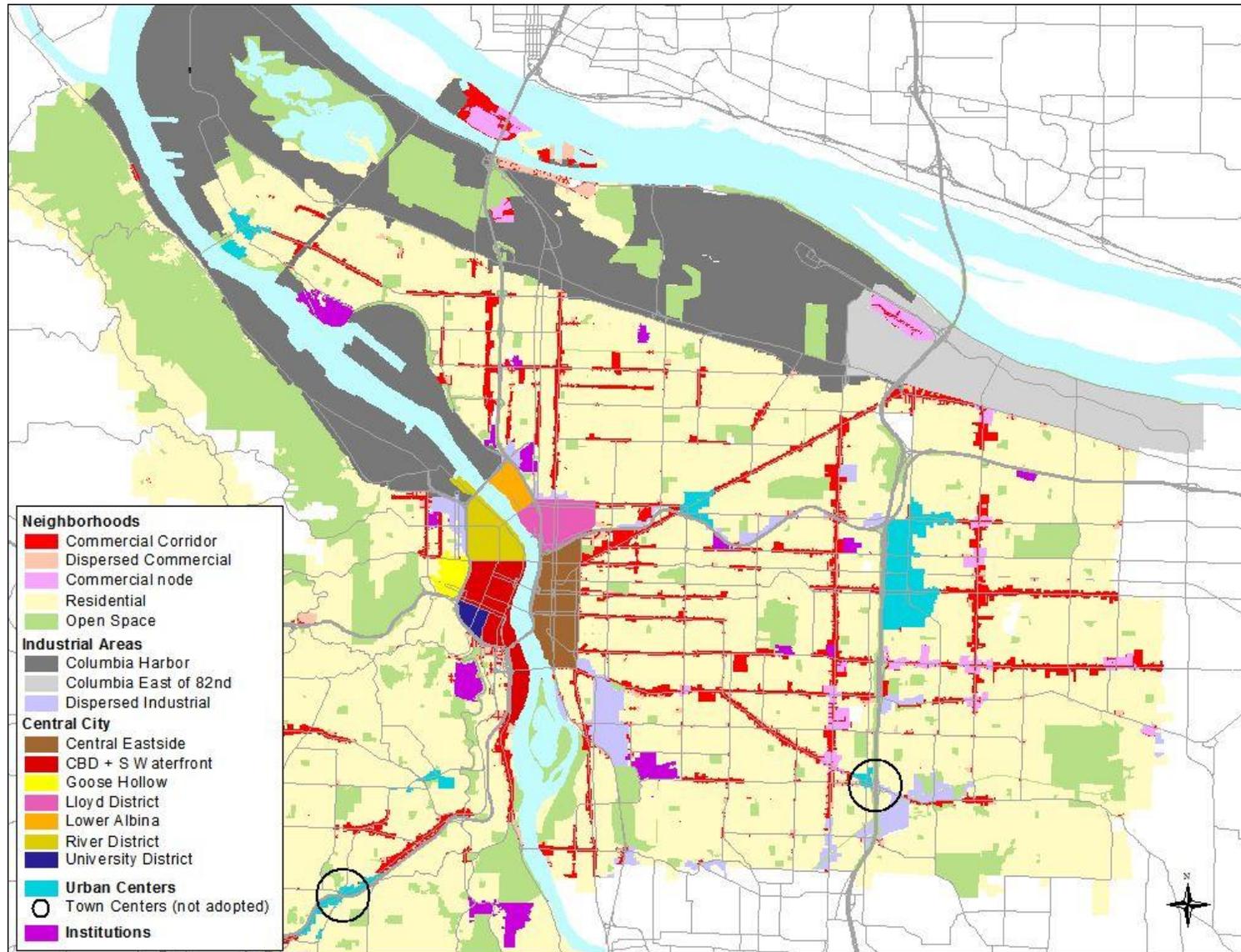
This section includes an analysis of Portland employment areas at a finer level of detail – geographic subareas that group together similar employment uses with common site characteristics and development patterns (Figures 8 and 9). Subareas are broadly grouped into categories of Central City, industrial, neighborhood commercial, institutional, and residential categories.

⁵ The reliability of sector comparisons over time should also improve in the future, as more years of data and experience with the NAICS classification system take place. This will especially be the case when it is not as important to provide time series comparison with the 2000-2002 time period when much of the SIC to NAICS changeover occurred.

Figure 8. Employment Geographies

Subarea	Boundary Methodology
Central City Commercial	
CBD + South Waterfront	Central City Plan District subareas
University District	Central City Plan District subarea
River District	Central City Plan District subarea
Goose Hollow	Central City Plan District subarea
Lloyd District	Central City Plan District subarea
Central City Industrial/Incubator	
Central Eastside	Central City Plan District subarea
Lower Albina	Central City Plan District subarea
Urban Centers	
Hillsdale Town Center	Plan District
Hollywood Town Center	Plan District
St. Johns Town Center	Plan District
Gateway Regional Center	Plan District
Lents Town Center	
West Portland Town Center	
Industrial Areas	
Harbor & Airport Districts	Industrial Sanctuary + adjacent ME comp plan designation
Harbor Access Lands	
Columbia East of 82nd	Industrial Sanctuary + adjacent ME comp plan designation east of 82 nd
Dispersed Employment	Dispersed IS + ME comp plan designations
Neighborhood Commercial	
Commercial Corridors	Commercial corridors designated by BPS
Commercial Nodes	Tax lots surrounding key commercial intersections identified by BPS
Dispersed Commercial	Other tax lots in commercial zoning (auto-oriented, storefront or mixed employment)
Institutions	
	10 colleges and 7 hospitals with campus areas larger than 10 acres and more than 100 employees, except for Portland State University, which is included in the Central City’s University District; and the Adventist Medical Center, which is included in Gateway Regional Center

Figure 9. Portland Geographic Subareas



Trend Observations by Employment Geography

Major observations from each employment geography are summarized below. As noted, submarkets are defined for each of the major employment geographies of Central City, urban centers, institutions, industrial, neighborhood commercial, and residential/open space employment activity. Added discussion of employment sector changes within geographies and accompanying graphs are located within the Demand Analysis – Data Assessment Topics section of this report.

- With 107,600 jobs, the **Central City Commercial** geography encompassed 27% of the city’s job base in 2008. With a 0.1% average annual growth rate between 2000-2008, employment increased at about the same rate as employment increased citywide over the same time period.

With nearly 66,400 jobs, the CBD + South Waterfront not surprisingly comprises the largest Central City subarea, although this core submarket experienced a loss of an estimated 3,100 jobs from 2000-08. The most rapid job growth occurred within the River District submarket (up by 2.1% per year), followed by the Lloyd District.

Two Central City subdistricts – Central Eastside and Lower Albina – are included within the Central City Industrial/Incubator geography. These are often referred to as “incubator” rather than general industrial districts and have out-performed the overall Central City area with annual job gains of 3.2% and 2.3% per year respectively.

- **Urban centers** comprised just 5% of citywide employment in 2008 and experienced job growth averaging 1.4% per year. Of the six urban center submarkets profiled, Gateway has the largest employment base with about 9,500, followed by Hollywood at 6,500 and West Portland at 2,600.

The highest levels of employment growth since 2000 are indicated for Hollywood and Lents Town Center, both averaging employment gains of better than 5% per year. Gateway also experienced employment growth, but at a much lower growth rate. The other urban centers experienced relatively flat to declining employment.

- **Institutions**, excluding PSU and Adventist Hospital, accounted for over 35,200 jobs in 2008 (nearly 9% of citywide employment), with job growth averaging 3.6% from 2000-08.
- **Industrial** areas comprise a total of 119,500 jobs (or better than 30% of employment citywide). Overall job growth has occurred at about the citywide average of 0.1% per year but with wide variation between districts.

With more than 52,200 employees, the Harbor and Airport Districts geography accounts for more than two-fifths (44%) of the industrial total (or 13% of all employment citywide). The Columbia Corridor East of NE 82nd Avenue accounts for more than 19,400 jobs with Dispersed Employment at 17,200. The two Central City Industrial (or incubator) districts account for 18,000 and 3,300 jobs respectively.

Harbor and Airport Districts report some job loss averaging less than 1% per year, with even more rapid attrition for Dispersed Employment. Job gains of close to 3% per year are noted for Columbia East of 82nd. Employment has increased 0.1% per year in all the

industrial areas combined. As noted, both the Central City incubator districts have experienced employment gains.

Harbor Access Lands are riverfront industrial lands in the Portland Harbor and along the Columbia River. As of 2008, Harbor Access Lands accounted for an estimated 9,300 jobs. From 2000-08, Harbor Access Lands experienced declining employment at a rate averaging 2.2% per year – a substantially more rapid rate of job loss than of the Harbor and Airport Districts geography. Reported employment losses were most substantial in manufacturing, followed by transportation, warehousing and wholesale trade. It is notable that a separate analysis indicates that the economic output (value added) in the Portland Harbor grew at 1.6% per year during approximately the same timeframe - 2002 to 2008. During that same time period, cargo volumes increased by 4.8% per year.⁶ As discussed later in this report, employment may not be the best indicator of land needs in the harbor.

- With 70,400 jobs or 18% of citywide employment, the **neighborhood commercial** geography has experienced net job loss since 2000. Of the neighborhood-related employment activity, nearly 56% of jobs are indicated as located in Commercial Corridors, followed by Dispersed Commercial. Commercial Corridors account for the largest base of neighborhood activity with just over 39,000 jobs but lost jobs at a rate averaging 1.5% per year. Commercial Nodes (about 20 key intersections) supported 9,600 jobs in 2008 or 14% of the neighborhood-related jobs total. Taken together, neighborhood commercial areas experienced a net loss of 1,900 employees from 2000 to 2008 – coming primarily from reduced employment in Commercial Corridors. Job losses are noted for 6 out of 10 employment sectors, led by construction which decreased by more than 1,700 jobs. A countertrend is indicated for Dispersed Commercial, with close to 3,900 more jobs reported in 2008 than 2000.
- More than 38,900 jobs are reported for **residential** areas plus **open space**. The majority of these jobs are in residential areas which account for just under 10% of citywide employment. Job losses are exhibited in every employment sector, except public sector employment.

More detailed data for these submarkets is provided by the tables on the next two pages.

⁶ EcoNorthwest, Portland Harbor Industrial Land Supply Analysis, February 2012)

Figure 10. Urban Centers & Institutions Employment (2000-2008)

	Central City - Non Industrial					Urban Centers						Institutions
	CBD + S Waterfront	University District	River District	Goose Hollow	Lloyd District	Gateway	Hollywood	St Johns	Hillsdale	Lents	West Portland	
Total Employment 2008												
Utilities	26	-	*	-	*	*	-	-	-	-	-	-
Construction	682	-	900	268	61	118	36	89	*	34	194	*
Manufacturing	275	*	481	*	*	150	*	*	*	*	*	-
Trans, Wareh. & Whlsle	800	*	2,478	24	341	242	46	95	5	*	36	*
Retail, Arts, Accommod.	11,033	353	4,337	1,935	5,616	2,705	950	388	286	89	292	353
Services	30,496	341	3,319	1,079	6,000	1,403	589	335	135	102	1,584	132
Information & Design	11,937	*	2,569	645	1,020	*	140	36	33	-	189	153
Education + Health	3,241	*	1,066	272	819	4,187	4,733	142	254	56	291	34,575
Public	7,740	182	95	-	1,684	487	*	*	-	*	*	-
Other/No NAICS	11	-	2	-	4	1	-	-	-	-	-	1
Total	66,365	3,925	16,162	4,444	16,704	9,514	6,513	1,313	742	324	2,605	35,234
<i>2008 Distribution</i>	<i>16.9%</i>	<i>1.0%</i>	<i>4.1%</i>	<i>1.1%</i>	<i>4.3%</i>	<i>2.4%</i>	<i>1.7%</i>	<i>0.3%</i>	<i>0.2%</i>	<i>0.1%</i>	<i>0.7%</i>	<i>9.0%</i>
Employment Change 2000-2008												
Utilities	(474)	-	*	-	(799)	-	-	-	-	-	*	-
Construction	(1,230)	(9)	787	10	(87)	(29)	(66)	23	4	12	140	1
Manufacturing	(576)	(26)	(672)	(186)	(39)	(13)	(25)	(3)	14	*	2	-
Trans, Wareh. & Whlsle	(1,039)	(8)	(2,495)	(139)	(435)	(628)	(22)	(64)	(27)	*	(98)	*
Retail, Arts, Accommod.	(592)	132	1,986	382	465	51	395	(50)	(133)	(11)	30	155
Services	1,732	(184)	1,538	(158)	2,672	(42)	(232)	120	24	45	(509)	36
Information & Design	(20)	*	825	(71)	13	(124)	75	6	(29)	-	(70)	(264)
Education + Health	635	222	590	(144)	(44)	995	2,147	116	(0)	56	108	8,792
Public	(1,243)	*	*	(797)	346	*	(5)	(133)	*	*	-	-
Other/No NAICS	(372)	(6)	(45)	(15)	(33)	(41)	(30)	(3)	(6)	-	(27)	(23)
Total	(3,098)	255	2,527	(1,119)	2,059	380	2,237	12	(168)	105	(429)	8,710
<i>2000 Distribution</i>	<i>17.8%</i>	<i>0.9%</i>	<i>3.5%</i>	<i>1.4%</i>	<i>3.8%</i>	<i>2.3%</i>	<i>1.1%</i>	<i>0.3%</i>	<i>0.2%</i>	<i>0.1%</i>	<i>0.8%</i>	<i>6.8%</i>
<i>00-08 Annual Growth</i>	<i>-0.6%</i>	<i>0.8%</i>	<i>2.1%</i>	<i>-2.8%</i>	<i>1.7%</i>	<i>0.5%</i>	<i>5.4%</i>	<i>0.1%</i>	<i>-2.5%</i>	<i>5.1%</i>	<i>-1.9%</i>	<i>3.6%</i>
Employment Distribution 2008												
Utilities	0%	0%	6%	0%	7%	1%	0%	0%	0%	0%	0%	0%
Construction	1%	0%	6%	6%	0%	1%	1%	7%	1%	11%	7%	0%
Manufacturing	0%	0%	3%	5%	0%	2%	0%	2%	3%	2%	0%	0%
Trans, Wareh. & Whlsle	1%	1%	15%	1%	2%	3%	1%	7%	1%	0%	1%	0%
Retail, Arts, Accommod.	17%	9%	27%	44%	34%	28%	15%	30%	39%	27%	11%	1%
Services	46%	9%	21%	24%	36%	15%	9%	26%	18%	32%	61%	0%
Information & Design	18%	0%	16%	15%	6%	1%	2%	3%	4%	0%	7%	0%
Education + Health	5%	77%	7%	6%	5%	44%	73%	11%	34%	17%	11%	98%
Public	12%	5%	1%	0%	10%	5%	0%	16%	0%	11%	1%	0%
Other/No NAICS	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: Oregon Employment Department (OED), Portland Bureau of Planning & Sustainability, E. D. Hovee & Company, LLC. Agricultural jobs are not detailed. Asterisks (*) denote data not disclosed to meet OED confidentiality provisions.

Figure 11. Industrial Areas & Neighborhood Employment (2000-2008)

	Non-Central City Industrial				Central City Industrial		Neighborhoods			Residential
	Harbor & Airport Districts	Harbor Access Lands	Columbia East	Dispersed Employment	Central Eastside	Lower Ablanda	Commercial Corridor	Commercial Nodes	Dispersed Commercial	
Total Employment 2008										
Utilities	*	-	-	*	-	-	-	*	-	*
Construction	3,573	571	1,830	1,527	2,227	418	1,020	64	1,959	2,800
Manufacturing	11,752	4,828	3,743	3,186	2,056	343	1,342	*	1,110	740
Trans, Wareh. & Whsle	22,334	2,605	4,686	2,260	3,577	314	1,589	80	828	1,651
Retail, Arts, Accommod.	4,388	67	2,786	1,552	3,126	189	18,756	6,863	5,601	3,407
Services	7,257	1,186	3,606	6,017	3,118	191	8,966	1,511	5,052	7,494
Information & Design	1,127	9	888	1,484	1,406	101	2,383	154	3,160	2,277
Education + Health	849	54	559	696	1,659	*	4,881	621	3,690	17,501
Public	945	-	1,327	*	821	*	62	284	*	2,981
Other/No NAICS	2	1	4	-	2	2	25	-	13	49
Total	52,227	9,321	19,429	17,183	17,992	3,254	39,050	9,589	21,718	38,928
<i>2008 Distribution</i>	<i>13.3%</i>	<i>2.4%</i>	<i>4.9%</i>	<i>4.4%</i>	<i>4.6%</i>	<i>0.8%</i>	<i>9.9%</i>	<i>2.4%</i>	<i>5.5%</i>	<i>9.9%</i>
Employment Change 2000-2008										
Utilities	(15)	-	-	7	-	-	-	(15)	-	*
Construction	520	250	714	186	772	(160)	(1,347)	(60)	(323)	(1,586)
Manufacturing	(5,559)	(939)	(6)	14	(90)	(176)	(1,035)	(25)	665	(773)
Trans, Wareh. & Whsle	(1,094)	(1,124)	1,045	(3,267)	(217)	(25)	(297)	(341)	(5)	(133)
Retail, Arts, Accommod.	425	(450)	12	(1,691)	608	23	(1,216)	(21)	1,825	(944)
Services	2,372	399	1,261	2,287	957	163	(148)	133	455	(2,073)
Information & Design	(2)	(102)	318	313	930	69	(72)	(113)	660	(601)
Education + Health	36	42	236	(173)	5	429	(434)	14	966	(537)
Public	706	*	473	(437)	821	*	(140)	*	(218)	492
Other/No NAICS	(185)	(23)	(75)	(88)	(82)	(7)	(432)	(46)	(180)	(918)
Total	(2,796)	(1,977)	3,944	(2,849)	3,703	502	(5,132)	(576)	3,853	(7,078)
<i>2000 Distribution</i>	<i>14.1%</i>	<i>2.9%</i>	<i>4.0%</i>	<i>4.9%</i>	<i>3.7%</i>	<i>0.4%</i>	<i>11.3%</i>	<i>2.5%</i>	<i>4.5%</i>	<i>11.8%</i>
<i>00-08 Annual Growth</i>	<i>-0.6%</i>	<i>-2.2%</i>	<i>3.2%</i>	<i>-1.8%</i>	<i>3.2%</i>	<i>2.3%</i>	<i>-1.5%</i>	<i>-0.7%</i>	<i>2.7%</i>	<i>-1.9%</i>
Employment Distribution 2008										
Utilities	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%
Construction	7%	6%	9%	9%	12%	13%	3%	1%	9%	7%
Manufacturing	23%	52%	19%	19%	11%	11%	3%	0%	5%	2%
Trans, Wareh. & Whsle	43%	28%	24%	13%	20%	10%	4%	1%	4%	4%
Retail, Arts, Accommod.	8%	1%	14%	9%	17%	6%	48%	72%	26%	9%
Services	14%	13%	19%	35%	17%	6%	23%	16%	23%	19%
Information & Design	2%	0%	5%	9%	8%	3%	6%	2%	15%	6%
Education + Health	2%	1%	3%	4%	9%	46%	12%	6%	17%	45%
Public	2%	0%	7%	1%	5%	6%	0%	3%	1%	8%
Other/No NAICS	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: Oregon Employment Department (OED), Portland Bureau of Planning & Sustainability, E. D. Hovee & Company, LLC. Agricultural jobs are not detailed. Asterisks (*) denote data not disclosed to meet OED confidentiality provisions.

IV. DEMAND ANALYSIS ISSUES – FOCUS GROUP INPUT

A key component of this economic opportunities analysis has centered on six *demand analysis topics* of particular interest to the City of Portland with this EOA and Comprehensive Plan update. To assist with this assessment, focus groups were organized and conducted in 2009 to cover each topic area, with each group hosted by a business or community organization:

- *Central City Office* – hosted by the Portland Business Alliance
- *Close-In Incubator* – hosted by the Central Eastside Industrial Council
- *Manufacturing & Distribution* – hosted by the Columbia Corridor Association
- *Neighborhood Commercial* – hosted by the Alliance of Portland Neighborhood Business Associations
- *Commercial Corridor/Mixed Use/Transit Oriented Development (TOD)* – hosted by the Portland Streetcar, Inc.
- *Campus Institutional* – hosted by the Institutional Facilities Coalition

A total of 58 business and non-profit organization representatives participated in these six focus groups (including two who participated in two sessions). Participants are identified in Appendix A.

Focus group discussions covered recent and emerging trends, business space and location needs, questions regarding density and development, opportunities for economic prosperity and creative vitality, and economic development focus. This summary of focus group results has been organized around major themes that emerged across multiple groups in response to specific topic areas. The comments are reported without attribution of comments to specific individuals or organizations.

A separate report provides more detailed discussion of items of more particular interest within each of these six areas of demand analysis groupings (Appendix B).

SUMMARY THEMES BY DEMAND TOPIC

To summarize, Figure 15 provides an overview of major observations for each of the six demand analysis groupings covered. This chart is followed by a more detailed narrative describing focus group responses for each of the demand topics in more detail.

Figure 12. Focus Group Themes by Demand Topics

Discussion Question	Central City Office	Close In Incubator	Manufacturing & Distribution	Neighborhood Commercial	TOD/Mixed Use Corridors	Campus Institutional
Recent Trends	<ul style="list-style-type: none"> •Resurgent Central City office leasing has been realized (until the recession) •Tenants are drawn back in from the suburbs •Live-work options create added urban synergy 	<ul style="list-style-type: none"> •Districts like Central Eastside are <i>on a roll</i> for diverse industry plus creative and tech oriented business •Close-in incubator space offers <i>grittier appeal</i> to young creatives 	<ul style="list-style-type: none"> •Finding qualified labor and distance from U.S. markets are major industry issues •De-consolidation of distribution nationally with higher fuel prices works to Portland business advantage 	<ul style="list-style-type: none"> •Neighborhood districts are finding their niche •Growth is organic and entrepreneurial •Business success depends on serving a mix of local and destination clientele 	<ul style="list-style-type: none"> •Retail opportunity is driven by more residents moving back to the city •Diverse mixed use settings are available – Central City, mid-rise transit corridors, distinctive urban neighborhoods 	<ul style="list-style-type: none"> •Regional institutions are investing in facility renewal to remain competitive •Locally oriented education and health care are moving closer to where clientele live or work
Emerging Trends	<ul style="list-style-type: none"> •Office market is becoming more diverse with entrepreneurial and sustainable business emphases •Central City has greater potential to increase its capture of the regional office market 	<ul style="list-style-type: none"> •Businesses are <i>hyper-local</i>, serving each other and the downtown •A mix of business, from industrial to arts and dining, is supported •Desire is expressed for incubator needs to evolve naturally and organically 	<ul style="list-style-type: none"> •Businesses draw needed labor both locally and nationally •There is a broad trend to sustainable design and business practices •A major concern is that freight transport capacity is not keeping up 	<ul style="list-style-type: none"> •Increased area residential density is anticipated, but more infrastructure is needed •Increased orientation to the concept of a <i>20-minute neighborhood</i> is strongly endorsed 	<ul style="list-style-type: none"> •Further intensification of development is expected with economic recovery •Successful TOD is all about reducing vehicle miles traveled (VMT) and location efficient development 	<ul style="list-style-type: none"> •Locally-oriented education providers are decentralizing •Strong health care growth is expected to continue •Increased transit orientation of institutions is more critical with facility investment
Business Space & Location Needs	<ul style="list-style-type: none"> •New and alternate office locations are desired, especially close to the core •The <i>life cycle</i> of each business means changing choices over time for type and cost of space, for a more diverse office mix 	<ul style="list-style-type: none"> •Options are desired for business condo arrangements and inexpensive space •Permitting & SDCs are cited as recurring issues with rehab of existing building space 	<ul style="list-style-type: none"> •Increased cost of doing business is cited as a growing competitive concern for the Portland area •Maintaining the industrial sanctuary is critical for manufacturing and distribution 	<ul style="list-style-type: none"> •Participants are <i>bullish</i> on options for increasing business vitality •More business tools/incentives together with robust planning for employment concentration are recommended 	<ul style="list-style-type: none"> •More focus on job-related as well as residential mixed use development is encouraged •A new City of Portland job density paradigm 	<ul style="list-style-type: none"> •Current impact mitigation process and mixed use limitations frustrate reinvestment •Affordable housing options are needed for students, faculty, workers

Discussion Question	Central City Office	Close In Incubator	Manufacturing & Distribution	Neighborhood Commercial	TOD/Mixed Use Corridors	Campus Institutional
Density & Redevelopment	<ul style="list-style-type: none"> Desired are options for added density (FAR) and multi-block campus developments A need is expressed to <i>think big enough</i> for greatly expanded jobs potential Improving the city’s business climate is cited as a priority initiative 	<ul style="list-style-type: none"> Streetcar extension will be the impetus for added development density Multi-level manufacturing still exists, but widespread applicability is questionable Code flexibility is key to maintaining close-in industrial 	<ul style="list-style-type: none"> Industrial site and transport needs make it difficult to exceed 35% site coverage (or FAR) Distributors build <i>high-cube</i> space to get more product in the same building footprint Requiring too much density may result in business leaving Portland 	<ul style="list-style-type: none"> Support for more housing density is viewed as generating positive business impacts Rather than mandating commercial density, the suggestion is to <i>let density float</i> to what the market supports 	<ul style="list-style-type: none"> Density will come with transit service extension More emphasis is recommended for mixed use development with a strong jobs mix Live/work incubator opportunity is cited for as yet untapped resources (such as Gateway) 	<ul style="list-style-type: none"> More multi-story buildings are expected with medical; cautious interest is also expressed for higher education (out of downtown) Increased density of development is predicated on better transit accessibility and service
Economic Prosperity & Creative Vitality	<ul style="list-style-type: none"> Portland’s Central City is viewed as vital to defining the <i>PDX brand</i> PSU and housing are more important as future economic engines to Central City office vitality 	<ul style="list-style-type: none"> Incubator districts are integral for the centrality of a regional service supplier role Close in business offers local networking and technology transfer capability 	<ul style="list-style-type: none"> Recommended is emphasis on balancing goals of sustainability and job growth For Portland, sustainability can mean being both green and efficient 	<ul style="list-style-type: none"> Small business is described as the engine of the Portland economy For increased economic contribution, offer more training for small and ethnic firms 	<ul style="list-style-type: none"> Portland offers the appeal of a village environment Economic recovery depends on sustainability and greater emphasis to build <i>creative, tenacious minds</i> 	<ul style="list-style-type: none"> Expect institutions to remain critical as a major future job source Higher ed and health care play a more important role in cultivating Portland area health & vitality
Economic Development Focus	<ul style="list-style-type: none"> Marketing Portland as a competitive place to do business Prioritize public investment in infrastructure and zoning flexibility 	<ul style="list-style-type: none"> Foster private investment in businesses, not just buildings Restore the linkage between the City and private sector 	<ul style="list-style-type: none"> Prioritize multi-modal freight and worker transport infrastructure Provide balanced support for industry with traded sector focus 	<ul style="list-style-type: none"> Offer improved access to resources for small business Plan for change with less emphasis on mandates 	<ul style="list-style-type: none"> Foster creativity and job density on transit corridors Re-tool the planning and zoning process Build the urban university 	<ul style="list-style-type: none"> Recognized and support institutional contributions Transition from regulatory emphasis to partnership roles

Source: Economic Opportunity Analysis focus groups conducted February-March, 2009.

RECENT TRENDS

Each focus group session began with the question: *What are the most important trends that have affected business, investment and development for your firm or organization over the past 3-5 years?*

Portland had been a dynamic place to be conducting business up to the point of the economic downturn starting in 2007-08. Major themes emerging from the six focus group conversations include the following:

- *Central City* office has, in recent years, experienced a resurgence of leasing activity (with the economic downturn only recently beginning to be felt). Some tenants have been drawn back in from the suburbs by the vitality and transit accessibility of the urban core, Portland is attracting and growing the sustainability industry, and the core area has benefited from the synergy of providing options for housing and work in close proximity.
- *Close-in incubator* areas (notably Central Eastside) have also been on a roll – but in a “grittier, more Portland” setting that is now home to businesses ranging from open source tech to distributors/brokers to destination retail. How to accommodate parking and diverse freight versus people transit is cited as the #1 issue. Bus and bike access is ever more important.
- *Manufacturing and distribution* firms of Portland’s harbor and Columbia Corridor have found that obtaining qualified workers is a growing challenge, even in a time of economic downturn. The Pacific Northwest is still a small market; getting to market is a competitive challenge and competitors are primarily out of state. Distribution may be deconsolidating to more and smaller centers across the U.S., offering added market activity for Portland.
- *Neighborhood business districts* are finding their niche and for some (like the Pearl and Mississippi) the niche has rapidly matured. Portland is still “under-retailed, national chains want in.” Much of the city’s neighborhood business development has taken off on its own. The “coolest stuff is organic,” responding to local entrepreneurial initiative and often “happened in spite of government.” While businesses often start by serving a primarily local neighborhood clientele, success means that customers increasingly are “not from the neighborhood itself” but also drawn from the rest of the city and region.
- *Mixed use/TOD* discussion paralleled much of what was heard with neighborhood business districts. From empty nesters to young professionals, people are coming “back to the city.” Portland’s resurgence is based on residents “coming for character and texture” with diverse options ranging from high-rise Central City districts to mid-rise transit corridors to distinctive urban neighborhoods. “More rooftops” with greater discretionary income has served to drive much of the growth with in-city retail and dining – at least up to the time of the recession.
- *Campus institutional* activities are identified as primarily including education and medical institutions (outside Portland’s Central City). Some nationally recognized education institutions in Portland face substantial reinvestment aimed at “renewal of facilities” to better meet science and technology needs and house more students (or faculty) on or near campus.

Locally oriented higher education institutions are increasingly focused on training for specific workforce needs – from nursing to welding – and look for locations and partnerships to get closer to the neighborhoods where the students are or will be. Similarly, medical institutions are looking to medium and smaller size facilities closer to where people live or work (including preparation for an aging demographic).

EMERGING TRENDS

The next question asked participants to look toward the future: *What do you see on the horizon as potentially important emerging trends for employment growth or change?* Participants were asked to comment on the next 3-5 years through a period of recovery from the current economic downturn and then beyond over the next 10-25 years (to 2035).

From virtually every group, the overarching theme is one of change. Portland’s economic opportunities can be expected to be different in 2035 than they are today. Even as of 2009, the outlook appeared promising, provided that economic recovery proves sustainable and that the City and region respond to shape this change in ways that keep Portland competitive for added investment and employment:

- *Central City office* specialists see the market becoming “more diverse” with increased emphasis on serving and stimulating business entrepreneurs, including those in the still expanding sustainability sector. Much of this need for lower cost and more flexible space is expected to be met on the fringes of or outside of the Central City, in places such as the Central Eastside and Gateway. Assuming that metro urban growth boundary expansions continue to be limited, the Central City and other Portland locations can be expected to compete for increasing shares of regional office employment. Resurgent commuter interest in transit dovetails with and buttresses this trend. As one focus group participant said: “Now we’re going to have to perform.”
- *Central Eastside/close-in incubator* interests express a wide range of thoughts. Some see more restaurants, craft businesses, theaters, and smaller 2-story infill. OMSI and some private owners have large multi-block holdings that could redevelop once land prices go high enough to support redevelopment. Some strongly suggested that the district should be supported as zoned.

The assumption that manufacturing will go away to be replaced with the creative class “is flawed.” Because of proximity to the rest of the Central City, vendors are “hyperlocal.” Doing business with neighbors next door or across the river downtown is part of the business culture. A common theme expressed is to not pick business winners; rather let this incubator environment “evolve naturally and organically.”

- *Manufacturing and distribution* focus group participants see continuing impetus to draw from both within and outside the Portland labor market for needed workforce skills and experience. More sustainable building design and business practices also are a priority – affecting stormwater management, air quality, transportation efficiency and internal heating, ventilation and air conditioning (HVAC) systems. A major concern is that freight transport capacity is not keeping up – due to rail networks operating at capacity and increased local freeway and street congestion.

- *Neighborhood business districts* see their communities generally becoming more densely developed with added planning to “identify necessary infrastructure” as an increasingly important focus. The concept of a “20-minute neighborhood” radius for walking to achieve a broad range of day-to-day needs is strongly endorsed. Much of what happens within these business districts depends on neighborhood demographics and housing development including anticipated trends for smaller houses.
- *Mixed use corridors and transit oriented development* can expect to intensify with economic recovery. As with neighborhood business districts, much of the development potentially can be expected to be residentially driven – at somewhat higher levels of density. For the next half century, TOD is about reducing vehicle miles traveled (VMT) – creating location efficient mixed use real estate opportunities.
- *Campus institutional* users see the need to think “more broadband” with more evening and weekend classes closer to where students live and/or work for work force oriented educators. Health care providers expect “tremendous growth” over the next five years and new partnerships with educational institutions.

Access to public transportation is a shared objective, with many of the institutions not currently well served by transit. Students at local colleges want to be able to commute into downtown; others (such as nursing students) go all over the city for work experience and rely on auto travel. To the extent that transit mode share can increase, needs for expensive (and increasingly structured) parking can be reduced.

BUSINESS SPACE & LOCATION NEEDS

This question and resulting discussion was aimed to better understand: *What are the most important requirements for business success at this type of location in Portland?*

Not surprisingly, space and location needs expressed through these focus group sessions were relatively diverse. However, common themes that emerged include opportunities for more mixed use and density with commercial-related uses versus strong desire for protection of more traditional manufacturing and distribution activity. More detailed notes follow:

- *Central city office* interests would like to see more blocs of developable land – including at new or alternate locations close to the downtown core. For example, if the Vestas office project happens, it can be expected to draw added interest for office development to South Waterfront. Other opportunities may include sites at the edge of the River (Pearl) District and Central Eastside. EX employment or similar zoning is viewed as pivotal – offering a greater range of mid-rise development options. The Central Eastside (MLK to the waterfront) is cited as perhaps the “hottest market,” Portland’s new location for digital jobs.

Incentives were discussed but not widely embraced for office development. Suggested instead: “Don’t give me money, give me infrastructure.”

The life cycle of a business can involve several phases of space use – starting with funky, low cost creative space, transitioning (for some) to more traditional Class A office as the business matures. An emerging trend (not yet captured) in Portland is for business owned buildings, whether condo or stand-alone.

Proximity to work-force housing and residential amenities including schools is also seen as key to which office locations offer the best bets to prosper. One focus group participant put it this way: “if there were a decent elementary school, I’d be living (as well as working) in downtown Portland now.”

- *Close-in incubator* focus group participants also cite the as-yet unmet opportunity for business condos. The ability to rehab a former warehouse as inexpensive shell space fits a definite tenant need; the Central Eastside can expect more success “if downtown fills up.” Permitting and SDCs with reuse of existing space are cited as definite issues, to the point of keeping “Portland at a competitive disadvantage.” Particularly problematic code issues cited include seismic retrofits, sidewalk standards, and needs for greater consistency and predictability in the permitting process.
- *Manufacturing and distribution* firms cite costs of doing business as a competitive concern with doing business in Portland. Costs include water/sewer rates and absence of performance based tax incentives for employers rather than for development. In the words of one participant: “Oregon doesn’t even get the short look.” Maintenance of the industrial sanctuary and limiting residential encroachment is viewed a pivotal – for reasons including maintenance of plant safety and security. Firms want a more solid and proactive message linked to work force opportunity in traditional industry: “We don’t tell our story very well.”
- *Neighborhood business district* participants are generally “bullish” on opportunities for increasing business vitality. Small business needs tools for storefront improvements and commercial development, tools to “really make our place special.” PDC storefront loans and access to incentives/tax breaks are identified as desired. Interest is also expressed in a more “robust” planning process. A plan that is “set in stone doesn’t work.”
- *Mixed use and transit oriented development* should begin to focus more on employment as well as residential development potential. One focus group participant commented that employment policy is as crude today as housing policy in Portland once was – with not much changing since the 1980s. With this focus group, continuation of the current industrial sanctuary policy has been called into question. Recommended is that the City adapt to a paradigm for more concentrated employment.

Noted as an example is computer chip manufacture in a multi-story setting in Hong Kong. Codes. Live/work development should be adapted to allow occupants to live “and/or” work on site as long as fire/life/safety requirements are met.

- *Campus institutional* users express frustration with the Impact Mitigation Plan (IMP) provisions of conditional use and/or institutional/residential zone requirements for project approval. Specifically cited as a concern limiting mixed use opportunity is the prohibition on commercial use in excess of 30% – a constraint on medical offices and/or on-site retail. Colleges are not an allowed in a commercial zone. Stated as a desire would be the creation of a higher education zone or perhaps a form-based code placing emphasis on characteristics and performance of development rather than use.

Also noted is a desire for an affordable/workforce housing policy in conjunction with institutional uses. Suggested is City initiative for a more streamlined permitting process, perhaps offering a central point of contact for larger projects.

Portland’s land use and permitting process received considerable discussion throughout all of the focus groups. Two themes of importance emerged: a) the desire for more flexibility to better respond to specific business or needs; and b) the desire for a more predictable and faster approval process. Recognizing that these two objectives can be in conflict with each other, one suggestion was to offer a two track approach: assurance of rapid-fire review and approvals for the standard project with the option for a very flexible but admittedly longer review process for the non-standard or pioneering application.

DENSITY & REDEVELOPMENT

The City and metro area have placed increased emphasis on building up rather than out as a means to better realize objectives for community livability and containment of urban sprawl. The question posed is: *In terms of market and financial feasibility, how viable are (varied) options as possible priorities with the next update of Portland’s Comprehensive Plan?*

Some group discussions were asked and/or addressed this question more directly than others. While opinions are varied, this topic received thoughtful discussion with regard to the practical implications and mechanisms for growing up rather than out:

- *Central City office* developers, brokers and businesses reported increased pressure to go up again – not just in the downtown core but elsewhere in the Central City and beyond. Old Town should be prepared for higher buildings, but getting transfers of development rights (TDRs) is a “hassle.” Another stated need is for sites that could accommodate large employer campuses. In the words of one participant, “we don’t think big enough.” While incentives do not appear to generate broad support, there is interest in marketing and related initiatives to “make the business climate more appealing.”

For nearby districts like Central Eastside, something like a 4-5 story cap might make sense to assure that each office product serves a distinct market niche. Also identified as having longer term office development opportunity is Gateway, based on proximity to affordable workforce housing.
- *Close-in incubator* opportunities also exist for higher density, even possibly for some manufacturing uses. The Pratt and Larson tile company is cited as an example of a manufacturer operating on more than one floor. Firms may be more willing to do multi-level industrial if they can set up cost-effective systems to get the product in and out. Greater flexibility on city code requirements – as for seismic and sidewalk standards – would also be required. Streetcar extension is expected to provide further impetus for greater density of employment. More supportive infrastructure will be needed – perhaps with MOUs for City investment much as happened in the Pearl and South Waterfront areas.
- *Manufacturing and distribution* areas of the Portland Harbor and Columbia Corridor see it challenging to exceed 35% site coverage if functional on-site parking and transportation (freight handling) capacities are to be adequately provided. The concept of industrial density is termed an “oxymoron” by one participant. There is concern with industries getting land-locked if site use is pushed too far. However, some distribution firms are going to higher cube space with up to 40 foot ceilings and high-rack distribution systems.

As one participant said, if density “economically makes sense, industry will do it.” However, pushing density and industrial prices too rapidly could cause some firms to relocate from the Portland area.

- *Neighborhood business district* representatives indicate support more nearby residential density to support continuing commercial revitalization. Rather than mandating commercial density of development, the suggestion is to “let density float” to what the market will support. Another suggestion: “Give corridors the highest degree of flexibility.”
- *Mixed use and transit oriented development* interests express strong support for increased density of development along and near transit. Specifically emphasized was greater attention to increased employment as well as housing and retail with mixed use development. Areas of Portland like Macadam that were developed with low-rise suburban densities could go from FARs of 2:1 to 3-4:1. Gateway was seen as an as-yet untapped resource with similar density potential – described by one participant as perhaps the “nation’s largest live/work” opportunity.
- *Campus institutional* participants also expressed interest in greater density of development, a phenomenon already occurring with medical facilities. Colleges have approached this topic more cautiously due to concerns over student, alumni and neighborhood appeal. However, interest was expressed in considering more height if it is not overly visible and accompanied by better transit service. As was indicated for one institution, the question is: how does one “build a six-story building in a neighborhood?”

ECONOMIC PROSPERITY & CREATIVE VITALITY

As part of the Portland Plan process now underway, a critical issue and question is: *How can we position Portland in the world economy to remain a prosperous city, building on our competitive strengths and core values of equity and sustainability?*

This question was read verbatim in all of the 2009 focus group sessions. It is probably not surprising that each demand group can lay claim to its sector’s importance to the future economic and creative vitality of the city and region. A key challenge for the plan updates may be how to harness these diverse activities into a coherent whole capable of enhancing Portland’s economic prosperity and sustainability:

- *Central city office* participants noted that every healthy regional economy is accompanied by a strong Central City. What’s more, the downtown, Pearl and SoWa are integral to the “Portland brand” – a city known for being comfortable, walkable and emphasizing quality of life. Enhancing the brand appeal requires strengthening the reputation of Portland State University as an “engine” of economic development.
Also emphasized: “Get more mixed use downtown.” Mixing in more residential with added building height and FAR capability is seen as pivotal to further strengthening of both retail and office competitiveness in Portland’s Central City.
- *Close-in incubator* functions at the edge of the Central City are viewed as serving an integral economic role by facilitating the flow of goods and services citywide and regionally. Because it is increasingly challenging to pick the economic winners of the

next economic cycle, keep the district “malleable.” In the words of another participant, because Portland does not have internationally tech education, “we are the sponge” providing the tech know-how and knowledge transfer capacity both in times of prosperity and even during the current downturn.

- *Manufacturing and distribution* firms of the Portland Harbor and Columbia Corridor place primary emphasis on balancing the twin goals of sustainability and added employment. Maintain the integrity of the industrial sanctuary; invest in the function of this area as the region’s transportation and freight hub. A reminder: “Sustainability means more than green, it also means efficient.”
- *Neighborhood business districts* see small business as the “engine” of the Portland economy – especially in a community that values quality of life as well as job growth. The public sector should be “more opportunity seeking.” Rather than competing for large employees in a globally incentivized market, focus on a different strategy emphasizing training for small business. To contribute more, small business needs strengthened advocacy – both mainstream and especially ethnic firms.
- *Mixed use and transit oriented* development is pointing the way in Portland to a greener and more prosperous economic future. One focus group participant said that this is “one of the few places in the U.S. to be sustainable.” Another observed that: “People want back into the village environment.” And this: “Portland – we’re more of a brand than we think we are.”

In the absence of major economic drivers, the region has no clear idea how people employ themselves today – the “market is always ahead of us.” The composition of the economy is likely to be totally different again in 20 years – in ways that are as yet not readily determined. While a lower level of economic activity might be expected for much of the next decade, the region will be healthy again in 10 years if it emphasizes “creative, tenacious minds.” Encourage industry to be more sustainable – looking for green opportunities not only in design but also business operations.

- *Institutional* uses are expected to be “critical” as an increasingly important source of employment in the future. Higher education and health care together play an increasingly important role in cultivating community health and vitality – both with an aging population and as a source of drawing new talent into Portland. Institutions are also proving to be leaders with green design – increasingly committed to achieving LEED standards with new buildings.

ECONOMIC DEVELOPMENT FOCUS

The final question asked was intended as a means to recap and summarize the focus group sessions: *What do you see as the single most important action that the City of Portland can take for improved business and employment opportunity with this Comprehensive Plan update?*

Unlike the other questions that involved open discussion, participants in each group were asked to identify their top suggestion on an individual basis – going around the table one-by-one. Not surprisingly, a wide range of suggestions were received. However, these responses appear to have fallen into a few major categories. Some were mentioned in virtually every group, while

others were identified less frequently albeit were of significant importance in a certain specific demand issues.

Mentioned Most Frequently:

- Need for greater regulatory flexibility better tailored to unique needs of individual businesses and/or business demand groupings (important across all six focus groups).
- More clearly demonstrated recognition of the contribution of business to Portland’s vitality – a change from regulators to partners – asking “what can we do to help” (a theme expressed across all but the TOD/Mixed Use Corridors group).
- Greater City emphasis on cultivating business opportunity in Portland – with active marketing but without “picking winners” (a theme across all but the institutional group).
- Need for better business access to resources, incentives and/or tax structure reform – ranging from desired reform of the business income tax, to loan/incentive programs for small business to a point person/advocate for business in City Hall (identified by in some fashion by all but the manufacturing and distribution group).

Mentioned Less Frequently (but important with some focus groups):

- Investment in multi-modal transportation, utility and livability infrastructure for business competitiveness and density (of importance for Central City office, manufacturing and distribution, neighborhood commercial and campus institutional).
- Setting aspirational goals that are City-driven but with regional cooperation – getting Portland “back to a visionary place” (important for Central City office, neighborhood commercial and TOD/mixed use corridors).

V. DEMAND ANALYSIS ISSUES – DATA ASSESSMENT

Focus groups were intended to provide a qualitative assessment of recent and emerging trends as well as opportunities for future job development in Portland. The qualitative review is supplemented with a more quantitative, data driven assessment of recent trends and current conditions. Taken together, the quantitative and qualitative assessments are intended to better inform the determination of future opportunities and employment forecasting for subsequent phases of the Portland Plan process.

Demand topics considered with this more in-depth data analysis are similar to those of the focus groups, organized to cover:

- High rise office development
- Incubator & manufacturing districts
- Neighborhood commercial districts
- Institutional development

Incubator and industrial/manufacturing activity are reviewed together. Transit-oriented and mixed-use development is considered in conjunction with both high-rise and neighborhood commercial. As employment data has now been updated from 2006 (with the 2009 draft EOA) to 2008 (with this report), all data as well as related focus group perspectives provided with this demand analysis discussion is now as of the 2008-09 time period.

A. HIGH RISE OFFICE DEVELOPMENT

This topic is concerned with the extent to which high density central city product can be expected to grow over the forecast period, and the extent to which similar product will be realized outside of the Central City. The guiding question of this analysis is: *What is the demand for high density office product?* Questions that inform this central theme include:

- Where has high rise development occurred in the recent past?
- What has been the historic pace of new development and absorption of higher density office products?
- What areas of the region outside of the city are competing for dense products/top rents?
- How has employment changed within districts zoned for high rise development?

Location Trends: Mid-High Rise Office Development

The City of Portland's mid-high rise product (focused on development of 4+ stories) is still very much clustered within the Central City: the downtown, River District and Lloyd District. The Central City has supported 28 newly constructed 4+ story buildings over the past 20 years, and the renovation of an additional 43 buildings. Outside of these districts, recently constructed buildings of this size are more limited: eight mid-high rise buildings have been newly constructed and 11 renovated.

Non-Central City Office

Since 1990, office development or renovation of more than four stories outside Portland's Central City area are dispersed (Figure 16). However, all but two buildings fall within neighborhoods adjacent to the downtown and Lloyd District: Northwest, the Central Eastside (which has primarily seen renovations rather than new construction), North Macadam and the Adidas headquarters buildings near Swan Island. Outlying buildings consist of one four-story southeast medical building (at the Clackamas County border) and one four story mixed tenant office product at Airport Way.

Of the newly constructed (versus renovated) buildings, half are classified as Class A and half as Class B office product. The only buildings served by structured parking, however, are medical and corporate headquarter campus (Adidas).

Both multi-story development and either structured parking or reduced parking ratios are necessary to increase the employment capacity of Portland's land base. Without structured parking, even high-rise buildings will not achieve greater land efficiency as typical office parking provisions allow for roughly an equivalent square footage in parking as is provided in building space. Reduced parking ratios represent another approach to increasing efficiency of site utilization, but this is only achievable in areas that are well served by transit.

Figure 13. Non-Central City Office Development 4+ Stories (post 1990)

Year Built	Building Name	Use	Stories	Building Class	Parking	Building Address	Avg Weighted Rent	rentable Building Area
Outer Southeast								
2008	Mt. Scott Professional Center	medical	4	A	surface	9300 SE 91st Ave	\$30.00	52,500
Inner Southeast								
2003	Central Eastside Office Blding	mixed	4	B	surface	3611 SE 20th Ave	\$20.00	20,000
1952/2007	RiverEast Center	mixed	4	B	surface	49 SE Clay St	NA	100,800
1928/2003	The Weatherly	mixed	12	B	surface	516-540 SE Morrison St	\$21.00	69,900
1925/2004	Eastbank Commerce Center	mixed	4	B	surface	1001 SE Water Ave	\$15.99	60,000
1920/2007	Olympic Mills Commerce Center	mixed	8	B	surface	107 SE Washington St	\$18.15	108,300
Inner NW								
2005	NW Cntr for Orthopedics & Rehab.	medical	4	B	mixed	1515 NW 18th Ave	\$24.00	33,300
2000	CNF Campus: Ad Tech 2	corporate HQ	5	A	surface	2055 NW Savier St	\$25.50	248,200
1900/1998	Bridgetown Bldg	mixed	4	C	surface	1631 NW Thurman	\$24.00	67,300
Inner North/Northeast								
2002	Adidas Village: Rome Blding	corporate HQ	4	A	structured	5055 N Greeley Ave	NA	67,300
2002	Adidas Village: Chamonix Blding	corporate HQ	4	B	structured	5055 N Greeley Ave	NA	54,000
1960/2002	Adidas Village: Athens Blding	corporate HQ	6	A	structured	5055 N Greeley Ave	NA	147,000
1960/2002	Adidas Village: Mexico City Blding	corporate HQ	4	B	structured	5055 N Greeley Ave	NA	22,200
Outer North/Northeast								
1996/2006	One Airport Center	mixed	4	A	surface	7700 NE Ambassador Pl	NA	73,300
Inner Southwest								
1989/2008	River Forum II	mixed	4	B	surface	4386 SW Macadam Ave	\$24.50	38,600
1985/2004	River Forum I	mixed	5	A	surface	4380 SW Macadam Ave	\$24.49	145,700
1996	PCG Corporate Center	corporate HQ	4	B	surface	4650 SW Macadam Ave	NA	41,400
1982/1991	ADP Plaza	mixed medical	4	B	surface	2525 SW First Ave	\$24.60	180,800
1979/1991	Raleigh West Executive Bldg	mixed	4	B	surface	6443 SW Beav Hillsdale Hwy	\$17.00	56,900

Source: CoStar March 2009, E. D. Hovee & Company, LLC.

Urban Centers Office

Portland’s eastside urban centers (Hollywood Town Center and Gateway Regional Center) have supported a cluster of mostly three story buildings but very little new office construction and no Class A office product. Only two new office buildings have been constructed in Hollywood since 1981: the Providence Healthcare building and a small amount of leasable space associated with a new multi-story 24 Hour fitness club. Older multi-story office product is largely leased to medical users.

Medical/health care activity also appears to be the driver for Gateway office development. Two new medical buildings have been constructed since 1990 and one small (18,000 square feet) mixed-tenant building. Medical users – like educational institutions – are now a pivotal driver in many non Central locations, as they can support higher rents, are often concerned with conserving land for future expansions, and are interested in dispersing to serve both population growth areas and areas currently underserved.

Figure 14. Centers Office Development 4+ Stories

Center	Building Name	Building Use	Building Stories Class	Building Address	Average Weighted Rent	Rentable Building Area
Hollywood Town Center						
1927/2007	K-2 Building	mixed	4 C	4152 NE Sandy Blvd	NA	26,000
2006	Phase I		3 B	4218 NE Halsey St	NA	76,400
1981	Hollywood Professional Bldg		3 B	3939 NE Hancock St	NA	19,200
1970	Building B	medical	3 C	5228 NE Hoyt St	NA	19,700
1966			3 C	3835 NE Hancock St	NA	10,200
1965	Providence Medical Office Build	medical	3 C	545 NE 47th Ave	\$34.00	32,200
1947	Hollywood Square		3 B	1827 NE 44th Ave	\$14.50	26,800
1941		medical	3 B	1235 NE 47th Ave	NA	178,200
1923		medical	3 C	2106 NE 47th Ave	NA	2,800
Gateway Regional Center						
2008			3 B	11006 SE Division St	\$21.00	18,000
2007	Oregon Clinic	medical	4 B	1111 NE 99th Ave	NA	101,600
1994	Gateway Medical Plaza	medical	3 B	10535 NE Glisan St	\$29.57	23,100
1988	Multnomah Plaza		3 B	305 NE 102nd Ave	\$18.18	46,600
1987	Columbia East Bldg		3 B	10011 SE Division St	\$15.00	32,200
1979	Lincoln Bldg		3 B	9955 SE Washington	NA	25,300
1967	Parkway Plaza Professional Bldg	medical	3 C	10105 SE Division St	NA	8,900

Source: CoStar March 2009, E. D. Hovee & Company, LLC.

Office Drivers

Focus group participants suggested that proximity to both housing and retail is increasingly pivotal to attracting new office investment. The success of the Pearl and the River District is widely attributed to the mixed use environments of these districts – first for residential and more recently as a premier office address. These areas realized over one million square feet of office development from 1990-2009 as well as the bulk of newly development residential units.

The downtown, however – which supports less market rate housing – realized over 2.8 million square feet of office development over this time period, a greater volume although a significantly smaller rate of growth compared to the existing building stock. Lloyd District realized just under one million square feet of new development. One-quarter of the square footage developed within these areas was driven by institutional users (public and education).

Beyond housing, recent themes in office development activity include the Central City streetcar alignment, availability of low-cost historic building stock and institutional end-users. Only 13 office buildings of four or more stories have been developed in the city since 2000. Three of these were multi-tenant towers built in 2000 – 2002 (in the CBD, Lloyd and River District). Four additional buildings were developed by end-users (three for corporate headquarters). Of the six remaining buildings, four are 50,000 square feet or fewer. Other than updates that regularly occur within the office building stock, investment in renovated office product has focused on lower cost buildings in transitional districts such as Old Town and the Central Eastside.

Figure 15. Citywide Office Development Since 2000

Geography	Development Post 2000		Description
	New Construction	Renovation	
River District	3	6	New: 1 smaller flex, 1 mid-sized office property in 2008-2009 along streetcar; 1 new Brewery Block tower in 2002. Rehabs include the Brewery Blocks, Old Town's Creative Services Center (public), U of Oregon's White Stag renovation and an update to an Old Town tower.
Gateway	1	0	Mid-sized medical
Downtown	3	18	New: 1 smaller office condo along streetcar, 1 built for non-profit end-user, 1 tower in 2000. Renovation: largely upgrading of historic properties already in office use.
Lloyd	1	0	1 tower in 2001
Close-in	4	0	1 smaller medical, 3 corporate headquarters buildings
Central Eastside	1	4	Renovation of three mid-sized former industrial buildings into office/flex use and update of 1 mid-sized office tower. New: 1 smaller multi-tenant space in industrial area
Hollywood	0	1	Small historic office rehab
Airport Way	0	1	Update of mid-sized office
John's Landing	0	2	Small and mid-sized office updates
Total	13	32	

Source: CoStar, E. D. Hovee & Company, LLC.

In general, office development has not been significant over the past decade. Larger towers were only recently (as of 2009) being initiated again and exclusively within the CBD: the ZGF tower, the Morrison Bridgehead project and Park Avenue West.

Density Realized vs. Zoned

The following map illustrates building square footage, per site, as a percentage of total square footage allowable by zone (base zone, without bonuses). This is displayed to inform conversations on whether zoned capacity should be increased in any areas.

Only Central City subareas, key commercial corridors and the Northwest neighborhood are identified as being developed at more than 10% of zoned capacity. The largest density of taxlots in which development approaches zoned capacity appears to be within the Northwest neighborhood, west of I-405 and north of Burnside.

Comparative Development Feasibility

High rise development typically is associated with a rent or price premium. The caveat to this would be renovation of historic buildings which may have originally been designed for office, warehouse or some other use. Available data indicates that the top tier of office rents is above \$26 per square foot (as of 2009), down from a peak above \$30 in 2006 and paradoxically below what is required to support market rate high rise construction despite office towers recently constructed or planned.

Other areas that have succeeded in attracting top of the market rents beyond Portland and include:

- St Vincent’s Providence Medical Center (Hwy 26/Beaverton)
- Kruse Way (Lake Oswego)
- Cascade Park (east Clark County)
- Dispersed product in outlying southwest (Tigard, Tualatin, Wilsonville)

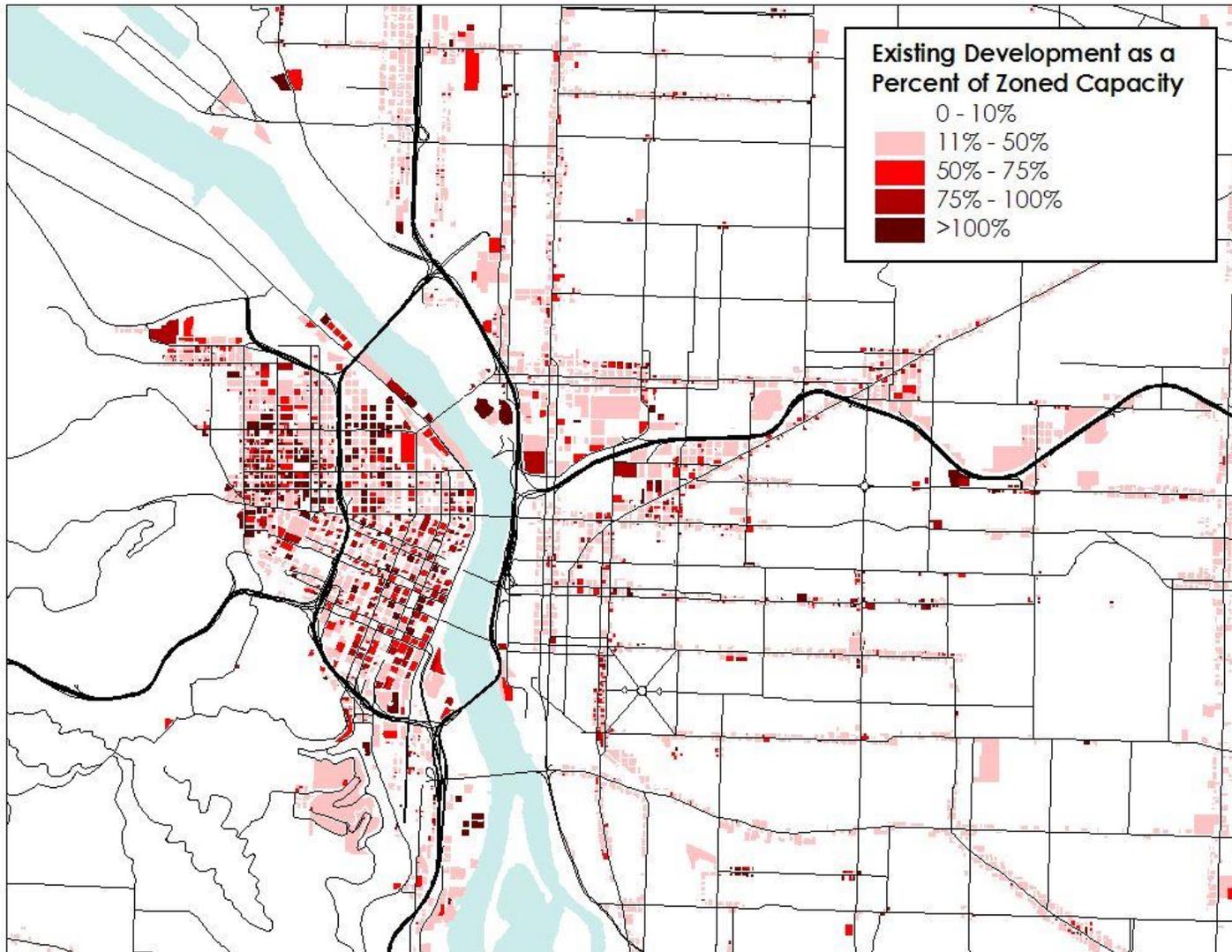
As of 2008, however, Portland’s Central City still encompassed more than half of the region’s total office product and close to 60% of its Class A office product. Continued investment in new buildings and reinvestment in Portland’s historic building stock is expected to continue over the 25 year forecast period.

Portland has successfully retained a critical mass of employment activity within its historic core and thus far at least limited the development of major competing fringe centers. Kruse Way would be the primary exception, but remaining land within that office cluster is now relatively limited.

However, future high rise construction within the City of Portland will increasingly compete with office clusters located elsewhere throughout the region. There is recent evidence of an emerging trend for a more dispersed pattern of office center development, Class A office development since 2000 has been fairly equally dispersed throughout the region, with Portland’s Central City capturing about one-third of new construction.

Midrise construction and renovation of office space appears to be the primary Central City opportunity to compete for a larger share of the regional office space market, according to a 2011 study by ZGF and ECONorthwest (*Cost Competitiveness of the Central City*). Comparing office tenant types by their location preferences, the types that were found most likely to shift to or away from the Central City are “cost conscious” tenants motivated primarily by rent levels and “urban character” tenants especially in creative services attracted by urban amenities. The study compared the cost competitiveness of Central City and suburban locations for five development prototypes, finding higher Central City development costs for each prototype. Cost gaps could

Figure 16. Existing Development as a Percent of Zoned Capacity



Source: Portland Bureau of Planning & Sustainability, E. D. Hovee & Company, LLC.

be overcome by a range of location incentives or amenities for developers, office tenants and office employees. The study distinguishes the high-density core and mid-density edge areas of the Central City, and the latter appears best suited to compete in these expanding office markets.

EMPLOYMENT TRENDS WITHIN PORTLAND'S URBAN GEOGRAPHIES

Job change is the final lens used to gauge current and potential demand within Portland's mid and high-rise districts. These *urban geographies* include the Central City districts (both non-industrial and industrial/incubator) plus urban centers outside the Central City area.

2008 Employment

In 2008 there were nearly 108,000 jobs within the primarily commercial areas of the Central City, with another 21,000 jobs in the Central City incubator/industrial districts of the Central Eastside and Lower Albina. The majority of Central City jobs – over 66,000 – have been situated within the Central Business District (including South Waterfront). In terms of job numbers, the Lloyd District is the second largest subdistrict which is approaching 17,000 jobs followed closely by the River District at just over 16,000.

2000-08 Employment Change

Both in and outside the Central City, the service sector has dominated Portland's job gains from 2000-08. This pattern has held for traditional commercial areas as well as the city's industrial districts.

Industrial areas accounted for 9,000 (or 28%) of the net citywide gain of over 32,000 service sector jobs. Much of the demand for service sector employment within industrial districts is being accommodated by 1-2 story rise business park and flex space, rather than by traditional multi-level office buildings.

As noted, at least some portion of the service sector job growth reported with employment data for industrial areas likely represents reclassification of industrial employment to service sector activities. For example, within the management sector (newly created with NAICS) which included holding company and corporate activities, reported employment more than doubled from 6,800 to 14,600 jobs; a portion of this increase is undoubtedly due to industry reclassification.

The major drivers of office demand in mid and high-rise office districts for Portland's urban geographies vary somewhat by district. Significant changes occurring between 2000 and 2008 are noted as follows:

- Within Portland's CBD (including South Waterfront), service sector employment increased by more than 1,700 jobs over this period, with another 635 jobs added in education and health services. These gains were not adequate to offset a net CBD job loss of nearly 3,100 jobs.

- The River District experienced a net gain of more than 2,500 jobs from 2000-08, with office-related job gains concentrated in services (+1,500), information and design (+825), and education and health (+590) – offset in part by net loss of industrial employment with legacy manufacturing and transportation, warehousing and wholesale firms. Strong growth of non-office employment (+2,000) is also noted for Pearl District activity in retail, arts and accommodations (including dining).
- Portland’s Lloyd District also realized a substantial reported net job gain (up by more than 2,000). This was led by gains of office-related service sector jobs (+2,700), partially offset by some loss of industrial job base.
- Goose Hollow reported nominal employment growth in construction with job losses in nearly every other industry sector, for a total employment decrease of 1,100.
- Of the non-Central City Commercial geographies, Hollywood is noted for the largest employment gain (over 2,200), indicated as being primarily related to education and health (+2,150).
- While overall employment increased only nominally in the Gateway area, strong growth was indicated for education and health (up by almost 1,000 jobs), offset by losses in a number of other job categories.
- Other urban geographies – including the University District in the Central City and other Urban Centers of St. Johns, Hillsdale, Lents, and West Portland – appear to have experienced very little job change over the 2000-08 period.

Figure 19 depicts the components of employment change across each of Portland’s urban geographies from 2000 to 2008.

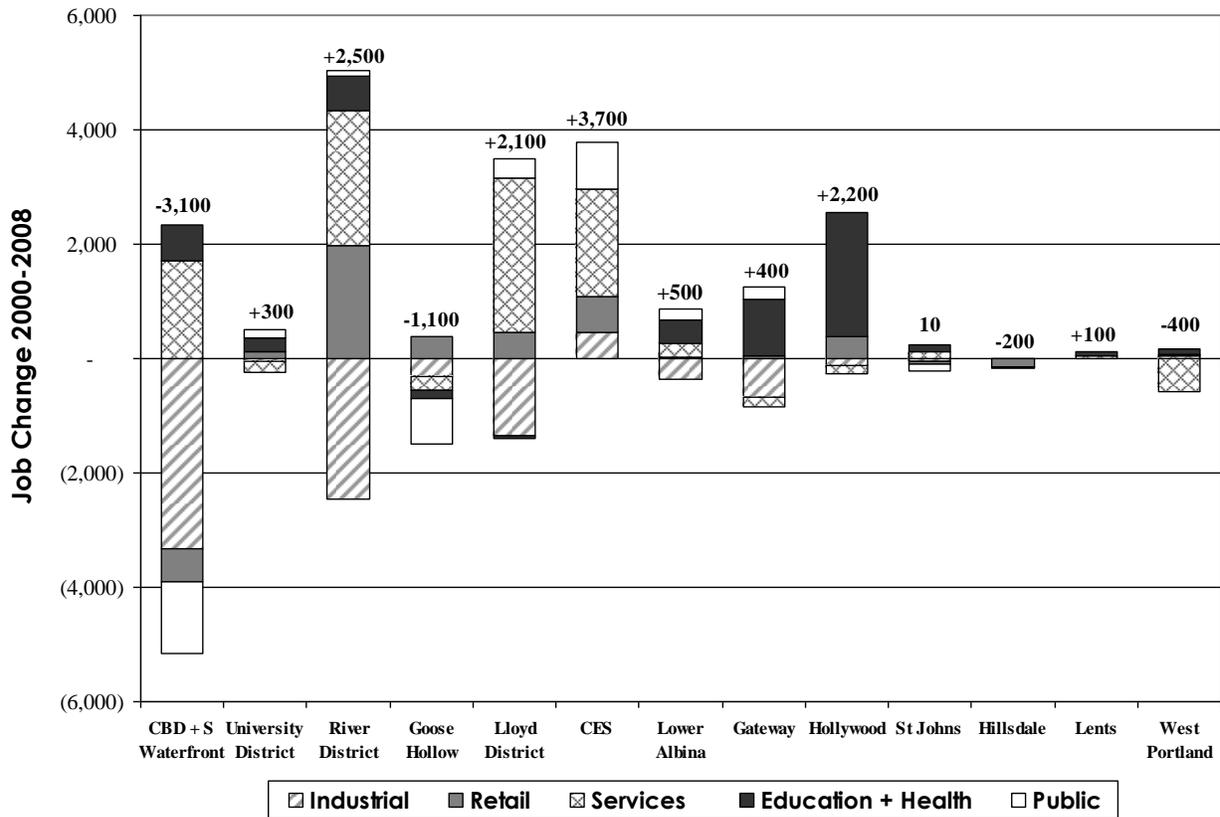
Employment Mix

Portland’s urban geographies differ not only in terms of recent employment gain or loss, but also with regard to the 2008 mix (or distribution) of employment:

- Approximately 46% of CBD employment is comprised of service businesses (ranging from professional to financial services), with 17-18% each in sectors of information and design and retail, arts and accommodations activity and 12% in the public sector. Together, these functions account for 92% of CBD employment.
- River District employment is relatively diverse, with retail, arts and accommodations accounting for 27% of employment, followed by services (at 21%), then information and design (16%), and with a still significant (15%) portion in transportation, warehousing and wholesaling activity.
- Services and retail (including arts and entertainment) account for about 70% of the Lloyd District employment.
- Central City incubator districts have an increasingly diverse mix of employment activity. Industrial accounts for 44% of Central Eastside employment, with strong added components of retail and service activities (at 17% each). In Lower Albina, industrial use accounts for a lesser 33% of district employment; education and health accounts for nearly half (at 46%).

- Retail represents the largest employment sector (at 30-44% of job base) for Goose Hollow, St. Johns and Hillsdale. For Gateway and Hollywood, education and health services are dominant employment activities, followed by retail. For Lents and West Portland, services represent the sector with the highest levels of district employment.

Figure 17. Sectoral Trends within Urban Geographies



Source: Oregon Employment Dept., Bureau of Planning & Sustainability, E. D. Hovee & Company, LLC.

While retail is important across all of the urban geographies, it is the #1 employment sector for only four of the urban geographies – River District, Goose Hollow, St. Johns and Hillsdale. Other districts have experienced some level of business specialty and concentration – based on a combination of historical location decisions and ongoing agglomeration benefits (attracting similar businesses). Dominant or major forms of employment across all urban geographies require some form of office or related building space – though the configuration and density of development varies substantially both within and between Central City and other Urban Centers outside the city core.

INDUSTRIAL AREAS

Portland has several different kinds of industrial areas: manufacturing/distribution, incubator and mixed. For this section of the EOA analysis, the *Columbia Harbor* geography includes the geographies of Harbor and Airport Districts and Harbor Access Lands combined. Columbia Harbor has been classified as a manufacturing/distribution industrial district. The Central City industrial districts of Central Eastside and Lower Albina are considered incubator, meaning they include a broader mix of industries. This mix is reflected in recent zoning amendments allowing greater amounts of office product – normally restricted within industrial sanctuaries – for information and design services. The Columbia Corridor (east of NE 82nd Ave) and the Dispersed Employment areas are considered mixed industrial areas.

The guiding question for this discussion is: *What competitive advantages are offered by the City's manufacturing/distribution and incubator districts – both currently and prospectively?* More specific aspects of this guiding question are:

- What job trends are observed within these districts?
- In what ways are job patterns similar or different between the manufacturing/distribution and incubator districts?
- What niches are forming within the incubator districts? Are they distinct from Columbia Harbor or other employment districts?
- How do incubator districts complement the Central City business district activity?
- What have absorption trends (demand) been in these districts?

Industrial/Incubator Employment Trends

Employment within Portland's five industrial areas totaled close to 119,500 in 2008, representing 30% of employment citywide. In total, industrial areas report a net increase of approximately 500 jobs 2000-08, a gain averaging 0.1% annually. Employment losses were greatest in manufacturing (-6,800 jobs), followed by a net loss of nearly 4,700 transportation, warehouse and wholesale jobs. It should be noted that the employment trends in industrial geographies are contradicted by trends showing increased manufacturing output and cargo volumes over roughly the same time period. This is discussed later in this section.

Off-setting job losses in the industrial areas were an increase of approximately 9,100 service sectors jobs excluding retail and public administration (but including education and health). Again, some portion of these jobs likely reflects re-classification of jobs classified as industrial in 2000. An increase in utilizing temporary employment agencies has also likely caused some industrial areas jobs to be reported in other geographies (where temp agency offices are located).

District-Specific Trends

One of the most important distinguishing factors between these districts – and the driver behind the “incubator” classification applied to the Central City districts – lies with their employment composition. Despite recent shifts towards service sector employment, Columbia Harbor retains close to 75% of its job base within the industrial sectors. Manufacturing represents 27% of total

employment with transportation, warehousing and wholesale activities at 40%; construction accounts for another 7% of Columbia Harbor employment.

As noted, this district is particularly distinguished by its high share of employment within the transportation and warehousing sectors. Columbia Harbor is also by far the largest industrial area, comprising 52% of total industrial area employment citywide. However, employment has declined in recent years, especially for the Harbor Access Lands portion of the Columbia Harbor geography.

Within the city's other industrial areas, industrial jobs represent a range of 33% of district employment in Lower Albina to 53% in Columbia East of 82nd. Retail accounts for 17% of employment in Central Eastside and 14% in Columbia East of 82nd. In the other industrial districts, retail accounts for less than 10% of the job total.

In Dispersed Employment areas, just 42% of jobs are associated with industrial sectors. At 35%, services are almost double their share as in any other industrial district, indicating that land use may have diverged from the zoning designation of these areas.

Service businesses (including information/design and education/health but excluding public administration employment) range from 17% of the job base in the Columbia Harbor to 55% in Lower Albina (for which Portland Public Schools is a major educational anchor employer). Service employment also exceeds industrial employment for the city's Dispersed Employment areas.

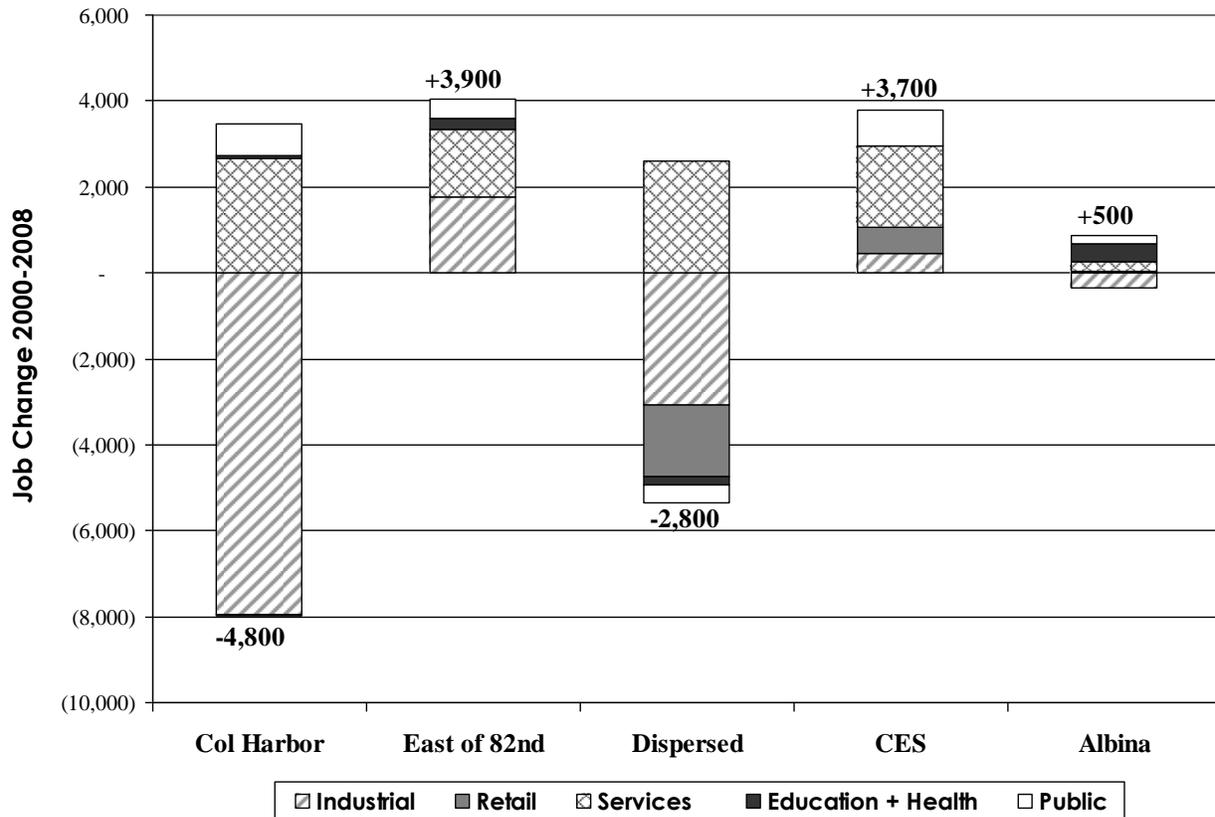
Net Job Gains vs. Losses

As illustrated by the following graph, the Columbia Harbor and Dispersed Employment areas experienced net job loss from 2000-08. While not directly depicted by the graph, job losses (in percentage terms) were most substantial for Harbor Access Lands, a subset of the Columbia Harbor geography.

Conversely, the Columbia East of 82nd area as well as Central Eastside and Lower Albina incubator districts realized employment gains. Despite declining industrial employment, the Columbia Harbor and Dispersed Employment areas experienced some partial offsets with service sector job gains. Employment growth in the East of 82nd Avenue area was fairly balanced between service and industrial sector activity; a lesser proportion of industrial job growth is noted for Central Eastside.

Overall, Portland lost an estimated 22,700 industrial jobs between 2000 and 2008 (albeit with some portion likely reflecting a classification shift into the service sectors). Of this total, about 11,450 of the industrial job loss (or 50%) occurred within the city's five identified industrial districts; the remaining 50% is associated with declining industrial employment or shifts away from industrial employment classifications experienced elsewhere in the city.

Figure 18. Industrial Areas Sector Changes (2000-2008)



Note: As “hybrid” or incubator districts, information for Central Eastside (CES) and Lower Albina is also shown with the Central City Commercial geographies.

Source: Oregon Employment Dept., Bureau of Planning & Sustainability, E. D. Hovee & Company, LLC.

Information & Design Services Trends

This sector has been identified as being of particular relevance in the industrial districts, especially the City’s emerging incubator districts. The Employment Opportunity Subarea within the Central Eastside Industrial Sanctuary allows out-right greater amounts of office space if occupied by information and design business types. The change sought to recognize the compatibility of business-serving businesses within the Central Eastside, the desire of these businesses to locate within the district, and the difficulty of reusing the district’s historic multi-level industrial building stock for traditional industrial uses.

Information and Design Services (NAICS 51 and 54) consist of the information sector (except movie theaters), and the professional and technical services sector (except lawyers and accountants). The Central Eastside increased employment within this sector by about 930 jobs. However, it added an equivalent number of “traditional” service business jobs, and another 600 retail jobs, suggesting district attraction that extends beyond information and design. It should also be noted that the Central Eastside includes commercial as well as industrial sanctuary zoning; sector growth has not been cross-tabulated with zoning within the district.

Also of interest is how this sector changed in other city geographies. With a net gain of 825 jobs, the River District attracted almost as much of the employment growth in this sector as the Central Eastside. Another net gainer with this sector was Dispersed Commercial – up by 660 jobs from 2000-08. In contrast, information and design employment declined slightly (by about 20 jobs) in the CBD.

Participants in the focus groups conducted in 2009 described both the importance of keeping residential uses out of the Central Eastside and increasing zoning flexibility, recognizing its role as a complement to the CBD. The growth rates within the CES indicate that it is successfully attracting new jobs, with somewhat greater net job gains through 2008 than for the River District (the closest contender as a CBD business alternative).

Building Development Trends

Despite job losses across the industrial sectors, Portland has realized development of new industrial building construction at an average rate of 1.5 million square feet per year (resulting in an end of 2008 in-city industrial building inventory of 81 million square feet). The amount of new industrial construction realized is significantly greater than the amount of development that occurred within either the retail or office building sectors (which realized 170,000 and 400,000 square feet annually citywide).

Figure 19. Recent Industrial Development Trends (2003-2008)

Subarea	Annual Average		Total Rentable Building Area
	New Construction	Annual Absorption	
Central City			
CBD	-	(7,000)	1,176,000
Lloyd District	-	53,000	2,671,000
NW Close In	-	3,000	1,044,000
Johns Landing	-	6,000	386,000
Inner Neighborhoods			
SW Close In	-	-	217,000
NE Close In	1,400	45,000	3,813,000
SE Close In	-	253,000	7,171,000
Industrial Areas			
Hayden Island/Swan Island	-	226,000	9,570,000
Rivergate	540,000	513,000	11,810,000
Guild's Lake	1,200	77,200	12,137,000
East Portland			
Airport Way	54,000	246,000	11,550,000
Mall 205	-	(300)	231,000
Gateway	-	16,000	1,615,000
East Columbia	832,000	730,600	17,641,000
Total	1,428,600	2,161,500	81,032,000

Source: CoStar, E. D. Hovee & Company, LLC.

Observations of note from these data have included the following:

- Industrial development activity has located primarily within the Columbia Corridor: East Columbia (which includes some properties outside of the city), Rivergate and Airport Way. East Columbia and Rivergate report significant annual average new construction at 830,000 and 540,000 square feet per year (through 2008) respectively.
- Business park activity has dominated East Columbia development, whereas Airport Way was more equally split between stand-alone buildings (averaging around 25,000 square feet annually) and business park development.
- Recent development within both East Columbia and Rivergate also has had a significantly larger format, averaging 70,000 and 160,000 square feet respectively (reflecting Rivergate’s distribution emphasis).
- The apparent disconnect between industrial jobs and industrial development may be related to high rates of industrial vintage relocation (existing businesses moving to new buildings, potentially leaving empty buildings unfilled – although vacancy rates have steadily fallen over the past five years to under 8% today) or changes in building use (with increased square feet per employee).

Thus far, Portland’s manufacturing and distribution space does not appear to have realized the change in form and density that has been occurring with office and retail product, which are moving towards denser urban forms both within the Central City and along commercial corridors. While focus group participants cited a Central Eastside manufacturer that functions in a multi-story environment, this appears to be an anomaly.⁷ A more common trend observed within the region’s industrial parks is high cube space, in which building footprints are reduced by developing very high ceiling, single story warehouses (which can store more product in a given amount of building floor area).

Beyond Employment Trends

The recent disconnect between employment and real estate trends is especially pronounced within the industrial sectors. While this Trends, Opportunities and Market Factors report is primarily concerned with employment trends and employment as a driver of land needs, it is important to note that jobs are not the only land driver or measure of an industry’s economic contribution.

For instance, during this most recent period of industrial job loss, the Bureau of Economic Analysis reports that the value of manufacturing output increased by more than \$9 billion for the 7-county region (Figure 23). More specifically, the economic activity in the Portland Harbor grew at 1.6% per year during approximately the same timeframe - 2002 to 2008. During that same time period, cargo volumes increased by 4.8% per year. Within the manufacturing sector at least, business growth (or profit) appears to contradict job growth, due in part to high commodity

⁷ The firm involved cited with multi-story Central Eastside manufacturing activity is an example of a long-time business located in historic building stock. New industrial or warehouse development has yet to replicate the multi-story patterns of the first half of the last century.

pricing and strong export markets. Equivalent data for other industrial sectors such as transportation and warehousing is suppressed due to confidentiality.

Figure 20. Portland-Vancouver MSA Gross Domestic Product Trends (2001-2006)

Industry	(\$ millions)		Change	
	2001	2006	Net	AAGR
All industry total	77,200	103,400	26,200	6.0%
Private industries	69,600	94,000	24,400	6.2%
Manufacturing	12,000	21,000	9,000	11.8%
Transportation and utilities	3,600	4,300	700	3.6%
Retail trade	4,300	4,900	600	2.6%
Professional and business services	8,700	11,000	2,300	4.8%
Education and health services	5,400	7,600	2,200	7.1%
Leisure and hospitality	2,300	3,000	700	5.5%
Information, Communication, and Techno	8,200	15,800	7,600	14.0%
Government	7,500	9,400	1,900	4.6%
<i>Private goods-producing industries</i>	<i>16,600</i>	<i>26,700</i>	<i>10,100</i>	<i>10.0%</i>
<i>Private services-providing industries</i>	<i>53,100</i>	<i>67,300</i>	<i>14,200</i>	<i>4.9%</i>

Source: Portland Bureau of Planning and Sustainability, Bureau of Economic Analysis, April 2009.

Focus Group participants – both for this study and for the 2006 Working Harbor Reinvestment Strategy – offer some suggestions into how industrial employment trends, complicated by data inconsistencies, can be interpreted:

- For at least some industries, productivity improvements have led to growing output while employment has declined. For industrial uses, this activity was especially pronounced during a period when the value of the U.S. dollar was relatively low, stimulating export demand.
- Both industrial real estate brokers and City permit data report that the bulk of recent demand has been for warehouse and distribution uses; these typically are associated with lower employment densities than manufacturing.
- Distribution and wholesale activity in Portland may have benefitted from some “deconsolidation” of the national and global distribution industry, especially as higher fuel prices re-emerge with economic recovery. Having more but smaller distribution centers across the nation in smaller metro markets (such as Portland) can result in reduced transport costs.
- In older industrial areas and waterfront industrial areas, site reuse (and associated employment growth) is limited by a number of issues. These include:
 - ✓ *Contamination*: owners aren’t yet lowering prices sufficiently to reflect the full cost of clean up, and in many cases the full extent of liability has yet to be resolved (as with Willamette River superfund sites).
 - ✓ *Retrofitting*: Building retrofitting is expensive, and the industrial sector typically seeks the lowest cost land and space of any sector.
 - ✓ *Zoning*: requiring a business to utilize either rail or water access limits the pool of qualifying businesses and will slow land absorption.

- ✓ *Flood plain:* particularly smaller sites become more expensive on a per square foot basis when floodplain or other environmental regulations are in play.

Regional data indicates that recent industrial sector growth has concentrated on the outskirts of the region, where greenfield development is more prevalent. Portland could capture this growth in the future if site re-use could be facilitated, stabilizing its industrial job base.

- Participants in the 2009 focus groups conducted for this EOA also added weight to the idea that employment in the harbor area has shifted towards the service sector: modern industry is described as “service-oriented” rather than needing heavy industrial space (e.g., retailers needing auxiliary warehouse space). In many cases, future demand was described as more likely to reflect industrial design and sales and marketing, with less space devoted to on-site manufacturing. Flex space – with a larger office component, higher parking ratios, and a broad range of space sizes – was described as a building product more in demand (especially in the Columbia Corridor east of I-205).

NEIGHBORHOOD COMMERCIAL DISTRICTS

Neighborhood subareas incorporate the majority of areas outside of the Central City, Urban Centers, Institutions, and Industrial districts. Three different types of neighborhood subareas are covered: Commercial Corridors, Commercial Nodes, and Dispersed Commercial.

These Neighborhood districts account for close to half (42%) of the city’s retail jobs and also a broad mix of employment across almost all sectors. The key guiding question for this sector is: *What is the current and future role of neighborhood commercial in Portland’s changing economy?* Related questions for this demand analysis issue topic are:

- What trends have neighborhoods realized in employment?
- What broad demand trends can be predicted for additional neighborhood retail, either from a market or planning perspective?
- What trends have neighborhoods realized in building development?
- What are the implications of neighborhood employment and building development for realizing greater amounts of Transit Oriented Development?

Neighborhood Commercial Growth Trends

In total, Neighborhood subareas accounted for an estimated 70,400 jobs as of 2008, 18% of the citywide job total. The sectors in which neighborhoods capture the greatest share of citywide covered employment are:

- Retail, arts, accommodation & food service: 42%
- Information & design: 19%
- Construction: 17%
- Services: 17%

While a significant contributor to the city’s jobs base, employment data indicates that neighborhood commercial subareas lost an estimated 1,900 jobs between 2000 and 2008. Neighborhood district job losses appear to be pulling down the city’s overall employment performance; this loss dwarfs that of any other geography except residential and open space.

Neighborhood district employment losses occurred in the majority of sectors except retail, arts, accommodation & food service (up by nearly 590), services (+440), information and design (+475), education and health services (+550). Net job losses were greatest with Commercial Corridors (-5,100 jobs) and Commercial Nodes (-580). Only Dispersed Commercial is indicated as experiencing net job growth (+3,900).

Commercial Corridors

The city’s Commercial Corridors encompass the largest share of Neighborhood jobs, accounting for 56% of Neighborhood district jobs.

The corridor designation indicates areas in which the City seeks to concentrate commercial activity. Commercial Corridors encompass both general commercial (auto-oriented) and storefront commercial zones, as well as much denser central employment and central housing zones. For this analysis, the corridors geography includes only corridors outside of plan areas and industrial areas, although many of those areas contain designated commercial corridors as well.

However, employment within the city’s Commercial Corridors declined by more than 5,100 net jobs from 2000-08, reflecting a rate of job loss averaging 1.5% per year. Job losses were experienced across all sectors and particularly pronounced for construction, retail, and manufacturing activities.

Job losses indicated by employment data are somewhat surprising given that the focus groups have been bullish on neighborhood commercial growth potential and continued consumer support for these districts. The discrepancy could be due to perception or varying definitions of neighborhood business districts (as this definition of Commercial Corridors excludes nodes as well as town and regional centers).

Commercial Nodes

These areas have covered about 12 intersections and, at 9,600 jobs, represent the least overall employment of the neighborhood geographies considered. Employment declined by nearly 600 jobs from 2000-08, for job loss averaging 0.7% per year. Similar to corridors, these Commercial Nodes experienced reduced employment across most sectors (except education and health).

Dispersed Commercial

This geography is zone-based and includes both auto-oriented and storefront commercial zones that are not in designated commercial corridors. Dispersed commercial areas tend to cluster as “second tier” corridor space and also constitute small areas of discrete zoning (commercial corners).

Dispersed Commercial areas accounted for about 21,700 jobs in 2008 (or 31% of neighborhood employment). A net gain of 3,900 jobs is noted for 2000-08 (up by 2.5% per year) – the only one of the neighborhood geographies for which an employment increase is reported.

Nearly one-half of the employment increase occurred with retail, arts and accommodations (including dining) uses. Job gains are also noted for education and health, manufacturing, information and design, and service sector businesses

Dispersed Commercial areas appear to function somewhat differently with a broader mix of job types compared to the other neighborhood geographies. Both industrial sectors and services are more prevalent within this geography. Retail is less important as a share of the total as compared with Commercial Corridors and Nodes.

Corridors, Nodes and Dispersed Commercial include both auto-oriented and storefront commercial zones.

RESIDENTIAL & OPEN SPACE ZONES

As of 2008, these non-employment geographies make up a surprising 10% of covered employment citywide, a total of over 38,900 jobs. Employment within residential zones includes schools, some institutions, home-based businesses and non-conforming uses. Not counted with employment data are individuals not covered by unemployment insurance (likely including many home occupations as sole proprietors, a factor that is likely of greater significance within residential zones).

Covered employment within residential zones is dominated by education and health care (at 45% of total covered employment). This likely reflects those institutional users to which special institutional or employment designations have not been applied (particularly as with neighborhood schools). Services account for another 19% of residential jobs, and retail comprises only 9%. Retail Growth Potential

As previously noted, close to half (42%) of the city's retail jobs are located within the City's neighborhoods-based employment geographies. Retail growth is a driver for neighborhood business districts and commercial corridors, but not the primary driver. Jobs data indicates that retail comprises just under one-third of neighborhood jobs across all subareas.

Generally, Portland is adequately retailed. Focus group participants tied retail growth potential to household growth and leakage data supports this assessment. As of 2008, the national demographics firm ERSI Business Analyst estimates that the city supports about \$6.5 billion annually in resident-generated demand for retail, food and drink, but generates \$7.6 billion in yearly sales volume. This indicates that, in addition to serving local resident needs the city serves as a regional destination market, attracting and supported by residents of surrounding communities throughout the metro region and beyond.

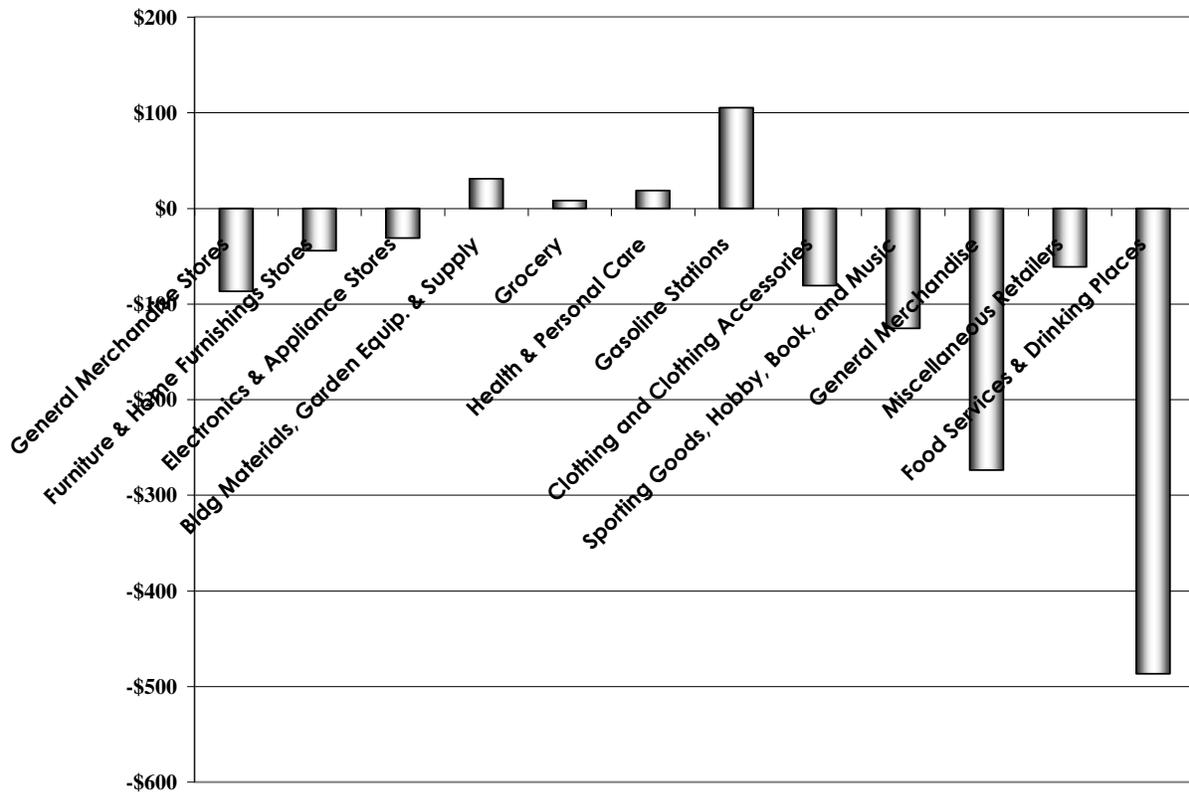
The following graph illustrates citywide retail leakage by store type. Negative numbers indicate store types in which supply exceeds demand: there is no sales leakage, or dollars spent by Portland residents outside of the city (in reality of course, residents shop in a variety of

jurisdictions, but the *net* result indicates that Portland retail supply is adequate to meet the shopping needs of Portland residents).

Retail sales leakage is reported within four retail categories, indicating there may be room for growth to meet residents’ needs for building materials and garden supply (an estimated \$87 million in sales leakage); grocery (\$7.8 million); health and personal care (\$18.5 million), and gas stations (over \$100 million).

Retail types estimated to have captured the greatest share of non-resident as well as resident spending potential are restaurants and bars, general merchandise (department stores), and sporting good stores.

Figure 21. City of Portland Leakage by Store Type (2008)



Source: ESRI, E. D. Hovee & Company, LLC.

These numbers may also reflect shopping patterns for Portland residents or store classifications that diverge from the national average (for instance, Portland residents may spend less on gas). On the 4-county metro level (including Clark County), retail demand appears to be more in line with supply. In 2008 there was an estimated \$24 billion in retail demand and \$23 billion in retail sales.

Given that greater retail supply is not needed to meet the needs of residents (of either the city or the 4-county region), retail development over the longer term is dependent primarily on some

combination of population and/or income growth coupled with destination tourism activity. Portland can also increase its capture of the regional retail market available by strengthening its destination districts and out-competing surrounding communities.

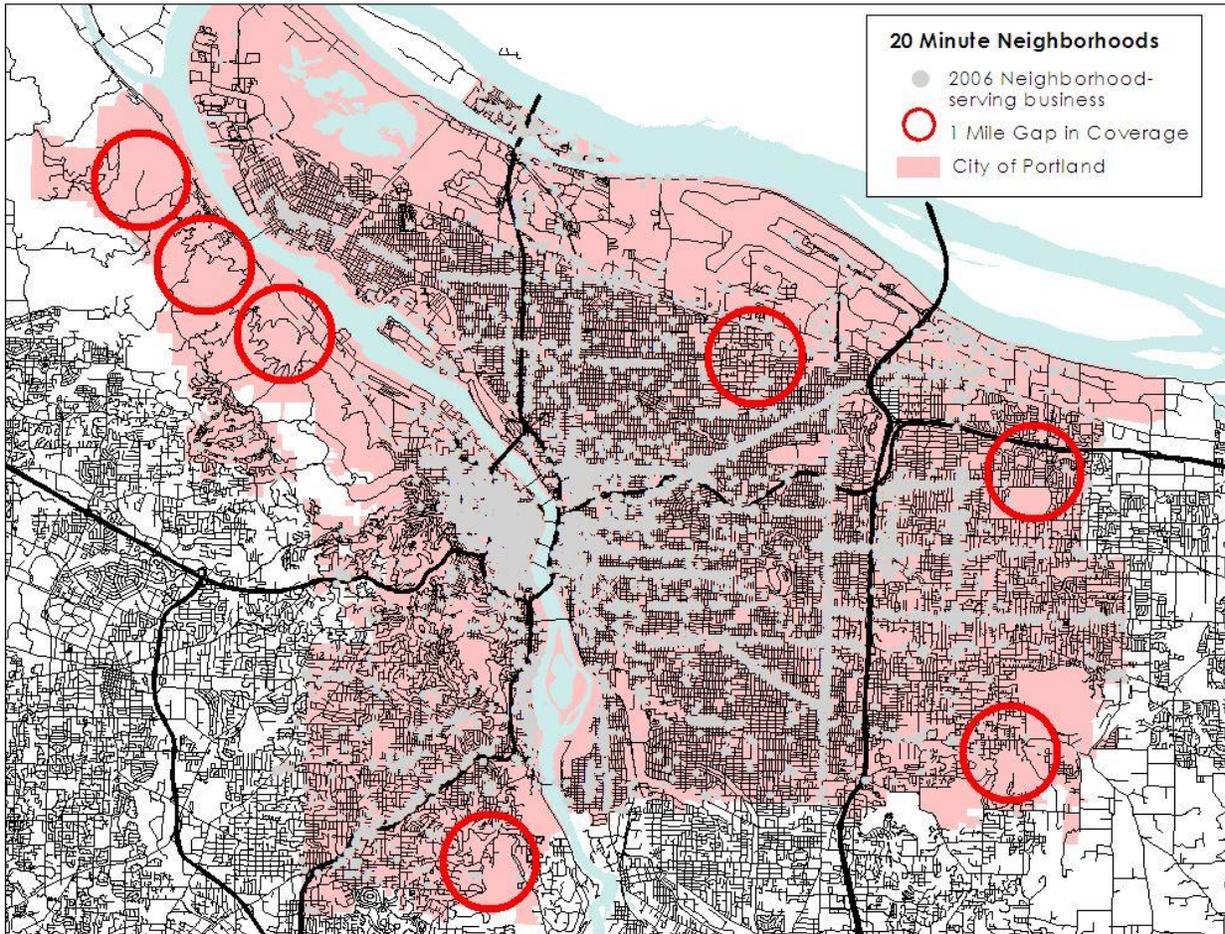
Complete Neighborhoods

Portland’s retail districts and corridors are a mix of neighborhood-serving and destination businesses, a distinction deriving as much from a business’s product or service mix as from its NAICS classification. Some businesses function as destinations purely because of their status within a business cluster (e.g., as with retailers along NW 23rd or within Lloyd Center Mall); other businesses – such as dry cleaners or convenience markets – are located within a destination business cluster but may primarily serve adjacent households. Many of Portland’s commercial corridors function as destination shopping districts, or as a mix of local and destination shopping.

One of the City’s planning objectives is to encourage complete or “20 minute” neighborhoods, meaning that daily goods and services are available to households within a walkable distance (equating to roughly one mile). Figure 24 shows these neighborhood serving businesses, which comprise about ¼ of total employment, and identifies areas of gaps in retail coverage.

Based on this visual overview, retail opportunities appear to be reasonably well distributed throughout the city except for a few areas that have more than one mile gap between businesses. Neighborhood-serving businesses blanket the city’s commercial corridors and virtually duplicate the arterial street grid. Retail densities decrease east of I-205 (outside of Gateway and SE 122nd), within the Cully neighborhood (west of I-205) and along the narrow but limited residentially populated Northwest corridor between the Willamette River and Forest Park.

Figure 22. Neighborhood Serving Retail Locations



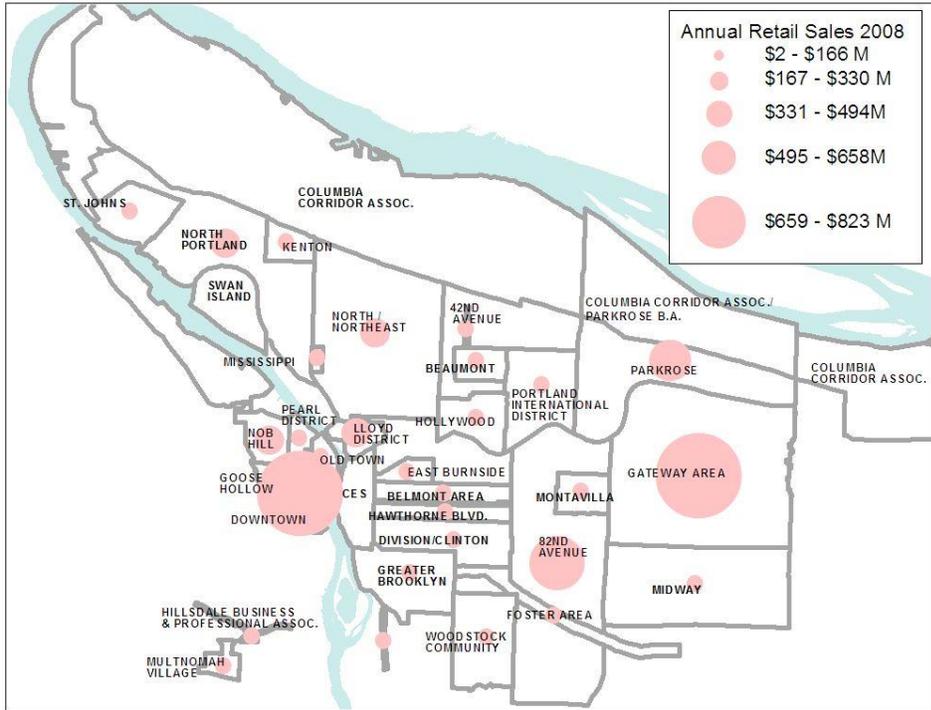
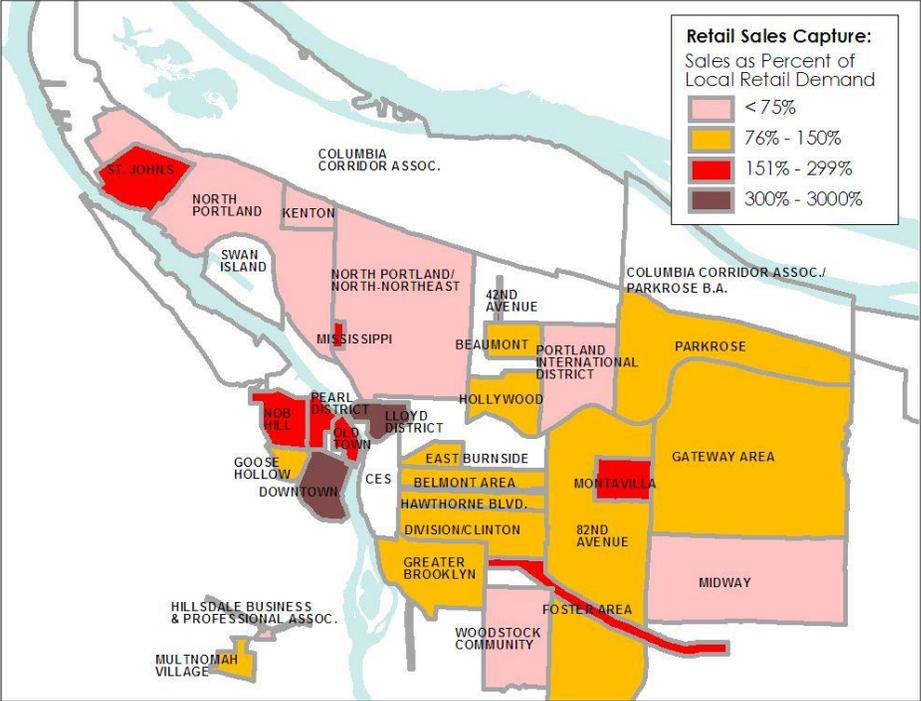
Source: Oregon Employment Department, E. D. Hovee & Company, LLC.

Business Associations

Portland’s Business Associations provide another way to analyze retail distribution. Out of the 34 associations, five are predominantly industrial and sales do not represent retail. Of the remaining 29 business associations, 17 reported sales in excess of estimated household demand – these districts function as destinations.

Central City districts top the list for sales capture, given the destination status of downtown retail in general. Neighborhoods with the highest capture rates include Montavilla, Mississippi, St. Johns and Nob Hill. In terms of sales volume, Gateway, 82nd Avenue, North/Northeast and the North Portland Business Association top the list.

Figure 23. Non-Industrial Business District Capture Rates & Sales Volumes (2008)

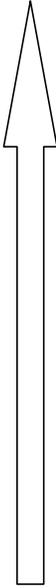


Note: Data is only displayed for non-industrial business associations.

Source: ESRI, Portland Bureau of Planning & Sustainability, E. D. Hovee & Company, LLC.

Figure 24. Business Association Supply & Demand (2008)

Type	Business Association	(in \$ millions)		Supply Rank	Sales Capture (Supply/Demand)
		Demand	Supply		
Industrial	Swan Island Business Association	\$1.5	\$157.6	12	10630%
Central City	Lloyd District Business Association	\$11.4	\$264.7	8	2328%
Industrial	Central Eastside Industrial Council	\$14.6	\$260.2	10	1785%
Industrial	Columbia Corridor Business Association	\$136.7	\$1,212.9	1	887%
Neighborhood	42nd Avenue Business Association	\$2.0	\$16.4	31	819%
Central City	Downtown Retail Council	\$131.4	\$822.8	2	626%
Central City	Old Town Chinatown	\$32.9	\$85.4	24	259%
Central City	Pearl District Business Association	\$60.7	\$151.7	13	250%
Neighborhood	Foster Area Business Association	\$49.9	\$120.4	18	241%
Neighborhood	Montevilla Business Association	\$45.8	\$101.1	20	221%
Neighborhood	Historic Mississippi	\$6.4	\$12.4	32	192%
Town Center	St Johns	\$62.8	\$102.5	19	163%
Neighborhood	Nob Hill Business Association	\$168.9	\$261.8	9	155%
Regional Center	Gateway Area Business Association	\$495.3	\$744.8	3	150%
Industrial	Columbia Corridor Association and Parkrose I	\$236.4	\$349.7	5	148%
Central City	Goose Hollow Business Association	\$71.1	\$86.1	23	121%
Neighborhood	Hawthorne Business Association	\$106.8	\$124.9	16	117%
Town Center	Hollywood Boosters	\$106.5	\$121.9	17	114%
Neighborhood	Greater Brooklyn Business Association	\$141.0	\$146.9	14	104%
Neighborhood	East Burnside Business Association	\$51.6	\$53.7	27	104%
Neighborhood	Multnomah Village Business Association	\$25.9	\$26.4	29	102%
Neighborhood	Westmoreland Business Association	\$6.4	\$5.8	33	90%
Neighborhood	82nd Avenue Business Association	\$627.9	\$550.2	4	88%
Neighborhood	Belmont Business Association	\$114.9	\$99.3	21	86%
Neighborhood	Beaumont Business Association	\$42.7	\$36.1	28	84%
Neighborhood	Division-Clinton Business Association	\$165.4	\$128.7	15	78%
Neighborhood	Kenton Business Association	\$34.2	\$25.6	30	75%
Neighborhood	North Portland Business Association	\$399.3	\$273.5	7	68%
Neighborhood	International Business District	\$151.5	\$90.6	22	60%
Neighborhood	North-Northeast Business Association	\$571.2	\$317.7	6	56%
Neighborhood	Midway Business Association	\$296.9	\$165.0	11	56%
Neighborhood	Woodstock Business Association	\$135.5	\$74.4	25	55%
Town Center	Hillsdale Business Association	\$14.1	\$1.7	34	12%
Industrial	NW Industrial	\$0.0	\$72.5	26	NA

Increasing sales relative to demand 

Source: ESRI, Portland Bureau of Planning & Sustainability, E. D. Hovee & Company, LLC.

Neighborhoods with relatively lower retail capture include Hillsdale, Woodstock, Midway, North-Northeast, North and Kenton. North-Northeast and North appear to be large districts with lower capture rates despite relatively larger sales volumes. The caveat is that some business associations have been narrowly defined to include a commercial corridor only and not the surrounding households (such as NE 42nd Avenue and Foster Area); sales capture rates for these business districts are therefore not a good estimate for whether surrounding neighborhoods are adequately served. High capture rates can also describe areas with relatively little housing, such as Old Town or Lloyd District (which has a relatively low residential mix and supports a regional mall).

To encourage added retail in areas where existing stores or related customer services are more limited, identifying *market drivers* to each specific neighborhood district represents a key opportunity and challenge:

- Retail is drawn to areas with high household density or high household income and offering good traffic/pedestrian counts plus street visibility. Existing retail locations reflect these market preferences.
- As referenced by focus group participants, neighborhood commercial growth will require greater household density. Encouraging household density – through zoning and project subsidies – may have a greater impact on retail site selection than either introducing commercial zoning or supporting commercial development in areas in which these are now missing.
- Since most (though not all) of the city currently has 20-minute coverage, a priority opportunity may be more to encourage locating critical urban retail services (e.g. grocery) and supportive infill rather than to create new or expanded retail districts.

Neighborhood Commercial Growth Trends: Building Development

Retail space has dominated the inventory of newly developed commercial space within Portland's neighborhoods, averaging about 300,000 new square feet annually over a five year period (from 2003-08) outside of the Central City. However, retail employment fell by about 4,000 jobs with 2/3 of that loss coming from the neighborhoods despite significant new building development.

The disconnect between these two trends may in part be due to service jobs locating within retail spaces. Also noted is that a significant contributor to neighborhood retail has been dining, which is no longer defined with retail (for employment classification purposes) but with arts, accommodations and food services. This sector is as large within the neighborhood geographies as the retail sector; however, it too declined over the study time frame.

Rather than corresponding necessarily to retail users (as defined by NAICS), retail space is increasingly becoming defined as either a) ground floor space within densely developed districts, with office or residential above, or b) a lower density or smaller footprint product (in comparison with office) within more suburban or main street settings.

Citywide, retail building development over the 2003-08 time period was dominated by Cascade Station, within the Airport Way subarea. That subarea has seen over 620,000 square feet of new large format/power center retail development over this five year period. This is close to twice the square footage added to the CBD (356,000 square feet) over the same time period, about 2/3 of which was ground floor space in residential buildings.

Figure 25. Recent Retail Development Trends (2003-2008)

Subarea	Annual Average New		Total Rentable Building Area
	Construction	Absorption	
Central City			
CBD	71,200	39,400	9,195,000
Lloyd District	6,900	17,100	4,689,000
Johns Landing	6,000	2,400	335,000
NW Close In	8,400	15,700	1,803,000
Inner Neighborhoods			
SW Close In	8,600	6,600	902,000
NE Close In	24,700	26,200	2,810,000
SE Close In	20,500	40,000	4,085,000
Industrial Areas			
North Portland	47,700	39,600	2,506,000
Rivergate	-	(1,300)	349,000
East Portland			
Airport Way	124,100	139,000	2,710,000
Mall 205	30,500	53,700	3,760,000
Gateway	14,900	32,500	3,720,000
East Columbia	39,500	55,600	3,060,000
Total	403,000	466,500	39,924,000

Source: E. D. Hovee & Company, LLC.

The other top subareas for attracting new (and inventoried) retail development were neighborhoods, with almost all growth locating along commercial corridors such as Killingsworth, Alberta, Lombard, MLK, Belmont, Division and Hawthorne. In-fill development along commercial corridors may also be classified as commercial retail/service by default due to the typical smaller building size.

- North Portland: 140,000 square feet
- Mall 205: 153,000 square feet (a submarket extending beyond the Mall property only)⁸
- Inner Northeast: 125,000
- Inner Southeast: 100,000

Office development has been both more limited and more concentrated than retail over the study time frame, with only 800,000 square feet developed citywide compared with 1.7 million square feet of new retail space. In contrast with retail trends, about 60% of newly developed office space was located within the CBD + Lloyd District, another 24% in Gateway and the remainder consisted largely of Class B buildings of less than 35,000 square feet each dispersed throughout the city.

⁸ Mall 205 is a submarket defined by CoStar and encompasses an area larger than the mall property.

Implications for Transit Oriented Development

Transit Oriented Development (TOD) describes dense development (a relative descriptor), either commercial or residential, with lower than average parking ratios and in close proximity to transit routes, either bus or fixed rail. TOD is also often viewed as occurring within a mixed use setting – as with residential (or in some cases office) above ground floor retail and related active use commercial space.

From a business owner’s perspective, TOD offers commercial space that is probably on the leading edge of the density to which the private market is willing to develop. “Denser” development may command a cost premium associated with steel vs. wood frame construction, although buildings up to five stories can be achieved via wood framing, and this quality of development may be acceptable for certain users outside of the Central City.

Businesses will desire space within an area or corridor suitable for TOD if:

- The space is well-located and visible to target customers
- The space is affordable
- The business’ customers can and will access the building in the absence of expansive parking options

The answer to these questions is not dictated by a building’s status as a TOD, although TODs are likely to be well-located (on commercial corridors) and well-served by transit. Rather than business demand, the extent to which this region sees additional TODs along its commercial corridors will be influenced by:

- Continued density increases within Portland’s neighborhoods;
- Continued resident and visitor preference for mixed use neighborhood retail districts (a vision to which participants in focus groups generally adhere, despite the indicated job losses);
- Flexibility with building uses allowed within commercial zones; and
- Over-all economic vitality and growth of the Portland metro region.

Continued growth in commercial rents to support more expensive construction techniques is also a consideration. In recent years Portland has seen significant market-driven in-fill commercial development occurring along relatively low-rent commercial corridors such as NE Alberta. The bulk of this development to date has been single story, indicating that the market will likely bring TOD projects – as opposed to infill – to those corridors now capable of achieving the highest rental rates.

Corridors reporting rents above \$20 per square foot as of March 2009 include SE Bybee, NE Broadway/Weidler, N Williams, John’s Landing, SE Belmont, N Mississippi and SE Division. While not a threshold that indicates certain development feasibility (which will vary according to construction technique, building configuration and building use mix), these reported rents have been on a par with the range reported for many Central City properties in the Pearl District, the West End and the CBD.

INSTITUTIONAL DEVELOPMENT

For this analysis, the focus is education and health institutions (but with secondary consideration of other public agency jobs). The key question for this topic is: *How will rapid growth of institutional employment and building needs be both accommodated within and potentially reshape development in Portland?* Related questions around this topic are:

- What job growth has occurred within Portland’s major institutional campuses?
- What job growth has occurred for institutional users that may not be located on institutional campuses?
- What are the unique land requirements of institutional users, and how are those changing?

Institutional Definitions & Associated Employment

This section of the report tracks institutional-related employment in two distinct ways:

- Campuses for 10 colleges and 7 hospitals on sites of more than 10 acres, which account for an estimated 35,200 jobs as of 2008, excluding Portland State University (Central City) and Adventist Medical Center(Gateway Regional Center). This *campus institutional* category is a primary frame of reference for the EOA analysis.
- All institutional uses throughout the City, consisting of schools and hospitals in all Comprehensive Plan zones and all businesses in the IR zone – account for 2008 employment estimated at 54,400.
- A third, broader indicator of institutional employment is the combined education and health care sectors, which totaled 84,660 jobs citywide in 2008.

Employment Associated with Institutional Uses

As depicted by the chart on the following page, the discussion in this section begins more broadly on the 54,400 jobs represented by schools and hospitals throughout all zones of the City plus other businesses within the City’s IR zone.

- From 2000-08, employment associated with these institutional uses within this zone increased at a rate averaging about 2.5% per year – well above the citywide job growth rate of just 0.1% per year.
- In 2008, 24% of employment situated within the IR zone was outside of hospitals and schools. The bulk of this was health-related (doctors offices, HMOs) and the remainder a mix of supportive uses such as retail and un-related businesses.

Institutional employment growth from 2000-08 has been stronger outside of institutional zoning than within this zone. These sectors averaged 2.5% annual growth citywide, compared with a growth rate of close to 2% within the IR zone. This appears to be primarily due to relatively flat employment with schools, while hospital and related IR zone employment increased more substantially.

Figure 26. Institutional Employment Trends (2000-2008)

	General Commercial	Central Commercial	Central Employment	Institution	Industrial Sanctuary	Mixed Employment	Commercial Storefront	Open Space	SFR R2.5,R5, R7,R10	MFR R1,R2,R3, RH,RX	Total
	CG	CX	EX	IR	IS	ME	NC,OC,UC	OS			
2008											
Institutions (defined by NAICS)											
Schools	448	3,257	12,821	4,968	1,402	140	358	583	5,513	4,383	33,873
<i>Primary</i>	103	228	114	1,110	1,380	1	251	583	5,214	1,760	10,744
<i>College</i>	345	3,029	12,707	3,858	22	139	107	-	299	2,623	23,129
Hospitals	-	3,330	3,181	5,430	1	-	99	-	-	5,232	17,273
Other businesses within IR Zone											
Health related				2,771							2,771
Other				531							531
	448	6,587	16,002	13,700	1,403	140	457	583	5,513	9,615	54,448
<i>2008 Share</i>	1%	12%	29%	25%	3%	0%	1%	1%	10%	18%	100%
<i>AAGR 00-08</i>	5%	4%	4%	2%	3%	-1%	22%	26%	-2%	3%	2.5%
2000											
Institutions (defined by NAICS)											
Schools	297	3,009	9,313	4,586	1,080	154	92	91	6,691	2,313	27,626
Hospitals	-	1,866	2,441	4,378	-	-	-	-	35	5,395	14,115
Other businesses within IR Zone											
Health related	-	-	-	1,666	-	-	-	-	-	-	1,666
Other	-	-	-	1,174	-	-	-	-	-	-	1,174
	297	4,875	11,754	11,804	1,080	154	92	91	6,726	7,708	44,581
<i>2000 Share</i>	1%	11%	26%	26%	2%	0%	0%	0%	15%	17%	100%

Source: Oregon Employment Department, Portland Bureau of Planning, E. D. Hovee & Company, LLC.

Trends within Key Institutions

Rather than reflect zoning designation, the institutional geography reported in Figure 14 (earlier in the report) reflects land owned by 17 hospitals and colleges on sites of at least 10 acres and 100 employees each. Total employment of 35,200 is more than double the 13,700 jobs located within IR-designated zoning. For these 17 large site institutions, employment grew at about 3.6% per year, above the average of 2.5% for citywide institutional employment.

Hospitals

- Oregon Health & Science University
- Shriners Hospital
- Portland Veteran’s Hospital
- Providence Portland Medical Center
- Legacy Emanuel Hospital & Health Center
- Legacy Good Samaritan Hospital
- Kaiser Medical Centers

Colleges

- Portland Community College (Sylvania)
- Portland Community College (Cascade)
- Portland Community College (Southeast)
- Reed College
- Lewis & Clark College
- University of Portland
- Multnomah Bible College
- Concordia University
- Western States Chiropractic College
- Warner Pacific University

Note: Adventist Medical Center and Portland State University (PSU) are not included in the Institutional employment geography – Adventist is part of the Gateway Regional Center and PSU is included with the Central City University District.

Many of these institutional uses are located on what could be considered as legacy sites that are in or near residential neighborhoods. Site decisions made decades ago for what typically began as relatively modest uses may have been for reasons unrelated to factors that would be considered today if these institutions were to start anew.

Implications for Future Development

Taken together, the city’s 54,400 institutional use jobs account for about 14% of its jobs base. The bulk of these are associated with the city’s colleges and hospitals. Institutions are key employment drivers and now among the fastest growing economic sectors in Portland.

With its moderate growth (mid-case) scenario, Metro forecasts that education and health care employment will increase by a combined average rate of 2.8% per year. This is well above the average projected growth rate of 1.7% for all regional employment and more than double anticipated public agency job growth.

To the degree that Portland continues to capture a relatively high share of medical and educational employment (particularly for higher education), growth needs for this sector can be

expected to account for an increasing share of the city’s total job base and associated building space requirements.

Based on the combination of this quantitative review and qualitative assessment from the institutional focus group, key challenges for the city’s institutions (both larger and smaller) will include:

- Opportunities for maintaining a strong in-city presence as a key economic development driver – offset by growing impetus for decentralization to get closer to residential populations.
- Improved transit access or other transportation options to better serve patrons and employees – especially for institutions currently not conveniently located near transit.
- Potential for increased density of development – as an alternative to expanded site area.
- Consistency of land use approach and approval process for institutional users – especially those situated within or near residential neighborhoods.

VI. LOCAL SECTOR SPECIALIZATIONS

This analysis considers local sector specializations both for the Portland metro area and the City of Portland. A common approach to defining comparative advantage is via location quotient (or LQ), which compares a geography’s concentration of employment with the national average.

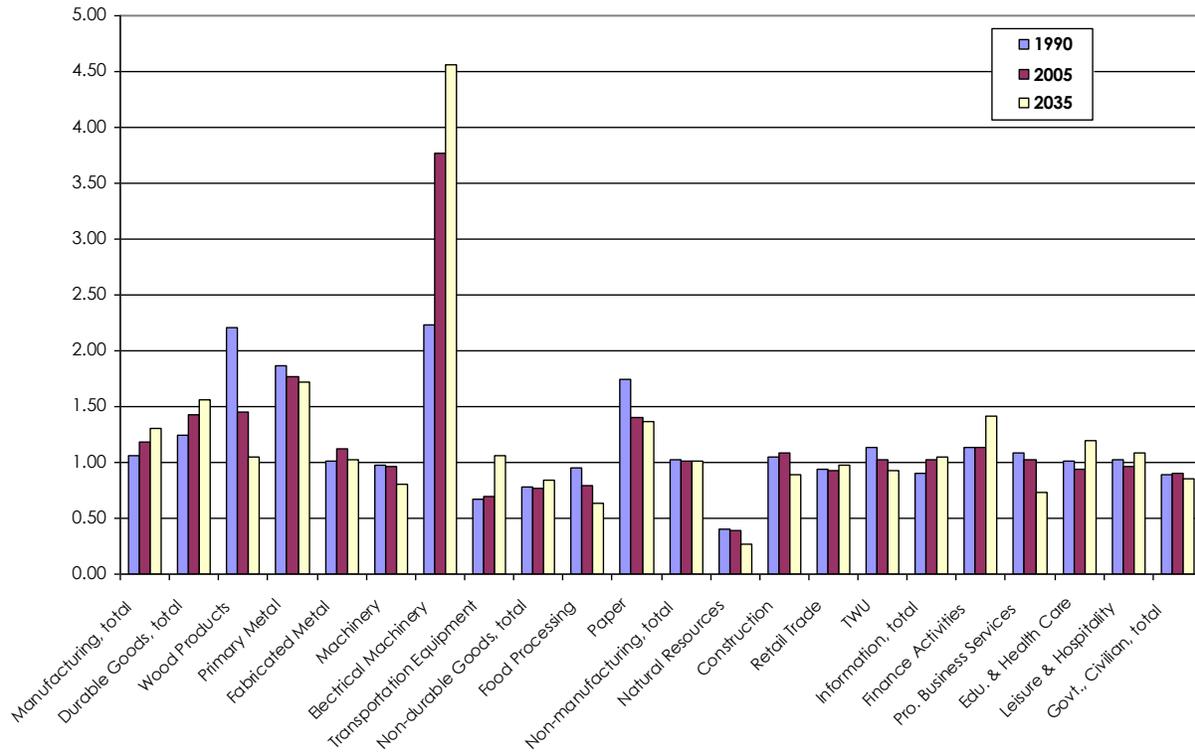
Portland can be defined as having a comparative advantage for sectors in which employment concentration is above the national average: a LQ of one or above.⁹ For example, if 20% of the region’s employment is in a particular sector versus just 10% of the nation’s job base, the location would be 2.0 – meaning that this region has twice the concentration of employment in that sector as the nation.

PORTLAND METRO SPECIALIZATIONS

The following chart illustrates changes in LQ by major job sector for the historic period 1990-2005 and as projected by Metro to 2035. The greatest detail is provided for manufacturing sub-sectors.

⁹ While comparative advantage analysis offers a snapshot of the relative concentration of employment in a region compared to the U.S. at a point in time, that advantage may be a reflection of both historic and current competitive advantage of the region relative to the nation. This changing competitive position can be indicated by the *shift* portion of *shift-share* analysis – with the shift indicated as the change in location quotient (LQ) between two or more different points in time.

Figure 27. Changing Portland Competitive Advantage – All Industries (1990-2035)



Source: Global Insight, 2008 QR US Long-Term Outlook and Metro.

Manufacturing LQ

The Portland metro area has gone from a slight comparative advantage relative to the nation in *manufacturing* in 1990 (LQ – 1.06) to a more substantial position as of 2005 (LQ – 1.18). This indicates that the region better maintained its manufacturing job count while net job loss was experienced across the nation as a whole. Metro has forecast that this comparative advantage may increase by 2035 to an LQ of as much as 1.30. If realized, this forecast would allow for a net manufacturing job gain of about 7% between 2005 and 2035.

LQs have increased since 1990 for manufacturing sectors of electrical machinery and transportation equipment, while declining for wood products, food processing and paper. Metals and machinery have about held their own relative to the nation. Looking forward to 2035, Metro has forecast continued LQ gains for electrical machinery and transportation equipment; the other manufacturing sectors are projected to hold steady or decline.

Non-Manufacturing LQ

Overall, non-manufacturing industrial sectors show relatively little comparative advantage relative to the rest of the nation. These sectors have experienced relatively minor changes in LQ since 1990, with slight gains noted for construction and information and losses for natural resources, transportation and warehousing, and utilities. These trends are largely expected to

continue forward except for construction where declining LQ is forecast (albeit after a continued surge that was projected to about 2010). Also noted is that Metro projects a growing LQ potential for publishing (a subsector of the information sector).

For most service sectors, Portland does not show any substantial comparative advantage relative to the rest of the U.S. – with the modest exceptions of finance activities (especially real estate) and professional business services (notably management of companies). Looking forward, Metro is projecting increased comparative advantage for finance activities, education and health care and other services (including personal services), but reduced LQ for professional business services (except management of companies).

CITYWIDE VALUE ADDED CLUSTERS

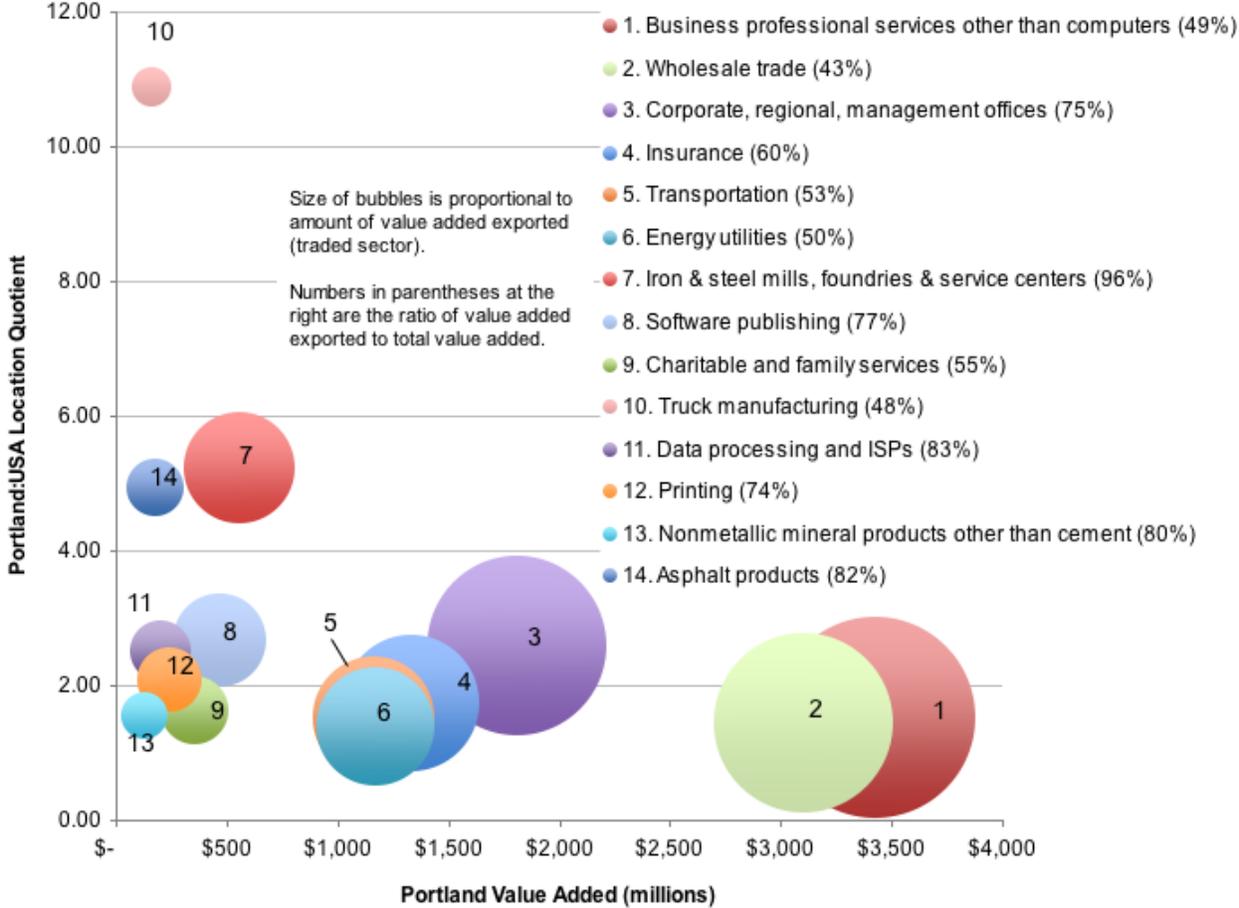
In a 2009 study for the Portland Development Commission, ECONorthwest has investigated LQ on the basis of an industry's value added (output) rather than employment, identifying city specializations relative to the nation rather than regional specializations. Value added describes the market value of a business' production of goods and services, including payroll and the contributions of capital, land and property. This approach elevates the importance of industry output, in addition to considering employment levels.

ECONorthwest's conclusions are that Portland supports two kinds of clusters:

- Specialized firms with high location quotients – such as truck manufacturing, iron and steel mills, insurance and software publishing – but that are relatively small contributors to the overall Portland economy in terms of value added and export amounts; and
- Firms with above-average but lower location quotients (1.5 – 2.5) that generate much larger amounts of industry output, as well as export output from sales outside the region. These are dominated by professional services and wholesale trade, many of which tend to serve the regional and statewide markets (although professional firms with national scope can also serve as local economic engines). These moderate city specializations also include management of companies, insurance, transportation, and energy utilities.

ECONorthwest's results tend to corroborate the employment-base results released by Metro in 2008: both LQ analyses indicate that Portland's location quotients are higher in the manufacturing sectors. However, these are smaller shares of total economic activity than in the past. Consequently, the ECONorthwest analysis indicates that manufacturing's output may be insufficient as an *exclusive engine* for continued economic growth into the future.

Figure 28. Value Added Portland Clusters (2007)



Source: ECONorthwest, 2009.

VII. INDUSTRIAL LAND DEMAND ANALYSIS

The primary method for determining land demand is employment growth. However, in the industrial areas there are indications that employment may not be the best measure of economic performance and the future demand for industrial land. Additional research has been compiled to supplement the industrial land demand forecast based on employment growth to analyze additional land demand drivers.

Absorption Trend Comparison

Reviewing long-term industrial land absorption trends is one method to estimate future industrial land needs, although this approach does not account for possible future shifts between industrial sectors.

Historic absorption is available only for properties along the Willamette and Columbia (west of the rail bridge) between the river and the nearest parallel street or railroad right-of-way. This area represents about one-third of the City’s industrial areas, but likely a greater portion of land absorption. The other primary area that has realized industrial development during this time frame (post 1960) is the Columbia Corridor east of 82nd Avenue and north of Sandy Boulevard. A land absorption trend estimate is currently being completed for this second geography so that a citywide industrial absorption trend can be approximated.

Figure 29. Industrial Land Demand Comparison with Past Trends

Absorption Trends	Acres per year			
Portland Harbor 1960-1997 absorption trends, all industrial uses (source: PHILS)	45			
Portland Harbor 1960-1990, marine uses (Portland only. Source: Port of Portland)	24			
Portland Harbor 1960-1990, all uses (including parks and residential. Source: Port of Portland)	39			
Portland Harbor 2002-2008, developed industrial land	18			
Absorption Forecast				
	All Industrial Areas		Columbia Harbor	
	driven	terminals	driven	terminals
Low	(9)	(9)	(5)	(5)
Mid	45	45	30	30
High	104	104	69	69

Source: Portland Harbor Industrial Lands Study Feb 2003, Bureau of Planning; E.D. Hovee & Company, LLC. Portland Harbor Industrial Land Supply Analysis, Feb 2012, ECONorthwest

The historic absorption figures available indicate an increase in annual absorption between 1990 and 1997. The bulk of this absorption occurred within the Port’s Rivergate development and on Swan Island.

Commodity Flows

Commodity flows provide another indicator of economic activity and terminal and distribution facility needs. The overall freight volume handled in the Portland region is forecast to roughly double in tonnage and triple in value between 2007 and 2040 (see Draft Portland/Vancouver Commodity Flow Forecast, 2014).

There are two studies that analyze the cargo moving through the Portland Harbor. The 2003 *Portland Harbor Industrial Land Study* (PHILS) reports that cargo volumes increased at an average annual rate of 2.3% between 1960 and 2000. Marine terminal investments of note that accompanied this increase include the 85 acre Portland Bulk Terminal facility at Port of Portland and a 20-acre expansion of the container terminal at T-6. The 2012 *Portland Harbor Industrial Land Supply Analysis* found cargo volume growth continues to be robust in recent years. From 2002-2008, cargo volumes increased by 4.8% per year. This study of marine terminal cargo volumes and land absorption needs plus the 2010 *West Hayden Island Economic Foundation Study* take a cargo-specific approach, factoring in the known size and capacity of existing terminals, existing cargo volumes, cargo forecasts, and the size requirements of modern terminal facilities. With the goal of understanding these factors in more depth, the City also commissioned a study of the operational characteristics of different marine terminal types, which includes case studies of best-in-class facilities with land area and cargo throughput information.¹⁰ More information about marine cargo forecasts, and associated land needs can be found later in this section.

The Port of Portland notes that land needs associated with commodity flows are inherently difficult to forecast. Over the past 10 years, the Port has twice been the fastest growing on the West Coast, and also the fastest declining. This short-term fluctuation results from decisions within the handful of steamship line companies on whether or not to utilize Port of Portland facilities, and is independent of shipping growth associated with business activity. For this reason, longer term trend data is more reliable. There is also some level of opportunistic growth that can be driven by a specific opportunity, driven by the competitive market. For example, other ports in the lower Columbia River have recently announced new projects to ship coal. Local ports are able to respond to these opportunities not because growth of that commodity had been forecast, but because they had an inventory available development-ready land. If the Port of Portland waits for a specific business opportunity to arise before land can be made available, as long as other Ports have more readily developable land supply, Portland will probably not be competitive.

Gross Domestic Product Output

Industry output provides a third measure of the health and growth of an industry. Data on industry output is available (via the Bureau of Economic Analysis) on a metro area level.

Between 2001 and 2006 there was a substantial increase in output among many industries, including manufacturing and information and technology. Manufacturing output (across the seven county PMSA, the smallest geography for which data is available) increased at an annual rate of close to 12%, compared to an annual average increase of 6% for the PMSA economy as a whole.

¹⁰ Worley Parsons, Operational Efficiencies of Ports/Terminals World--Wide, February 2012

GDP data portrays manufacturing as a growth industry, rather than the declining industry that employment trends suggest. Industry stakeholders describe several factors that influenced this sector’s recent profitability gains, including:

- Substantial increases in commodity and product pricing;
- Substitution of technology for labor, and
- A low valued dollar that fueled export growth.

These factors may continue in future years. However, the challenge remains of predicting land needs based on industry output; as yet no clear quantitative relationship between the two measures has been identified.

Figure 30. Portland-Vancouver PMSA Gross Domestic Product Trends (01-06)

Industry	2001	2006	Change	
			Net	AAGR
All industry total	77,200	103,400	26,200	6.0%
Private industries	69,600	94,000	24,400	6.2%
Manufacturing	12,000	21,000	9,000	11.8%
Transportation and utilities	3,600	4,300	700	3.6%
Retail trade	4,300	4,900	600	2.6%
Professional and business services	8,700	11,000	2,300	4.8%
Education and health services	5,400	7,600	2,200	7.1%
Leisure and hospitality	2,300	3,000	700	5.5%
Information, Communication, and Technol	8,200	15,800	7,600	14.0%
Government	7,500	9,400	1,900	4.6%
<i>Private goods-producing industries</i>	<i>16,600</i>	<i>26,700</i>	<i>10,100</i>	<i>10.0%</i>
<i>Private services-providing industries</i>	<i>53,100</i>	<i>67,300</i>	<i>14,200</i>	<i>4.9%</i>

Source: Bureau of Economic Analysis, US Dept. of Commerce, April 2009

Other Indicators

In order to better understand this dynamic, ECONorthwest examined trends in land efficiency from 2002-2008 in the Portland Harbor using several different measures. They calculated the economic activity measured in terms of employment, real market value, value added, and cargo tonnage. The value added and real market value measures appear to grow, however the US Consumer Price Index grew by 3.0%, indicating that these measure grew less than the rate of inflation, while the cargo tonnage grew at a faster pace (Table 30).¹¹

¹¹ ECONorthwest, Portland Harbor Industrial Land Supply Analysis, February 2012 (Appendix C)

Figure 30. Portland Harbor Measures of Economic Activity (per acre)

Measure	2002	2008	AAGR
Value Added	\$1,147,614	\$1,217,713	1.0%
Real Market Value	\$776,715	\$838,091	1.3%
Employment (jobs)	6.21	5.75	-1.3%
Cargo Tonnage	3,873	4,928	4.1%

Source: ECONorthwest, Portland Harbor Industrial Land Supply Analysis, February 2012

VIII. ECONOMIC MULTIPLIER ANALYSIS

As discussed above, there can be a disconnection between employment growth and the demand for new building space and development sites, especially within the industrial sectors. Another way to look at the situation is economic multipliers, which represents the relationship between direct investment in economic activity at a particular site and the resulting multiplier (or ripple effect) throughout Portland and the metro region. The three most common types of economic multipliers are provided within this EOA report are measures of:

- Employment
- Personal income (to residents of the region)
- Output (or added gross receipts)

For example, an employment multiplier of 2.00 indicates that for every job directly associated with a place-specific investment, another job is created off-site through indirect and induced economic effects elsewhere in the region. Indirect effects occur as the new economic activity makes purchases from other businesses in the region. Induced effects occur as the direct employees of the new economic activity are able to make added purchases from increased disposable income from local retail and services.

Multipliers are based on the nationally recognized IMPLAN input-output model. IMPLAN data is available for every county in the U.S. Multipliers used with this analysis are those for the seven-county metro region (PMSA) as of 2009. Economic multipliers are typically reported by NAICS employment sector. For the Portland EOA, NAICS specific multipliers have been aggregate to six industrial/commercial building types based on the City of Portland’s projected 2035 mix of sector employment and anticipated allocation of employment sectors to building types.

This essentially reflects weighted averaging of specific building types. For example, the General Industrial building type is associated with a relatively high 3.15 overall jobs multiplier. The key components of the General Industrial multiplier are manufacturing (with a 3.69 multiplier) and construction (2.04). Other building types involve different employment sectors but with a similar weighting methodology applied.

Figure 31. Economic Multipliers By Building Type

Building Type	Economic Multiplier		
	Jobs	Income	Output
Office	1.95	1.87	1.98
Institution	1.62	1.69	2.13
Flex / BP	2.19	2.12	1.91
General Industrial	3.15	2.50	2.15
Warehouse	2.36	1.95	1.95
Retail	1.64	1.76	1.97

Source: E. D. Hovee & Company, LLC based on IMPLAN

Multipliers are relevant to district-specific land supply decisions because they suggest the importance of looking beyond direct site-specific employment opportunities. For example, although job density is low on industrial land, the General Industrial and Warehouse multipliers are high. That is, industrial acres have the potential to generate a greater number of secondary and tertiary off-site jobs than an acre of retail. All other things being equal, this could be a factor if one must allocate a limited supply of land to different industry types. Or, put another way, some of our retail and office job growth is dependent on having an adequate industrial land supply.

IX. LAND EFFICIENCY ANALYSIS

The purpose of this analysis is to estimate the portion of future employment-related development that will take place on parcels with a significant amount of existing building square footage – sites that are not included in the Buildable Land Inventory.

METHODOLOGY

The analysis is based on development activity from 1999-2011 to assign it to the type of site in 1999 – vacant, LoFAR, or HiFAR.¹² The LoFAR category corresponds to the underutilized or redevelopable sites in the BLI and is defined as sites with less than 20% of the building square footage allowed by zoning (based on applicable zoned FARs) based on existing building square footage in 1999. For industrial properties, only vacant parcels are considered buildable.

RLIS assessor data is used to create a side-by-side comparison of tax lots with a “new year built” or for which there was more than 50% building square footage added (as opposed to a minor addition). A review of the assessor data revealed a number of parcels for which there was no building square footage indicated in 1999 but had a 1999 building value of over \$25,000, which indicated some kind of improvement. Tax parcels greater than 10,000 square feet in size with missing data have been cross-checked with development permit data to better determine which parcels were: a) previously developed in 1999 with no added building space developed through 2011, or b) previously developed but added some amount of net new building space since 1999. This analysis was limited to parcels for which there was comparable data regarding building square footage, land and improvements valuation with matching tax records in 1999 and 2011. Excluded are parcels for which there is not a matching tax parcel identifier or for which other data is missing in either year. Also excluded are parcels for which building square footage was increased by less than 50%, but with no new built data between 1999-2011 indicated. For these reasons, the analysis should be viewed as representing a conservative representation of development activity on employment lands over this time period.

Using the revised parcel dataset, development activity is assigned to the type of site in 1999 – vacant, LoFAR, or HiFAR (Figure 32). The proportion of development activity that occurs on vacant or LoFAR is development that would occur on sites in the BLI (industrial geographies are limited to vacant sites). Development that takes place on HiFAR parcels is on parcels that are not included in the BLI.

The data analysis shows that the campus institutions present a unique case. These campuses consist of large parcels with existing development that places them in the HiFAR category. So as to not skew the overall results, the campus institutions were eliminated from this analysis because these areas are treated differently in the BLI (development capacity based on master plans, not vacant/underutilized parcels).

¹² The initial method was to analyze employment data (ES202) data to identify job growth that took place on sites with existing development and no new development from 2000-2008. This analysis proved to be too difficult to manage because of employers with multiple tax parcels and dispersed employment that was reported to different tax parcels over the analysis period.

Figure 32. Land Efficiency Analysis (Net Added Building Space 1999-2011)

Forecast Geographies	On Sites that Were Previously			Total	% on	
	Vacant	LoFAR	HiFAR		Vac/Lo	
Central City Commercial	4,753,957	286,431	3,605,539	8,645,927	58%	
Central City Incubator	589,616	230,191	41,871	861,678	95%	
Columbia Harbor	4,259,890	2,262,671	91,150	6,613,711	64%	Vacant
Columbia East	3,932,091	502,344	75,646	4,510,081	87%	Vacant
Dispersed Employment	543,702	241,891	491,278	1,276,871	43%	Vacant
Neighborhood Commercial	3,111,419	12,073	2,236,145	5,359,637	58%	
Town Centers	135,913	0	341,128	477,041	28%	
Regional Center	694,329	0	160,986	855,315	81%	
Institutions	407,270	4,800	2,164,726	2,576,796	16%	
Total	18,428,187	3,540,401	9,208,469	31,177,057	70%	
Total (w/o Institutions)	18,020,917	3,535,601	7,043,743	28,600,261	75%	
% of Change	59%	11%	30%	100%	70%	
% of Change w/o Institutions	63%	12%	25%	100%	75%	

Aggregate Geographies

Central City	5,343,573	516,622	3,647,410	9,507,605	62%	
Industrial	8,735,683	3,006,906	658,074	12,400,663	70%	Vacant
Commercial	3,941,661	12,073	2,738,259	6,691,993	59%	
Institutions	407,270	4,800	2,164,726	2,576,796	16%	
Total	18,428,187	3,540,401	9,208,469	31,177,057	70%	
Total w/o Institutions	18,020,917	3,535,601	7,043,743	28,600,261	75%	

Source: E.D Hovee & Company

OBSERVATIONS

This supplemental analysis provides added insight into development patterns for different employment geographies. From a market perspective, the data indicates that newly built sites tend to occur on vacant or low value property. However, considerable acreage has experienced building expansion on properties with existing high value improvements. The overall results show that roughly 60% of Central City and Commercial development took place on vacant or LoFAR land and approximately 70% of industrial development took place on vacant land. A significant portion of new development (30-40%) is occurring on parcels with a significant amount of existing development (HiFAR) that is not included in the BLI.

Both for newly built sites and expansions, the market evidences continued preference for unconstrained sites. The market can shift to support development of environmentally constrained and/or potential brownfield sites where fewer unconstrained property opportunities are available. This analysis is useful as a means to better refine realistic land needs in employment land supply and demand analysis.

X. MARINE CARGO FORECAST

PORTLAND HARBOR MARINE TERMINALS

The Harbor Access Lands geography benefits from its superior connectivity: the confluence of two rivers, access to domestic markets via two major rail lines (UP and BNSF), and interstate freeway access to I-5 (north-south) and I-84 (east-west), and access to global markets via the Pacific Ocean. Having all of this connectivity in the heart of the City of Portland, with strong local and regional policies in place to preserve harbor land for industrial use, creates a special place for water-dependent industrial firms. However, the industrial harbor land supply in the Portland region is fixed, and vacant developable land is rare and usually constrained. (See Appendix C. ECONorthwest, *Portland Harbor Industrial Land Supply Analysis*, May 2012)

A primary source of past economic growth in Portland has been marine-related economic activity, including marine industrial and marine cargo uses. These uses are projected to continue to grow over the next 30-years, with particular growth forecasted in the marine cargo and related transportation, warehousing, utility, and wholesale trade sectors. The Portland Harbor serves as a major economic engine for the regional economy. Studies indicate that cargo and manufacturing activities dependent on waterborne transportation contribute significantly to the metro region's economy. These studies indicate that marine-related economic activity generates from 20,000 to 100,000 jobs and from \$1.4 to 3.4 billion annually in regional income.¹³

The Port of Portland has four marine terminals located along the Willamette and Columbia Rivers. These terminals accommodated 575 ocean-going vessels in 2010, though over the past two decades it was not uncommon for the Port to accommodate 800 to 1,000 ocean-going vessels in a year. Not counting cargos received or shipped via inland barges, the Port of Portland shipped over 13 million short tons of cargo in 2010.

Harbor industrial development tends to have low floor-to-area ratios (FAR) and a relatively low number of jobs per acre. But despite declining employment in recent years, the Portland Harbor experienced an increase in cargo tonnage at a faster pace than the rate of industrial land development in the area.¹⁴ Therefore, given the disconnected relationship between employment growth and cargo activity in the harbor, there is a need to base the need for additional marine terminals on cargo forecasts as a supplement to any land needed to support future industrial employment growth in the Harbor Access Lands geography.

MARINE CARGO FORECAST

While employment forecasts traditionally form the basis of employment land supply analysis, as noted earlier, employment is not a very good indicator of the long-term land needs of the freight and distribution sectors of the economy. Despite a general decline in industrial employment between 2002 and 2008 (-1.3% AAGR), cargo tonnage handled in the Portland Harbor went up

¹³ Entrix, West Hayden Island Economic Foundation Study, July 2010

¹⁴ ECONorthwest, Portland Harbor Industrial Land Supply Analysis, May 2012.

4.1% per year during that same period. An average of 18 acres of land was developed each year during that period.¹⁵

There have been several attempts to understand how cargo tonnage trends may impact future land needs in the Portland Harbor. Entrix studied this topic in 2010, based on cargo forecasts completed in 2009. The most recent cargo forecasts are based on a 2010 study by BST, refined to specifically call out cargo demand for Portland and Vancouver and updated with the most recent economic data.¹⁶ Cargo forecasts generally assume an adequate land supply will be made available (that is, they do not attempt to predict how any land supply constraint might impact growth). The most recent BST forecast demand for the region in 2040 (including both Portland and Vancouver) ranges from 39 million to 66 million metric tons. For the Portland Harbor, the forecast range is 28 million to 43 million metric tons. For context, in 2010 the Port of Portland moved 13 million metric tons of cargo, and approximately 27 million tons moved through the region as a whole (including private terminals and both public Ports).

Figure 33. 2040 Portland Harbor Cargo Volume Forecast Scenarios

Cargo Type	Low	Medium	High
Automobiles (units)	811,000	912,500	1,014,000
Containers (TEUs)	379,000	452,500	526,000
Metric Tons			
Automobiles	1,076,000	1,206,000	1,336,000
Containers	2,162,000	2,583,500	3,005,000
Breakbulk	1,132,000	1,242,000	1,352,000
Grain	6,686,000	9,078,000	11,470,000
Dry Bulk	10,278,000	14,093,500	17,909,000
Liquid Bulk	6,912,000	7,461,500	8,011,000
Total	28,246,000	35,664,500	43,083,000

Source: ECONorthwest and BST Associates

Note: Low and High forecasts were made by BST Associates for the Portland and Vancouver Harbor Forecast Update, 2012. Medium scenario is calculated by ECONorthwest.

Factoring in the capacity of existing marine terminals, ECONorthwest estimated the need by 2040 for additional marine terminal facilities by cargo type, shown in Figure 34.¹⁷ With the low scenario forecast, they estimated that existing terminals could handle all commodity types except automobiles. With the high scenario forecast, additional new terminals would be needed for automobiles, containers, grains, and dry bulk commodity types. With the mid-range scenario forecast, additional terminals would be needed for automobiles, grain, and dry bulk commodities.

Based on the size trends of new terminals being constructed on the West Coast, most of the land need for marine cargo is expected to be for parcels larger than 100 acres to accommodate rail access and ensure competitiveness.¹⁸ The actual acres needed to accommodate the projected

¹⁵ EcoNorthwest, Portland Harbor Industrial Land Supply Analysis, May 2012

¹⁶ BST Associates, Portland and Vancouver Harbor Forecast Update, February 2012

¹⁷ EcoNorthwest, Portland Harbor Industrial Land Supply Analysis, May 2012

¹⁸ Entrix, West Hayden Island Economic Foundation Study, July 2010

marine terminal need varies, depending on the commodity type, and depending on how important it is to have an optimal terminal design. For example, it is possible to operate a grain terminal on less than 10 acres, but a modern rail-served terminal would likely require 100+ acres.

Figure 34. 2040 Portland Harbor Forecast Cargo Capacity Shortfall

Cargo Type	Low	Medium	High
Automobiles (units)	-136,000	-310,000	-554,000
Containers (TEUs)			-196,000
Metric Tons			
Automobiles	-187,000	-410,000	-730,000
Containers			-1,120,000
Breakbulk			
Grain		-2,390,000	-4,370,000
Dry Bulk		-2,960,000	-10,949,000
Liquid Bulk			
Total	-187,000	-5,760,000	-17,169,000
Acreage Needs			
Minimum	51	170	
Practical	150	390	
With Rail Loop		470	977

Source: ECONorthwest (see Appendix C)

At the City's request, Worley Parsons completed a detailed analysis of the operational and land consumption characteristics of modern ports.¹⁹ The report included case studies of innovative international facilities. Provision of efficient rail operations is one of the primary ways that modern terminals maximize cargo throughput for a given terminal. The report also includes discussion of auto terminals with multi-deck parking structures (shown as minimum acreage needs of the low scenario in Figure 34), but concludes that they would be very difficult to make cost-competitive in the context of the current Lower Columbia River market.

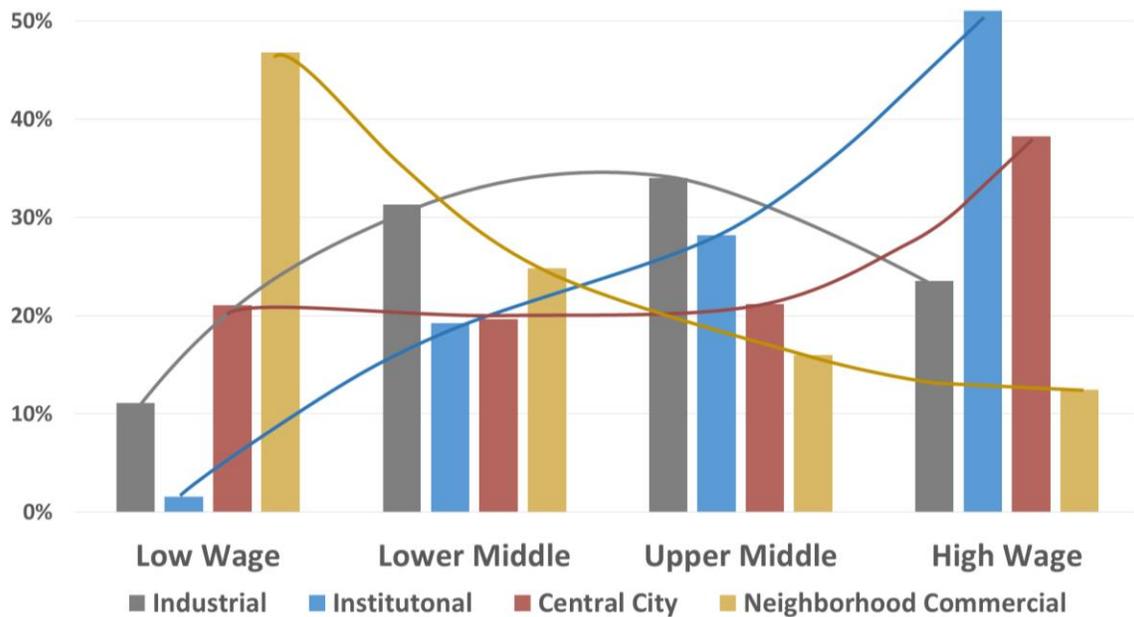
Using information collected from Worley Parsons, and the forecast information described above, ECONorthwest estimated the land need through 2040 for the Port of Portland ranges from 150 acres (practical terminal size) to 977 acres, with a mid-range land need of approximately 470 acres (Figure 34).

¹⁹ Worley Parsons, Operational Efficiencies of Ports/Terminals Worldwide, 2012

XI. WAGE DISTRIBUTION AND JOB POLARIZATION

The mix of businesses and employment geographies in the local economy shapes the income-distribution and economic equity of the population. As shown in Figure 35, employment in the Central City and institutional geographies is concentrated in high-wage occupations that primarily require college education; industrial geography employment is concentrated in middle-wage occupations; and neighborhood commercial employment is concentrated in low-wage occupations.

Figure 35. Wage Quartile Comparison of Portland’s Employment Geographies, 2012

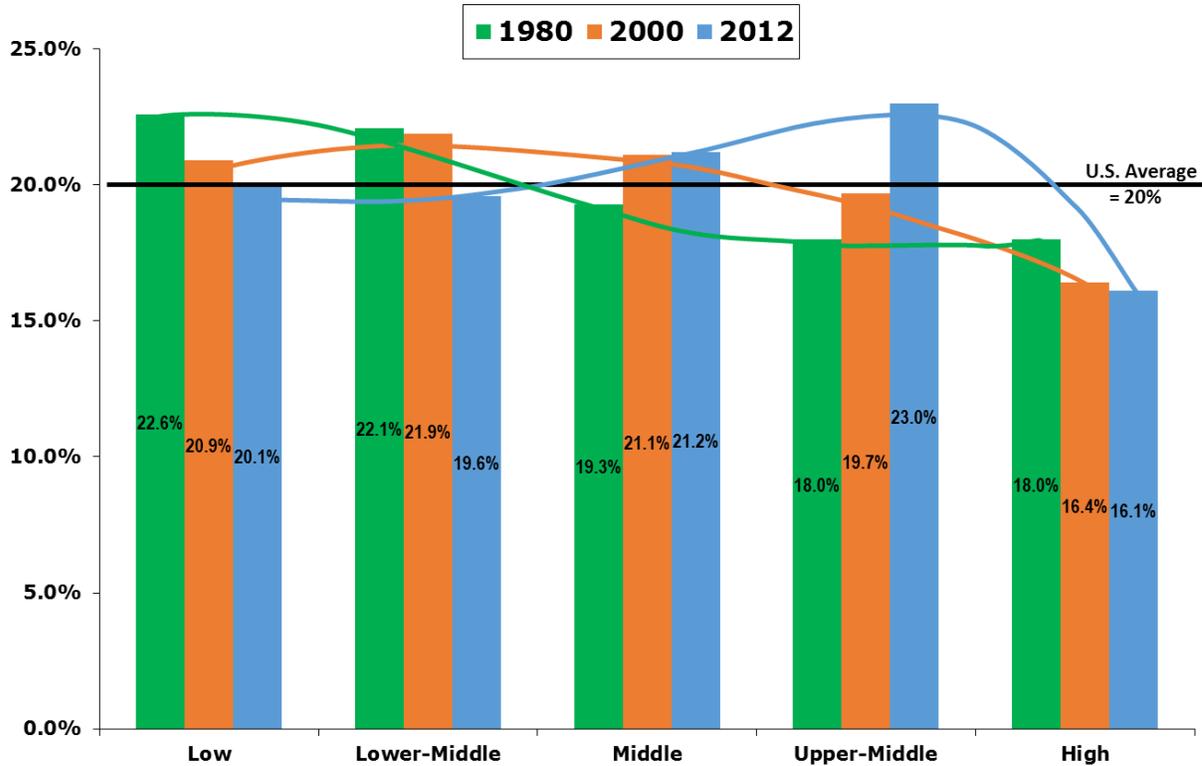


Source: Bureau of Planning and Sustainability. The wage distribution of covered employment in Portland’s EOA employment geographies is grouped by citywide wage quartiles. The Low Wage quartile is less than \$26,400 annually; Lower Middle is \$26,400-46,400; Upper Middle is \$46,400-67,600; and High Wage is more than \$67,600.

Since 1980, the wage distribution of the economy has been changing, and job growth has become increasingly polarized in low- and high-wage occupations with shrinking middle-wage job opportunities ([Josh Lehrer, 2012](#)). This national trend is mirrored in the state and the region. For the majority of the workforce that doesn’t have a 4-year college degree, middle-wage job opportunities are primarily in industrial and administrative-support occupations.

Portland has been less affected by this trend, having a relatively balanced economy that supports a predominantly middle-class population ([Brookings Institution, Berube and Tiffany, 2004](#)). Nevertheless, Portland’s primarily lower-middle income distribution of households in 2000 has shifted to a more upper-middle income distribution by 2012, as shown in Figure 36.

Figure 36. Proportion of Households in Portland by National Quintile Income Category

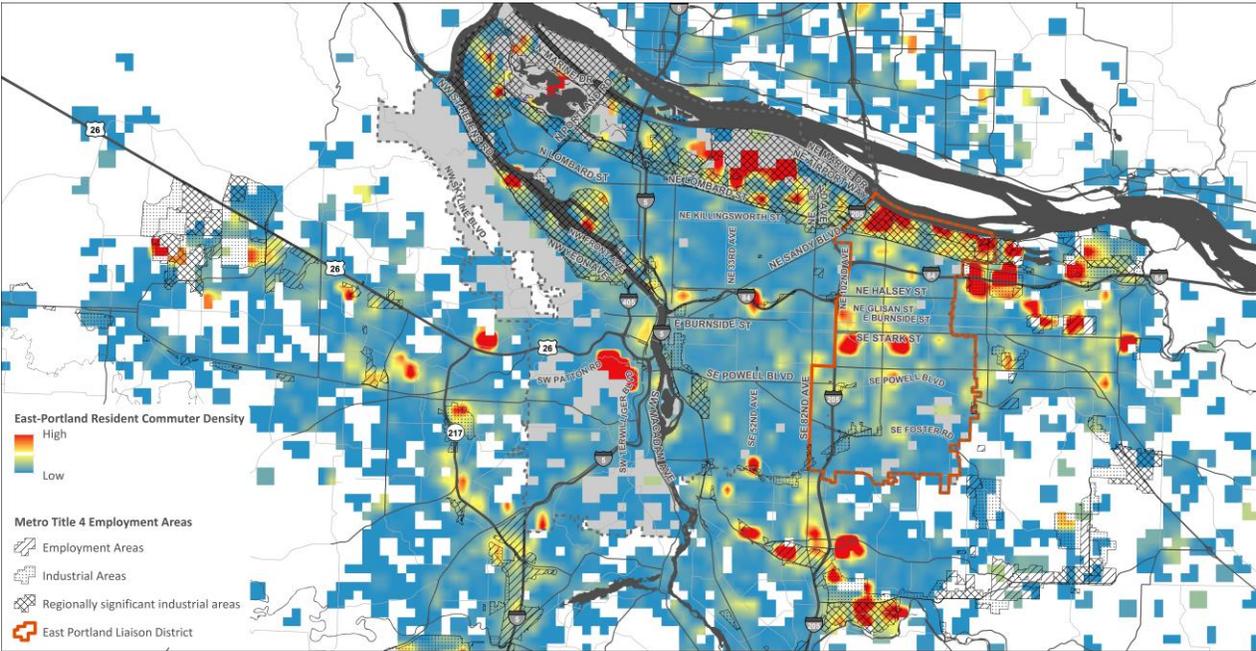


Source: Bureau of Planning and Sustainability and Brookings Institution (Alan Berube and Thatcher Tiffany, *The Shape of the Curve*, August 2004) from U.S. Census data. The income distribution of Portland households is grouped by national income quintile categories.

Industrial job growth also provides an important equity role in expanding income self-sufficiency for Portland’s diverse population and reducing income disparities for people of color and East Portland residents. For example, 27% of the workers of color in Multnomah County are employed in middle-wage industrial occupations, compared to 17% of white workers ([Coalition of Communities of Color, 2010](#)). In contrast, only 23% of workers of color are employed in the high-wage professional and management occupations, compared to 44% of white workers. As a result, people of color are disproportionately impacted by job-polarization trends and slower industrial job growth.

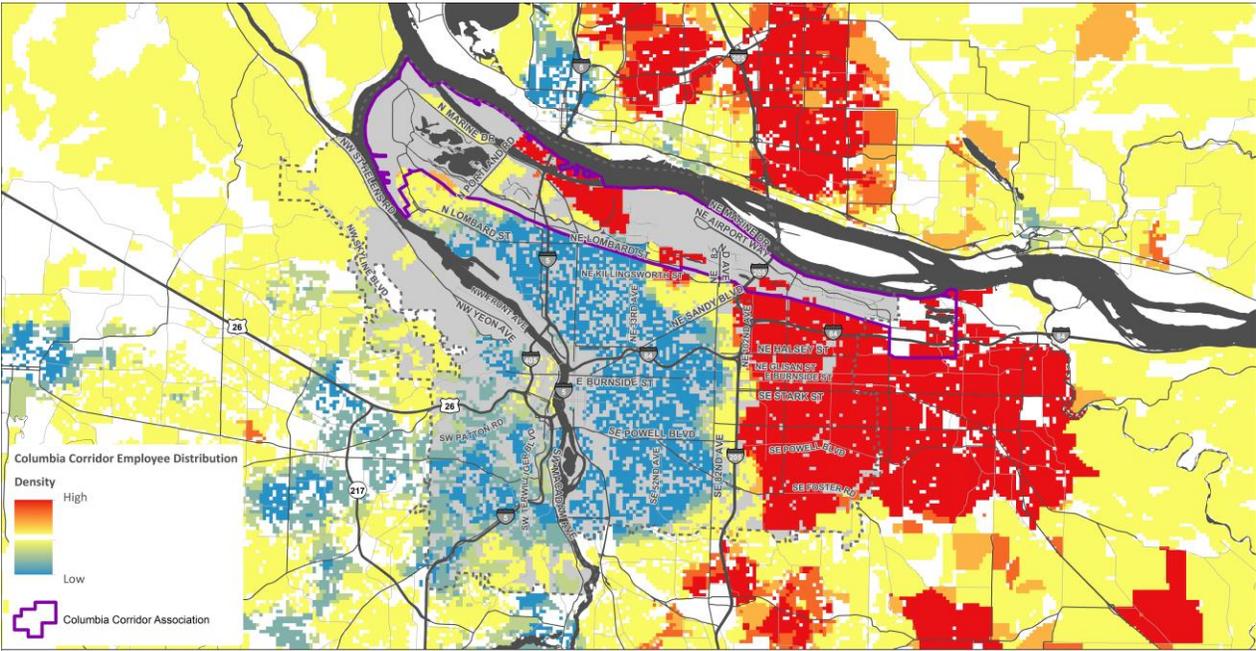
Similarly, residents of the East Portland neighborhoods work disproportionately in industrial districts and especially the Colombia Corridor, as shown in Figure 37. Conversely, workers in the Colombia Corridor industrial districts live primarily east of I-205 and are underrepresented in inner and West Portland neighborhoods, as shown on Figure 38. While labor markets are commonly considered to be regional in scale, there also appears to be substantial interdependence between East Portland’s predominantly middle-/moderate-income neighborhoods and Portland’s large middle-wage industrial districts.

Figure 37. Where East Portland Residents Work



Source: Bureau of Planning and Sustainability (August 2014) from Longitudinal Employment and Housing data, U.S. Census.

Figure 38. Where Columbia Corridor Workers Reside



Source: Bureau of Planning and Sustainability (August 2014) from Longitudinal Employment and Housing data, U.S. Census.

XII. EOA IMPLICATIONS

This section is intended to *set the stage* for the next steps of this economic opportunities analysis. Key implications of this trends and opportunities analysis for remaining portions of the economic opportunities analysis are summarized as follows:

- Long-term job growth trends have fluctuated and create uncertainty for forecasting growth in the coming decades. The 2000’s were a period of relatively slow job growth not only for Portland but for the metro region and nationally. Despite an economic downturn experienced just after 2000, followed by modest growth and a major recession at end of the decade, Metro is projecting that the nation and region should expect to return to a more normalized pattern of job recovery and stronger growth over the long-term horizon of the next 25 years.
- For Portland, another question is whether the city will maintain the 25% capture rate of regional job growth that Multnomah County experienced over the 1980-2008 period. Portland’s capture rate fell to 5% in the 2000-2008 business cycle and has since rebounded to 23% in the 2008-2013 period. The answer to this question has significant ramifications not only for Portland’s economic vitality but for regional urban growth management.
- Finally, it is apparent that the “hot spot” locations where job growth is occurring within the City have shifted in recent years. The focus of added Central City job gains has shifted from the traditional downtown core toward adjacent areas in the River and Lloyd commercial / mixed use districts and the emerging incubators of the Central Eastside and Lower Albina. Similar shifts are occurring within and between the City’s industrial, urban center and neighborhood commercial areas. In numerical terms, by far the strongest growth has been within Portland’s institutional geography.

As a final note, this Task 1 report has focused on employment in terms of Goal 9 requirements for an Economic Opportunities Analysis. The resulting employment analysis addresses trends with respect to the number and types of jobs including categorization by land use designation. However, it is important to note that employment is one of many approaches to measuring economic activity.

Because the focus of this report is how business uses land, employment and building development are emphasized. Other factors – such as wage levels, technology and capital intensiveness, monetary output and comparative regional advantage (or location quotients) – are not directly considered. This report also does not evaluate which industries and jobs the region should endeavor to encourage, but rather reports past trends as illustrated via employment data.

APPENDIX A. FOCUS GROUP PARTICIPANTS

As identified by the following listing, a total of 58 individuals participated in six focus groups conducted in 2009 for this Economic Opportunities Analysis. The interest and time given by all participants is gratefully acknowledged.

Figure 39. Focus Group Participants

Participant Name	Firm/Organization
Central City Office:	
Gregory Goodman	City Center Parking
Ted Gilbert	Gilbert Brothers
David Lake	Liberty NW
Scott Andrews	Melvin Mark Companies
Jeff Bourlag	NBS Realtors
Brian Owendoff	Opus NW
Steve Pfeiffer	Perkins Coie
Bernie Bottomly	Portland Business Alliance
Carly Riter	Portland Business Alliance
Josh Schlesinger	Schlesinger Companies
Matt Cole	Shorenstein
Close In Incubator:	
Pete Eggspuehler	Beam Development
Eva Schweber	Cube Space
Debbie Kitchin	Inter Works
Mickael Zokoych	Michael's Italian Beef & Sausage
Peter F. Fry	Planning Consultant
Daniel Yates	Portland Spirit
Bob Rogers	Robert R. Rogers Co.
David Lorati	School Specialty Co.
Manufacturing & Distribution:	
Corky Collier	Columbia Corridor Alliance
D. A. Albrecht	Concordia University
Jay Griffith	Evraz Inc NA
Wayne Matulich	ITT Technical
Linda Craig	Norris & Stevens
Gary Hunt	Oregon Transfer
Ann Gardner	Schnitzer Steel
Mike Williams	Silver Eagle Manufacturing
Deon Kampfer	WM

Participant Name	Firm/Organization
Neighborhood Commercial:	
Michael Zokoych	Central Eastside Industrial Council
Cindy Sturm	Cindy Sturm Real Estate
Bob LeFeber	Commercial Realty Advisors
Jean Baker	Division Clinton
Tony Fuentes	NW Children’s Business/Fox Chase Alliance
Michelle Marx	SERA Architects
Gerry Boeher	St. Johns Boosters
TOD/Mixed Use Corridors:	
Pete Eggspuehler	Beam Development
John Carroll	Carroll Investments
Kevin Cavanaugh	Cavanaugh Development
Jeana Woolley	JM Woolley & Associates
Tom Kemper	Kemper Company, LLC
Vern Rifer	Rifer Development
Kim Knox	Shiels Oblatz Johnsen
Rick Gustafson	Shiels Oblatz Johnsen
Campus Institutional:	
Theresa Paulson	Concordia University
Michael Sestric	Institutional Facilities Coalition
Scott Davis	Kaiser Permanente
Richard Bettega	Lewis & Clark College
David Groff	Linfield College
Glenn Ford	Linfield College
Gary Andeen	Oregon Independent Colleges Association
Wing-Kit Chung	Portland Community College
Ty Wyman	Providence Medical Center
Edwin McFarlane	Reed College
Jennifer Baters	Reed College
Townsend Angel	Reed College
Andrea Cook	Warner Pacific College
Steve Stenberg	Warner Pacific College

APPENDIX B. SUPPLEMENTAL DATA TABLES

On the following pages are provided supplemental detailed U.S. employment trend and projection data covering:

- U. S. Non-Farm Employment Trend and Projection (by employment sector and covering the 1980 – 2035 time period)
- Portland Metro Location Quotients Relative to the U.S. (by employment sector and covering the 1990 – 2035 time period)

Figure 40. U.S. Non-Farm Employment Trend & Projection (1980-2035)

	U. S. Employment (in millions)												Annual % Change		% of Total		
	1980	1985	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	1990-05	2005-35	1990	2005	2035
Total Non-Farm Jobs	90.53	97.51	109.49	117.31	131.79	133.69	135.62	146.5	153.33	159.9	166.49	173.54	1.3%	0.9%	100.0%	100.0%	100.0%
Private Employment	74.15	80.98	91.08	97.87	111	111.89	113.24	123.29	129.36	135.4	141.28	147.88	1.4%	0.9%	83.2%	83.7%	85.2%
Manufacturing	18.73	17.82	17.70	17.24	17.27	14.23	11.99	12.78	12.63	12.00	11.52	11.14	-1.4%	-0.8%	16.2%	10.6%	6.4%
Durable Goods	11.68	11.03	10.74	10.37	10.88	8.96	7.46	8.20	8.04	7.57	7.28	7.10	-1.2%	-0.8%	9.8%	6.7%	4.1%
Lumber	N/A	N/A	0.54	0.57	0.61	0.56	0.43	0.55	0.53	0.49	0.46	0.47	0.2%	-0.6%	0.5%	0.4%	0.3%
Primary Metals	N/A	N/A	0.69	0.64	0.62	0.47	0.37	0.38	0.37	0.37	0.33	0.29	-2.5%	-1.6%	0.6%	0.4%	0.2%
Fabricated Metals	N/A	N/A	1.61	1.62	1.75	1.52	1.29	1.47	1.50	1.45	1.39	1.30	-0.4%	-0.5%	1.5%	1.1%	0.7%
Machinery	N/A	N/A	1.41	1.44	1.46	1.17	1.05	1.20	1.18	1.11	1.05	1.00	-1.2%	-0.5%	1.3%	0.9%	0.6%
Electronics	N/A	N/A	1.90	1.69	1.82	1.32	1.15	1.01	0.94	0.90	0.94	1.01	-2.4%	-0.9%	1.7%	1.0%	0.6%
Transport. Equipment	N/A	N/A	2.13	1.98	2.06	1.77	1.39	1.61	1.47	1.24	1.11	1.10	-1.2%	-1.6%	1.9%	1.3%	0.6%
Oth. Durables	N/A	N/A	2.45	2.43	2.56	2.15	1.79	1.99	2.05	2.01	1.99	1.92	-0.9%	-0.4%	2.2%	1.6%	1.1%
Non-Durables	7.05	6.78	6.96	6.87	6.39	5.27	4.53	4.58	4.59	4.43	4.25	4.04	-1.8%	-0.9%	6.4%	3.9%	2.3%
Food Proc.	N/A	N/A	1.51	1.56	1.55	1.48	1.45	1.55	1.62	1.62	1.62	1.61	-0.1%	0.3%	1.4%	1.1%	0.9%
Paper	N/A	N/A	0.65	0.64	0.60	0.48	0.41	0.42	0.43	0.42	0.40	0.38	-2.0%	-0.8%	0.6%	0.4%	0.2%
Other Non-Dur.	N/A	N/A	4.80	4.67	4.23	3.31	2.67	2.61	2.55	2.39	2.22	2.05	-2.4%	-1.6%	4.4%	2.5%	1.2%
Non-Manufacturing	71.79	79.69	91.79	100.07	114.53	119.45	123.63	133.71	140.71	147.90	154.95	162.39	1.8%	1.0%	83.8%	89.3%	93.6%
Natural Resources	1.08	0.97	0.76	0.64	0.60	0.63	0.72	0.66	0.56	0.55	0.53	0.53	-1.2%	-0.6%	0.7%	0.5%	0.3%
Construction	4.45	4.79	5.27	5.28	6.79	7.33	6.52	7.61	8.11	8.74	9.57	10.47	2.2%	1.2%	4.8%	5.5%	6.0%
Wholesale Trade	4.56	4.91	5.27	5.43	5.93	5.76	5.76	6.35	6.98	7.66	7.87	7.69	0.6%	1.0%	4.8%	4.3%	4.4%
Retail Trade	10.24	11.73	13.18	13.90	15.28	15.28	15.40	15.59	15.38	15.38	15.32	15.44	1.0%	0.0%	12.0%	11.4%	8.9%
Auto parts	N/A	N/A	1.49	1.63	1.85	1.92	1.95	1.81	1.79	1.78	1.80	1.80	1.7%	-0.2%	1.4%	1.4%	1.0%
Food & Bev.	N/A	N/A	2.78	2.88	2.99	2.82	2.94	2.78	2.61	2.60	2.55	2.52	0.1%	-0.4%	2.5%	2.1%	1.5%
Other Retail	N/A	N/A	8.91	9.39	10.44	10.54	10.51	10.89	10.96	11.00	10.99	11.12	1.1%	0.2%	8.1%	7.9%	6.4%
TWU	3.61	3.73	4.22	4.51	5.01	4.92	4.95	5.76	6.38	6.88	7.19	7.23	1.0%	1.3%	3.9%	3.7%	4.2%
Information	2.36	2.44	2.69	2.84	3.63	3.06	2.78	2.96	3.15	3.44	3.80	4.32	0.9%	1.2%	2.5%	2.3%	2.5%
Printing	N/A	N/A	0.87	0.91	1.03	0.90	0.80	0.82	0.84	0.86	0.89	0.95	0.2%	0.2%	0.8%	0.7%	0.5%
Internet, etc.	N/A	N/A	1.82	1.93	2.59	2.16	1.98	2.14	2.32	2.58	2.91	3.37	1.1%	1.5%	1.7%	1.6%	1.9%
Financial Activities	5.02	5.81	6.61	6.83	7.69	8.15	8.24	8.57	8.42	8.44	8.44	8.61	1.4%	0.2%	6.0%	6.1%	5.0%
Finance & Ins.	N/A	N/A	4.98	5.07	5.68	6.02	6.11	6.33	6.22	6.21	6.22	6.39	1.3%	0.2%	4.5%	4.5%	3.7%
Real Estate	N/A	N/A	1.64	1.76	2.01	2.13	2.13	2.24	2.20	2.23	2.22	2.22	1.8%	0.1%	1.5%	1.6%	1.3%
Professional Business	N/A	N/A	10.85	12.85	16.67	16.94	17.73	21.96	25.16	28.42	32.30	36.37	3.0%	2.6%	9.9%	12.7%	21.0%
Pro., Sci., Tech.	N/A	N/A	4.54	5.08	6.70	7.02	7.88	8.98	10.20	12.29	14.79	17.96	2.9%	3.2%	4.1%	5.3%	10.3%
Mgmt. of Companies	N/A	N/A	1.67	1.69	1.80	1.76	1.80	1.72	1.60	1.53	1.45	1.39	0.4%	-0.8%	1.5%	1.3%	0.8%
Admin & Waste	N/A	N/A	4.64	6.08	8.17	8.16	8.05	11.26	13.36	14.60	16.06	17.02	3.8%	2.5%	4.2%	6.1%	9.8%
Edu. & Health	7.07	8.66	10.98	13.29	15.11	17.37	19.90	21.61	22.87	23.64	24.09	24.81	3.1%	1.2%	10.0%	13.0%	14.3%
Education	N/A	N/A	1.69	2.01	2.39	2.83	3.24	3.06	3.01	3.05	3.06	3.09	3.5%	0.3%	1.5%	2.1%	1.8%
Health Care	N/A	N/A	9.30	11.28	12.72	14.54	16.66	18.55	19.86	20.60	21.03	21.73	3.0%	1.3%	8.5%	10.9%	12.5%
Leisure & Hospitality	6.72	7.87	9.29	10.50	11.86	12.81	13.53	14.12	14.39	14.73	14.95	15.33	2.2%	0.6%	8.5%	9.6%	8.8%
Arts & Entertain.	N/A	N/A	1.13	1.46	1.79	1.89	1.97	1.95	2.09	2.29	2.42	2.54	3.5%	1.0%	1.0%	1.4%	1.5%
Accomm. & Food Ser.	N/A	N/A	8.15	9.04	10.07	10.92	11.56	12.17	12.30	12.44	12.53	12.79	2.0%	0.5%	7.4%	8.2%	7.4%
Other Services	2.75	3.37	4.26	4.57	5.17	5.39	5.72	5.31	5.34	5.52	5.69	5.93	1.6%	0.3%	3.9%	4.0%	3.4%
Govt., Civilian, total	16.38	16.53	18.41	19.43	20.79	21.81	22.38	23.21	23.97	24.50	25.20	25.66	1.1%	0.5%	16.8%	16.3%	14.8%

Source: Global Insight, *2008 QR US Long-Term Outlook*, as compiled by Metro.

Figure 41. Portland Metro Location Quotients Relative to U.S. (1990-2035)

	1990	1995	2000	2005	2008	2010	2015	2020	2025	2030	2035
Manufacturing, total	1.06	1.09	1.12	1.18	1.22	1.27	1.23	1.22	1.26	1.28	1.30
Durable Goods, total	1.25	1.29	1.34	1.43	1.45	1.53	1.45	1.45	1.51	1.54	1.56
Wood Products	2.21	1.54	1.31	1.45	1.34	1.22	1.15	1.12	1.14	1.12	1.05
Primary Metal	1.86	1.47	1.68	1.77	2.09	2.22	2.03	1.82	1.67	1.66	1.72
Fabricated Metal	1.01	1.13	1.06	1.12	1.11	1.16	1.07	1.01	1.00	1.00	1.02
Machinery	0.98	1.01	0.97	0.96	0.95	0.96	0.85	0.80	0.80	0.80	0.81
Electrical Machinery	2.23	2.70	3.07	3.77	3.75	3.63	4.38	4.79	5.01	4.86	4.56
Transportation Equipment	0.67	0.67	0.73	0.69	0.71	0.83	0.74	0.82	0.97	1.07	1.06
Non-durable Goods, total	0.78	0.79	0.76	0.77	0.80	0.85	0.84	0.82	0.82	0.83	0.84
Food Processing	0.95	0.86	0.77	0.79	0.83	0.85	0.79	0.72	0.68	0.65	0.64
Paper	1.75	1.55	1.46	1.40	1.32	1.45	1.47	1.39	1.36	1.35	1.37
Non-manufacturing, total	1.03	1.03	1.01	1.01	1.00	1.00	1.01	1.01	1.01	1.01	1.01
Natural Resources	0.40	0.44	0.42	0.39	0.28	0.31	0.31	0.32	0.30	0.29	0.27
Construction	1.05	1.20	1.06	1.08	1.17	1.22	1.09	1.03	0.99	0.93	0.89
Retail Trade	0.94	0.93	0.95	0.93	0.95	0.94	0.98	0.96	0.96	0.97	0.98
Motor Vehicle & Parts	1.09	1.04	1.04	1.00	0.97	0.92	1.01	1.07	1.08	1.09	1.08
Food & Beverage Stores	0.82	0.80	0.85	0.89	0.93	0.89	0.97	1.01	1.01	1.03	1.05
Other Retail	0.96	0.95	0.96	0.93	0.95	0.96	0.97	0.93	0.93	0.94	0.94
Transp., Warehouse, & Utilities	1.13	1.08	1.04	1.02	0.98	1.01	1.00	0.95	0.91	0.90	0.93
Information, total	0.90	0.93	0.97	1.02	1.09	1.08	1.11	1.14	1.14	1.12	1.05
Publishing	0.78	0.99	1.27	1.37	1.56	1.66	1.86	2.14	2.36	2.51	2.48
Internet & Other	0.97	0.90	0.85	0.87	0.90	0.85	0.83	0.78	0.74	0.69	0.64
Finance Activities	1.14	1.13	1.14	1.14	1.13	1.12	1.20	1.28	1.34	1.39	1.42
Finance & Insurance	0.91	0.91	0.99	0.99	0.95	0.96	1.04	1.11	1.17	1.21	1.24
Real Estate	1.84	1.77	1.57	1.55	1.62	1.61	1.63	1.74	1.80	1.89	1.96
Pro. Business Services	1.08	1.14	1.06	1.03	1.01	1.01	0.93	0.88	0.83	0.78	0.73
Pro., Sci., & Tech.	1.21	1.20	0.98	0.95	0.91	0.90	0.89	0.85	0.76	0.67	0.59
Mgmt. of Companies	0.92	1.23	1.52	1.56	1.62	1.61	1.95	2.32	2.66	3.10	3.56
Admin. Support	1.01	1.05	1.02	0.99	0.96	0.99	0.81	0.73	0.70	0.67	0.65
Edu. & Health Care	1.01	0.92	0.92	0.94	0.92	0.90	0.95	1.01	1.07	1.14	1.19
Educational	1.04	0.98	1.02	1.00	0.96	0.96	1.09	1.21	1.29	1.38	1.45
Health Care	1.00	0.91	0.90	0.92	0.91	0.89	0.92	0.98	1.03	1.10	1.15
Leisure & Hospitality	1.03	1.01	0.98	0.96	0.96	0.95	0.99	1.03	1.05	1.08	1.09
Arts, Entertainment & Rec.	1.32	1.13	0.99	0.95	0.92	0.91	0.98	0.99	0.96	0.96	0.95
Accommodation & Food	0.99	0.99	0.98	0.96	0.97	0.96	0.99	1.03	1.07	1.10	1.12
Other Services	0.91	0.89	0.88	0.87	0.88	0.83	1.04	1.15	1.21	1.27	1.28
Government, Civilian total	0.89	0.85	0.90	0.90	0.91	0.91	0.86	0.85	0.85	0.83	0.85
Federal, Civilian	0.89	0.85	0.89	0.91	0.87	0.87	0.85	0.81	0.78	0.75	0.73
State & Local	0.81	0.79	0.84	0.85	0.86	0.86	0.82	0.81	0.82	0.81	0.83

Source: Global Insight, 2008 QR US Long-Term Outlook and Metro.

APPENDIX C. PORTLAND HARBOR INDUSTRIAL LAND SUPPLY ANALYSIS

Portland Harbor: Industrial Land Supply Analysis

Prepared for the City of Portland:
Bureau of Planning and Sustainability

Prepared by ECONorthwest

in association with:

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Preface

This report addresses four questions about land in the Portland Harbor area. It supports the City of Portland's efforts to update its Economic Opportunities Analysis, plan for the land use in the Harbor area, and address issues related to the development and conservation of West Hayden Island.

ECONorthwest was the lead consultant to the City on this evaluation, assisted by subconsultants Maul Foster & Alongi, and Bonnie Gee Yosick LLC. This consultant team had substantial and appreciated assistance from many sources, but especially: City of Portland Bureau of Planning and Sustainability, Port of Portland, Port of Vancouver, Working Waterfront Coalition, and BST Associates.

Despite the assistance, ECONorthwest and its subcontractors alone are responsible for the report's contents. The report has been reviewed by City staff and an advisory committee, but the views expressed are those of the consultants and may not be shared by others who contributed to or reviewed this report.

Throughout the report ECONorthwest has identified sources of information and assumptions used in the analysis. Within the limitations imposed by uncertainty and the project budget, staff at ECONorthwest and the Bureau of Planning and Sustainability at the City of Portland have made every effort to check the reasonableness of the data, methods, and assumptions and to test the sensitivity of the results to changes in key assumptions. Any forecast of the future is uncertain. The fact that ECONorthwest and its team members evaluate the assumptions in this report as reasonable does not guarantee that those assumptions will prevail.

Summary

This evaluation starts from the assumption, embedded in the economic development policies of all local governments in the region, that the retention, expansion, and relocation to the region of industrial sectors is something that the region desires. It addresses the capacity of industrial land in the Portland Harbor area to accommodate future development, both for new public marine terminals and private marine-dependent businesses. It addresses *four questions posed by the City*:

1. Are the methods the City used to estimate the location and amount of vacant, partially vacant, and potentially buildable industrial land in the Portland Harbor area likely to yield reasonable estimates?
2. Given the estimated land supply in the Portland Harbor area, how suitable for a public marine terminal are the few sites identified by the City as having the best potential to accommodate such a terminal?
3. If those sites do not develop as marine terminals (for whatever reasons) to what extent can the Port of Vancouver play a role in accommodating forecasted cargo demand in the Portland region?
4. Finally, if existing vacant land in the harbor area and in Vancouver is estimated to be insufficient to accommodate forecasted or desired transshipment or industrial activity, what is the potential for more efficient use of industrial land in the Portland Harbor study area? That question implies answering the question: What does more efficient use of industrial land mean, and how would it be measured?

SUPPLY OF VACANT OR UNDERUTILIZED INDUSTRIAL LAND

The methods used for the City's evaluation of the supply of vacant land in the Harbor Area are sound, state of the practice, and produce results that have been confirmed by independent methods. When looking for where in the Harbor Area is vacant land that could potentially be assembled into a 100-acre (or, at a minimum, a 50-acre) site with waterfront access? the City correctly identified the two sites with greatest potential: Atofina and Time Oil.

POTENTIAL FOR MARINE TERMINAL SITES

Public marine terminals have specific land use requirements that are difficult to find. Ideally, sites must be large and flat, inside of an industrial zone, have significant shoreline on a navigable river, be served by both rail and truck, and free of contamination, wetlands, or other environmental constraints. Excluding West Hayden Island, there are no sites in the Portland Harbor that meet these ideal requirements, though there are a few sites that come close. This should not imply that West Hayden Island meets all the ideal site requirements (in fact West Hayden Island lacks sufficient truck access, and is constrained by wetlands), but is simply stating that the West Hayden Island site is outside the boundary of our study area. The questions are: how close do they come, and is there a way to cost-effectively develop these sites as productive public marine terminals?

The City of Portland identified the two sites in the Portland Harbor that are most likely to be suitable for development of a new public marine terminal: the Atofina site, and the Time Oil site. Of these two sites, development is technically possible on either, but there are major hurdles that would add significant costs. Both sites have some level of contamination, both sites would require negotiation and property acquisition from numerous property owners, and both sites are smaller than desirable, which precludes the possibility of an onsite rail loop. Ultimately, issues related to the Superfund cleanup of the Willamette River make all sites in the Portland Harbor very challenging (if not altogether unfeasible) for development in the near future.

ROLE OF VANCOUVER IN PROVIDING HARBOR-AREA INDUSTRIAL LAND

Recent forecasts suggest that under mid-range assumptions about cargo demand, the Port of Portland's existing marine terminals will reach the limits of their capacity (for at least some cargo types) in the next several decades. Once these facilities meet their capacity, the Port will need to develop new facilities, or else turn away demand. The Port of Vancouver shares many of the same attributes that make the Port of Portland an attractive place for marine shipping. Thus, the Port of Vancouver is a logical place to site new marine terminals, if sites are unavailable in the 4,000-acre Portland Harbor.

Projecting future land needs to accommodate demand for public marine terminals is difficult, and even the best forecasts suggest a wide-range of potential outcomes. Given mid-range (and presumably most likely) scenario for future demand, the Port of Vancouver may, in theory, have

enough developable land to accommodate regional growth in cargo volumes through 2040. The assumptions in variation of the mid-range forecasts show the Portland-Vancouver Region needing an additional 200 to 600 acres for new terminals by 2040: there is vacant industrial land with water-access that is in that range. In practice, however, competing demands for Port of Vancouver lands, policies and competition among affected jurisdictions, and the potential for higher growth in cargo volumes all make it possible, if not likely, that the land controlled by the Port of Vancouver would not be able to accommodate all of the regional demand for marine cargo. The “high” forecast of cargo demand, for example, is three times the mid-range demand.

From a regional perspective, it makes little difference whether terminal development occurs in Portland or Vancouver. Both cities function as part of the same regional economy, and share the same infrastructure and labor pool. At a local level, however, if demand for public marine terminals is shifted from Portland to Vancouver, the City of Portland would lose some industrial jobs and the income they generate to Vancouver.

POTENTIAL FOR INCREASED EFFICIENCIES IN THE USE OF LAND

Typical measures of efficiency of land use include employment, real market value, and built space. Harbor industrial development tends to have low floor-area ratios (FAR) and a relatively low number of jobs per acre. Thus, typical measures of efficiency would all tend to improve if industrial land were converted to other commercial uses. But industrial lands in general, and harbor lands in the case of this study, are clearly an important piece of the regional economy. Therefore, we suggest two alternative measures of efficiency that are more appropriate for harbor industrial land: value added and tonnage of cargo.

Data from recent years show some measures of economic output have been increasing faster than vacant land is being converted to developed land, and other measures have not. The region should continue to track these measures and adopt policies with the intention of increasing measures of economic output faster than vacant land is converted to developed land. This seems like an objective that could appeal to people with different interests: economic development, environmental amenity, or smart growth.

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Chapter 1 INTRODUCTION

Section 1.1 describes events leading to this study and what the City hopes to learn from it. The City wants to evaluate the potential for the Portland Harbor to support economic activity. It has four questions about the capacity of land in the Portland Harbor to support future economic activity: (1) about the supply of vacant and underutilized land in the harbor area for marine terminals or water-dependent industrial uses; (2) about the land needs and potential land available for new port terminals; (3) about the role of Vancouver as a regional port; and (4) about potential changes in the use of industrial land (one aspect of which is referred to as “land efficiency”). **Section 1.2** describes how the rest of the report is organized.

1.1 BACKGROUND AND PURPOSE

The City of Portland (City) is the center of a large regional economy: there are about one million jobs in the seven-county metropolitan area, and almost 400,000 jobs within the city limits.

Many factors have contributed to the growth of the Portland economy, but one important factor is its ability to transport goods. Portland benefits from accessibility by highways (at the intersection of Interstates 5 and 84), rail (two Class 1 railroads - Union Pacific and BSNF, and short-line railroads), air (Portland International Airport), and sea (the Columbia and Willamette rivers).

The Portland Harbor is an industrial area located along the Willamette River that relies on the confluence of transportation infrastructure in the City (Exhibit 1.1). It contains about 4,000 acres of land located south of the Columbia River, west of I-5, and on both the east and west shores of the Willamette River. River-related industrial activities operate as a partnership between public marine terminals (owned and operated by the Port of Portland) and private businesses, including many marine-dependent industries. Key industrial sectors in the Portland Harbor include construction, manufacturing, warehousing, and transportation.

Over the past decade several studies of the Portland Harbor have been completed. The 2010 *West Hayden Island Economic Foundation Study* (prepared by Entrix for the City of Portland) summarized the conclusions of these studies:

“Portland Harbor serves as an economic engine for the metro regional economy... Past studies indicate that cargo and manufacturing activities dependent on waterborne transportation contribute significantly to the metro region’s economy. These studies indicate that marine-related economic activity generates from 20,000 to 100,000 jobs and from \$1.4 to 3.4 billion annually in regional income.”

Exhibit 1-1. Portland Harbor study area



Source: City of Portland, Bureau of Planning, 2011.

Another recent study, *Portland's Working Rivers: The Heritage and Future of Portland's Industrial Heartland* (2008 report prepared by Carl Abbott for the Working Waterfront Coalition) describes the impact of the harbor on the City. Some of its conclusions:

- The Portland Harbor is the nexus of a multi-modal system. The Willamette and Columbia rivers serve marine terminals, ocean shipping lines, barge lines, and bulk handling facilities. These waterborne facilities connect to railroads, interstates, commercial and general airports, and pipelines.
- Approximately 90% of harbor sites have access to rail routes, improving efficiency of transporting large loads from sea to land.
- Cargo forecasts by the Port of Portland further highlight the importance of the harbor: the volume of trade through Portland is expected to double by 2035.

In 2004, four river-related districts (Northwest Industrial District, Swan Island / Central Eastside, Rivergate, and Columbia Corridor) had employment about equal to the metropolitan area's three other industrial districts: the Sunset Corridor and 217 Corridor (where the electronics and computer industry is concentrated), and the Milwaukie/Clackamas Corridor (with a mix of manufacturing and distribution).

The importance of the harbor to the regional economy would be sufficient reason for the City to evaluate the harbor's needs for continued operation and expansion. But additional issues motivate the current evaluation. First, the City is in the process of concluding an extensive study of the City and regional economy (its *Economic Opportunities Analysis*, or EOA) as required by state land-use law. Second, the City has been engaged in studies of West Hayden Island, where there is a question about which land should be made available for future port development and which should be preserved as natural areas.¹ Answering that question depends in part on whether alternative areas in or near the Portland Harbor study area have land that is appropriate and sufficient for the water- and port-related development that is expected or desired.

Thus, though several studies of development issues in the Portland Harbor area have occurred in the last five years, the City wanted an evaluation to (1) synthesize and evaluate the findings of previous studies as they relate to the harbor economy and industrial land uses, and (2) address three specific questions related to the development of industrial land in the Portland Harbor.

To that end, the City asked ECONorthwest (ECO) to re-examine the inventory of existing harbor lands, both in Portland and the broader region (including Vancouver). This report addresses the capacity of industrially-designated land in the harbor area to accommodate future development,

¹ A current proposal for West Hayden Island is to devote 300 acres of land for marine terminal development, while setting aside 500 acres for open space.

both for new public marine terminals and private marine-dependent businesses. It addresses four questions posed by the City, each new question building from the answer of the question preceding it:

1. Are the methods the City used to estimate the location and amount of vacant, partially vacant, and potentially buildable industrial land in the Portland Harbor area likely to yield reasonable estimates?
2. Given the estimated land supply in the Portland Harbor area, how suitable for a public marine terminal are the few sites identified by the City as having the best potential to accommodate such a terminal?
3. If those sites do not develop as marine terminals (for whatever reasons), to what extent can the Port of Vancouver play a role in accommodating forecasted cargo demand in the Portland region?
4. If existing vacant land in the harbor area and in Vancouver is estimated to be insufficient to accommodate forecasted or desired transshipment or industrial activity, what is the potential for more efficient use of industrial land in the Portland Harbor study area? That question implies answering the question: What does more efficient use of industrial land mean, and how would it be measured?

By answering these questions, this report helps the City move forward in its planning processes. It provides information to help with assumptions that the City's *Economic Opportunities Analysis* may be making about industrial land supply and the efficiency (density) at which that land is likely to develop. It helps the City assess the importance of West Hayden Island as a site for future development of new public marine terminals by evaluating the (limited) potential of suitable sites for such development elsewhere in the Portland Harbor.²

² This report does not, however, include any analysis regarding the applicability of its findings to state, regional or local planning policies: such information will presumably be provided as part of any additional analysis by the City.

1.2 ORGANIZATION OF THIS REPORT

This report has three additional chapters and three appendices:

Chapter 2, Framework and Methods: Summary of economic concepts underlying the analysis, and specific methods used to answer the four questions that are the focus of this report.

Chapter 3, Analysis: Current and likely future conditions for key factors affecting economic activity in the Portland Harbor.

Chapter 4, Summary of Findings: Briefly restates the important conclusions of our analysis.

Appendix A: Research Methods: Framework for understanding and methods for conducting our analysis (more detail than is provided in Chapter 2 of the main report).

Appendix B: Port Terminal Site Evaluation Criteria: Used by Maul Foster & Alongi, Inc. to evaluate the feasibility of potential sites in the Portland Harbor.

Appendix C: Analysis of Harbor Land Capacity and Demand, Portland and Vancouver: Provides greater detail (including a wealth of tables) on the data-driven methods used, in part, to determine the potential for the Port of Vancouver to accommodate forecast demand for the Portland Harbor, if there are insufficient sites in Portland to accommodate all of the expected demand.

Appendix D: Mapping Analysis: Presents the results of the City's visual survey of aerial maps of the Portland Harbor to classify the lands in one of several categories.

Section 2.1 discusses a *framework* for evaluation: concepts that underlie any evaluation of this type. It discusses (1) the role of industrial activity in the economy, (2) definitions of industrial use and industrial land, (3) factors relating to the supply of and demand for industrial land, and (4) the concept of land efficiency: what is it, why does it matter, and how is it measured. **Section 2.2** is more specific about the *methods* used for the evaluation (review of previous studies, secondary data, case studies, interviews) and how they are used to address this study's four questions. **Appendix A** provides a more detailed description of our framework and methods.

2.1 FRAMEWORK

2.1.1 WHY CARE ABOUT INDUSTRIAL LAND?

This study starts from the assumption, embedded in the economic development policies of all local governments in the region, that the retention, expansion, and relocation to the region of industrial sectors is something that the region desires. Industrial activity and employment is mainly classified as export oriented (“traded sector”) and is likely to have jobs at higher than average wages.

2.1.2 DEFINING INDUSTRIAL LAND AND USERS

- **Industrial land:** What is commonly referred to as “industrial” land is land designated by a local government (in its comprehensive plan, and implemented by its zoning ordinances) to allow (but not necessarily require) industrial uses. In the Portland Harbor, the City does strictly limit non-industrial uses, and allows only river-related and river-dependent industry.
- **Harbor land:** A smaller subset of industrial land pertinent in this study is “harbor” land. For this study, we use the City’s definition of the “Portland Harbor.” A map of the Portland Harbor is shown previously in Exhibit 1-1.
- **Industrial users:** A recent analysis of industrial land published by the American Planning Association³ used NAICS codes to define “industrial use” in urban areas, including a “strict” definition of construction, manufacturing, wholesale trade, and transportation and warehousing. This list, however, does not necessarily reflect the types of businesses that require industrial land. For example, many jobs in the construction industry are not physically located at a

³ Howland, Marie. 2011. “Planning for Industry in a Post-Industrial World: Assessing Industrial Lands in a Suburban Economy.” *Journal of the American Planning Association*. Winter, Vol 77, No 1. pp 39-53.

central, industrial location, but instead operate on sites throughout the region. Therefore, one should not focus exclusively on a list of NAICS codes to identify the range of businesses that could have demand for industrial land in Portland.

- **Public marine terminals:** Our analysis treats public marine terminals (i.e., the Port of Portland facilities) differently from other uses of harbor industrial land. These port terminals function as public infrastructure, facilitating economic activity for other industries in the region.

2.1.3 SUPPLY OF AND DEMAND FOR INDUSTRIAL LANDS

The total amount of land inside the Portland city limits is essentially fixed. Thus, for the City of Portland, the question of land supply focuses on how much land is vacant, partially vacant, or underutilized, and how much land is constrained (by environmental contamination, environmental overlays, and other issues).

In general, industrial land must accommodate most job growth in “industrial” sectors. It must also accommodate some job growth in “non-industrial” sectors. In other words, not all jobs in “industrial” sectors use industrially-designated land, and not all industrially-designated land is used by “industrial” sectors.

Analysis of land *supply* is about estimation, not forecasting. The use of “data layers” from Geographic Information Systems (GIS) is the standard technique for such estimation. Because it is estimation, the uncertainty is not about the future, but about the data and assumptions that are used to describe what is on the ground now. Our evaluation consists of a review of the data and assumptions.

Factors affecting supply and demand are not independent. Businesses and developers choose the land with the best value. Price makes a difference. In the Portland Harbor land may be more expensive (cost per acre) than at the region’s periphery. But land in the Portland Harbor is also close to the downtown, labor markets, port terminals, and interstate highways. If it is only a little more expensive, it may still be a preferred location for growth. If it becomes too expensive, then prospective industrial users may locate elsewhere, on land that provides a better value (for example, because lower land cost and congestion are judged to more than offset the higher costs of being more distant from a preferred location). Businesses that need water access would have an incentive to bid more for land providing that access, and other businesses would find better value in alternative locations.

2.1.4 “EFFICIENT” USE OF INDUSTRIAL LAND

Efficiency is a measurement of how much output is produced per unit of input. In this case, the City’s concern is about the amount of economic activity (output) generated per acre of land (input).

Traditional measures of efficiency

Typical measures of efficiency of land use include employment, real market value, and built space. These measures look at the amount of economic activity occurring on a property, but give relatively low marks to industrial development. Compared to an office tower, an acre of industrial development is likely to have much lower assessed value, employment, and gross square footage of built space. Thus, measures of the efficiency of employment land based on any of these measures in the numerator would all tend to improve if industrial land were converted to commercial uses.

But industrial lands (and harbor lands) are clearly important to the regional economy. If every jurisdiction allowed vacant industrial land to convert to commercial uses on the assumption that some other jurisdiction would provide the industrial land, the regional supply of industrial land would get smaller quickly. Land with port access is a particularly important and relatively rare component of all regional industrial land. Marine terminals provide access to other markets, facilitating commerce, and allowing traded-sector businesses to export their goods to other markets.

Alternative measures of the output component of efficiency

To evaluate the efficiency of the use of industrial land in the Portland Harbor, one needs a definition of efficiency that makes sense for industrial land. We suggest two alternative measures of efficiency that are most appropriate for harbor industrial land: value added, and tonnage of cargo.

- **Value added:** Value added is defined as the value of outputs (per unit or in the aggregate) minus the cost of inputs purchased from other firms used to create output.⁴ Proponents of the industrial and manufacturing sectors point to its potential for high “value added.” One measure of the efficiency of a fixed supply of industrial harbor land would be the amount of value added generated per acre for businesses located in the harbor.
- **Cargo:** There is a reasonable argument that much of the industrial land in the Portland Harbor area serves a regional need for

⁴ In that sense, value added is a measure of a firm’s contribution to GDP. Another way to think about this is that everything that a firm itself puts into the production of a product (primarily the labor of its employees and capital) “add value” to the raw materials and intermediate goods and services it purchases to make its final product.

transshipment. Therefore, a regional measure of transshipment activity might be appropriate for measuring the efficiency of such land. Some measure of cargo (e.g., tonnage, volume, value, berth utilization) is an obvious choice. Because data are more readily available for tonnage of cargo, that is an alternate measurement of land-use efficiency in the Portland Harbor that we examine in this report. If the City were interested in tracking these alternative efficiency measures in the future, then tracking multiple measures of cargo (i.e., tonnage and value) would provide a more complete picture of cargo trends.

2.2 METHODS

2.2.1 GENERAL DATA SOURCES AND TECHNIQUES

To conduct our analysis, we used the following data sources:

- **Existing studies.** Extensive analysis has been conducted regarding the Portland Harbor, industrial land, and port terminals. These efforts result in a library of reports and studies addressing different aspects of the regional economy. Appendix A includes a list of recent (or ongoing) studies that were reviewed in our analysis.
- **Secondary data sources.** ECO incorporated many secondary data sources into its analysis.⁵ As with “existing studies,” the objective is to leverage past research efforts to answer the questions posed in this study. Appendix A includes a list of the secondary data sources used in our analysis.
- **Interviews:** Many people in the Portland area have special knowledge of, and interest in, the Portland Harbor. ECO interviewed individuals from both the public and private sectors, and reviewed notes on past interviews that had been conducted for recent related studies.

2.2.2 EVALUATING CITY METHODS USED TO ESTIMATE PORTLAND HARBOR BUILDABLE LAND SUPPLY

ECONorthwest used the following methods to address this question:

⁵ Secondary data sources are ones collected and readily available by someone other than the user (in this case ECONorthwest). Typical secondary sources are government agencies (e.g., U.S. Census, ODOT, Metro, Port of Portland).

- Review of studies summarizing industrial and harbor land supply: *Industrial Districts Atlas* (2004) and *Harbor ReDI Industrial Sites Analysis* (2009).
- Review of GIS shape files and cross-referencing to staff aerial analysis of harbor lands and Google Earth aerial photos (August 2011).
- Discussion of methods and BPS staff, and comparison to standard methods for developing land inventories and identifying buildable land.

2.2.3 ADDRESSING THE POTENTIAL SITES FOR NEW MARINE TERMINALS

To determine which sites might best accommodate a public marine terminal, we began by identifying the technical site requirements for a marine terminal. ECO interviewed representatives of the Port of Portland to identify their ideal site requirements, as well as which of these requirements could be reduced while still accommodating a working port facility. Members of the ECONorthwest team with experience running west coast ports looked for creative ways to adjust these site requirements to create a working terminal on smaller or otherwise constrained sites.

BPS staff identified sites that could potentially meet these criteria, based upon an aerial analysis of existing development in the Portland and Vancouver harbors.⁶ ECO, reviewed the sites identified by the City of Portland, and toured the sites, conducting a visual inspection, documenting conditions affecting the suitability of each site for the proposed development.

2.2.4 ADDRESSING THE ROLE OF VANCOUVER IN HARBOR INDUSTRIAL LAND SUPPLY

We began by attempting a data-driven analysis. In principle, if we knew the capacity of existing marine terminals in Portland and Vancouver, and subtracted the forecast future demand for these areas, then we could identify the amount of demand that could not be accommodated by existing facilities. This demand (in tons of cargo) could then be translated into the acres of land necessary for new terminals to accommodate this growth. Comparing the required acres to support new terminals with the available land supply in the Portland Harbor and in Vancouver, we could identify how much of Portland's demand might need to be accommodated

⁶ Aerial photos were taken in 2010 and 2011.

in Vancouver, and whether or not Vancouver had sufficient land to accommodate it.

This analysis established a high and low boundary for the potential land need. We also defined a “most-likely” scenario that falls between the two extremes. In order to give these numbers more context, and to help us arrive at the most-likely scenario, we conducted numerous interviews with representatives of the ports of Portland and Vancouver.

2.2.5 ADDRESSING THE POTENTIAL FOR INCREASED EFFICIENCIES

The City is interested in knowing if industrial land in the Portland Harbor can be used more efficiently in the future. To answer, we looked at recent economic trends in the Portland Harbor and in the City of Portland as a whole for changes in land-use efficiency for industrial users. For this analysis, we considered several measures of output in an efficiency measure: employment, real market value, value added, and tonnage.

We began by identifying all parcels in the Portland Harbor using GIS. We examined data from two different years: 2002 (one of the earliest years that data are available using North American Industry Classification System codes), and 2008 (the most recent year Quarterly Census of Earnings and Wages data are available). Comparing data from the two years we calculated the change in developed acreage in the Harbor, the corresponding change in real market value, and the net change in employment.⁷

We also collected data from different sources for two alternative measures of output (for the denominator): value added and cargo (volume, tonnage, and value). Unlike employment and real market value, data for value added and cargo tonnage is not tracked at a parcel-specific level. Instead, data is available at the regional, City, zip code or Census tract level. For our analysis, we used Port of Portland data on historical levels of cargo tonnage in the Portland Harbor, and the IMPLAN economic model for the zip codes that most closely align with the boundaries of the Portland Harbor for value added. We used the same years (2002 and 2008) as were used for other measures of efficiency.

⁷ The time period used in this analysis, 2002 to 2008, does have limitations. Only having data for two years, doesn't allow for a detailed view of trends during the interim years. Moreover, a six-year period is relatively short, and may not be indicative of long-term trends. Nonetheless, these years allowed us to make the most efficient use of available data for our analysis. Moreover, the analysis focused on comparing how these different measures of efficiency changed relative to each other over the same period of time, and not on establishing long-term trends for each measure.

Section 3.1 addresses whether or not the methods used by the City to estimate the location of buildable land in the Portland Harbor area yields reasonable estimates: it concludes that they are. **Section 3.2** addresses the potential for land in Portland Harbor (not including West Hayden Island) to accommodate a new Port terminal. It finds that the two areas that might have enough vacant land to be assembled into a development site of sufficient size are relatively constrained: they could, theoretically, accommodate small terminals of various types, but some of the costs of development would be high relative to alternative sites. **Section 3.3** addresses the potential for the Port of Vancouver to accommodate regional demand for expanded Port facilities. It concludes that under the most-likely scenario, the Port of Vancouver has about the right amount of land to accommodate the bulk of the region's forecast growth in marine cargo through 2040, but that alternative and reasonable assumptions lead to the conclusion that more land than what the Port of Vancouver now controls will be needed. **Section 3.4** addresses the potential for increased efficiency for the use of industrial land in the Portland Harbor. It concludes that value added and tonnage of cargo per acre are more appropriate than traditional measures of efficiency for harbor industrial lands, and that recent historical trends demonstrate the Portland Harbor has become more efficient by most efficiency measures.

3.1 EVALUATION OF METHODS USED BY THE CITY TO ESTIMATE BUILDABLE LAND

The question is whether the methods used by BPS to identify vacant and buildable land are likely to be accurate. Will they systematically over or under estimate the land supply? In particular, are they likely to miss areas of vacant, buildable land that are big enough for a marine terminal (sites of at least 50 acres of contiguous vacant or underutilized land that has river access and could be serviced)?

To begin to answer these questions, we looked at recent studies that sought to determine the supply of buildable land in the Portland Harbor. Exhibit 3-1 summarizes the findings of the City of Portland Economic Opportunities Analysis (EOA), including the first draft (Hovee, 2009), and final report (Hovee, 2012), as well as the West Hayden Island Economic Foundation Study (Entrix, 2011), and the City of Portland Bureau of Planning and Sustainability's internal effort to quantify buildable lands, described in Exhibit 3-2 as "BPS Aerial Survey."

Exhibit 3-1. Summary of previous study estimates of Portland Harbor buildable land supply

Study	Year	City of Portland Harbor Land Supply		Parcels of Size: (3)	
		Gross Acres (1)	Effective Acres (2)	50-250 Acres	250+ Acres
EOA Draft 1, Hovee	2009	266	61	0	0
EOA, Hovee, BPS	2012	326	108	0	0
Entrix, Inc.	2010	299	<50	2	0
BPS Aerial Survey	2011	590	178	3	0

Compiled by the City of Portland Bureau of Planning and Sustainability, from the following original data sources: City of Portland Economic Opportunities Analysis, (E.D. Hovee and Company, 2012), and first draft (2009) West Hayden Island Economic Foundation Study (Entrix, 2011)

Notes:

- (1) Total acres of vacant land, without regard to environmental or contamination constraints
- (2) Total acres adjusted for environmentally sensitive land, contaminated land, or land with insufficient infrastructure
- (3) Number of individual parcels or polygons of the stated acreage

Although these recent studies come to different conclusions on the amount of vacant, buildable land, all of the studies show a relatively small supply of effective acres, ranging from less than 50 acres in the Entrix study, to 178 acres in the BPS Aerial Survey. For the purpose of identifying sites for public marine terminals, we need to consider not only the total acreage, but the size of the individual parcels. Scattered small parcels of vacant land cannot accommodate a marine terminal, a single site (typically of 50 acres or more) is needed. These recent studies show that no more than three such sites are present in the Portland Harbor.

The City asked ECONorthwest to confirm that the methods used to identify these sites were reasonable. Some simple ideas and calculations help to answer that question:

- The state of the practice for land inventories is quite advanced. The Oregon statewide planning program’s requirements for “buildable land analysis” (from the mid-1970s) spurred the use of Geographic Information Systems (GIS) throughout the state. All large cities and Metropolitan Planning Organizations in Oregon have been developing their GIS tools and datasets for over 25 years. Metro is looked to as a leader in the country on the use of GIS for land-use evaluation. The City of Portland has advanced its data in parallel with Metro. Databases that started as crude approximations have improved substantially. They have been reviewed and updated many times; data from more and more sources have been added (e.g., tax assessment, public works); computer power and software have improved; digitized mapping of aerial photographs now allows accurate registration of those photographs to underlying layers of thematic maps. In short, the data are current and accurate, and the

ability to manipulate and summarize them is substantial, fast, and technologically reliable.

- The Portland Harbor area is not big by regional standards. The detailed BPS GIS data put it at just over 4,000 acres. As a back-of-the-envelope corroboration using different datasets and tools, ECO used Google-Earth to draw the approximate boundaries of the study area (Exhibit 1-1 above) and calculate areas: the result was 4,100 acres, the equivalent of a square 2.5 miles on a side. Just inspecting aerial photographs would allow one to find large, undeveloped acreages.
- The City has conducted three extensive studies of industrial and harbor land that resulted in detailed mapping: *Industrial Districts Atlas* (2004), *Harbor ReDI Industrial Sites Analysis* (2009), and the GIS-based inventory (2011). The 2011 inventory maps and data table are included as an Appendix to this report.
- ECO has worked on a dozen buildable land evaluations, and has written many reports on the steps for working from “all land” to “vacant, buildable land.” ECO’s conversations with BPS staff led to the conclusion that staff had used state-of-the-practice techniques. In summary, (1) from “all land” the land not in parcels is removed (e.g., water bodies, street and other rights of way); (2) of the land in parcels, the land that is developed and judged unlikely to redevelop easily (usually based on the value of improvements) is removed; (3) from the undeveloped or under-developed land, the land with physical or policy constraints is removed (e.g., wetlands, in flood ways, steep slopes).

All of the previous points strongly suggest that the information about the supply of developable industrial land in the Portland Harbor area that BPS has generated is very reliable. The buildable land inventory using GIS data that was done for the update of the Economic Opportunity Analysis looks reasonable by the tests we noted.

But despite good intentions and good analysis, there are details in any such analysis that require assumptions, and the assumptions can make a difference to the outcomes. For example:

- Which constraints are absolute, and which are restrictive? Does a slope of more than 10% preclude industrial development? 15%? What if the average slope on a large parcel is 10%, but half of the parcel has slopes less than 5%? What about soil contamination: can the site be remediated, or is the extent of the contamination and legal complexities such that the site is effectively off the market for the foreseeable future?
- When is land “underutilized”? Some vacant areas around buildings may be necessary for vehicle movement, production staging, or

occasional storage. Are large parking lots “vacant” or are they an essential part of the operations in the buildings adjacent to them? A low value for improvements does not necessarily mean that the owner has any interest in redevelopment.

- Ownership patterns. What might look like relatively large areas of vacant land on an aerial photograph may be in many parcels with many different owners. Land assembly and development may be very difficult. This point is illustrated by the findings in Exhibit 3-1, which show up to three sites with at least 50 acres using the BPS methods (ignoring parcel boundaries and looking at aerial photographs), but no sites of that size when using the methods in the Economic Opportunities Analysis (which did look at parcel boundaries).

For the Harbor Area land evaluation, our evaluation is that the buildable land inventory using GIS data that was done by BPS to update of the Economic Opportunity Analysis has generally made inclusionary rather than exclusionary assumptions: we think that is appropriate. BPS did not, for example, eliminate from its search for large, buildable parcels those with arbitrarily defined thresholds for buildability (e.g., proximity to services or the river, steep slopes, contamination), or those that had a particular ownership. All those parcels are still part of the dataset from which large sites were identified. The result, as Section 3.2 shows, is that the large sites identified have several challenges for development: challenges that were not screened out by earlier assumptions about buildability criteria. In other words, on that score, the methods used by BPS were inclusive, and the result is that there would be less chance of screening out land that might eventually prove to be capable of contributing to a large site for a marine facility.

An assumption that BPS did make, and that all buildable land evaluations that we are familiar with also make, is that developed parcels are, in general, not buildable parcels. They can, of course, become buildable parcels if their buildings are removed. Thus, it is theoretically possible that parcels that look developed (from assessment data, aerial photographs, and field surveys) could eventually be part of a land assembly large enough to accommodate a large marine terminal. The kind of detailed, property-level analysis needed to make judgments about land redevelopment and site assembly is not done as part of a regional or city buildable land evaluation.

But there is still the issue of “underutilized” land. A buildable land dataset, like the one BPS has developed, will be quite good (after field testing – and there has been plenty in the Harbor Area over the last 10 years) at distinguishing developed parcels from vacant parcels in most cases. But it is more difficult to determine when a generally vacant parcel is underutilized, and more difficult still to determine whether parcels that are

developed have underutilized remainders that might be considered as vacant and eligible for consolidation into a larger, developable site.

The documentation of the City of Portland's GIS-based Development Capacity Model⁸ says that it (1) identifies (and presumably flags as undevelopable) "constrained" properties (i.e., significant environmental or historic resources), and (2) identifies developed parcels "significantly underutilizing their allowed development capacity (using less than 20% of available capacity, not including any development bonuses or incentives)" [that determination can be over-ridden by a judgment by BPS staff that a property is "likely" or "not likely" to redevelop]. The dataset has detailed information on parcel attributes (around 100 attributes per parcel), including building footprint (which allows a calculation of the amount of land not currently developed as a building). It has an algorithm for calculating "site area" by combining the acre of contiguous "underutilized" lots. In short, this is an extensive and well-documented dataset.

The BPS identification of potentially developable sites in the Portland Harbor did not rest entirely on technical analysis using GIS. Additional analysis done as part of the specific to the Harbor Lands Inventory also relied extensively on a review of aerial photographs, with staff performing a visual inspection of all sites along the Willamette River to ensure that any large areas of apparently vacant land had been included in the database of potential terminal sites, and that all of the sites identified by GIS appeared to have the development potential that was suggested by the data. Additionally, BPS staff made reasonable efforts to acquaint themselves with the sites, talking to Port of Portland officials, and visiting the areas, to make sure that the BPS analysis was grounded in a solid understanding of what was actually occurring on key sites in the Portland Harbor. In short, land uses and vacant lands identified in the visual survey were compared with the GIS/BLI data to ensure there were no large information gaps.

As a final check on the site inventory, we relied on our familiarity with the study area, the City documents cited above, and aerial photographs to see whether there were any large areas of vacant or underutilized land besides the two (Atofina and Time Oil sites) that the City identified as the best candidates for a new marine terminal. On the west bank of the Willamette River, we found nothing beyond the Atofina site: the north reach has only a narrow strip of mainly developed land; the south reach has a wider land area but is entirely developed along the waterfront. We found the following candidates on the east bank:

⁸http://www.portlandonline.com/cgis/metadata/viewer/display.cfm?Meta_layer_id=52965&Db_type=sde&City_Only=False

- Swan Island Industrial Park. Land at the south edge on the NE bank of the Willamette River could be classified as underutilized: it is an operation for transshipment of aggregate (10 acres). But even if the parking and storage on both sides of the site is counted, the site would still fall way short of the minimum threshold of 50 acres.
- McCormick and Baxter site, SE of BNSF bridge on east side of the Willamette River. Depending on what land is counted (e.g., backing out land for rail right of way, some existing buildings), this site may be 50 – 70 acres in size. This site was excluded from the City’s analysis, primarily because it was recently proposed to be rezoned as EG2 in the River Plan, which (although it allows industrial development) does not allow rail yards, and requires greater setbacks and landscaping than other industrial zones (like IH for heavy industrial). Conversations with BPS staff indicate that the EG2 zone designation is one element of the River Plan that has been challenged, and there is a good chance that a revised River Plan will not propose the EG2 zoning for the site, which would make this site potentially available for marine terminal development.
- “Underutilized” land north of St. John’s Bridge on east side of the Willamette. What may seem underutilized from a high-level aerial photograph is actually space for parking new cars from Asia – this is the Port of Portland’s Terminal 4 operation (about 260 acres total, handling autos, forest products, steel, and dry and liquid bulks). This site is already part of the Portland area’s supply of marine terminals and cannot be counted to add new capacity, unless it were redeveloped. Evaluating that possibility is beyond the scope of our study.
- Sites in the Terminal 5 and Terminal 6 area. There are some sites for infill (e.g., 50 acres off North Lombard in Terminal 6) but there is no water frontage available for a new terminal. Evaluating redevelopment of Port terminals is beyond the scope of our study.
- Kelly Point Park. About 50 acres at the confluence of the Willamette and Columbia Rivers, abutting Port properties of Terminals 5 and 6 is park land that is not available for development.

Of all the sites examined (beyond the Atofina and Time Oil sites already identified by BPS), the only one that met the minimum size requirements (and was not parkland) was the McCormick and Baxter site. The development potential of this site was studied extensively by the City in the past, and the results are described in the *McCormick & Baxter Site Reuse Assessment: Final Report* (June, 2001). The site could have potential for marine terminal development, but (as detailed in the 2001 site assessment) it is heavily constrained in several areas: relatively shallow water at the shoreline, inability to expand to adjacent parcels due to existing uses (Metro

open space and University of Portland campus), isolation from truck routes that require traveling through residential neighborhoods and up a relatively steep bluff, other infrastructure insufficiencies, and significant liens and encumbrances. While the challenges are substantial, they are not necessarily insurmountable, and the other sites identified by BPS face some similar challenges.

Ultimately, the site was excluded from further analysis, because it is less likely that adjacent lands could be assembled into the site, due to the adjoining zoning, and because past brownfield remediation work on the site was carried out in a way that limits future industrial uses, unlike the Atofina and Time Oil sites. Our brief review of the site constraints suggest it is at least as constrained as the Atofina and Time Oil sites, and would not be a better site for marine terminal development, due to the access constraints mentioned above. Thus, our answer to question posed is:

- BPS has used appropriate measures to identify vacant and buildable land.
- The two sites it has identified as meeting the minimum size requirements for a new marine terminal (Atofina and Time Oil) appear to be the two best sites that meet that size requirement with vacant land. Any other location would require assembling and redeveloping properties that now have buildings on them.⁹

3.2 POTENTIAL SITES FOR NEW MARINE TERMINALS

This section addresses the question: How suitable for a public marine terminal are the few sites in the Portland Harbor that have been identified by the City as having the best potential to accommodate such a terminal? Through previous planning efforts,¹⁰ the City of Portland Bureau of Planning and Sustainability (BPS) identified the following minimum criteria to meet forecasted demand for new marine terminal sites in the Portland Harbor:

- Industrial zoning
- Deep-water harbor access
- Railroad access

⁹ Whether such redevelopment could be, in some cases, financially feasible is a question beyond the scope of this study.

¹⁰ West Hayden Island Economic Foundation Study, prepared by Entrix and Bonnie Gee Yosick LLC for the City of Portland Bureau of Planning and Sustainability, May 2010. City of Portland Economic Opportunities Analysis: Working Draft, prepared by E.D. Hovee and Company, LLC for the City of Portland Bureau of Planning & Sustainability, June 2011.

- Truck street access
- Vacant (unimproved or unoccupied brownfield) site-assembly area approaching 100 acres.

Using the methods described in Section 3.1 above, BPS staff identified only two sites that could potentially meet all these criteria. These are the two largest vacant sites in the Portland Harbor area: the 59-acre Atofina site, and the 43-acre Time Oil site. Both are brownfields, and both could potentially be assembled with nearby vacant sites.

This analysis looked only at vacant sites. It is always possible that some sites that are non-vacant today could be redeveloped as marine terminals in the future. When considering the opportunity to redevelop non-vacant sites, it is important to look at the net impact in economic activity. In other words, redeveloping existing sites would only be beneficial to the economy if the new use of the site were more efficient and able to accommodate more economic activity (whether measured by employment, output, cargo volumes, etc.) on the same acreage. Evaluating all non-vacant sites in the Portland Harbor to attempt to determine which might be most likely to redevelop in the future was beyond the scope of our analysis.

The ECONorthwest team reviewed the two vacant sites identified by the City of Portland, and evaluated maps of the Portland Harbor, including zoning, infrastructure and aerial photographs. Our preliminary review confirmed the City's findings: most of the Portland Harbor has active development on it, and these two sites have the greatest opportunity to accommodate new public marine terminals.

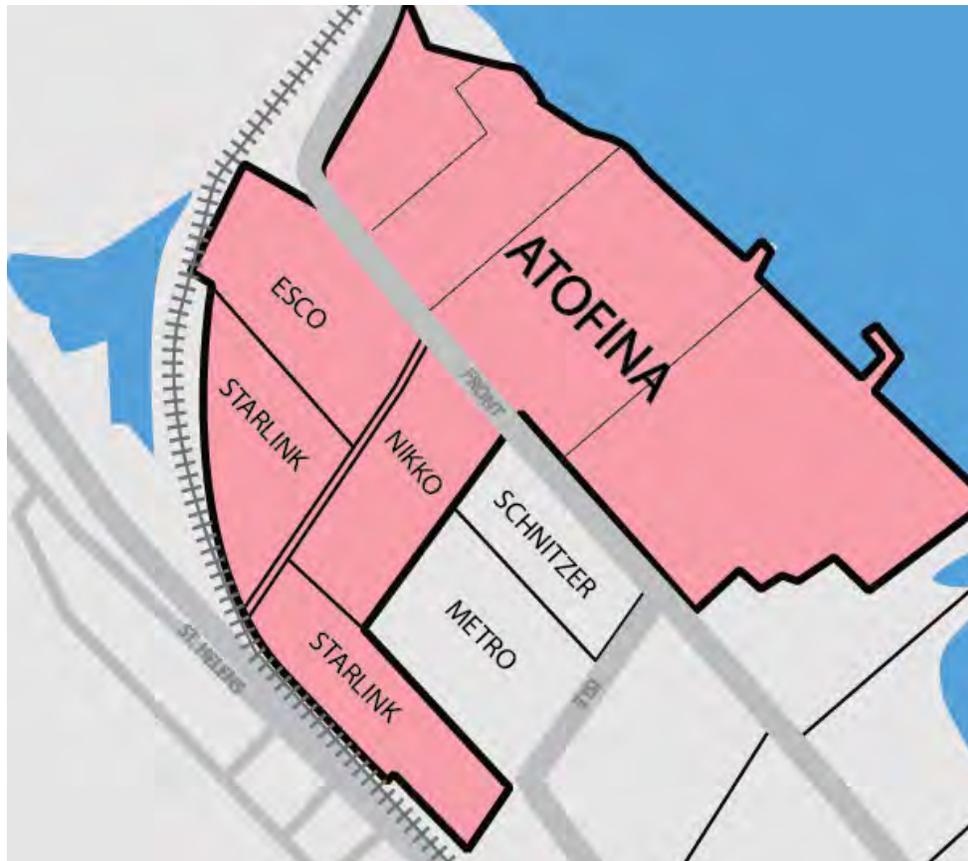
Staff from ECONorthwest and Maul Foster & Alongi toured these sites with BPS staff, documenting conditions affecting the suitability of each site for the proposed development. Key factors considered in the evaluation were: site access, existing uses, natural features, and contamination / remediation. After conducting this site visit, Maul Foster & Alongi developed a set of criteria for evaluating site feasibility for typical port terminals (see Appendix B).

Using these criteria, Maul Foster & Alongi evaluated the potential opportunities and constraints of these sites to accommodate development of a public marine terminal. A cursory site visit is insufficient to make a final determination of site feasibility. Nonetheless, the methods are consistent with the scope and budget, and are sufficient for identifying major opportunities and constraints for these potential sites, and for making a preliminary determination of site feasibility. Further investigation of these sites could be conducted to refine our feasibility findings.

3.2.1 ATOFINA

The Atofina site is a collection of parcels under several ownerships, which total approximately 114 acres (59 acres in the four main Atofina parcels, and an additional 55 acres in adjacent parcels across Front Ave.). The parcels are zoned heavy industrial (IH), and are bordered by industrial uses. The site is adjacent to SR 30 and fronts the Willamette River within the Portland Harbor. Exhibit 3-2 shows a map of the Atofina site.

Exhibit 3-2. Atofina site



Source: ECONorthwest, 2011.

The parcels that the Atofina site comprises have the following owners:

- Atofina: four vacant parcels totaling 59.14 acres
- Schnitzer: an 8.32-acre parcel, currently occupied by Air Liquide America Corporation
- Metro: a 10.43-acre parcel housing the regional solid waste transfer station
- Nikko (Gould Electronics): a 9.21-acre parcel, which is partially occupied by an operating RCRA C hazardous material landfill
- ESCO: a 10.51-acre parcel, which is a former landfill

- Starlink (Aventis Cropscience USA LP; Rhone Poulenc Ag): two significantly contaminated parcels totaling 16.42 acres, currently under remediation.

Access

Water depth in the Willamette River near the Atofina site ranges from 30 to 40 feet. The site has historically been used as a bulk-commodity manufacturing and shipping terminal. The waterside parcels (Atofina) provide a total of 2,700 feet of shoreline, and currently accommodate three existing piers on leases from the State of Oregon, Department of State Lands.

The aggregated Atofina site is served by a rail siding from the BNSF mainline. The siding is approximately 2,200 feet in length with three road 'at grade' crossings. While the site has rail access, it appears to be of insufficient size to accommodate a loop track, which would hamper efforts to build an efficient, modern port facility. Highway 30 access has been somewhat hampered by the closure of local streets accessing the highway.

Existing uses

Current industrial uses on the Schnitzer property as well as the Metro property seemingly eliminate 18.75 acres, while the existing Gould Superfund disposal site on the Nikko property reduces the available footprint by an additional 9.21 acres. The Nikko property contains an operational on-site 4.5-acre containment facility (Subtitle C closed hazardous waste landfill), and is approximately 25 to 30 feet higher in elevation than the surrounding property, with a structured fill containing 77,000 cubic yards of contaminated materials. The former ESCO landfill received non-recyclable wastes (e.g., foundry sand, slag, demolition debris) from ESCO's foundry operations from approximately 1953 to 1983. The landfill was closed with the approval of the Oregon Department of Environmental Quality (DEQ) and the Oregon State Health Division in 1983. The Starlink properties are undergoing extensive investigation and remediation.

Natural features

The property generally rises in grade from the Front Street ROW in the east to the rail ROW in the west, and has considerable natural gain exclusive of the Subtitle C landfill mass. Along the north and northwest perimeter of the site is a berm with a steep slope leading up to the BNSF main line on its approach to the rail bridge. Across the rail line, North Doane Lake and an environmental conservation land designation wrap the 'site' to the north and west.

The waterside parcel is partially within the FEMA Special Flood Hazard Area or was partially inundated by a 1996 flood event. The area is in a low to moderate earthquake hazard exposure area.

Contamination and remediation

The Atofina parcels are being remediated by Legacy Site Services (LSS), as the Atofina agent, under a consent order with DEQ, requiring source control and a site-wide feasibility study. The source control measures include both groundwater and stormwater migration controls. The site is included in the area of the Lower Willamette River that was designated a Superfund site in 2000 by the Environmental Protection Agency. Final remediation plans for the Portland Harbor Superfund site have not been determined. The potential liability for remediation of the Superfund adds a high level of risk for all affected properties, making prospective real estate transactions or development unlikely.

Other constraints

In addition to these property encumbrances the Atofina site is transected by Front Avenue (Service Level B; Priority Truck Route; peak-hour volume average of 106 vehicles and an average daily traffic volume of 640 vehicles, of which 92% are automobiles). Front Avenue separates the Atofina-owned parcels from the remainder of the site. Front Avenue provides primary access to the adjacent Siltronic site and is a public right of way. The Siltronic property does have alternate direct highway access to US 30, but there is an 'at-grade' rail crossing, and it does not readily serve the current land use configuration for the site. In addition to the Front Avenue ROW there is a pipeline easement adjacent to the east side of the street ROW.

While the total aggregated acreage appears to adequate for serving as a barge or bulk facility, current encumbrances, uses, and rights of way limit the useable area to 59 acres: the four parcels owned by Atofina to the East of Front Avenue, fronting the Willamette River.

Site assessment

Significant changes would need to be overcome to develop this site as a productive public marine terminal. To develop the entire site, NW Front Avenue would need to be closed, requiring additional infrastructure investments to provide alternative access to the Siltronic property. Without closing NW Front Avenue, this site is practically limited to 59 useable acres, with limited road and rail siding access.

While the site has rail access, site size and dimensions are insufficient to accommodate a rail loop track. Providing adequate rail service for the site is

even more challenging if development is limited to the 59 acres east of NW Front Avenue.

If NW Front Avenue were closed to accommodate development of the 114-acre site, the properties owned by Metro and Schnitzer are in active use, and would be unlikely to relocate. Property acquisition for the remaining parcels would be challenging, as it would require negotiations with five different private property owners. While acquiring these properties would provide additional acreage for development, acquisition would also involve additional costs as well as need for environmental remediation on these sites.

Ultimately, the site may be suitable for break bulk commodities, such as project cargoes, but the uncertainty of the planned and ongoing environmental remediation on the Atofina parcels--in addition to the uncertain liability for the Lower Willamette River Superfund remediation--probably make the cost of the land prohibitively high. The site *could* be big enough for a terminal, but the cost of preparing the site to accommodate such a terminal will make the effective land price very high relative to other industrial properties.

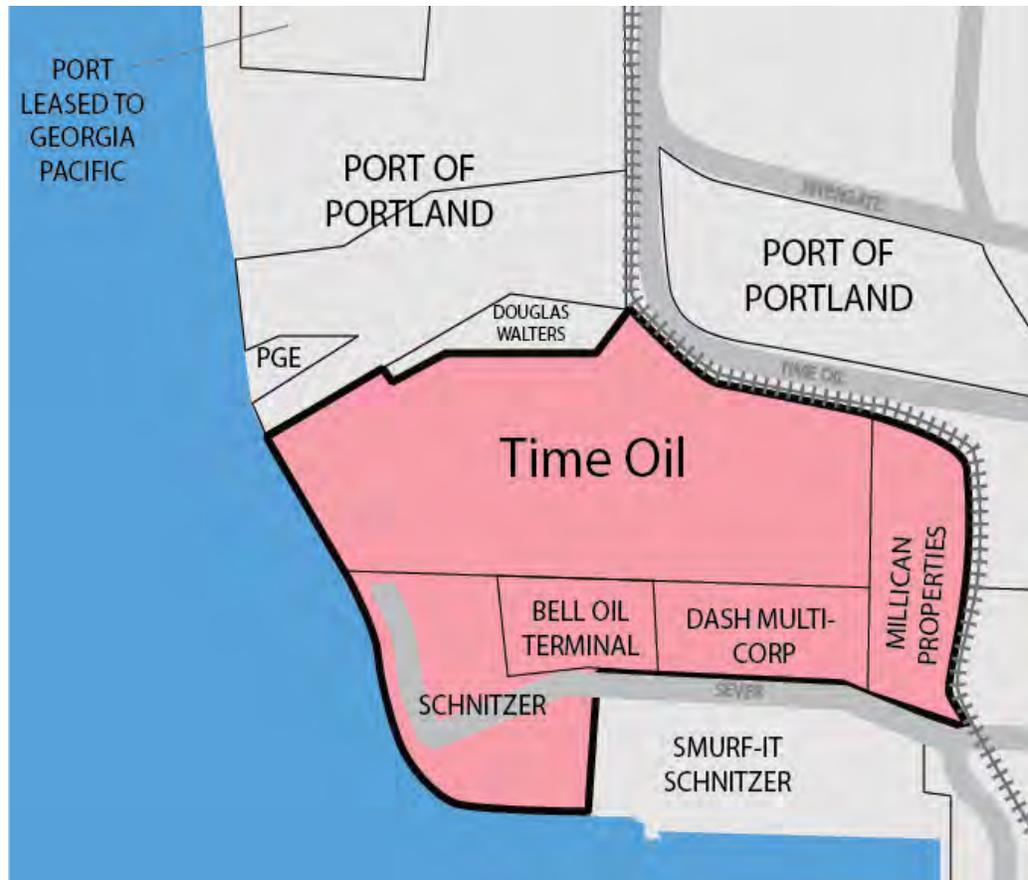
3.2.2 TIME OIL

The Time Oil site includes several separately owned parcels totaling approximately 84.2 acres. The subject parcels are adjacent to the Willamette River within the Portland Harbor and are zoned heavy industrial (IH) with a 'River' overlay designation. The site is bordered by industrial uses and also an area governed by a soon-to-expire natural resource management plan. Exhibit 3-3 shows a map of the Time Oil site.

The Time Oil site comprises parcels with the following owners:

- Time Oil: 43.41 acres
- Schnitzer Investment Corporation: 13.79 acres
- Bell Oil: 6.04 acres
- Dash Multi Corporation: 9.82 acres
- Millican Properties: 11.12 acres

Exhibit 3-3. Time Oil site



Source: ECONorthwest, 2011.

In addition to the aggregated property initially considered for the Time Oil site, there appears to be additional parcels totaling approximately 57 acres to the east of the Time Oil site, and bounded by Time Oil Street and Burgard Street. Including these parcels (not shown in Exhibit 3-3), the total potential aggregate site would be approximately 139 acres.

Access

Water depth in the Willamette River ranges from 30 to 40 feet. The aggregated site has approximately 1,400 feet of shoreline (pier head): the Time Oil parcels with 550 lineal feet, and the Schnitzer parcel with 850 lineal feet.

Historically there have been two piers on the parcels. The side channel serving the Schnitzer parcel is navigable, and is likely to be addressed in the Portland Harbor cleanup project.

The Time Oil site is served by a rail siding from the Union Pacific Railroad mainline of approximately 2,500 feet in length with two road 'at-grade' crossings and on-site railroad access. While the site has rail access, it appears to be of insufficient size to accommodate a loop track, which would

hamper efforts to build an efficient, modern port facility. Access to the specific site would require use of a private or Port-owned right of way, connecting to either Rivergate Blvd. or Burgard St., ultimately connecting to N Lombard St, a district collector and priority truck roadway.

Existing uses

Current industrial uses on the Schnitzer property appear to be temporary in nature. The Bell Oil Terminal is inactive; the Millican parcel is underutilized, and the Dash Multi Corp parcel is an operational tire recycler. There are several existing structures on the Time Oil and Schnitzer site, and evidence of removal of liquid storage tanks. The western half of the site is in a floodplain.

Contamination and remediation

Like most properties in the Portland Harbor, sediment in the adjacent channel and berthing area have known or suspected contamination. The upland properties have known or suspected contamination and are in various regulatory phases of investigation and remediation. The site is included in the area of the Lower Willamette River that was designated a Superfund site in 2000 by the Environmental Protection Agency. Final remediation plans for the Portland Harbor Superfund site have not been determined. The potential liability for remediation of the Superfund adds a high level of risk for all affected properties, making any real estate transactions or development highly unlikely.

Other constraints

To the north of the subject site there are high-tension power lines; a small parcel owned by PGE and a series of parcels owned by the Port of Portland with the presence of wetlands (some of these wetlands have environmental conservation zoning). The site is generally flat with mild slope to the river.

Site assessment

The Time Oil site faces challenges that would need to be overcome to be developed as a productive public marine terminal. While the core of the site (57 acres) has only two different private property owners, the remainder of the site is divided into several different owners. Depending on the desired use and scale of a proposed port terminal, additional property to the east of the site may need to be acquired. The number of private properties and owners makes site assembly a challenge, but not an insurmountable obstacle.

Compared to the Atofina site, the Time Oil site appears to have fewer challenges to redevelopment: it does not require closing a public street, it

appears to have less severe environmental contamination, and the possibility exists to acquire a larger aggregate site. The contamination is mainly along the river, not upland. It may be possible that lower lying contaminated land could be used as fill on other parts of the site and capped under the footprint of a new building.

The site would be a viable candidate for a marine terminal with the appropriate aggregation of key properties. Aggregating 80 to 140 acres would accommodate the transshipment of break bulk and some bulk commodities. Property configuration to make 1,400 feet of pier face accessible is critical to its usability. This site could be explored further for marine terminal use. It will be difficult, however, to negotiate any real estate transactions for this site while the liability for the Lower Willamette River Superfund remediation remains uncertain.

3.2.3 IMPLICATIONS

Public marine terminals have specific land use requirements that are difficult to find. Ideally, sites must be large and flat, inside of an industrial zone, have significant shoreline on a navigable river, be served by both rail and truck, and free of contamination, wetlands, or other environmental constraints. There are no sites in the Portland Harbor that meet these ideal requirements, though there are a few sites that come close. The questions are: how close do they come, and is there a way to cost-effectively develop these sites as productive public marine terminals?

The City of Portland identified the two sites in the Portland Harbor that are most likely to be suitable for development of a new public marine terminal: the Atofina site, and the Time Oil site. Of these two sites, development is technically possible on either, but there are major hurdles that would add significant costs. Both sites have some level of contamination, both sites would require negotiation and property acquisition from numerous property owners, and both sites are smaller than desirable, which precludes the possibility of an onsite rail loop.

Of the two sites, the Time Oil site is most suitable for development, as it does not have certain challenges faced by the Atofina site. The development of the Atofina site is further restricted by NW Front Ave. that bisects the site, and provides primary access to the Siltronic property. With this road in place, the site is limited to just 59 acres. Vacating the road would be costly, and would likely require significant infrastructure investments to be made to provide access to the Siltronic property. Even if the road were vacated, property on the other side of the road is contaminated or in active use. And the nature of the contamination on the Atofina site is considered to be more severe than contamination elsewhere in the Portland Harbor.

Ultimately, issues related to the Superfund cleanup of the Willamette River make all sites in the Portland Harbor unfeasible for development in the near future. Until a final agreement is reached, determining the specific liability for all property owners in the Harbor, there is too much cost uncertainty to negotiate a reasonable price for the land acquisition that would be necessary to assemble a site large enough for a new public marine terminal.

3.3 ROLE OF VANCOUVER IN HARBOR INDUSTRIAL LAND SUPPLY

The third question we were asked by the City is: What role can the Port of Vancouver play in accommodating forecast demand for cargo volumes in the Portland region? To answer this question, we reviewed estimates from recent studies on the current capacity and forecast demand for cargo in the region, and augmented this data-driven analysis through interviews with port officials. A more detailed description of our analysis is found in Appendix C: Analysis of Harbor Land Capacity and Demand, Portland and Vancouver.

3.3.1 EXISTING CAPACITY

The Port of Portland has four marine terminals located along the Willamette and Columbia Rivers. These terminals accommodated 575 ocean-going vessels in 2010, though over the past two decades it was not uncommon for the Port to accommodate 800 to 1,000 ocean-going vessels in a year. Not counting cargos received or shipped via inland barges, the Port of Portland shipped over 13 million short tons of cargo in 2010.

While the Port's existing marine terminals have excess capacity, that capacity is limited. As demand increases over time, the Port will reach a point when existing facilities are unable to accommodate the demand that is forecasted. If the Port is unable to find new ways to improve the efficiency of existing terminals, or find suitable sites to build new terminals, then the Port of Portland may miss potential cargo opportunities. The Port of Vancouver, located across the Columbia River from the Port of Portland, could accommodate some unmet demand.

Exhibit 3-4 summarizes the estimated capacity of public marine terminals in the Port of Portland. Total capacity for all cargo types in the Port of Portland is estimated to be over 21,000,000 metric tons. This capacity is significantly above current cargo volumes for all cargo types, except for grain, which saw a reduction in capacity when the Port closed the terminal

4 grain elevator in recent years, and is unable to accommodate historical levels.

Exhibit 3-4. Estimated capacity of public marine terminals, and recent peak cargo volumes, Port of Portland

Cargo Type	Estimated Capacity	Recent Peak Volume	Peak Year
Automobiles (units)	675,000	460,000	2006
Containers (TEUs)	700,000	330,000	1995
<i>Metric Tons</i>			
Automobiles	889,000	606,000	
Containers	3,999,000	1,885,000	
Breakbulk	2,100,000	1,130,000	2007
Grain	4,100,000	5,400,000	1995
Dry Bulk	10,700,000	5,460,000	2008
Liquid Bulk	-	-	N/A
Total	21,788,000	14,481,000	

Source: Estimates of capacity are from Port of Portland, reported in West Hayden Island Economic Foundation Study (Entrix, 2010), and confirmed through interviews with Port of Portland officials. Reported recent peak cargo volumes are from Port of Portland Marine Terminal Statistics, 1980-2010.

3.3.2 FORECAST OF FUTURE CARGO VOLUMES

Our analysis did not include forecasting future cargo demand for the region. Instead, we were tasked with obtaining and reviewing the most recent forecasts. These forecasts were contained in the *Portland and Vancouver Harbor Forecast Update* (BST Associates, 2012). These forecasts were based on a 2010 study by BST Associates, but were refined to specifically call out cargo demand for the City’s of Portland and Vancouver, and were updated with the most recent economic data.

Exhibit 3-4 shows the *capacity of existing public* marine terminals. Exhibit 3-5 shows the forecast *demand for existing and future public and private* marine terminals (measured as cargo volume) in the City of Portland in 2040. The forecast demand ranges from 28 million to 43 million metric tons. For context, in 2010 (the most recent year for which data is available) the Port of Portland reports it moved 13 million tons of cargo. Even the low scenario forecasts demand to be more than double 2010 levels by the year 2040, with an average annual growth rate of 1.5% per year.

Exhibit 3-5. Forecasted cargo volume, public and private, City of Portland, 2040

Cargo Type	Low	Medium*	High
Automobiles (units)	811,000	912,500	1,014,000
Containers (TEUs)	379,000	452,500	526,000
<i>Metric Tons</i>			
Automobiles	1,076,000	1,206,000	1,336,000
Containers	2,162,000	2,583,500	3,005,000
Breakbulk	1,132,000	1,242,000	1,352,000
Grain	6,686,000	9,078,000	11,470,000
Dry Bulk	10,278,000	14,093,500	17,909,000
Liquid Bulk	6,912,000	7,461,500	8,011,000
Total	28,246,000	35,664,500	43,083,000

Source: Low and High forecasts were made by BST Associates for the *Portland and Vancouver Harbor Forecast Update* (2012).

*Medium scenario is calculated by ECONorthwest as the average of the BST low and high scenarios.

Note that 2040 is an arbitrary date. It is not a key milestone. Demand for cargo does not stop growing for some assumed reason in 2040. It is simply the last date for which there is a forecast for cargo demand. Thus, our advice is not to focus on exact tonnage requirements, or exact acres needed to accommodate demand in 2040. It is more important to focus on the big picture. The City of Portland has a limited supply of land suitable for marine terminal development, and this supply will not increase. Demand for cargo has increased steadily for decades, and is forecast to continue to do so in the future. Over a long-enough period, the City will use its capacity to accommodate future growth. As it does, land prices will increase and redevelopment will become more possible than it appears now.

Nonetheless, the inevitable reduction of vacant land available for water-dependent uses in the Portland Harbor area is the motivation for considering ways to use the land efficiently, and whether neighboring jurisdictions might accommodate some additional amount of the forecasted growth. Looking at the 2040 gives good idea of how close the City (and the region) is to reaching its full capacity for public marine terminals.

3.3.3 CAPACITY SHORTFALL

Comparing the capacity of existing facilities with the forecast demand provides an estimate of the potential capacity shortfall for the Port of Portland in 2040. Two factors complicate this analysis: (1) private marine terminals also handle a portion of the City’s cargo volume, and there are not accurate estimates of the capacity of private terminals in the City; and (2) if the growth in cargo volumes comes from a different mix of clients and commodities than the terminals are currently handling, then the existing facilities may not be able to accommodate the new opportunities, which

means these facilities may not reach 100% of their capacity before new terminals are needed.

Our analysis needed to make assumptions on how to deal with these two issues. Variations in assumptions, combined with the wide range of the BST forecasts for cargo demand in 2040, result in an even wider range of estimates for capacity shortfall. To bookend our analysis, we created assumptions that would give us the lowest and highest possible shortfall, and then selected assumptions for a “most-likely” scenario.

The lowest shortfall scenario assumes the low demand forecast from BST, and assumes that existing facilities would be able to operate at 100% efficiency to accommodate forecast demand, and that private terminals will be able to continue accommodating cargo at their recent peak levels. The highest shortfall scenario uses the high demand forecast from BST, and assumes that existing facilities would continue operating at their historical peak levels, with all additional demand coming from new market opportunities that require new terminals. The most-likely scenario uses assumptions that fall between the range of these two bookends. Key assumptions for the most-likely scenario are existing facilities operate at 90% of capacity (i.e. to accommodate the forecast growth in cargo, we do not assume that existing facilities are able to use 100% of their capacity, since part of the growth in cargo volumes may be due to new users and new commodities that cannot use existing facilities), and we use the medium demand scenario, calculated as the average of the low and high scenario by BST Associates.

The results of these three scenarios are shown below in Exhibit 3-6. Note that the potential capacity shortfall ranges from less than 200,000 metric tons in the low shortfall scenario to more than 17 million metric tons in the high scenario. Ultimately, our most likely scenario shows a potential shortfall of 5,760,000 metric tons, with all of the shortfall occurring in dry bulk, grain, and automobiles.

Exhibit 3-6. Potential capacity shortfall, City of Portland, public and private marine terminals, 2040 (metric tons)

Cargo Type	Low	High	Most Likely
Automobiles (units)	(136,000)	(554,000)	(310,000)
Containers (TEUs)	-	(196,000)	-
<i>Metric Tons</i>			-
Automobiles	(187,000)	(730,000)	(410,000)
Containers	-	(1,120,000)	-
Breakbulk	-	-	-
Grain	-	(4,370,000)	(2,390,000)
Dry Bulk	-	(10,949,000)	(2,960,000)
Liquid Bulk	-	-	-
Total	(187,000)	(17,169,000)	(5,760,000)

Source: Calculated by ECONorthwest, with demand forecasts from BST Associates (2012).

3.3.4 LAND NEED FOR NEW PORT TERMINALS

Translating cargo volumes into acres for port terminals is challenging, and depends on a host of variables for which we have little or no data for this analysis. Will the terminal need rail access, if so will it need a dedicated rail loop, or will it be able to share rail infrastructure with adjacent terminals? Would another rail configuration like a ladder track work?¹¹

The composition of the demand is important as well. For example, if you have demand for 10 million pounds of dry bulk, will that all be the same commodity type? If not, you may not be able to use the same terminal (for example a coal exporter and potash exporter may need to have completely separate terminals even though they are both dry bulk and would have very similar needs. Even the ownership of the cargos makes a difference (e.g., one exporter with a throughput of 10 million tons of potash may require different facilities, than 5 exporters each handling 2 million tons of potash a piece).

Because of the many variables, it is difficult to translate the potential shortfall numbers shown in Exhibit 3-6 into the number of terminals that would be needed to service that demand, and even more difficult to translate the number of terminals into acres. For the purposes of our analysis, we first looked to recent studies to find an industry standard or a rule of thumb for the size of marine terminals for various cargo types. The three sources we looked at were the *West Hayden Island Economic Foundation Study* (Entrix, 2010), the Draft Report on *Operational Efficiencies of Port/Terminal World Wide* (Worley Parsons, 2012), and the Maul Foster and Alongi evaluation criteria included with this report as Attachment B.

Unfortunately, there is little consensus among these sources on the land needed for each terminal. This is because the unique characteristics of each site, the needs of each unique user and commodity, and the market conditions and technologies available at the time existing facilities were built result in a wide-range of variables that are difficult to control for. In short, no conclusive rule of thumb exists, and if it did exist, it would not necessarily be applicable to each of the sites in the Portland and Vancouver harbors. Nonetheless, for the purposes of our analysis, we needed to make some assumptions on the acreage requirements for new terminals for various commodities. We again sought to use different assumptions to present a high and low bound on our analysis, and then to select

¹¹ Representatives of businesses in the Portland Harbor, as well as Port Officials, and other consultants with expertise in marine terminal development and cargo forecasts have stressed that there is no equal substitute for a loop track, and that other rail configuration such as a ladder track will not work, for attracting new port users in a competitive global economy.

assumptions in the middle of the range that we believe resulted in a most-likely scenario.

The details of these scenarios are shown in Appendix C: Analysis of Harbor Land Capacity and Demand, Portland and Vancouver. The most-likely scenario uses our most-likely capacity shortfall estimates, and assumptions on throughput (tons per acre of terminal land) from the *Operational Efficiencies of Port/Terminal World Wide* (Worley Parsons, 2012), based on tons per acre for case study ports in North America and Europe. It is optimistic, however, to think that all new terminals would achieve the level of efficiency identified in the Worley Parsons draft report, so we have shown another column for the “practical” (i.e., more conservative assumption of land need) land need, based on an average value of the assumptions in the various supporting documents used in our analysis. A final column was added to show the land need if a dedicated rail loop is included with the terminals that would require rail access. Exhibit 3-7 shows the results of our most likely scenario, with at least 170 acres of land needed, and up to 470 acres if rail access is included.

Exhibit 3-7. Acres of land needed for new public marine terminals in the City of Portland, 2040

Cargo Type	Capacity Shortfall (Tons)	New Terminal Space Needed	Acres Needed		
			Minimum	Practical	w / rail
Automobiles	(410,000)	Yes	120.0	270.0	270.0
Containers	-	No	-	-	-
Breakbulk	-	No	-	-	-
Grain	(2,390,000)	Yes	30.0	50.0	100.0
Dry Bulk	(2,960,000)	Yes	20.0	70.0	100.0
Liquid Bulk	-	No	-	-	-
Total	(5,760,000)		170	390	470

Source: Calculated by ECONorthwest

Note: This table estimates acreage needed, not the number of terminals needed. Terminal size can range from 150 to 200 acres for automobiles and containers, to as small as 5 acres for liquid bulk. Depending on terminal size assumptions, the acreage need for automobile cargo could be accommodated by anywhere from one to five terminals in the City of Portland.

Comparing the demand for land for public marine terminals in the City of Portland shown in Exhibit 3-7, with the supply of land in the Portland Harbor shown in Exhibit 3-1, shows an insufficient land supply. As described in Sections 3.1 and 3.2, the Portland Harbor has the potential for two (or perhaps three, if the barriers to development at the McCormick and Baxter site can be overcome) sites to accommodate public marine terminals. These sites (Atofina and Time Oil) have serious development constraints, and even if these constraints can be overcome, they would each only be able to accommodate one terminal of practical size.

The Portland Harbor probably has insufficient land to accommodate the forecast growth for public marine terminals in the City of Portland. An optimistic scenario would show the Portland Harbor with capacity to

accommodate perhaps two terminals of relatively small size (and without a modern rail loop to serve these terminals). A more conservative outlook (and a real possibility) is that the two potential sites in the Portland Harbor may be unable to overcome their significant barriers to redevelopment, which would mean the Harbor may not have any capacity to accommodate future development of marine terminals.

Given the expected growth in demand over the next 30 years, there are few easy solutions to accommodate the City of Portland's anticipated shortfall in land for public marine terminals. The City can take action to address the existing constraints to facilitate redevelopment, or look elsewhere for buildable land for public marine terminals. The following section addresses the latter solution: looking outside of the City of Portland for land for new marine terminals.

3.3.5 PORT OF VANCOUVER DEVELOPABLE LAND

This analysis presupposes that from a regional perspective, there is no benefit to having port development occur in Portland vs. Vancouver. Leadership for the ports, and for the cities, counties, and states they are located in, may have different opinions. Indeed many public policies exist that emphasize the importance of retaining and attracting industrial jobs, like those created by marine terminal development. However, the purpose of this analysis was to determine if it was *technically* possible (as opposed to *politically* desirable) to accommodate future marine terminal demand at the Port of Vancouver.

Additionally, our analysis assumed that the type of port users that would be attracted to the Port of Portland if land were available, would find the Port of Vancouver equally as attractive if there were no developable sites in Portland. This assumption may be true for many, but not necessarily all public marine terminal users. Portland and Vancouver are similar in many ways, sharing the same regional infrastructure and labor pool. But differences do exist between the two jurisdictions, and more so for specific sites within each jurisdiction. For the purposes of our analysis, we have assumed land at the Port of Vancouver would be an acceptable substitute for potential marine terminal users unable to find developable land in the Port of Portland.

Ideally, our analysis for the supply and demand for public marine terminals in the Port of Vancouver would have used the same methods as were used for the Port of Portland. Unfortunately, our analysis was constrained by both data limitations, and time/budget. Thus, we were asked to conduct a less rigorous analysis of the Vancouver land supply, making use of the best available data, gathered mostly from conversations and correspondence with officials from the Port of Vancouver.

ECO interviewed officials with the Port of Vancouver to understand their long-term plans for harbor industrial lands, and the challenges and opportunities that would arise from a greater share of regional industrial development locating in Vancouver versus Portland.

The Port of Vancouver is located along the banks of the Columbia River, with access to the same markets and same multi-modal transportation infrastructure as the Port of Portland. The port handles more than 500 ocean-going vessels each year, as well as river barges, with total annual cargo of more than 5 million metric tons.

The Port of Vancouver has room to grow. An analysis of aerial photos of Port land indicate roughly 750 vacant acres. The Port of Vancouver sent a memorandum to the City of Portland that further clarified their intentions for these 750 acres. The land includes approximately 450 acres of undeveloped greenfield land called Columbia Gateway. Approximately 350 acres of this property is planned to be developed as maritime, and the remaining 100 acres planned for heavy industrial. In addition, the port has 110 acres of available undeveloped light industrial land called Centennial Industrial Park. The light industrial properties could be available for development within 12-14 months, while the Columbia Gateway area is not expected to be ready for development for another 8-15 years. The Centennial properties are not waterfront parcels.

Terminal 5, now under development, added 200 acres of heavy industrial and maritime land. All but four acres of this property is river-dependent maritime land. The maritime portion has been, or will be, filled with rail infrastructure, new tenants, and cargos, including wind energy exports and a dry bulk exporter with up to 16 million ton export capacity. The sole industrial tenant is a rail-dependent propane distributor.

The Port of Vancouver is in a period of rapid growth and is currently undertaking a number of public and private development projects, including the West Vancouver Freight Access project. This public rail improvement project will create a unit train facility, more than doubling the miles of track within the port, along with adding a new, grade separate entrance from the BNSF Railway mainline. This project will increase capacity from 45,000 rail cars per year, to more than 160,000 per year, with 40 percent less delay.

Given the Port of Vancouver's holdings of vacant land, the recent dredging of the Columbia River to a depth of 43 feet, and ongoing investment in new rail infrastructure (i.e., the West Vancouver Freight Access project), the Port of Vancouver is well positioned to capture growth in the future. Officials from the Port of Vancouver believe that neither the Port of Portland or the Port of Vancouver have sufficient land and resources to accommodate **all** of the region's future growth on their own.

Instead, ports on both sides of the Columbia River will need to supply land for new public marine terminals.

The Port of Vancouver’s undeveloped, unpermitted maritime and industrial land will accommodate some regional growth – from those businesses selecting the Washington business environment and requirements. Using the BST forecasts of cargo demand for the City of Vancouver, we conducted a similar capacity shortfall analysis for Vancouver as we did for Portland (as was described in sections 3.3.1 to 3.3.4).

Combining these analyses allows us to view the regional demand for and supply of land for public marine terminals. The result of this analysis is shown in Exhibit 3-8. Our most likely scenario shows that regional cargo volumes in 2040 could require between 210 and 570 acres of land for new marine terminals.

Exhibit 3-8. Acres of land needed for new public marine terminals in the Portland Metro Region (including Portland and Vancouver), 2040

Cargo Type	Capacity Shortfall (Tons)	New Terminal Space Needed	Acres Needed		
			Minimum	Practical	w / rail
Automobiles	(570,000)	Yes	160.0	370.0	370.0
Containers	-	No	-	-	-
Breakbulk	(90,000)	No	-	-	-
Grain	(2,390,000)	Yes	30.0	50.0	100.0
Dry Bulk	(2,960,000)	Yes	20.0	70.0	100.0
Liquid Bulk	-	No	-	-	-
Total	(6,010,000)		210	490	570

Source: Calculated by ECONorthwest with demand forecasts from BST Associates, and other assumptions based on conversations with officials from the Port of Portland and Port of Vancouver, as well as supporting documents including: *Operational Efficiencies of Port/Terminal World Wide* (Worley Parsons, 2012) and *West Hayden Island Economic Foundation Study* (Entrix, 2010).

Note: This table estimates acreage needed, not the number of terminals needed. Terminal size can range from 150 to 200 acres for automobiles and containers, to as small as 5 acres for liquid bulk. Depending on terminal size assumptions, the acreage need for automobile cargo could be accommodated by anywhere from one to seven terminals in the Portland Region.

If each new port terminal requires a dedicated rail loop, the total acreage needed to accommodate regional cargo volumes in 2040 exceeds the current supply of 350 acres of vacant developable land at the Port of Vancouver planned for marine terminal development.¹² However, the Port of Vancouver has about 200 acres of vacant developable land that could technically accommodate marine terminal development, but is planned for other industrial uses. But about 100 acres of this amount is part of

¹² It is important to note that these projections are based on our “most-likely” scenario. The range of possible assumptions that could be used in this analysis is significant. When using our most conservative assumptions, our analysis showed a regional land need as low as 70 acres, and our most aggressive assumptions resulted in a land need of over 2,250 acres.

Centennial Industrial Park and are not on the waterfront parcels or linked to waterfront parcels, so 100 acres might be a more appropriate estimate. If these acres were included in the total supply, then the Port of Vancouver comes close to having a supply of land to accommodate regional cargo demand through 2040.

While this scenario is technically possible, it may not be politically feasible or consistent with adopted policies of the affected jurisdictions: Vancouver's land supply could fall short. The high and low demand forecasts differ by + or - 20% from the most-likely forecast, and assumptions about whether a new terminal has rail loop access or not can easily double the need for land. Portland and Vancouver probably have adequate land now to accommodate a low-demand forecast with few new terminals sized for loop trains. But in our simulations, high demand plus loop-train access at all new terminals led to a overall land shortfall of almost 1,500 acres. If only 350 acres at the Port of Vancouver are available for marine terminal development (its current estimated based on policy) then unmet demand for public marine terminals in the region would be around 1,100 acres.¹³

3.3.6 IMPLICATIONS

The most recent forecasts for future cargo demand show the Port of Portland will be unable to accommodate forecast demand by 2040 without adding new capacity. However, the extent of that capacity shortfall depends on the assumptions used. Interviews with officials from the Port of Portland, and the author of the most recent cargo forecasts indicate that although actual tonnage for specific cargo types may differ from the forecasts, long-term trends have shown past forecasts for total cargo volume to be fairly accurate, and the most recent forecasts should be seen as reliable.

Taken at face value, these forecasts suggest that additional port capacity will likely be utilized in the future; however, accurately and reliably forecasting the future is impossible. Although our forecasts (and the BST forecasts which underpin them) include a broad range of assumptions, reflecting the high degree of uncertainty, there is no way to guarantee that the future will fall within our forecast range, let alone our "most-likely" scenario. No one knows exactly how demand for port facilities in the lower

¹³ Although this is the "high-scenario," it is not also "highly unlikely." BST Associates, authors of the cargo forecasts used in this analysis, note that the high-scenario calls for 3.1% growth in cargo volumes per year, which is actually lower than the 4.1% average annual growth experienced on the Columbia River between 1962 and 2011.

Columbia will change in the future. Economist HE Haralambides effectively summarizes the difficulty forecasting port demand, stating:¹⁴

“As a result of intertwined and extended hinterlands; abundant land infrastructure and short-sea feeding networks; continuously evolving liner shipping networks; and the infamous ‘mobility’ of the container, demand is very volatile and unpredictable. Port market shares are unstable; investments in one region or country have an impact on another ... In such a ‘fluid’ environment, how could one forecast port demand with any degree of credibility?”

Competitive and volatile environments do not support reliable forecasting because outcomes depend on many randomly moving variables. Ultimately, whether or not demand for additional port facilities on the lower Columbia materializes will depend on market conditions – demand (what’s produced and consumed in the Portland region), supply (what technologies are used to ship goods, what competing port capacity exists), and price. These factors will inevitably change over the next 30 years in ways that no one can predict, which means any attempt to forecast them should be taken with a grain of salt.

In other words, individual cargo types fluctuate year to year and are difficult to predict with accuracy, but long-term historical trends show that demand for total cargo volumes is less volatile, more predictable, and tends to grow at a pace that is linked to the global economy. While the Port’s four public marine terminals are not operating at 100% of capacity today, it is very likely that they will reach the limits of their capacity in the next several decades, as demand increases. Once these facilities reach capacity, the Port of Portland will need to develop new facilities, or else turn away demand.

The Port of Vancouver shares many of the same attributes that make the Port of Portland an attractive place for marine shipping. Thus the Port of Vancouver is a logical place to site new marine terminals, if sites are unavailable in Portland.

From a regional perspective, it makes no difference whether terminal development occurs in Portland or Vancouver. Both cities function as part of the same regional economy, and share the same infrastructure and labor pool. However, at a local level, if demand for public marine terminals is shifted from Portland to Vancouver, the City of Portland would lose out on high-paying industrial jobs (and some of the residents that fill those jobs), which would have a detrimental effect on the Portland economy, and a

¹⁴ Haralambides, H.E. (2002), Center for Maritime Economics and Logistics, “Competition, Excess Capacity, and the Pricing of Port Infrastructure”.

positive impact on Vancouver's. In other words, some amount of economic activity (measured any number of ways: jobs, wages, output, value added, etc.) would occur in Vancouver, rather than Portland, and Portland would miss out on the resulting direct, indirect, and induced economic benefits.

Given the most recent forecasts of demand, and reasonable assumptions on current capacity and the likely size of new terminals, it would appear that the Port of Vancouver has a surplus of vacant industrial land to accommodate their likely future demand, and should the Port of Portland be unable to accommodate forecast growth, the Port of Vancouver could accommodate some (and perhaps all) of that growth. However, officials from the Port of Vancouver stress that a regional strategy will be necessary to respond to future demand for public marine terminals in the region, and if actual cargo volumes reflect the high-scenario projections from the BST forecasts, then the region is likely to have a significant shortfall of suitable land for new public marine terminals.

3.4 POTENTIAL FOR INCREASED EFFICIENCIES

What is the potential for more efficient use of industrial harbor land? The total amount of land inside the Portland city limits is essentially fixed. Unless submerged land is filled to create new dry land, the only way the City can get more land is to expand its boundaries, which is unlikely to occur due to the constraints of surrounding land. Therefore, the City is interested in using its supply of industrial land as efficiently as possible to accommodate the most economic activity.

3.4.1 RECENT TRENDS IN EFFICIENCY OF PORTLAND HARBOR LANDS

We examined trends in efficiency in the Portland Harbor using several measures. Because of data limitations (see Chapter 2 and Appendix A) we focused our analysis on the period between 2002 and 2008. We calculated the economic activity in the Portland Harbor for these years, measured in terms of employment, real market value, value added, and cargo tonnage. We then divided each of these measures by the number of developed industrial acres in the Portland Harbor for each year to get a measure of land efficiency: i.e., some amount of some measure of economic activity, per acre. We then looked at the change in that measure of efficiency over this period of time.

Recent trends in the Portland Harbor show different results, depending on the measure of efficiency used. These results are summarized in Exhibit 3-9.

**Exhibit 3-9. Measures of economic activity
per acre, Portland Harbor, 2002 and 2008**

	2002	2008	AAGR
Value Added	\$1,147,614	\$1,217,173	1.0%
Real Market Value	\$776,715	\$838,091	1.3%
Employment	6.21	5.75	-1.3%
Cargo Tonnage	3,873	4,928	4.1%

Calculated by ECONorthwest with data from:

Value Added: IMPLAN

Real Market Value: Metro RLIS

Employment: Oregon Employment Department, Quarterly Census of Employment and Wages

Cargo Tonnage: Port of Portland

Acreage: Metro RLIS and Multnomah County Office of Assessment and Taxation

From 2002 to 2008, developed industrial land within the Portland Harbor increased from 2,757 acres to 2,863 acres, an average of 18 acres per year. Value added, real market value, and cargo tonnage all grew at a faster pace than developed industrial acres. By those measures, land was used more efficiently. Employment in the Portland Harbor, however, declined over that period (both in absolute terms, and per acre of developed industrial land). The measure of efficiency that is chosen makes a difference when evaluating trends in land use efficiency.

The next section explains each of these measures in more detail.

Employment

Employment density is a traditional measure of land-use efficiency. In fact, it is typically the basis for forecasting supply of and demand for employment land for all jurisdictions across the State, as they conduct periodic Economic Opportunity Analyses that are required by State law.

For our analysis, we obtained employment data from the Oregon Employment Department for all businesses in the City of Portland for 2002 and 2008. We used GIS software to isolate all employment located within the Portland Harbor for these two years. Total employment in the Portland Harbor declined from 17,134 to 16,466 over this period, a decline of roughly 111 jobs per year (or -0.7% per year).

The Oregon Employment Department QCEW data do have limitations that are worth noting:

- Although the geocoding process OED uses produces accurate results, it is possible that the exact location of some employers could be wrong by one or two hundred feet. This means that some employment in the Portland Harbor may appear outside the harbor boundary when using QCEW data, and conversely, some employment that is actually outside of the Portland Harbor may appear inside the harbor boundary.

- Some firms have multiple locations, but may only report employment at one location (such as at a company headquarters). Depending on how a company reports multi-site employment, all of the company's employment may be incorrectly reported as being inside or outside of the Portland Harbor boundary.
- QCEW data represents the number of *covered workers*. The data excludes members of the armed forces, the self-employed, proprietors, domestic workers, unpaid family workers, and railroad workers covered by the railroad unemployment insurance system. In the case of the Portland Harbor, the most important of these omissions is likely railroad workers. Other studies have shown a significant economic impact from railroad activity in the Portland Harbor, but these workers are excluded from the data.

We do not wish to imply that tracking employment density as a measure of economic activity is wrong or pointless. It is indeed an important measure, and one that the policy-makers, and the general public find useful for understanding the scale of economic activity. Despite the limitations listed above, the QCEW data is widely recognized as one of the most accurate employment data sources updated on an annual basis with site-specific data on all industries. We are just acknowledging that employment isn't the **only** measure of economic activity, and due to its limitations, other alternative measures may prove more useful for evaluating the economic performance of the Portland Harbor.

Real market value

Real market value is another typical measure of land-use efficiency. The relationship is a fundamental principle of urban economics: higher prices reflect the relative scarcity of some type of land or location, and that relative scarcity causes developers to substitute capital for land (i.e., to build more intensively). Higher-value development typically translates into higher assessed values and property taxes, which is seen as a benefit to local governments.

For our analysis, we obtained real market value for all parcels in the Portland region from Metro RLIS data for 2002 and 2008. Using GIS software, we calculated the sum of the real market value of all parcels within the Portland Harbor. The Harbor saw real market values grow from \$2.14 billion in 2006 to \$2.40 billion in 2008, an average annual increase of 1.9%. However, the US Consumer Price Index grew by 3.0% per year over this same time period, indicating that real market value in the Portland Harbor grew at less than the pace of inflation.

Data on real market value for this time period should be treated cautiously. The local and national real estate markets were booming during

this period. Multnomah County real estate values grew at above average rates: more than 8% during this period. The region has now had three consecutive years of declining real market values since 2008; a detailed analysis of property values in the Portland Harbor would probably mirror these broader regional trends. Over a long period (long enough to include the ups and downs of several business cycles – say, 20 years) inflation-adjusted changes in real market value in the Portland Harbor might be a useful indicator of land-use efficiency. For shorter periods, it is not a measure that can be used without interpretation.

Value added

Value added is a measure of economic activity that is not commonly used to measure land use efficiency. Value added, simply defined, is the difference between the sale price and the production cost of a good or service.¹⁵ It is directly comparable to Gross Domestic Product (GDP) at the national level. Value added only considers the final cost of goods and services (the total of four components: wages, business income, other income, and indirect business taxes), and excludes the value of intermediate goods, to avoid double counting.

While value added is a good measure of economic activity at a regional level, the data are not typically collected at smaller geographic levels, and certainly are not available as time-series data at a parcel-specific level. This presents challenges for using value added as a measure of efficiency for the Portland Harbor.

We used the IMPLAN economic modeling software to obtain value added information for the smallest geographic areas possible (zip codes). ECO used the IMPLAN forecast of value added for the four zip codes that overlap the Portland Harbor for 2002 and 2008. Using a geographic boundary that is close to, but not exactly the same as, that of the Portland Harbor means that the measure of value added per gross developed acre should not be viewed as accurate in an absolute sense. But because our geographies and data sources were consistent in both years, the measure is still useful for observing trends over time.

Our analysis showed value added in the zip codes approximating the Portland Harbor increased from \$3.16 billion in 2002 to \$3.48 billion in 2008, an increase of 1.6% per year. However, the US Consumer Price Index grew by 3.0% per year over this same time period, indicating that value added in the Portland Harbor grew at less than the pace of inflation.

¹⁵ More accurately, the production costs are the outside purchases of materials and services, but do not count payments to employees for wages, salaries, and benefits. Thus, a lot of value added is a “return to labor;” it also includes returns to land and capital.

Cargo

The Port of Portland tracks cargo tonnage on a monthly basis and publishes annual data, dating back 30 years. While the data are only available for Port of Portland public marine terminals, and not privately-operated terminals, they are a good proxy for cargo shipped in the Portland Harbor, and the most comprehensive historical data available. The Port data show cargo volumes (measured in short tons¹⁶) increased from 10.7 million in 2002 to 14.1 million in 2008, an increase of 4.8% per year. Over this period, cargo volumes experienced more robust growth than any of the other efficiency measures used in this analysis. In other words, despite a decline in employment, and modest gains in real market value and value added, the Portland Harbor saw strong growth in cargo volumes per developed acre of industrial land.

Note that is not the same as saying that land in the Portland Harbor is what generated or somehow caused that tonnage to go through the Port.

3.4.2 OPPORTUNITIES FOR INCREASED EFFICIENCIES

The available data provide limited answers for understanding the potential for industrial land in the Portland Harbor to be used more efficiently. To supplement them, we interviewed key stakeholders in the Portland Harbor to solicit their input on (1) ways to measure efficiency, (2) challenges to improving efficiency, and (3) strategies to overcome those challenges.

To conduct these interviews as efficiently as possible, ECO staff met with about a dozen members of the Working Waterfront Coalition (WWC), rather than conducting separate interviews with similarly qualified individuals. Established in 2005, the WWC is an organization of businesses concerned about the environmental health and economic vitality of the Portland Harbor. Members of the WWC who were interviewed for this project, included representatives of the following businesses and organizations:

¹⁶ 2,000 pounds per ton, as opposed to metric tons (1,000 kilos, about 2,200 pounds).

- The Greenbrier Companies
- CalPortland
- Northwest Pipe Company
- Schwabe, Williamson & Wyatt
- Kinder Morgan
- Smart Decisions
- Port of Portland
- Perkins Coie
- Schnitzer Steel
- Columbia Pacific Planning
- Evraz Oregon Steel Mills

Group members had different views based on their individual experiences in the Portland Harbor, yet the group as a whole agreed on most key points. Although no votes were taken at the meeting, the following points seemed to achieve consensus:

- **The Portland Harbor has many attributes that provide a competitive advantage for water-dependent industrial activity.** The Harbor benefits from its amazing connectivity: the confluence of two rivers, access to domestic markets via two major rail lines, inland waterways via the Columbia/Snake River system, and I-5 and I-84, and access to global markets via the Pacific Ocean. Having all of this connectivity in the heart of the City of Portland, with strong local policies in place to preserve harbor land for industrial use, creates a special place for water-dependent industrial firms. Members of the WWC recognize the importance of the Portland Harbor, and are committed to maintaining and enhancing its competitive advantages.
- **The constrained land supply is an issue.** Members of the WWC recognize that the industrial harbor land supply in the Portland region is fixed, and vacant developable land is rare and constrained. They believe this limitation is an important issue, and one that will become more important over time.
- **Businesses adjust to these constraints by taking measures that have the effect increasing output on an existing site (i.e., of increasing land efficiency).** Such measures include extra shifts, better machinery, tighter processing procedures, and more.
- **There are bigger public policy issues that are affecting demand for new development in the Portland Harbor.** While members of the WWC were concerned about the constrained land supply, they were more concerned with issues affecting demand: Superfund liability and a burdensome permitting process.
 - **Superfund liability.** The specter of the Superfund is hanging over the heads of all property owners in the Portland Harbor. They know that their liability for the Willamette River cleanup effort will be significant, but they do not know what their individual liability will be, or when a final agreement will be

reached. Members of the WWC expressed concern that it is nearly impossible to sell land in the Portland Harbor for new industrial development until a final agreement has been reached on the Superfund liability.

- **Permitting process.** Members of the group believe the local permitting processes to be time consuming, costly, and uncertain. Such beliefs are typical of most cities. But members of the group who operate facilities across the globe expressed their view that Portland's permitting process is more costly and difficult than most other places they do business. An implication for land efficiency is that permitting, its other intended benefits notwithstanding, makes private sector efforts to improve sites and increase efficiency more difficult. Thus, the City should be sure that the intended benefits are worth the tradeoff, and adjust its permitting process if they do not appear to be.
- **Traditional measures of efficiency do not apply for harbor industrial land, and alternative measures should be used.** Regarding the efficiency of land use, members of the WWC supported the conclusions of this report, that traditional measures (employment, real market value, and FAR) are ill suited for measuring the performance of water-dependent industrial land. The group suggested other measures of economic output, such as value added and cargo tonnage, are more appropriate measures of land-use efficiency in the Portland Harbor.

3.4.3 IMPLICATIONS

In our opinion, the main value of this attempt to measure land-use efficiency was to show what a slippery notion it is, and why simple statements about that efficiency are more likely to derive from opinion and a simple causal model than from an even semi-rigorous empirical analysis. In other words, things are complicated.

For example, many would say that land is being used more efficiently if it accommodates more employees. That kind of definition would be consistent with land-use planning practice and law in Oregon. By that measure, land use efficiency in the Portland Harbor decreased from 2002 to 2008.

But an alternative view – and one more likely to be taken by economists – is that labor (employment) and land are both inputs to a production process. They may be substitutes, or at least there is no necessity that they move together. If a business can use less land and even less labor and still increase its production, it is getting more efficient. If a lot

of businesses in an area are increasing their output on the same land they have always been on, then “land efficiency” can be said to be increasing.

In Portland Harbor the data shows mixed results. Despite declining employment, and growth in real market value and value added that is less than the rate of inflation, the Portland Harbor experienced an increase in efficiency as measured by cargo tonnage. If the City is interested in generating the most economic activity on the fixed supply of harbor industrial land, then value added and cargo tonnage may be more appropriate measures than employment. But these measures are inconclusive on whether the harbor increased in land use efficiency from 2002 to 2008.

That last point leads to a suggestion for policy discussion: instead of talking broadly about “land efficiency,” talk specifically about changes in certain economic output per acre. Accept that there are different measures of output, and track several of them. That is what we did above. Our conclusion is that some measures of economic output have been increasing faster than vacant land is being converted to developed land, and other measures have not. The region should continue to track these measures, and adopt policies with the intention of increasing measures of economic output faster than vacant land is converted to developed land. This seems like a good objective for people with different passions: economic development, environmental amenity, or smart growth.

Finally, our simple analysis does not answer other questions that could be important for policy, such as (1) What is causing the increase or decrease in economic activity? (2) How does that change compare with other areas in the Portland region, or with other port areas in the U.S.? and (3) What policies would allow for even greater growth?

SUMMARY OF FINDINGS

This report focused on issues related to the demand for and supply of land for water-dependent industrial employment in the Portland Harbor (about 4,000 acres of land along the Willamette River, from approximately the I-405 Bridge north of downtown to the confluence of the Willamette and Columbia Rivers). Its main conclusions are:

- The City and its partner agencies have spent years in study and data development for the study area. The City's mapping of vacant parcels is detailed and support its conclusion that outside of land already in Port of Portland Terminals, the best potential sites in the study area of a location and size that a new marine terminal would require are Atofina and Time Oil.
- These two sites meet mandatory criteria for minimum size (more than 50 acres) and location (frontage on the Willamette River) for a new marine terminal. That makes them *possible* sites, but not necessarily *likely* sites. The analysis in this report reconfirms findings of previous studies: small size and a lot of site constraints (especially the need to deal with the legal liabilities of prior soil contamination) make development of these sites for a marine terminal challenging.
- Even using the most detailed and recent data available, it is difficult to predict future land needs for public marine terminals with precision. While the potential land need through 2040 varies greatly depending on key assumptions, the most-likely scenario shows that the Port of Vancouver may, in theory, have enough developable land to accommodate regional growth in cargo volumes through 2040. In practice, however, competing demands for Port of Vancouver lands, competition among and public policies of affected jurisdictions, and the potential for higher growth in cargo volumes all make it possible, if not likely, that the land controlled by the Port of Vancouver would not be able to accommodate all of the regional demand for marine cargo.
- Regarding the efficiency of land use, for the time periods evaluated, we found a decline in employment, modest growth in real market value and value added (though less than the rate of inflation), and stronger growth in cargo volumes per developed acre of industrial land. The mixed results of the various measures of economic activity prevent us from drawing a strong conclusion. The region should continue to track these measures, and adopt policies with the intention of increasing measures of economic output faster than vacant land is converted to developed land. This seems like an objective that could appeal to people with different interests: economic development, environmental amenity, or smart growth.

Section A.1 describes why getting clear about definitions and assumptions at the beginning of a study is important. **Section A.2** discusses a *framework* for evaluation: concepts that underlie any evaluation of this type. It discusses (1) definitions of industrial use and industrial land, (2) factors relating to the supply of and demand for industrial land, (3) the role of industrial activity in the economy and (3) the concept of land efficiency: what is it, why does it matter, and how is it measured. **Section A.3** is more specific about the *methods* used for the evaluation (review of previous studies, secondary data, case studies, interviews) and how they are used to address four key questions: about land supply for water-dependent uses, a new marine terminal, the role of Vancouver in the regional land supply for marine terminals, and land efficiency.

A.1 OVERVIEW

The purpose of research on public policy issues to provide information to a public debate about public action. The research *informs* decisions; it does not *make* decisions. Those decisions are usually made by elected and appointed officials on behalf of the citizens they represent.

Some of the issues that require action are controversial. People and groups have different opinions about the extent of the problem, its causes, and best ways it can be mitigated. Ultimately, most solutions that get adopted are a result of debate and compromise. Fundamental to a productive debate about problems and solutions are (1) an agreement on definitions, and (2) clarity about assumptions. Many discussions fail to lead to consensus on action because there was never consensus on definitions. Moreover, it is common for evaluation results to depend more on the assumptions selected than on the data collected in support of those assumptions.

Thus, the analysis in this report starts by trying to describe clearly the context for the questions being asked. That context is a foundation from which to identify data sources and analytical methods. Stated another way, the methods used for evaluation should be consistent with generally accepted ideas about how a regional economy and industrial development work. What do theory and prior empirical work suggest are fundamental contributors to (causes of) economic activity and industrial development, and which of those factors are most closely related to the questions this study is addressing?

Section A.2 provides a *framework* for evaluation: evaluation concepts that underlie any evaluation of this type. Section A.3 then discusses more specific *methods* for data collection and analysis that are consistent with that framework.

A.2 FRAMEWORK FOR THE EVALUATION

This section discusses a *framework* for evaluation. It discusses (1) definitions of key concepts used in the analysis, (2) the role of industrial activity in the economy, (3) factors relating to the supply of and demand for industrial land, and (4) the concept of land efficiency: what it is, why it matters, and how it is measured.

A.2.1 WHY CARE ABOUT INDUSTRIAL LAND?

No city or region exists that does not engage in economic activity. A concentration of economic activity is a defining characteristic of all cities.

A substantial but inconclusive literature investigates which economic activities provide the greatest net benefits to cities. Most of that literature assumes, at least implicitly, that (1) specialization allows consumers to get a variety of goods and services at lower prices; (2) if places specialize where they have comparative advantages, they will (a) produce goods more efficiently and be more competitive, but (b) have to trade to get everything they want; and (3) trading requires having something to trade; it means exporting some goods and services so that that money is available to pay for imports. It is that logic that leads economic development specialists to emphasize the importance of growing and retaining local firms that export goods and services: the payment for those exports brings money into the local economy that, among other things, allows purchases of desired goods and services not provided in the local economy.

Whether industrial activity generates larger economic benefits than other economic activities is a matter of debate in the professional literature of development economics.¹ Most economic development practitioners, however, believe that:

- Manufacturing is central to a strong regional economy (for a variety of reasons related to assumptions about greater value added, export

¹ See a recent debate sponsored by *The Economist* on the motion “This house believes that an economy cannot succeed without a big manufacturing base.” (<http://www.economist.com/debate/days/view/714>; accessed 24 August 2011). The opening remarks of the moderator stated “Our topic for the next few days is one that has divided economic practitioners and commentators for as long as anyone can remember: how important is manufacturing?” Hypothetically, if the U.S. were manufacturing more products being sold abroad, its debt would be less. But are global and U.S. economic conditions such that manufacturing is the comparative advantage of the U.S.; maybe it should be exporting services (e.g., financial, accounting, medical, engineering, and so on) instead. Pro and con arguments are posted on-line and readers vote. Readers voted 3 to 1 in favor of the proposition.

orientation, multiplier effects, average wages, and employment social diversity) and their missions.²

- By extension, the supply of land to accommodate manufacturing (i.e., industrial land) is important: too little industrial land hinders the growth or utilization of regional economic capacity. It is not uncommon for economic development discussions to include a statement that a region lacks sufficient land for industrial development at what someone has judged to be reasonable prices.

While proponents of manufacturing and industrial development have arguments and data to support their beliefs, so do groups that have different opinions about the importance of manufacturing relative to other sectors. Some of their arguments: too much industrial land could impose opportunity costs on the regional economy and hinder the growth or utilization of regional economic capacity; land markets and resulting land price should be allocating land to highest and best use, and that preserving land for industrial users at the exclusion of non-industrial users would reduce regional economic well-being.

The disagreement between groups stems from different assumptions about the value of industrial uses on particular parcels of land relative to alternative uses. In debates about public policy on land use and development, advocates for any particular use usually argue that:

- Their preferred use of the lands in question generates greater net benefits for a region than the other potential uses.
- Regions should preserve lands for their preferred use even if other users are willing to pay higher prices for these lands. Stated differently, all sides frequently assume that their uses produce positive externalities for a local economy that justify the effective subsidy associated with keeping other users that might pay more for the lands at issue.
- Where the alternative use would pay *less* for land than their preferred use, their arguments go the other way: the preferred uses generate greater net benefits to a region because the alternative uses will not generate sufficient positive externalities to offset the lost consumer and producer surplus that results from requiring the land to be used for purposes that the market prices do not show to be the highest and best use.

² One should note, however, the likelihood of self-selection bias here: local economic development has typically been funded with a mission to retain and attract manufacturing jobs, and people attracted to the field of economic development are likely to start with or acquire that point of view.

The arguments for public-sector involvement in urban land markets (e.g., planning, zoning, urban renewal) are based fundamentally on arguments about external effects that are not incorporated into the market price of land transactions. Proponents for policies favoring industrial land (or any type of land use³) might make both sides of the argument: because of the important external benefits of industrial use (1) protect industrial land from being converted to uses that will pay more for that land, and (2) do not prohibit industrial uses from converting other land to industrial uses when it is willing to pay more for the land than those other uses.

This study cannot resolve the longstanding debate about the net benefits of industrial uses and land relative to other uses and land. Rather, *this study starts from the assumption, embedded in the economic development policies of all local governments in the region, that the retention and expansion of industrial sectors is something that the region desires.* The City of Portland specifically addresses industrial land uses in its Comprehensive Plan and Zoning Code. The Urban Development goal of the Comprehensive Plan calls for industrial sanctuaries, where industrial land is preserved for manufacturing purposes exclusively. This stance is reiterated in Goal 5: Economic Development, which identifies retention of industrial sanctuary zones, including maximizing linkages with and within these areas, as a primary objective. These policies are implemented via the city's zoning code, which restricts certain commercial uses in industrial zones and only permits changes to Industrial and Employment Comprehensive Plan designations, if stringent criteria are met. These policies demonstrate the City of Portland's commitment to protecting industrial lands for industrial use. With this commitment in mind, this study then investigates land and in the Portland Harbor to see what capacity they have (given different assumptions about user types and changes in technology and operations) to accommodate industrial users.

A.2.2 DEFINING INDUSTRIAL LAND AND USERS

A.2.2.1 Industrial land

What is commonly referred to as "industrial" land is land designated by a local government (in its comprehensive plan, implemented by its zoning ordinances) to allow (but not necessarily require) industrial uses.⁴ Thus, land may be defined by public policy (e.g., plan or zone designation) or by actual uses. Such definitions may lead to an identification of roughly the

³ For example, the fundamental argument for the preservation for West Hayden Island is that such preservation has external natural and social benefits that make the land more valuable to the region in its natural state than in development.

⁴ Much of the overview in section A.2.2 is drawn from previous work ECO has done on industrial lands, especially work for the City of Tukwila, WA.

same land, but they are not identical. Industrial uses exist on land not zoned for those uses, and non-industrial uses exist on lands zoned industrial. Either definition, or both, may be appropriate for a particular policy issues.

A smaller subset of industrial land pertinent in this study is “harbor” land. That land could be defined in any of several ways. It could be, for example, land parcels that are within the boundaries defined for this study and also:

- With docking facilities
- Abutting a navigable waterway
- With active water-dependent industries (however “water-dependent” may be defined)
- Owned by the Port of Portland
- Any combination of the above.

For this study, we use the City’s definition of the “Portland Harbor,” based on land designated industrial by the City’s Comprehensive Plan in close proximity to the Willamette River. A map of the City’s harbor lands is shown below in Exhibit A-1.

Exhibit A-1. Map of harbor lands in Portland



Source: City of Portland, 2011.

A.2.2.2 Industrial users

All industrial users

Land is designated industrial because it meets, or is intended to meet, the needs of the industrial users. These needs typically include proximity to transportation routes (interstate roadways, rail, water ports, airports),

relatively low-cost land (to accommodate the relatively large land needs of many industries), and a location that reduces conflict with other uses.

Industrial users are usually identified as a collection of sectors from the North American Industrial Classification System (NAICS). A recent analysis of industrial land published by the American Planning Association⁵ used NAICS codes to define “industrial use” in urban areas. It described a *strict* definition and *loose* definition. The industries included in both definitions are shown in Exhibit A-2.

Exhibit A-2. NAICS codes presumed to be highly correlated with industrial land use

NAICS	Industry
Strict Definition	
23	Construction
31-33	Manufacturing
42	Wholesale trade
48-49	Transportation and warehousing
Loose Definition	
23	Construction
31-33	Manufacturing
42	Wholesale trade
48-49	Transportation and warehousing
221	Utilities
444	Building material and garden equipment and supplies dealers
511	Publishing industries (except Internet)
517	Telecommunications
518	Internet service providers, web search portals, and data processing services
562	Waste management and remediation services
811	Repair and maintenance
812	Personal and laundry services

Source: *Planning for Industry in a Post-Industrial World*, Marie Howland. See text for full citation.

These sectors share some basic characteristics. First, they are often referred to as part of the “traded” sectors, presumably because they have a greater propensity to be export-oriented and involved in direct creation of physical goods.⁶ Second, they generally have the same building and land needs and site requirements. They cannot typically locate in high-rise office space or in storefront retail space, or in converted homes. This limitation is in part related to possible external effects that can make them unattractive neighbors; they can generate more noise, dust, smells, and visual impacts than other uses. (But many industrial uses can have *fewer* external impacts

⁵ Howland, Marie. 2011. “Planning for Industry in a Post-Industrial World: Assessing Industrial Lands in a Suburban Economy.” *Journal of the American Planning Association*. Winter, Vol 77, No 1. pp 39-53.

⁶ But note that this distinction has always been fuzzy and is getting blurrier in today's economy. Many businesses in the Services sector are export-oriented: e.g., business services and tourism. Moreover, the notion of “basic” is also fuzzy and increasingly questioned.

of some types than businesses in other sectors have: e.g., on traffic). The limitation also relates to their general need for cheap land and proximity to transportation routes.

The industrial sectors shown in Exhibit A-2 are defined by industrial activities, but the list does not necessarily reflect the types of businesses that require industrial land. For example, many jobs in the construction industry are not physically located at a central, industrial location, but instead operate on sites throughout the region. Similarly, many utility jobs in the region are often in office towers in the Central City, and do not require industrial land. Therefore, the list of NAICS codes that constitute industrial uses (as defined by the American Planning Association) do not necessarily reflect the range of businesses that would have demand for industrial land in Portland.

Water-dependent industrial users

For this analysis, more important than “all industrial” users is the subset of industrial users that are either “water dependent” or “water related.” Every type of job must, by definition, fit into one of 17 broad (“two-digit”) NAICS categories. But at the most detailed level (six-digit) there are about 1,175 categories. If one wants information about “water-dependent” employment, one must define it as some combination of NAICS codes, and those codes, even at the finest level of disaggregation, may have firms that one might call water-dependent and others one would not. No standard data source defines business this way; one has to either combine NAICS codes or do primary research (e.g., site evaluations of phone surveys).

Even seemingly obvious NAICS codes like 3366, ship and boat building, may not be completely populated by water-dependent firms: smaller pleasure boats may be built or refurbished for shipping by truck or rail. And codes that may appear to have little to do with water (e.g., 3112, oil seed and grain milling) may have reasons to be close to the water because of the importance of bulk shipment. This report does not conduct analysis that requires a definition of water-dependent industrial users, and because of the difficulties of defining water-dependent industries by NAICS codes, we have not attempted to do so.

The City of Portland defines river-dependent uses as those that can be carried out only on, in, or adjacent to a river because they require access to the river for waterborne transportation or recreation. Included is any development, which by its nature, can be built only on, in, or over a river. The zoning language, however, does not distinguish specific water-dependent industrial uses.

Public marine terminals

Our analysis treats public marine terminals (i.e., the Port of Portland facilities) differently from other users of harbor industrial land. These port terminals function as public infrastructure, facilitating economic activity for other industries in the region. In this report, we examine certain questions related to broader harbor industrial land efficiencies, and other questions related to land supply specifically for new public marine terminals.

A.2.3 EVALUATING THE SUPPLY OF AND DEMAND FOR INDUSTRIAL LANDS

This section looks at how cities answer critical questions like: How much developable industrial land is there? How is it likely to be used? Will it be enough for the expected demand in the future?

A.2.3.1 Supply of industrial land

The total amount of land inside the Portland city limits is essentially fixed. Unless submerged land is filled to create new dry land, the only way the City can get more land is to expand its boundaries. But such expansions are unlikely, because the City is mainly surrounded by rivers, protected areas (Forest Park), and incorporated municipalities.

Thus, for the City of Portland, the question of land supply focuses on how much land is vacant, partially vacant, or underutilized, and how much land is constrained (by environmental contamination, environmental overlays, and other issues).

The Bureau of Planning and Sustainability (BPS) at the City of Portland has done extensive work to characterize the land supply in the Portland Harbor. It uses state-of-the-practice procedures (e.g., GIS data layers) consistent with Oregon planning law (e.g., statutes and administrative rules for statewide Goals 9 and 14).

Exhibit A-4 shows the typical process for categorizing and evaluating land supply. In summary:

- All land is either fully developed or not.
- If not, it is either (1) under development (in the pipeline), (2) buildable, or (3) not buildable (because of prohibitive physical or policy constraints).
- If buildable, a parcel of land may be (1) fully vacant, (2) partially vacant, or (3) potentially redevelopable.

- Buildable land in any of those categories has a *capacity* to accommodate new development. That capacity is defined by public policy and may be partially constrained by public policy.

Exhibit A-4. Conceptual framework for buildable land inventory and capacity analysis

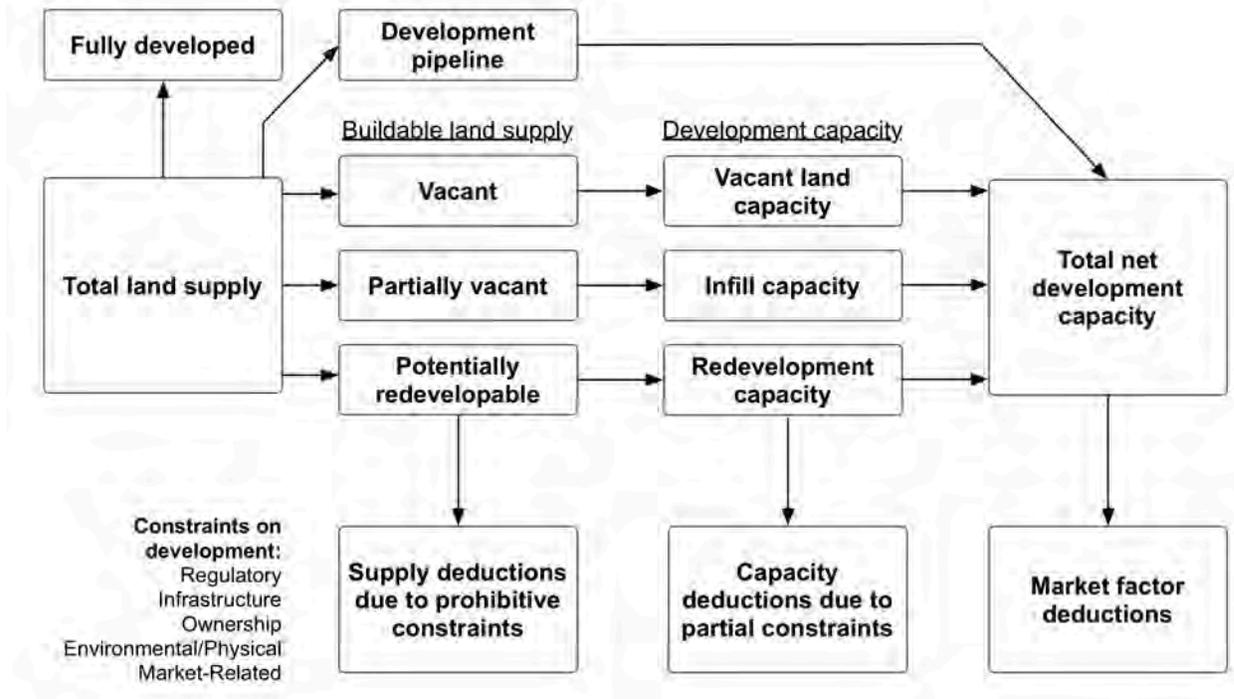


Fig. 7-4 Land supply and capacity analysis process. Source: Moudon and Huber 2000. This material is used by permission of John Wiley & Sons, Inc.

The concepts and definitions illustrated in Exhibit A-4 are relatively well understood in Oregon planning practice. Our investigation suggests that the extensive work by BPS on the land supply in the Portland Harbor generally accepts these concepts, even if its definitions and methods are slightly different.

A.2.3.2 Demand for industrial land

Forecasting demand for industrial demand begins by identifying what types of users will consider locating on land designated industrial. In general, industrial land must accommodate most job growth in “industrial” sectors. It must also accommodate some job growth in “non-industrial” sectors.

Not all jobs in “industrial” sectors use industrially-designated land. For example, a head office of a manufacturing company may be in a downtown office/commercial zone rather than in an industrial part of a city. Another

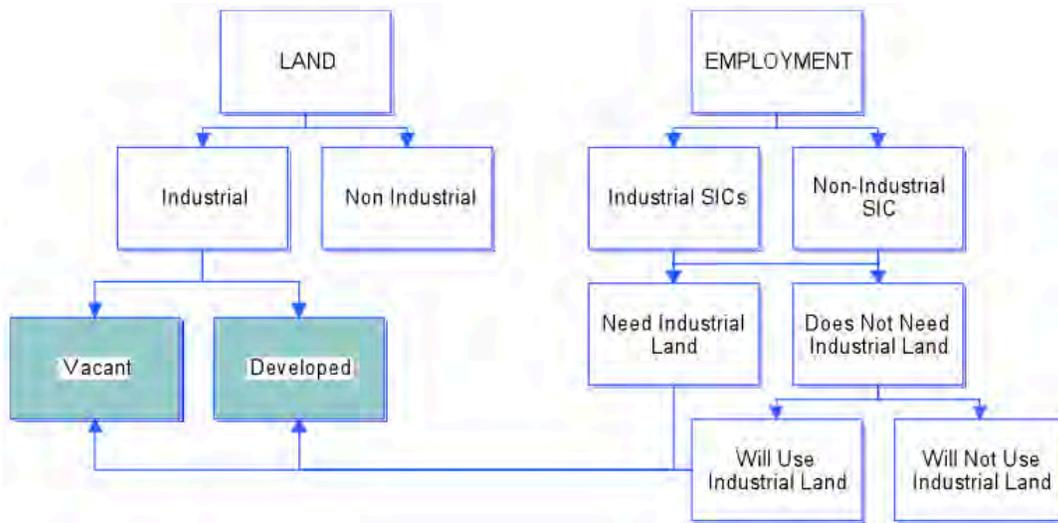
example is that some firms in the industrial sectors are allowed to locate in general commercial or mixed-use zones and may do so.

Not all industrially-designated land is used by “industrial” sectors. Some businesses that are referred to by the NAICS system as “services” need industrial land (for example, auto repair) because they share the same need for a location where land is cheap and where their activity is compatible with the surrounding neighborhood. In addition, non-industrial uses that don’t necessarily *require* the characteristics of industrial land (low price, access to transportation, etc.) may nevertheless locate there if (1) they are not prohibited from doing so, and (2) the market conditions allow them to out-bid industrial uses. Big-box retailers with sufficient drawing power may not need surrounding retail: they can stand alone in industrial areas, where they may find cheaper land and better access to customers and suppliers. Services may locate in an industrial area to serve food and other convenience needs of industrial workers. Residential uses may also find an industrial area attractive if the environmental effects of industry are not too deleterious and the location is convenient for residential living. Most significantly, given the focus of this study, professional offices and other commercial uses may locate on industrial land because they can out-bid industrial uses.

This is one of the City of Portland's concerns: that large amounts of industrial land will convert to non-industrial uses. The City has already taken actions to alleviate this concern. Existing policies in the City’s Comprehensive Plan and Zoning Ordinance (see Section A.2.1 of this document) aim to prevent the use of industrial land for non-industrial uses. Industrial sanctuary zones, for example, preserve land zoned as industrial for industrial purposes exclusively. The code does, however, allow for conditional use of industrial land for non-industrial purposes in these same areas.

Exhibit A-5 shows this relationship between “industrial” uses (as measured by industrial employment) and “industrial” land, and why studies of industrial land like this one are tricky.

Exhibit A-5. How industrial and non-industrial businesses use industrial land



Source: ECONorthwest, 2011.

On the "Land" side, the analysis in this study is concerned with only land designated as industrial, and is concerned with both vacant and developed industrial land. On the "Employment" side, the study cannot limit itself to industrial NAICS codes⁷: non-industrial users use industrial land. It also cannot limit itself to a subset of businesses that in some sense "need" industrial land, because many businesses that fail to meet whatever need criteria we might develop will still be users of industrial land.

In Oregon, state law requires that cities provide adequate land for 20 years of forecasted economic growth (Goals 9 and 14 of the statewide planning goals). As a matter of practice, (1) the common measure of economic growth used in a 20-year forecast is employment, and (2) some estimate of employees per developed acre, by broad industry type (e.g., retail, office commercial, industrial), is used to convert forecasted future employment to needed acres of land.

For several reasons related to market conditions and public policy, it is possible for (1) employment density to increase over time, and (2) an increasing amount of new employment-related development to occur as an intensification of development on an already developed parcel (rather than as new development on a "greenfield" parcel). If a region uses its land more "efficiently" (due to public policies, market forces, or a combination of both), then the ratio of employees per acre should increase, which would reduce the amount of demand for land in the forecast period.

⁷ Formerly SIC codes, as shown in Exhibit A-3.

While employment is typically the measurement used to forecast demand for land, it may not be the best measurement for forecasting industrial land demand. Later, this appendix discusses other measurements that could be used to forecast demand, and to measure land efficiency.

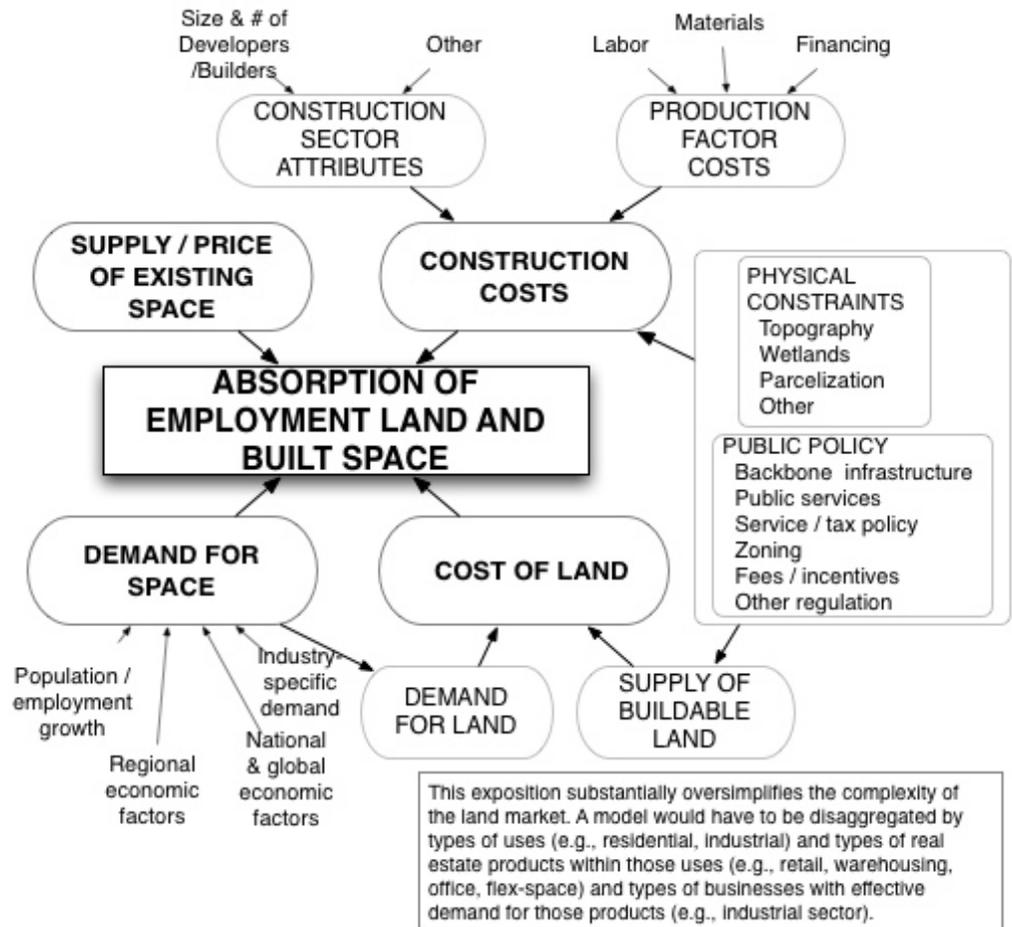
A.2.3.3 Comparing supply and demand

Factors affecting demand and factors affecting supply are not independent: in theory those factors interact to result in a market clearing price. Businesses and developers do not necessarily choose the cheapest land or the best (most expensive) land: they choose the land with the best value. In other words, price makes a difference. Below are some key points that describe how factors of supply and demand interact to determine where industrial development occurs:

- In any production processes, businesses try to economize on scarce (relatively expensive) resources by finding substitutes or changing the production process. For example, if serviced lands become scarcer, their prices should increase and businesses will substitute other factors (e.g., equipment) for land. In other words, as land gets scarcer, its price should rise and it should get used more intensively.
- With a fixed supply of total land, the supply of vacant, buildable land will decrease as development occurs.
- As the supply decreases (and as the real costs of providing services to that land increase), the price of land for new development will increase.
- As the price increases, users of land (businesses and developers) will try to economize on the use of land. They may do that by (1) using the available land in Portland more intensively, (2) choosing locations in other cities in the region more distant from the center that have more and less expensive buildable land, or, if no land elsewhere in the region has the desirable attributes at an affordable price, then (3) locating somewhere other than the Portland region.

Exhibit A-6 shows some of the many factors that affect the absorption of employment built space and land.

Exhibit A-6. Factors affecting the price and absorption of vacant land



Source: ECONorthwest, 2011

In the Portland Harbor, for example, land may be more expensive (cost per acre) than at the region's periphery. But land in the Portland Harbor is also close to the downtown, labor markets, port terminals, and interstate highways. If it is only a little more expensive, it may still be a preferred location for growth. If it becomes too expensive, then prospective industrial users may locate elsewhere, on land that provide a better value. If there is no land within the Portland region that provides this value, then the prospective industrial users may locate in other regions instead of Portland.

In an idealized market, such a value differential would be spotted by developers and businesses. In their efforts to secure the land they would bid up its price until it had little net advantage relative to all other land. In that idealized situation, all industrial land is equally suitable and every sub-area will, over time, get its share of new development.

But more realistically, a particular firm may have particular needs that are best met by land at a certain location. Though businesses on average

may be willing to pay only, say, \$5 per square foot for the land, such a firm may be willing to pay, say, \$8 per square foot. Thus, the question becomes one of making some assessment of whether the particular package of land attributes for properties in the Portland Harbor is going to be especially desired by some subset of businesses (e.g., water-dependent businesses).

A.2.4 “EFFICIENT” USE OF INDUSTRIAL LAND

Efficiency is a measurement of how much output is produced per unit of input. Thus, an efficiency measure requires a numerator (output) and a denominator (input). In this case, we care about the amount of economic activity (output) generated per acre of land (input). The denominator – acres – is relatively clear in theory and straightforward to measure. Thus, the bigger challenge is in choosing and measuring the numerator: economic activity. This section describes the various ways to measure efficiency of industrial land, and why some of these measures may be more appropriate than others.

If land use in an area becomes more efficient, then any given amount of economic activity will require less land than it would have otherwise. In an area with a fixed supply of industrial land, like the Portland Harbor, it makes sense to consider ways to use the land more efficiently to accommodate more economic activity. Typical measures of efficiency, however, may not be ideal for evaluating industrial land and marine terminals.

A.2.4.1 Traditional measures of efficiency

Typical measures in the numerator of an efficiency measure of land use include employment, real market value, and built space. These measurements look at the amount of economic activity occurring on a property. In general, advocates of economic development would prefer larger buildings, with higher value, and more employees to locate on a given parcel of land. But these measures of efficiency tend to give relatively low marks to industrial development.

Harbor industrial development tends to have low floor-to-area ratios (FAR) and a relatively low number of jobs per acre. Compared to an office tower, an acre of industrial development is likely to have much lower assessed value, employment, and gross square footage. Thus, measures of the efficiency of employment land based on any of these measures in the numerator would all tend to improve if industrial land were converted to commercial uses.

But industrial lands in general, and harbor lands in the case of this study, are clearly an important piece of the regional economy. If every

jurisdiction allowed vacant industrial land to convert to commercial uses on the assumption that some other jurisdiction would provide the industrial land, the regional supply of industrial land would get smaller quickly and, at the margin, industrial expansion would be slower than it would have been. Land with port access is a particularly important and relatively rare component of all regional industrial land. Marine terminals provide access to other markets, facilitating commerce, and allowing traded-sector businesses to export their goods to other markets.

In the context of the discussion in A.2.1 above, land with port access is necessary for the development of port and port-related facilities, and such facilities may have large external benefits for the region. Since the benefits are external (and, by definition, cannot be readily captured by owners of the land), they do not influence the price that private developers will pay for land. Thus, land prices that industrial users are willing to pay for land in the Portland Harbor probably do not reflect the full value to the Portland region of having that land in industrial use.⁸

A.2.4.2 Key issues for measuring efficiency

Regardless of what measure of economic activity is used in the numerator for calculating efficiency, there are fundamental issues that present challenges for defining and measuring efficiency and changes in efficiency for industrial land.

Efficient use of land versus efficient production of goods and services

Fundamental to land-use planning regulation in Oregon is the assumption that sprawl is inefficient, and that reducing sprawl saves valuable natural land (for farming, forestry, and the provision of ecosystem services) and promotes more intensive use of urban land (i.e., more density). This system intends to promote more efficient use of land. Denser development, however, does not necessarily mean more efficient production of goods and services for all types of businesses. Put another way, a public-sector mandated increase in certain measures of intensity of industrial land use (e.g., minimum FAR) may or may not increase the efficiency of a particular operation (measured by value added, employment, etc.).

This issue is critical when discussing land-use efficiency in the Portland Harbor. For some (perhaps many) industrial businesses located in the

⁸ Proponents of other uses could make the same argument: that their external benefits are substantial and not capitalized in land value. A full technical evaluation of the relative net benefits would require extensive empirical work, is unlikely to be definitive, and is beyond the scope of this study.

Portland Harbor, pressure to develop at greater density is unlikely to increase the efficiency of their operations.

Site-specific land efficiency versus regional land efficiency

Site-specific efficiency refers to the economic activity on an individual site. If a user of a one-acre industrial parcel were to double some measure of economic activity (e.g., employment, value added, etc.) without developing more land, one could call that an example of increasing the efficiency of industrial land as a factor of production. This is often what is meant by increasing efficiency.

But what if a parcel serves the regional economy: in other words, what if it provides external benefits? For example, a warehouse may allow other businesses in the region to transport their goods. The warehouse could appear unchanged over time by many measures of economic activity (e.g., assessed value, employment, FAR), but it may be accommodating more goods for other businesses in the region, allowing these businesses to grow.

There are at least three implications. First, standard measures of economic activity like employment may be the wrong ones. The warehouse and its employment may not have changed: it may be that both are now more efficient because the warehouse is now processing more goods because of increases in demand, changes in technology, or some other factor. Second, even if the production per acre for that warehouse were to remain the same in terms of tons or cubic feet of cargo processed, the value of that cargo may have increased (so an argument can be made that efficiency should be measured as value, not tonnage). Third, and related, even if the value of cargo did not change much, its transshipment is a necessary component of what may be a different and rapidly growing industrial sector that is contributing to the regional economy.

An example of this regional land efficiency is the Port of Portland itself. A port's economic impacts extend well beyond its land and the land that surrounds it. In Oregon, the economy of eastern Oregon and Washington depend on the port facilities in the Portland area to ship grain and other products. Looking just at measures of production on land around a port can easily miss the point: a port is a regional facility that may benefit many businesses a great distance from the port. Thus, it may be "efficient" for a port to have relatively low-density uses that allow efficient transportation of goods, facilitating economic growth throughout the region.

Economies of scale and threshold effects

For many enterprises, as they grow from small and start-up to bigger and established, they achieve economies of scale. There are start-up costs that they have to incur, and there are relatively fixed ongoing operating costs

that must be amortized. It is common for costs per unit of output (or, in the case of transshipment) throughput to decline.

Economies of scale (because of declining marginal costs) almost certainly exist for port facilities. There is a large initial capital investment in facilities: once they are there, they can be used more intensively at a low additional (marginal) cost per unit of activity (e.g., tonnage handled). As more facilities, even of different types are available, the per-unit cost of operation and maintenance can decrease, and the attractiveness of and demand for the facilities may increase for users.

Politically, getting to some scale is probably important for users and for higher levels of government (state and federal) that provide financial assistance to ports: in the case of Portland especially, for dredging the Columbia River. In other words, there may be subtle or not-so-subtle threshold effects: if port operations drop below some level, its ability to sustain even those lower levels of activities may be seriously diminished.

Markets versus public policies

Many economists would argue that the best judges of the efficiency of a particular industrial use at a particular site are the owners and managers of the use in question. If they believe that they can operate more efficiently by adding employees, buildings, or equipment to their site, they will do so. If they believe they can profitably increase production without adding land, they will do so. If their land and land around their site has locational characteristics that make it particularly valuable for certain types of production, and if there are a number of businesses involved in that type of production, its price will rise, and the price is a measure of the increasing value (efficiency) of the land in production.

That argument, however, does not address a concern of cities like Portland about that market-based process: what if non-industrial and non-water-dependent commercial uses (e.g., offices and retail) outbid industrial uses for the land? Yes, the land value has increased (as have the cities' property-tax revenues), but perhaps at a greater cost to the regional economy.

A.2.4.3 Alternative measures of the output component of efficiency

In short, to address the question about the efficiency of the use of industrial land in the harbor area, one needs a definition of efficiency that makes sense for industrial land. Such a definition must make sense not only in theory, but also in the context of the data and methods that are available for measuring efficiency. We suggest two alternative measures of efficiency

that are most appropriate for harbor industrial land: value added, and tonnage of cargo.

Value added

Proponents of the industrial and manufacturing sectors point to its potential for high “value added.” Value added means that the value of outputs (per unit or in the aggregate) less the cost of inputs purchased from other firms used to create output.⁹ In economic terms, industrial activity is a “goods-producing” activity, and is generally considered to have strong potential for value added. A service industry, in contrast, tends mainly to sell transformed labor services. There is value added, of course, but this value added is often lower than in a goods-producing setting.¹⁰

Setting aside cross-sector comparisons, value added may be a better measure of output over time *within* sectors than employment or built square footage. A measure of the efficiency of a fixed supply of industrial harbor land would be the amount of value added generated per acre for businesses located in the harbor.

Cargo

There is a reasonable argument that much of the industrial land in the Portland Harbor area serves a regional need for transshipment. Therefore, a regional measure of transshipment activity might be appropriate for measuring the efficiency of such land. Some measure of cargo (e.g., tonnage, volume, value) is an obvious choice. Because data are more readily available, we suggest tonnage of cargo as an alternate measurement of land-use efficiency in the Portland Harbor.

The economic activity occurring on a parcel is only part of the impact that land has on the regional economy. Many users of harbor industrial land facilitate economic activity throughout the region. While most measures of efficiency fail to measure this broader impact, tonnage of cargo is a measurement that is consistent with the idea that port facilities have broader regional economic benefits.

⁹ In that sense, value added is a measure of a firm’s contribution to GDP. Another way to think about this is that everything that a firm itself puts into the production of a product (primarily the labor of its employees and capital) “add value” to the raw materials and intermediate goods and services it purchased to make its final product.

¹⁰ Often lower, but not always lower. Service sectors that use highly-trained human capital may have high productivity and high value added. In addition, as technology increases the productivity of physical capital, less manufacturing and construction activity is required to produce the same output. Communication systems, for example, are much more productive than they were in the past, but require much less “brick and mortar” type activities and, hence, less construction activity.

Methodologically, such an analysis should be done for the Portland Harbor in the aggregate, not for individual businesses or parcels. For this measure, it does not matter how much cargo occurs on a given parcel; it matters how much the amount of tonnage per developed acre of land is increasing.

A.3 METHODS

Section A.2 is a *framework*: it is about definitions and concepts related to the issues this study is investigating. It is a basis for selecting specific methods (data and analytical approaches) for addressing the four questions posed:

- Are the methods the City used to estimate the location and amount of vacant, partially vacant, and potentially buildable industrial land in the Portland Harbor area likely to yield reasonable estimates?
- How suitable for a public marine terminal are the few sites in the Portland Harbor that have been identified by the City as having the potential to accommodate such a terminal?
- What role can the Port of Vancouver play in accommodating forecast demand for cargo volumes in the Portland region?
- What is the potential for more efficient use of industrial harbor land?

We describe the methods we used to answer those questions in the rest of this section.

A.3.1 GENERAL DATA SOURCES AND TECHNIQUES

To conduct our analysis, we used the following data sources:

- **Existing studies.** Extensive analysis has been conducted regarding the Portland Harbor, industrial land, and port terminals. Local governments and service districts in the region (e.g., Metro, the City of Portland, the Port of Portland) are constantly evaluating past economic growth patterns, and planning for future economic development opportunities. These efforts result in a library of reports and studies addressing different aspects of the regional economy. These recent (as well as ongoing) efforts contain useful information for the analysis. *The scope for this study emphasized synthesizing and interpreting existing data over collecting new data.* Thus, ECO reviewed these related research efforts, and pulled their key findings into the analysis where appropriate.

The City of Portland provided ECO with a list of over 30 recent, relevant documents. After an initial review of all of these documents,

ECO selected a subset of documents of particular value to its analysis:

- Portland Economic Opportunities Analysis (2010)
- West Hayden Island Economic Foundation Study (2010)
- West Hayden Island: Marine Cargo Forecasts & Capacity Assessment (2010)
- Portland Vancouver Trade Capacity Analysis (2006)
- West Hayden Island Planning Document
- Oregon Commodity Flow Forecast (2005)
- Portland's Working Rivers: The Heritage and Future of Portland's Industrial Heartland (2008)
- Port of Portland annual reports

ECO focused on data and text related to historical trends and future projections for economic growth: in the region in general and the Portland Harbor in particular.

- **Secondary data sources.** ECO incorporated many secondary data sources into its analysis.¹¹ As with "existing studies," the objective is to leverage past research efforts to answer the questions posed in this study. Examples of secondary data sources we used are:
 - Buildable Lands Inventory (City of Portland). This source includes multiple data layers in the City's Geographic Information System (GIS)
 - Port of Portland Marine Terminal Statistics
 - Multnomah County Assessment & Taxation
 - RLIS (Metro)
 - Quarterly Census of Employment and Wages
 - IMPLAN
- **Interviews:** Many people in the Portland area have special knowledge of, and interest in, the Portland Harbor. ECO interviewed individuals from both the public and private sectors, and reviewed notes on past interviews that had been conducted for recent related studies. Interviewees included:

¹¹ Secondary data sources are ones collected and readily available by someone other than the user (in this case ECONorthwest). Typical secondary sources are government agencies (e.g., U.S. Census, ODOT, Metro, Port of Portland).

- Port of Portland officials
- Port of Vancouver officials
- Authors of relevant studies and reports
- Members of the Working Waterfront Coalition
- Other local economic development professionals

Data from these sources were used to address the three specific questions that are the focus of this study. The next sections explain how.

A.3.2 EVALUATION OF PRIOR EFFORTS TO IDENTIFY LAND SUPPLY IN THE PORTLAND HARBOR

The City asked ECO to evaluate whether the methods the City used to estimate the location and amount of vacant, partially vacant, and potentially buildable industrial land in the Portland Harbor area likely to yield reasonable estimates? More specifically, the question was whether it is reasonable to assume that the two sites that the City identified (Atofina and Times Oil) are the only two in the Harbor study area (as defined in Exhibit A-1) that are of a size and location that they *might* be suitable for a new Port of Portland marine terminal?

To answer that question we needed an estimate of the minimum feasible size of a marine terminal. Maul, Foster & Alongi provided that estimate (documented in Section 3.2 of the report and Appendix B): 50 acres. We then looked for 50 acres of vacant land with waterfront access in the study area by:

- Reviewing studies summarizing industrial and harbor land supply: *Industrial Districts Atlas* (2004) and *Harbor ReDI Industrial Sites Analysis* (2009).
- Reviewing GIS shape files and cross-referencing to Google Earth aerial photos (August 2011).
- Discussing methods with BPS staff, and comparing those to standard methods for developing land inventories and identifying buildable land.

A.3.3 ADDRESSING THE POTENTIAL SITES FOR NEW MARINE TERMINALS

Much of the analysis in this report deals with the supply of harbor industrial lands in general: it includes both public and private ownership and uses of the land. This task deals specifically with land supply for new, public, marine terminals.

To determine which sites might best accommodate a public marine terminal, we began by identifying the technical site requirements for a marine terminal. ECO interviewed representatives of the Port of Portland to identify their ideal site requirements, as well as which of these requirements could be reduced while still accommodating a working port facility. ECO compared these site requirements with the findings of the Worley Parsons, a consultant to the City evaluating the potential site design of a new marine terminal on West Hayden Island. Finally, ECO turned to internal team members with experience running west coast ports, and looked for creative ways to adjust these site requirements to create a working terminal on smaller or otherwise constrained sites.

BPS staff identified only two sites that could potentially meet these criteria. ECO, reviewed the sites identified by the City of Portland, and evaluated maps of the Portland Harbor, including zoning, infrastructure and aerial photographs. Our preliminary review confirmed the City's findings, that most of the Portland Harbor has active development on it, and these two sites have the greatest opportunity to accommodate new public marine terminals.

The ECONorthwest Team, including Maul Foster & Alongi, Inc., toured these sites with BPS staff. Maul Foster & Alongi, Inc. conducted a visual inspection of the sites, documenting conditions affecting the suitability of each site for the proposed development. Key factors considered in our analysis were: site access, existing uses, natural features, and contamination/remediation. After conducting this site visit, we developed a set of criteria for evaluating site feasibility for typical port terminals. This set of criteria is included with this document as Appendix C.

Using these criteria, Maul Foster & Alongi evaluated the potential opportunities and constraints of these sites to accommodate development of a public marine terminal. A cursory site visit is insufficient to make a final determination of site feasibility. Nonetheless, our methods are consistent with our scope and budget, and are sufficient for identifying major opportunities and constraints for these potential sites, and making a preliminary determination of site feasibility.

A.3.4 ADDRESSING THE ROLE OF VANCOUVER IN HARBOR INDUSTRIAL LAND SUPPLY

The third question we were asked by the City is: What role can the Port of Vancouver play in accommodating forecast demand for cargo volumes in the Portland region? To answer this question, we used a combination of interviews with port officials and reviews of past reports.

We began by attempting a data-driven analysis. In principle, if we knew the capacity of existing marine terminals in Portland and Vancouver, and subtracted the forecast future demand for these areas, then we could identify the amount of demand that could not be accommodated by existing facilities. This demand (in tons of cargo) could then be translated into the acres of land necessary for new terminals to accommodate this growth. Comparing the required acres to support new terminals with the available land supply in the Portland Harbor and in Vancouver, we could identify how much of Portland's demand might need to be accommodated in Vancouver, and whether or not Vancouver had sufficient land to accommodate it.

The specific steps in our analysis, and detailed tables showing our results are contained in Appendix C: Analysis of Harbor Land Capacity and Demand, Portland and Vancouver. In short, we relied on the following data sources:

- Capacity of existing facilities: Estimates for the public marine terminals in the Port of Portland were taken from the *West Hayden Island Economic Foundation Study*, prepared by Entrix for the City of Portland in May 2010. These estimates were produced in interviews conducted by Entrix with Port of Portland staff. For estimates of capacity of private terminals in the City of Portland, as well as all terminals in the City of Vancouver, we relied on historical data on cargo volumes reported by BST Associates in their *Portland and Vancouver Harbor Forecast Update*, prepared for the Port of Portland in February 2012. Our estimates were confirmed and refined through interviews with Port of Portland officials.
- Future cargo demand: Estimates of cargo demand for all public and private terminals in the cities of Portland and Vancouver in the year 2040 were taken from the BST Associates *Portland and Vancouver Harbor Forecast Update*. These forecasts included a low and high scenario.
- Acreage necessary for new terminals: Estimates of the acreage required for new marine terminals were taken from a variety of sources, including the *West Hayden Island Economic Foundation Study* (Entrix, 2010), the Draft Report on *Operational Efficiencies of Port/Terminal World Wide* (Worley Parsons, 2012), and the Maul Foster and Alongi evaluation criteria included with this report as Attachment B.
- Available land supply: Finally, estimates of available land in the Portland Harbor are based on our own analysis of developable sights, described in Sections A.3.2 and A.3.3. Estimates of available

land in Vancouver, were based on the *West Hayden Island Economic Foundation Study* (Entrix, 2010), and verified through GIS analysis, and conversations with officials from the Port of Vancouver.

The data-driven method described above has many advantages: it is a logical way to conduct the analysis, it relies on the best and most recent data and forecasts, and with any one-set of assumptions used in the analysis, it results in a definitive answer of the acres of land needed for new terminal development. However, there is one major limitation to this method: it relies on so many assumptions, which can be pulled from such a broad range, with each assumption compounding on all previous assumptions, that using different sets of reasonable assumptions can create largely different results.

Therefore, our analysis uses the data to establish a high and low boundary for the potential land need, and describes a “most-likely” scenario that falls between the two extremes. In order to give these numbers more context, and to help us arrive at the most-likely scenario, we also conducted numerous interviews with representatives of the ports of Portland and Vancouver.

A.3.5 ADDRESSING THE POTENTIAL FOR INCREASED EFFICIENCIES

Section A.2.4 provides a context for defining and evaluating the efficiency of the use of industrial land. This section builds on that context to describe specific data and analytical techniques that this study uses.

The City is interested in knowing if industrial land in the Portland Harbor can be used more efficiently in the future. To answer we looked at recent economic trends in the Portland Harbor and in the City of Portland as a whole for changes in land-use efficiency for industrial users. For this analysis, we considered several measures of output in an efficiency measure: employment, real market value, value added, and tonnage.

Ideally, we would like to have data with a long time series (20 – 30 years) for each efficiency measure. But changes in the type, definition, and collection of data make it impossible to get consistent time-series data for both the numerators and denominators of efficiency measures. Our method is an approximation based on available data. We create different measures of efficiency for two different time periods: (1) 2002 – 2008, when detailed and consistent data are available on both output and land area, and (2) 1960 - 1997 when the Port of Portland did occasional studies of its land and activity.

For 2002- 2008 we began by identifying all parcels in the Portland Harbor using GIS. We examined data from two different years: 2002 (one of the earliest years that data are available using NAICS codes), and 2008 (the most recent year QCEW data are available). Comparing data from the two years we calculated the change in developed acreage in the Harbor, and the corresponding change in real market value, and employment.

We also collected data from different sources for two alternative measures of output (for the denominator): value added and cargo (volume, tonnage, and value). Unlike employment, and real market value, data for value added and cargo tonnage is not tracked at a parcel specific level. Instead, data is available at the regional, City, zip code or Census tract level. For our analysis, we used Port of Portland data on historical levels of cargo tonnage in the Portland Harbor, and the IMPLAN economic model for the zip codes that most closely align with the boundaries of the Portland Harbor for value added. We used the same years (2002 and 2008) as were used for other measures of efficiency.

In summary, we created various measures of change in land-use efficiency between 2002 and 2008.

This method has limitations. Six years is not a long time to observe economic trends and changes in land-use efficiency if one is hoping to use those trends as a basis for long-run forecasts. Moreover, the period includes the recent recession, which began in 2007. Ideally, our analysis would include years before 2002, as well as years later than 2008. However, data after 2008 are not yet available, and data before 2002 have significant limitations. Prior to 2000, employment was recorded by SIC codes, rather than NAICS. The change in classification makes comparing data across this time period difficult and unreliable for time-series analysis. Additionally, land-use data, including data from the County Assessor is less accurate prior to 2000, as GIS and other technology had not yet been widely adopted.

For a long-run look at trends, we used yet another method based on cargo tonnage as a measure of output. The Port of Portland conducts periodic studies of land use and development in the Portland Harbor. The earliest Port study dates back to 1960, with additional studies in 1990 and 1997. Additionally, various data sources, including the Port of Portland, the US Department of Transportation, and the Corps of Engineers track cargo tonnage that is shipped through the Portland Harbor. Comparing these datasets, we were able to calculate the tons of cargo that were shipped per developed acre in the Portland Harbor from 1960 through 1997, and observe trends over this 37-year period.

Criteria for Evaluating Potential Sites for Marine Terminals

One of the four questions that this study addressed was, “How well do the characteristics of the Atofina and Time Oil sites (the two identified by the City as meeting the minimum requirements for size and waterfront access) match the characteristics that would be needed to create a reasonable probability the sites could be developed as marine terminals?” To answer that question the consultant team had to specify those characteristics. Team member Maul, Foster & Alongi created the evaluation criteria summarized in the table that follows. Those criteria are used in the evaluation reported in Section 3.2 of the main report.

Marine Terminal Criteria

Criteria	Considerations	Comments
Water Access	Depth	Both berth and channel water depth are limiting considerations on vessel size and ultimately cargo type: (1) Barge: 15 to 20'; (2) Bulk: 35 to 52'; (3) Break Bulk: 30 to 40'
	Dredge Maintenance	Ability to maintain navigational depth through routine dredging. It is a function of siltation rate, cost, regulatory hurdles and physical restraints such as the presence of contaminated sediments.
	Pier Face Capacity	Vessel length and number of number of berths determine cargo type: <ul style="list-style-type: none"> ▪ Barge: 200 to 500' ▪ Bulk: 330 to 1200' ▪ Break Bulk: 400 to 800'
Land side transportation	Mainline Rail	Multiple rail service is desirable for competitive rates.
	Rail Siding	On site useable rail siding with sufficient on site car storage. The requirements for train length storage awaiting loading or unloading is a function of the cargo type. Bulk facilities including autos require 9,000 to 12,000 feet of track, whereas specialty project cargos can be managed on much smaller sidings and onsite storage track systems.
	Road	Proximity and ease of access to interstate freeway systems is an important criterion for marine terminals. Access should be on designated, all-weather truck routes with high levels of service including the access ramps to the interstate system.
Size	Total Acreage	Minimal acreage for cargo handling is required for various cargo types:* <ul style="list-style-type: none"> ▪ Barge: 10 to 75 acres (Mixed, bulk and project cargos) ▪ Bulk: 10 to 200 acres (Liquid and dry commodities) ▪ Break Bulk: 20 to 100 acres (Project cargos; autos)

Criteria	Considerations	Comments
Size (continued)	Unity of Ownership	Total acreage is a critical consideration and the assembly of property is often hampered by cost and timely assembly.
	Configuration	Parcel shape for marine terminals has an impact on terminal operating efficiency, most notably distance to pier face from remotest staging area. Configurations vary with cargo type and loading techniques. Dry conveyor and liquid piping configurations as well as auto handling are somewhat more forgiving.
Physical	Slope and elevation	Generally speaking facilities need to have minimal elevation change and slope. Bank heights have practical limitations, but fixed pier systems can be engineered to accommodate water to upland elevation differentials.
	Utilities	Power demands are limited to electricity for equipment operation and “at berth” vessel operations for on board systems to avoid ship engine fuel burn consistent with zero discharge environmental goals. Stormwater management is also a prime concern, but can readily be managed on most sites.
	Encumbrances	Encumbrances include easements, public rights of way and other deed restrictions that restrict or otherwise limit a site’s efficient use.
Regulatory	Zoning	Appropriate zoning is required consistent with local land use regulations. In Portland, although several zoning classifications may be appropriate for some aspects of marine terminals, the heavy industrial (IH) zone allows for the widest range of primary and assessor uses necessary for marine terminals; such as rail yards or handling of hazardous materials.
	Overlay Regulations	While Oregon does not have shoreline regulations, the City of Portland has overlay zones which may impose additional restrictions and protections.

Criteria	Considerations	Comments
Environmental and Natural Resources	Contamination	Shipping terminals have historically been in industrial sites which quite frequently have been exposed to contamination. Remediation of these sites are typically held to a long time industrial use standard and as a result continuing industrial use for shipping are wholly compatible with industrial level cleanup standards. However it should be noted that previously remediated sites are likely to have deed covenants on future use such as restrictions on potable water wells (not an encumbrance in a serviced urban environment), penetrations into protective caps and disruption of in situ treatment processes.
	Flood Plain	Flood plains are a consideration as most shipping terminals are at elevations that are often included in exposure areas.
Cultural & Historic	Historical and Cultural Significant Sites	Like critical areas, industrial properties that have been historically used for industrial purposes are unlikely to present any encumbrances for cultural and historical uses.

*Acreages vary considerable depending on the precise cargo handling and storage requirements. Storage and handling approaches that dramatically affect the required acreage include: on site storage in rail cars, bulk tanks and silos; warehouses and open air facilities, as well as handling mechanisms such as cranes, loading ramps and bulk material (dry and liquid) conveyors. These ranges are generally useable for the cargo category, but need to be further refined for a specific cargo. In selecting a site, one would err to the higher side of the range to afford the maximum market flexibility. The planned use of rail storage sidings has the single greatest impact on size, and materially affects a site's usability.

Analysis of Harbor Land Capacity and Demand, Portland & Vancouver

The City of Portland asked us: to what extent can the Port of Vancouver play a role in accommodating forecast cargo demand in the Portland region? This question is addressed Section 3.3 of the main report. This appendix provides additional tables with more detail than was presented in the main report. Our analysis finds that the Portland Harbor has very limited capacity to accommodate future demand for public marine terminals, but that the Port of Vancouver may technically have sufficient capacity to accommodate all forecast demand for cargo for both the cities of Portland and Vancouver through the year 2040.

C.1 DISCLAIMER

All of this analysis described in this appendix depends on estimates of current variables that are uncertain, and forecasts that are even more uncertain, and themselves dependent on a wide range of possible assumptions. Like any analysis of future economic conditions, this one is built upon many layers of assumptions: each assumption widens the range of potential outcomes, and each layer of assumptions compounds on the previous layer to provide an even wider range of potential results. That fact does not necessarily make the analysis irrelevant: it can definitely inform public policy about possible and likely futures. Despite the uncertainty inherent in this analysis, it is helpful for bookending the potential land need for public marine terminals. Assumptions in the middle of the range give conclusions that should be useful for planning purposes, even if actual results may vary.

C.2 DEMAND FOR MARINE CARGO

We were tasked with obtaining and reviewing the most recent forecasts. These forecasts were contained in the *Portland and Vancouver Harbor Forecast Update* (BST Associates, 2012). These forecasts were based on a 2010 study by BST Associates, but were refined to specifically call out cargo demand for the City's of Portland and Vancouver, and were updated with the most recent economic data. Exhibit C-1 shows the forecast demand for public and private marine terminals in the City of Portland in 2040.

Exhibit C-1. Forecast cargo demand, public and private marine terminals, City of Portland, 2040

Cargo Type	Low	Mid-Range	High
Automobiles (units)	811,000	912,500	1,014,000
Containers (TEUs)	379,000	452,500	526,000
<i>Metric Tons</i>			
Automobiles	1,076,000	1,206,000	1,336,000
Containers	2,162,000	2,583,500	3,005,000
Breakbulk	1,132,000	1,242,000	1,352,000
Grain	6,686,000	9,078,000	11,470,000
Dry Bulk	10,278,000	14,093,500	17,909,000
Liquid Bulk	6,912,000	7,461,500	8,011,000
Total	28,246,000	35,664,500	43,083,000

Calculated by ECONorthwest with source data from BST Associates (2012).

Exhibit C-2 shows the forecast demand for public and private marine terminals in the City of Vancouver in 2040.

Exhibit C-2. Forecast cargo demand, public and private marine terminals, City of Vancouver, 2040

Cargo Type	Low	Mid-Range	High
Automobiles (units)	159,000	197,000	235,000
Containers (TEUs)	-	-	-
<i>Metric Tons</i>			
Automobiles	226,000	278,500	331,000
Containers	-	-	-
Breakbulk	534,000	568,500	603,000
Grain	3,808,000	4,109,000	4,410,000
Dry Bulk	5,931,000	11,663,500	17,396,000
Liquid Bulk	510,000	802,500	1,095,000
Total	11,009,000	17,422,000	23,835,000

Calculated by ECONorthwest with source data from BST Associates (2012).

BST Associates estimates that the regional demand for cargo at marine terminals will range from 39,255,000 to 66,918,000 metric tons in 2040, with roughly two thirds of the demand coming from Portland, and the remainder from Vancouver. Dry bulk is forecast to be the cargo type with the most demand (as measured by tonnage) in 2040, comprising just over half of total tonnage in the region.

C.3 EXISTING CAPACITY

Estimates of existing cargo capacity are difficult to obtain, particularly since our analysis looked at multiple geographies (Portland and Vancouver), and multiple ownerships (public and private). We used two methods to bookend our estimates of existing capacity, based on two different assumptions (1) assuming current facilities operate at 100% of maximum capacity before new terminals are needed, and (2) assuming all

growth in demand is from new opportunities that require new facilities, and current facilities continue to operate at current levels.

The Port of Portland provided us with estimates of maximum capacity, as well as annual historical cargo volumes for each cargo type for public marine terminals in the City of Portland. These estimates of capacity are shown in Exhibit C-3.

Exhibit C-3. Existing cargo capacity, public marine terminals, City of Portland

Cargo Type	Estimated	Recent Peak Volume	Peak Year
Automobiles (units)	675,000	460,000	2006
Containers (TEUs)	700,000	330,000	1995
<i>Metric Tons</i>			
Automobiles	889,000	606,000	
Containers	3,999,000	1,885,000	
Breakbulk	2,100,000	1,130,000	2007
Grain	4,100,000	5,400,000	1995
Dry Bulk	10,700,000	5,460,000	2008
Liquid Bulk	-	-	N/A
Total	21,788,000	14,481,000	

Calculated by ECONorthwest with source data from the Port of Portland, 2012.

Note: Recent peak volume for grain is no longer applicable, as the Terminal 4 grain elevator has closed since 1995 when the peak was measured.

For private marine terminals in the City of Portland, we compared historical data for total cargo volumes for the years 2000 and 2010 from the BST report with anecdotal data and conversations with the Port of Portland to determine the estimated current capacity. Key assumptions are that all historical liquid bulk cargo, and that none of the automobile and container cargo shown in the BST report for the City of Portland is handled by private marine terminals. For private marine terminals we only used one method for estimating existing capacity, under the assumption that existing facilities do not have significant excess capacity, and that recent historical peaks are a reasonable estimate of capacity.

Exhibit C-4. Existing cargo capacity, private marine terminals, City of Portland

Cargo Type	Estimated	Notes
Automobiles (units)	-	No private auto terminals
Containers (TEUs)	-	No private container terminals
<i>Metric Tons</i>		
Automobiles	-	
Containers	-	
Breakbulk	250,000	Conversation with Port of Portland.
Grain	3,000,000	Existing private terminals are old and nearing obsolescence
Dry Bulk	1,500,000	Conversation with Port of Portland, recent historical peak.
Liquid Bulk	8,280,000	BST reports citywide liquid bulk in 2000.
Total	13,030,000	

Source: ECONorthwest, informed by "Portland and Vancouver Harbor Forecast Update" (BST Associates, 2012) and conversations with officials from the Port of Portland.

For the City of Vancouver, we were unable to obtain estimates of capacity from the Port of Vancouver or from the Port of Portland. Nor were we able to obtain detailed historical data by cargo type isolating public terminals from private terminals. Instead, we relied on the BPS report, which reported cargo volumes for just two years: 2000 and 2010. In our evaluation of Port of Portland public marine terminals (described previously in this section), we found that the recent peak volumes were equal to 66% of the total capacity. We applied that same percentage to the recent peak volumes for the City of Vancouver to estimate the total capacity, shown in Exhibit C-5. One adjustment, however, had to be made. The Port of Vancouver is in the planning process of developing a potash terminal, which will have capacity for up to 16 million tons of dry bulk. We added this capacity to the estimated capacity shown in Exhibit C-5.

Exhibit C-5. Existing cargo capacity, public and private marine terminals, City of Vancouver

Cargo Type	Estimated	Recent Peak	Peak Year
Automobiles (units)	90,000	60,000	2010
Containers (TEUs)		-	
<i>Metric Tons</i>			
Automobiles	137,000	91,000	
Containers	-	-	
Breakbulk	531,000	354,000	2000
Grain	5,544,000	3,696,000	2010
Dry Bulk	17,556,000	1,037,000	2010
Liquid Bulk	1,110,000	740,000	2000
Total	24,878,000	5,918,000	

Source: ECONorthwest, informed by "Portland and Vancouver Harbor Forecast Update" (BST Associates, 2012) and conversations with officials from the Port of Portland.

C.4 CAPACITY SHORTFALL

Determining the capacity shortfall should be as simple as subtracting the existing capacity from the projected demand. However, we have two different estimates of capacity, and three different estimates of demand. And since we are interested in identifying the shortfall for public marine terminals, we also need to make assumptions for what portion of future demand for what cargo types will be accommodated by private terminals.

We created three scenarios for cargo capacity: low, high, and most likely. These scenarios are based on the following assumptions:

- The low shortfall scenario takes the estimates of facility capacity and subtracts the low BST forecast for 2040 demand. This assumes that all existing facilities are pushed to 100% of capacity to accommodate the forecast future demand.
- The high scenario takes the recent peak volume for facility capacity, and subtracts the high BST forecast for 2040 demand. This assumes that all facilities continue to operate at their current levels and that all additional demand will need to be accommodated in new facilities.¹
- The most-likely scenario takes the estimates of facility capacity and reduces them by 10% (this reduction reflects the fact that some forecast demand will be from new market opportunities that will not be able to take advantage of existing facilities, and therefore despite forecasting a capacity shortfall in the aggregate, not all existing facilities will be operating at 100% of capacity), then subtracts the mid-range demand forecasts (that we calculated as the average of the high and low BST forecasts). This scenario assumes that demand will fall in the middle of the range that BST forecast, and that existing facilities will be able to accommodate some of the future growth, but will never operate at 100% of capacity.

Exhibits C-6 through C-8 show the forecast of the cargo capacity shortfall for public marine terminals in 2040 for each of these three scenarios. In Exhibit C-6, we see the shortfall for the City of Portland public marine terminals could range from 187,000 metric tons to more than 17 million metric tons, with the medium scenario showing some shortfall for automobiles, grain, and dry bulk cargoes.

¹ Since the recent historical peak for grain for public marine terminals in the City of Portland is not applicable, due to the removal of the Terminal 4 grain elevator, we used the estimated capacity for grain in this scenario.

Exhibit C-6. Forecast cargo capacity shortfall, public marine terminals, City of Portland, 2040

Cargo Type	Low	Medium	High
Automobiles (units)	(136,000)	(310,000)	(554,000)
Containers (TEUs)	-	-	(196,000)
<i>Metric Tons</i>			
Automobiles	(187,000)	(410,000)	(730,000)
Containers	-	-	(1,120,000)
Breakbulk	-	-	-
Grain	-	(2,390,000)	(4,370,000)
Dry Bulk	-	(2,960,000)	(10,949,000)
Liquid Bulk	-	-	-
Total	(187,000)	(5,760,000)	(17,169,000)

Calculated by ECONorthwest with source data from Portland and Vancouver Harbor Forecast Update” (BST Associates, 2012) and conversations with officials from the Port of Portland.

Exhibit C-7 shows the forecast cargo capacity shortfall for public marine terminals in the City of Vancouver could range from less than 100,000 to 1.9 million metric tons, with the medium scenario showing a shortfall of 250,000.

Exhibit C-7. Forecast cargo capacity shortfall, public marine terminals, City of Vancouver, 2040

Cargo Type	Low	Medium	High
Automobiles (units)	(69,000)	(120,000)	(175,000)
Containers (TEUs)	-	-	-
<i>Metric Tons</i>			
Automobiles	(89,000)	(160,000)	(240,000)
Containers	-	-	-
Breakbulk	(3,000)	(90,000)	(249,000)
Grain	-	-	(714,000)
Dry Bulk	-	-	(359,000)
Liquid Bulk	-	-	(355,000)
Total	(92,000)	(250,000)	(1,917,000)

Calculated by ECONorthwest with source data from Portland and Vancouver Harbor Forecast Update” (BST Associates, 2012) and conversations with officials from the Port of Portland.

Exhibit C-8 shows the combined shortfall for public terminals in the City of Portland and City of Vancouver for the year 2040. The total shortfall is estimated to range from 279,000 metric tons to more than 19 million metric tons, with a medium scenario showing a shortfall of 6 million metric tons.

Exhibit C-8. Forecast cargo capacity shortfall, public marine terminals, Portland / Vancouver region, 2040

Cargo Type	Low	Medium	High
Automobiles (units)	(205,000)	(430,000)	(729,000)
Containers (TEUs)	-	-	(196,000)
<i>Metric Tons</i>			
Automobiles	(276,000)	(570,000)	(970,000)
Containers	-	-	(1,120,000)
Breakbulk	(3,000)	(90,000)	(249,000)
Grain	-	(2,390,000)	(5,084,000)
Dry Bulk	-	(2,960,000)	(11,308,000)
Liquid Bulk	-	-	(355,000)
Total	(279,000)	(6,010,000)	(19,086,000)

Calculated by ECONorthwest with source data from Portland and Vancouver Harbor Forecast Update" (BST Associates, 2012) and conversations with officials from the Port of Portland.

C.5 TERMINAL SIZE

We were asked to translate the forecast cargo capacity shortfalls (described in Section C.4) into acres of land for public marine terminals. To accomplish this, we need assumptions on the size of public marine terminals.

As stated in Section C.1, all of this analysis suffers from a high degree of uncertainty and a wide range of possible assumptions. This aspect of the analysis (converting tons of cargo into acres of land for new terminals) is probably the most uncertain. There is no accepted rule of thumb for the minimum size of marine terminals, let alone the standard or average size. Some aspects of marine terminal size can scale with cargo volumes (e.g., an automobile terminal moving 100,000 cars may require roughly half the acreage of an automobile terminal moving 200,000 cars.). However, other aspects of terminal size may not scale proportionately to cargo volume.

We attempted to assemble recent studies from the City of Portland to see what we could learn about the likely size of marine terminals that would be needed to accommodate future demand in the City of Portland. The West Hayden Island Economic Foundation Study (Entrix 2011), provided a summary of site characteristics for marine-related land uses, including an acreage approximation for terminals of various cargo types in the Portland Harbor and other west coast harbors. The Operational Efficiencies of Port/Terminal World-Wide (Worley Parsons, 2011 – Draft) provides other assumptions for terminal sizes for automobiles, grain, and dry bulk, based on case studies from North American and European terminals. The Worley Parsons analysis also provides a range of potential throughput per acre based on these case study ports.

Ultimately, we looked at both of these sources of data, and the Criteria for Evaluating Potential Sites for Marine Terminal produced by Maul, Foster & Alongi as part of the consultant team for this study (included as Appendix B to this same report) to determine a range of reasonable terminal sizes. These assumptions are shown in Exhibit C-9. We show both a minimum size, and a practical, case study-supported size. Note that the size for these marine terminals does not necessarily reflect land required for rail infrastructure to support these terminals.

Exhibit C-9. Summary of assumptions on acreage requirements for public marine terminals by cargo type

Cargo Type	ENTRIX		Worley Parsons		For This Analysis	
	Minimum	Practical	Minimum	Practical	Minimum	Practical
Automobiles	75	100	47	150	50	150
Containers	50	200			50	200
Breakbulk	15	50			15	50
Grain	40	50	15	45	30	50
Dry Bulk	5	100	30	30	20	70
Liquid Bulk	5	20			5	20

Source: ECONorthwest, with original data and input from:
 West Hayden Island Economic Foundation Study (Entrix, 2011)
 Operational Efficiencies of Port/Terminal World-Wide (Worley Parsons, 2011- Draft)
 Appendix B: Criteria for Evaluating Potential Sites for Marine Terminal (Maul, Foster & Alongi, 2012)

Other experts and stakeholders may have different opinions on what is truly a practical size for a new marine terminal. The assumptions used in this analysis, are not asserted as the definitive answer for what size terminal is best for any and all new marine terminals. These assumptions simply reflect the range of terminal sizes that were reported as reasonable and practical in the two source documents that we reviewed. For this reason, in the rest of this document, we refer to the “practical” terminal sizes in Exhibit C-9, as “case study supported” terminal sizes.

C.6 EVALUATION OF LAND NEED FOR PUBLIC MARINE TERMINALS

Determining the land needed for public marine terminals is as simple as multiplying the demand shortfall (in metric tons) by a ratio of tons per acre for cargo size. However, the estimate of shortfall does not tell us how many terminals will be needed. If for example, we see a shortfall of 10 million tons of dry bulk, it could potentially be accommodated in one terminal, or in many terminals. For each of the terminals, they could be operating at 100% of capacity, or at only a small fraction of capacity (if they were sized to accommodate future growth, beyond the 2040 horizon). Additionally, we have multiple scenarios for the cargo capacity shortfall (low, medium, and high), and multiple measures of cargo size (minimum, and case study-

supported). One final challenge is that some terminals will require rail access, and if a dedicated rail loop is needed, then it will require about 100 acres of land, regardless of our other assumptions on minimum or case study-supported terminal size.

In this section, we present results only in terms of the minimum number of acres needed to absorb the capacity shortfall, and do not estimate the number of terminals the acreage equates to. We ultimately provide assumptions for determining the number of terminals required to accommodate the projected cargo capacity shortfall.

Exhibits C-10 through C-12 show projected capacity shortfall, needed acreage to fulfill the shortfall, and whether new terminal space is needed for the six cargo types under the lowest scenario in the City of Portland, City of Vancouver, and the two combined. This scenario uses the low estimate of cargo capacity shortfall and assumes the minimum acreage requirement for each cargo type.

For the City of Portland automobile shortfall, we used an estimate of throughput per acre from the Operational Efficiencies of Port/Terminal World-Wide (Worley Parsons, 2012), which used case study examples to show that automobile terminals can achieve 2,688 autos per acre. For the City of Vancouver automobile shortfall, we assumed the 89,000 metric tons, could be accommodated by improved efficiencies at their existing facility, and would not be sufficient demand to necessitate development of a new terminal. Exhibits C-10 through C-12 show the results of the lowest scenario for public marine terminals in Portland and Vancouver.

Exhibit C-10. Lowest Scenario, Forecast land need for new public marine terminals, City of Portland, 2040

Cargo Type	Capacity Shortfall (Tons)	New Terminal Space Needed	Minimum Acres Needed
Automobiles	(187,000)	Yes	51.0
Containers	-	No	-
Breakbulk	-	No	-
Grain	-	No	-
Dry Bulk	-	No	-
Liquid Bulk	-	No	-
Total	(187,000)		51.0

Source: ECONorthwest, with original data and input from:
 West Hayden Island Economic Foundation Study (Entrix, 2011)
 Operational Efficiencies of Port/Terminal World-Wide (Worley Parsons, 2011- Draft)
 Appendix B: Criteria for Evaluating Potential Sites for Marine Terminal (Maul, Foster & Alongi, 2012)
 Portland and Vancouver Harbor Forecast Update" (BST Associates, 2012)
 Conversations with officials from the Port of Portland

Exhibit C-11. Lowest Scenario, Forecast land need for new public marine terminals, City of Vancouver, 2040

Cargo Type	Capacity Shortfall (Tons)	New Terminal Space Needed	Minimum Acres Needed
Automobiles	(89,000)	No	-
Containers	-	No	-
Breakbulk	(3,000)	No	-
Grain	-	No	-
Dry Bulk	-	No	-
Liquid Bulk	-	No	-
Total	(92,000)		-

Source: ECONorthwest, with original data and input from:
 West Hayden Island Economic Foundation Study (Entrix, 2011)
 Operational Efficiencies of Port/Terminal World-Wide (Worley Parsons, 2011- Draft)
 Appendix B: Criteria for Evaluating Potential Sites for Marine Terminal (Maul, Foster & Alongi, 2012)
 Portland and Vancouver Harbor Forecast Update" (BST Associates, 2012)
 Conversations with officials from the Port of Portland

Exhibit C-12. Lowest Scenario, Forecast land need for new public marine terminals, cities of Portland and Vancouver, 2040

Cargo Type	Capacity Shortfall (Tons)	New Terminal Space Needed	Minimum Acres Needed
Automobiles	(276,000)	Yes	51.0
Containers	-	No	-
Breakbulk	(3,000)	No	-
Grain	-	No	-
Dry Bulk	-	No	-
Liquid Bulk	-	No	-
Total	(279,000)		51.0

Source: ECONorthwest, with original data and input from:
 West Hayden Island Economic Foundation Study (Entrix, 2011)
 Operational Efficiencies of Port/Terminal World-Wide (Worley Parsons, 2011- Draft)
 Appendix B: Criteria for Evaluating Potential Sites for Marine Terminal (Maul, Foster & Alongi, 2012)
 Portland and Vancouver Harbor Forecast Update" (BST Associates, 2012)
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The previous set of tables show that in the lowest scenario, demand for new public marine terminals in Portland and Vancouver could be as low as 51 acres. Exhibits C-13 through C-15 show the opposite bookend, the highest scenario. This scenario uses the high estimate of cargo capacity shortfall, assumes low estimates of throughput per acre for automobile terminals, and assumes terminals for dry bulk, grain, and containers require a dedicated rail loop.

Exhibit C-13. Highest Scenario, Forecast land need for new public marine terminals, City of Portland, 2040

Cargo Type	Capacity Shortfall (Tons)	New Terminal Space Needed	Maximum Acres Needed
Automobiles	(730,000)	Yes	577.0
Containers	(1,120,000)	Yes	100.0
Breakbulk	-	No	-
Grain	(4,370,000)	Yes	100.0
Dry Bulk	(10,949,000)	Yes	200.0
Liquid Bulk	-	No	-
Total	(17,169,000)		977.0

Source: ECONorthwest, with original data and input from:
 West Hayden Island Economic Foundation Study (Entrix, 2011)
 Operational Efficiencies of Port/Terminal World-Wide (Worley Parsons, 2011- Draft)
 Appendix B: Criteria for Evaluating Potential Sites for Marine Terminal (Maul, Foster & Alongi, 2012)
 Portland and Vancouver Harbor Forecast Update" (BST Associates, 2012)
 Conversations with officials from the Port of Portland

Exhibit C-14. Highest Scenario, Forecast land need for new public marine terminals, City of Vancouver, 2040

Cargo Type	Capacity Shortfall (Tons)	New Terminal Space Needed	Maximum Acres Needed
Automobiles	(240,000)	Yes	180.0
Containers	-	No	-
Breakbulk	(249,000)	Yes	50.0
Grain	(714,000)	Yes	100.0
Dry Bulk	(359,000)	Yes	100.0
Liquid Bulk	(355,000)	Yes	50.0
Total	(1,917,000)		480.0

Source: ECONorthwest, with original data and input from:
 West Hayden Island Economic Foundation Study (Entrix, 2011)
 Operational Efficiencies of Port/Terminal World-Wide (Worley Parsons, 2011- Draft)
 Appendix B: Criteria for Evaluating Potential Sites for Marine Terminal (Maul, Foster & Alongi, 2012)
 Portland and Vancouver Harbor Forecast Update" (BST Associates, 2012)
 Conversations with officials from the Port of Portland

Exhibit C-15. Highest Scenario, Forecast land need for new public marine terminals, cities of Portland and Vancouver, 2040

Cargo Type	Capacity Shortfall (Tons)	New Terminal Space Needed	Maximum Acres Needed
Automobiles	(970,000)	Yes	757.0
Containers	(1,120,000)	Yes	100.0
Breakbulk	(249,000)	Yes	50.0
Grain	(5,084,000)	Yes	200.0
Dry Bulk	(11,308,000)	Yes	300.0
Liquid Bulk	(355,000)	Yes	50.0
Total	(19,086,000)		1,457.0

Source: ECONorthwest, with original data and input from:
 West Hayden Island Economic Foundation Study (Entrix, 2011)
 Operational Efficiencies of Port/Terminal World-Wide (Worley Parsons, 2011- Draft)
 Appendix B: Criteria for Evaluating Potential Sites for Marine Terminal (Maul, Foster & Alongi, 2012)
 Portland and Vancouver Harbor Forecast Update" (BST Associates, 2012)
 Conversations with officials from the Port of Portland

The previous set of tables for the highest scenario show that up to 1,457 acres of land could be needed to accommodate the 19 million metric tons of cargo capacity shortfall. Given the assumptions about minimum and case study-supported terminal size shown in Exhibit C-9, a shortfall of this size would probably require on the order of 10 new terminals of average size.

Both the lowest and highest scenarios are possibilities, but unlikely.² These scenarios do help to show the extreme ends of the spectrum, but it is better to focus our attention on the medium scenario. For this scenario, we used the medium estimate of cargo capacity shortfall, and assumed all demand for each cargo type in each City could be accommodated by one terminal.

Exhibit C-16 shows our medium forecast of acres needed for public marine terminals in the City of Portland in 2040. It shows a total land need ranging from 170 to 470 acres, depending on the size and efficiency of new terminals, and the need for dedicated rail infrastructure.

² This is not to imply the underlying "high-scenario" cargo forecast from BST is unreasonable. In fact, the forecast demand for cargo in the high scenario averages 3.1% growth per year, which is less than the 4.1% per year that has been experienced on the Columbia River between 1962 and 2011. However, the compounding assumptions for capacity (existing facilities only operate at current levels, and accommodate none of the future growth), terminal size (rail loops for every terminal), and number of terminals (e.g., 3 new auto terminals to accommodate total demand of less than 1,000,000 tons per year), all combine to make this scenario unrealistic.

Exhibit C-16. Medium Scenario, Forecast land need for new public marine terminals, City of Portland, 2040

Cargo Type	Capacity Shortfall (Tons)	New Terminal Space Needed	Acres Needed		
			Minimum	Case Study Examples	w / rail
Automobiles	(410,000)	Yes	120.0	270.0	270.0
Containers	-	No	-	-	-
Breakbulk	-	No	-	-	-
Grain	(2,390,000)	Yes	30.0	50.0	100.0
Dry Bulk	(2,960,000)	Yes	20.0	70.0	100.0
Liquid Bulk	-	No	-	-	-
Total	(5,760,000)		170.0	390.0	470.0

Source: ECONorthwest, with original data and input from:
 West Hayden Island Economic Foundation Study (Entrix, 2011)
 Operational Efficiencies of Port/Terminal World-Wide (Worley Parsons, 2011- Draft)
 Appendix B: Criteria for Evaluating Potential Sites for Marine Terminal (Maul, Foster & Alongi, 2012)
 Portland and Vancouver Harbor Forecast Update* (BST Associates, 2012)
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Exhibit C-17 shows our medium forecast of acres needed for public marine terminals in the City of Vancouver in 2040. It shows a total land need ranging from 40 to 100 acres to accommodate 160,000 metric tons of automobiles.

Exhibit C-17. Medium Scenario, Forecast land need for new public marine terminals, City of Vancouver, 2040

Cargo Type	Capacity Shortfall (Tons)	New Terminal Space Needed	Acres Needed		
			Minimum	Case Study Examples	w / rail
Automobiles	(160,000)	Yes	40.0	100.0	100.0
Containers	-	No	-	-	-
Breakbulk	(90,000)	No	-	-	-
Grain	-	No	-	-	-
Dry Bulk	-	No	-	-	-
Liquid Bulk	-	No	-	-	-
Total	(250,000)		40.0	100.0	100.0

Source: ECONorthwest, with original data and input from:
 West Hayden Island Economic Foundation Study (Entrix, 2011)
 Operational Efficiencies of Port/Terminal World-Wide (Worley Parsons, 2011- Draft)
 Appendix B: Criteria for Evaluating Potential Sites for Marine Terminal (Maul, Foster & Alongi, 2012)
 Portland and Vancouver Harbor Forecast Update* (BST Associates, 2012)
 Conversations with officials from the Port of Portland

The combination of demand for public marine terminals in the cities of Portland and Vancouver are shown in Exhibit C-18. It forecasts a need for 210 to 570 acres.

Exhibit C-18. Medium Scenario, Forecast land need for new public marine terminals, cities of Portland and Vancouver, 2040

Cargo Type	Capacity Shortfall (Tons)	New Terminal Space Needed	Acres Needed		
			Minimum	Case Study Examples	w / rail
Automobiles	(570,000)	Yes	160.0	370.0	370.0
Containers	-	No	-	-	-
Breakbulk	(90,000)	No	-	-	-
Grain	(2,390,000)	Yes	30.0	50.0	100.0
Dry Bulk	(2,960,000)	Yes	20.0	70.0	100.0
Liquid Bulk	-	No	-	-	-
Total	(6,010,000)		210.0	490.0	570.0

Source: ECONorthwest, with original data and input from:
 West Hayden Island Economic Foundation Study (Entrix, 2011)
 Operational Efficiencies of Port/Terminal World-Wide (Worley Parsons, 2011- Draft)
 Appendix B: Criteria for Evaluating Potential Sites for Marine Terminal (Maul, Foster & Alongi, 2012)
 Portland and Vancouver Harbor Forecast Update” (BST Associates, 2012)
 Conversations with officials from the Port of Portland

In Exhibits C-10 through C-18 we purposely showed estimates of “acres needed” and not “number of terminals needed.” Moving from cargo to land adds uncertainty; moving from acres to terminals adds even more. Exhibit C-9 is a basis for the conversion, but it shows a range of possible terminal sizes.³ Moreover, terminals may not be used to capacity, technologies may change, and so on. That said, a rough application of estimates of terminal size supported by the case studies (in acres, Exhibit C-9) to estimates of needed acres under medium assumptions (Exhibit C-18), yields estimates of number of new terminals needed by 2040 as follows: automobiles, 1 - 4 terminals; grain, 1 - 3 terminals; dry bulk, 1 - 3 terminals.

³ The ranges in Exhibit C-9 are based on all available data sources: existing terminal sizes at the Port of Portland and Vancouver, conversations with officials at both ports, and case studies included in the report on Operational Efficiencies of Port/Terminal World-Wide (Worley Parsons, 2011 Draft). Ultimately, however, these assumptions were a judgment call on the part of ECONorthwest, and represent our best guesses for a lowest, highest, and medium scenario.

C.7 IMPLICATIONS

The City of Portland identified the two sites in the Portland Harbor that are most likely to be suitable for development of a new public marine terminal: the Atofina site, and the Time Oil site. Of these two sites, development is technically possible on either, but there are major hurdles that would add significant costs. Both sites have some level of contamination, both sites would require negotiation and property acquisition from numerous property owners, and both sites are smaller than desirable, which precludes the possibility of an onsite rail loop. Depending on the specific parcels that would be acquired and aggregated to make development of these sites possible, each site could range in size from 50 to 100 acres, for total developable acreage of 100 to 200 acres.

When considering the potential cargo capacity shortfall, the two sites in the Portland Harbor could potentially accommodate the one dry bulk and one grain terminal that are anticipated to be needed. These terminals are expected to require between 20 and 200 acres, which matches fairly well with the capacity of the two potential sites. However, if these potential terminals require a dedicated rail loop, or if they are unable to overcome the barriers to redevelopment at each site, then the forecast capacity shortfall will need to be accommodated elsewhere in the region.

Assuming each new port terminal requires a dedicated rail loop, it would appear that the total acreage needed to accommodate regional cargo volumes in 2040 exceeds the current supply of 350 acres of vacant developable land at the Port of Vancouver planned for marine terminal development.⁴ However, the Port of Vancouver has about 200 acres of vacant developable land that could technically accommodate marine terminal development, but is planned for other industrial uses. If these acres were included in the total supply, then it would appear that the Port of Vancouver would have about the right supply of land to accommodate regional cargo demand through 2040. While this is technically possible, that does not mean that it is politically feasible or consistent with adopted policies of the affected jurisdictions.

While it is possible that the Port of Vancouver could accommodate the regional demand for cargo through 2040, it is also possible that Vancouver's land supply could fall far short. Using the high-scenario demand forecasts, and assuming rail loop access for all terminals, the region could have a

⁴ It is important to note that these projections are based on our medium scenario. The range of possible assumptions that could be used in this analysis is significant. When using our most conservative assumptions, our analysis showed a regional land need as low as 70 acres, and our most aggressive assumptions resulted in a land need of over 2,250 acres.

shortfall of up to 1,457 acres. If only 350 acres at the Port of Vancouver are available for marine terminal development, as is their current stated policy, then that would leave over 1,100 acres of unmet demand for public marine terminals in the region.

Our analysis finds that the Portland Harbor has very limited capacity to accommodate future demand for public marine terminals, but that the Port of Vancouver has capacity to accommodate some (but not necessarily all) forecast demand for cargo for both the cities of Portland and Vancouver through the year 2040 under our medium scenario.

Appendix D Mapping Analysis

As part of the background research for the Harbor Lands Contract, Bureau of Planning and Sustainability staff conducted a visual survey of aerial maps of the Portland Harbor to classify the lands in one of several categories. The first reason for undertaking this review was to provide the consultant for the Harbor Lands Analysis, ECONorthwest (ECO), with a visual representation of current Portland Harbor development so that they could analyze this and confirm potential sites to consider for assembly into larger parcels. The second reason for this effort was to help validate the initial acreage findings of the draft Economic Opportunities Analysis (EOA).

Lands were split into various development types, including buildings, other structures/tanks, exterior work/storage areas, loading & maneuvering areas, parking areas, rail yards, vacant land and a few residual categories (see chart below). Once these lands were categorized, they were compared with the lands that are considered environmentally constrained or brownfields. The intent was to specifically consider whether vacant lands predominantly had one of these constraints applied to them. While the visual survey and analysis was initially considered to cover the lands that staff wanted ECO to review along the harbor, it was also refined to incorporate the boundary of the EOA for the Portland Harbor sub-geography to determine whether the acreage was significantly different. The findings are provided in a table attached to this summary.

Within the Portland Harbor sub-geography, the visual survey identified a total of 590 acres of lands that were considered vacant. However, of this acreage, approximately 412 acres either contained medium or high level natural resources (174.4 acres), were existing brownfields (145.2 acres), or were brownfield sites with resources as well (92.6 acres). This left approximately 174 acres that were not constrained. This number exceeds the amount of unconstrained vacant land determined by Hovee (108 acres). This is partially due to the fact that the visual survey included vacant portions of otherwise developed parcels, and was not constrained by lot lines. Thus vacant portions of lots were included in the aerial survey that were not included in the EOA. Within the EOA update, Hovee had separated out the Harbor Access Lands from the larger Columbia Harbor subgeography. In either case, the unconstrained land represents a minority of the overall vacant land in the harbor.

For the ECO analysis, the maps helped illustrate the potential vacant sites that could be looked in greater detail in their report. This led to the consideration of the Time Oil and Atofina sites as possible areas for consideration of a marine terminal. The report includes the analysis on these sites.



Category #	Category Description	TOTAL Acres Harbor Lands Study Area	(1)Acres in med/high NRI resources ONLY	(1) Acres both NRI & Brownfields	(1)Acres in vacant Brownfields ONLY (2009+11)	TOTAL Acres PDX *Harbor Access Lands (2)	Acres in med/high NRI resources* ONLY (2)	Acres both NRI AND Brownfields (2)	Acres in vacant Brownfields ONLY(2009+11)* (2)	Acres Port of Vancouver
1	building	415.1	0.6	0.1	5.2	267.2	0.4	0.1	4.8	65.7
2	other structures, tanks, utilities	197.1	2.6	0.0	1.5	92.1	2.2	0.0	1.5	72.6
3	exterior storage & work areas	1,326.0	26.9	1.1	20.7	994.0	23.9	1.0	10.3	435.7
4	loading/maneuvering	295.0	14.0	0.2	0.2	181.9	13.4	0.2	0.2	134.9
5	rail yards	457.3	38.4	0.3	3.3	138.0	5.2	0.3	0.0	72.1
6	employee/guest parking	143.2	6.7	0.1	1.1	94.5	1.5	0.0	1.1	12.0
7	vacant land	1,739.4	328.1	127.9	214.4	586.0	174.4	92.6	145.2	1,442.5
8	parks	110.0	103.2	0.8	0.4	3.0	1.0	0.0	0.0	0.0
9	taxloted water	89.3	88.9	0.0	0.0	89.3	88.9	0.0	0.0	101.8
10	misc right of way	25.3	6.8	0.0	0.0	15.6	4.1	0.0	0.0	0.0
Total		4,798	616	131	247	2,462	315	94	163	2,337

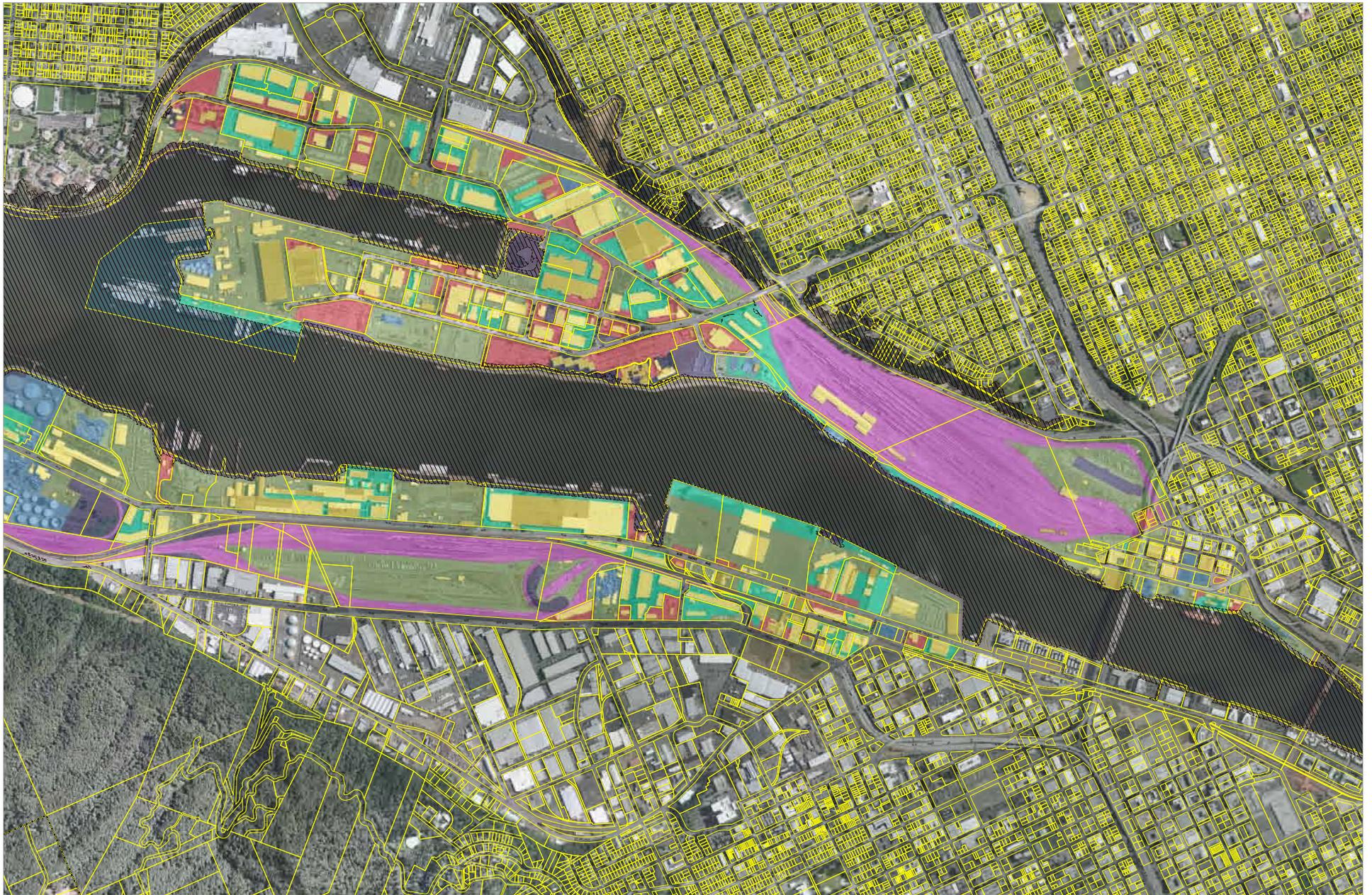
Revised 3/19/2012

*Harbor Access Lands dataset = river overlay zones created by Hovee

(1)Acres within the Harbor Lands Boundary

(2)Acres within *Harbor Access Lands dataset (hovee's river overlay zone shapefile)

NOTE: West Hayden Island NRI not included.



Harbor Lands Inventory - 2009 aeriels - MAP 1

inventory categories

- | | | | | | |
|----------------------|--|-------------------------|----------------------------|-----------------------|--------------------------|
| 0 - no value/no data | 2 - other structures, tanks, utilities | 4 - loading/maneuvering | 6 - employee/guest parking | 8 - parks | 10 - misc right of way |
| 1 - building | 3 - exterior storage and work areas | 5 - rail yards/lines | 7 - vacant land | 9 - water (taxiloted) | ranked natural resources |



May 18, 2011

City of Portland | Bureau of Planning & Sustainability | Geographic Information System

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Harbor Lands Inventory - 2009 aeriels - MAP 2

Inventory categories

- | | | | | | |
|----------------------|--|-------------------------|----------------------------|----------------------|--------------------------|
| 0 - no value/no data | 2 - other structures, tanks, utilities | 4 - loading/maneuvering | 6 - employee/guest parking | 8 - parks | 10 - misc right of way |
| 1 - building | 3 - exterior storage and work areas | 5 - rail yards/lines | 7 - vacant land | 9 - water (taxloted) | ranked natural resources |



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Harbor Lands Inventory - 2009 aeriels - MAP 3

Inventory categories

- | | | | | | |
|----------------------|--|-------------------------|----------------------------|----------------------|--------------------------|
| 0 - no value/no data | 2 - other structures, tanks, utilities | 4 - loading/maneuvering | 6 - employee/guest parking | 8 - parks | 10 - misc right of way |
| 1 - building | 3 - exterior storage and work areas | 5 - rail yards/lines | 7 - vacant land | 9 - water (taxloted) | ranked natural resources |



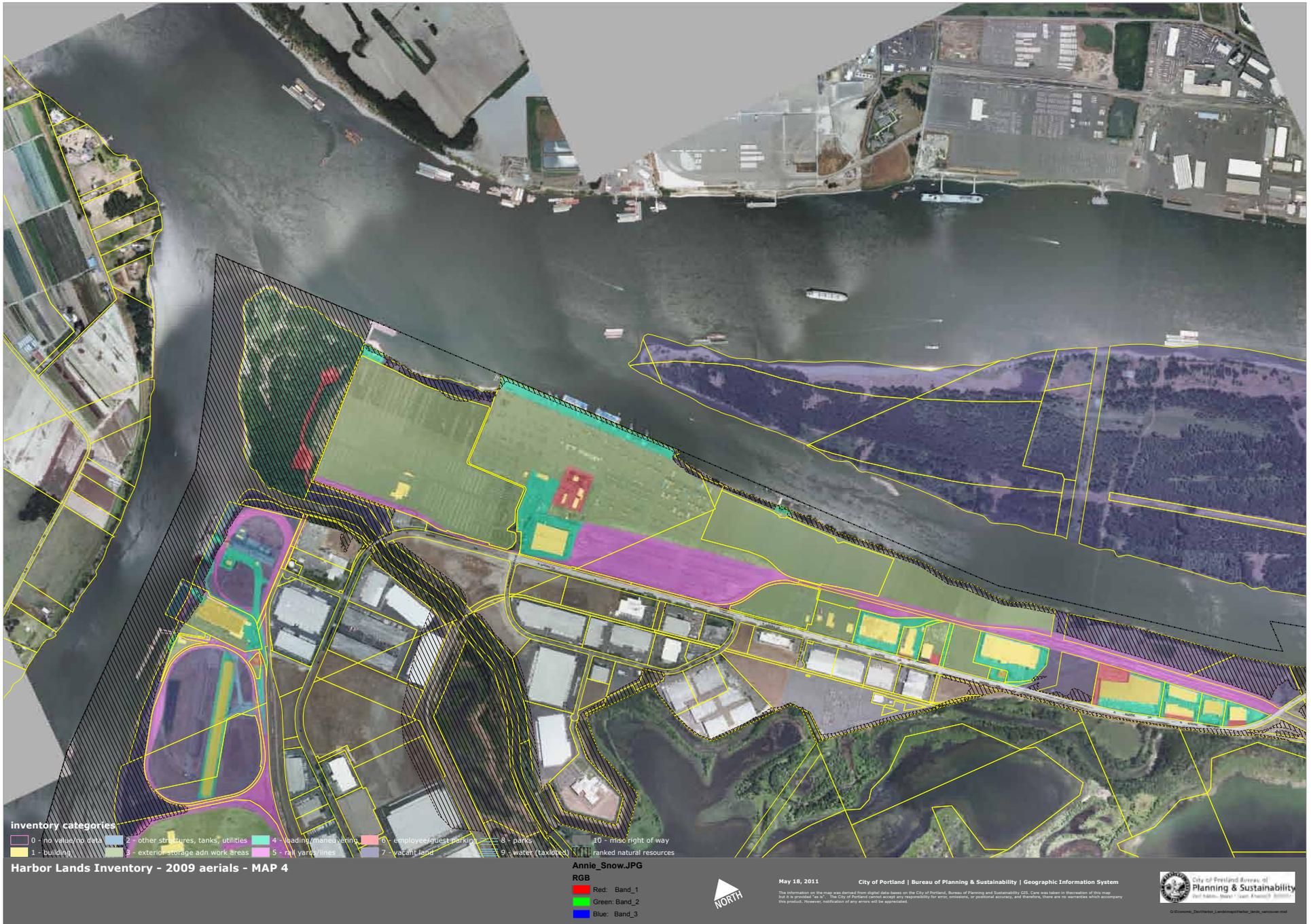
May 18, 2011

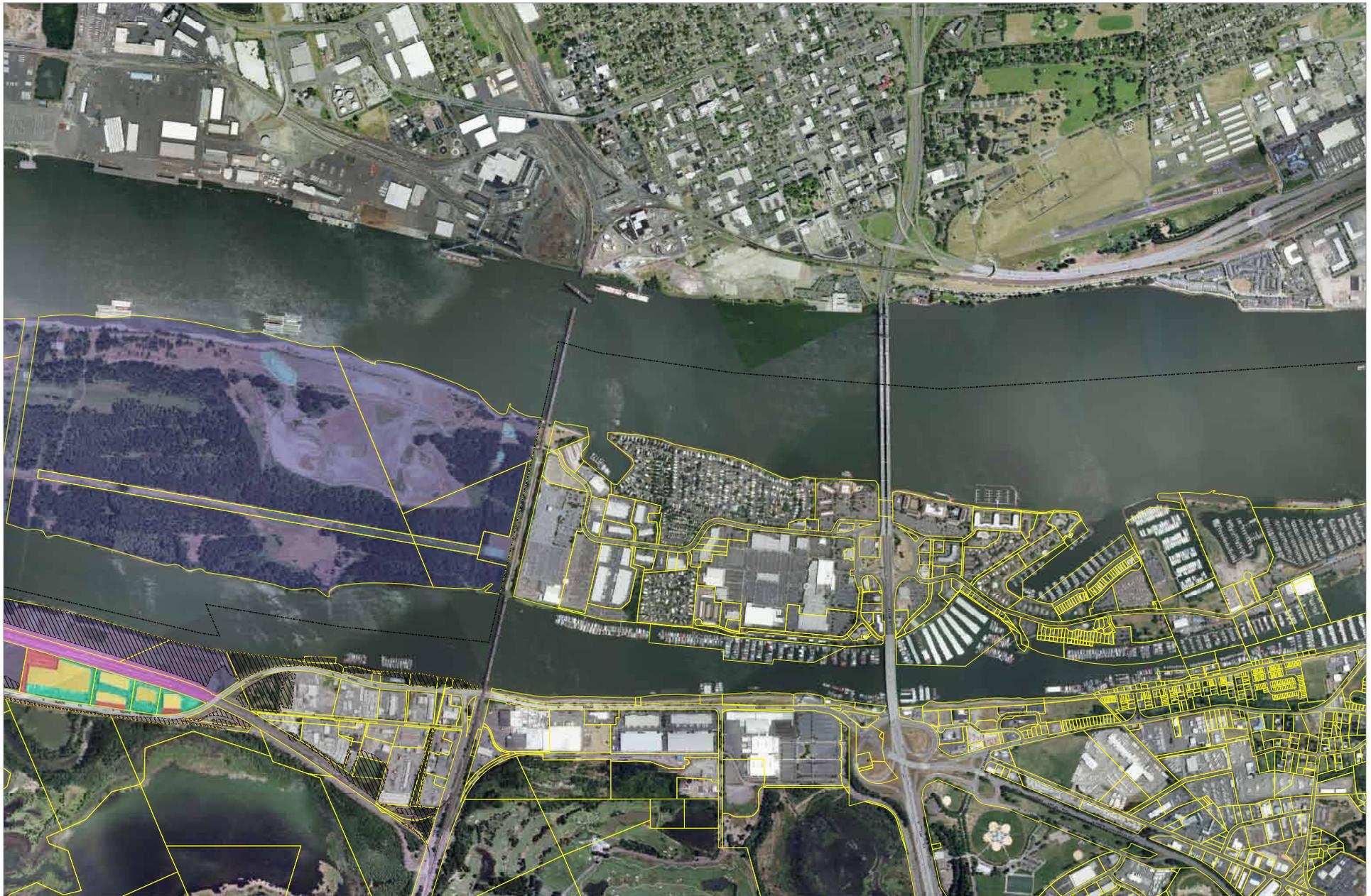
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Harbor Lands Inventory - 2009 aeriels - MAP 5

inventory categories

- | | | | | | |
|----------------------|--|-------------------------|----------------------------|----------------------|--------------------------|
| 0 - no value/no data | 2 - other structures, tanks, utilities | 4 - loading/maneuvering | 6 - employee/guest parking | 8 - parks | 10 - misc right of way |
| 1 - building | 3 - exterior storage adn work areas | 5 - rail yards/lines | 7 - vacant land | 9 - water (taxloted) | ranked natural resources |



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Harbor Lands Inventory - 2007 aeriels - Vancouver

- | | | |
|---|--|---|
|  1 - building |  4 - loading/maneuvering |  7 - vacant land |
|  2 - other structures, tanks, utilities, concrete plant |  5 - rail yards/lines |  9 - water (part of lot) |
|  3 - exterior storage and work areas |  6 - employee/guest parking |  Not Port owned |



May 18, 2011

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The information on the map was derived from digital data bases on the City of Portland, Bureau of Planning and Sustainability GIS. Care was taken in the creation of this map but it is provided "as is". The City of Portland cannot accept any responsibility for errors, omissions, or positional accuracy, and therefore, there are no warranties which accompany this product. However, notification of any errors will be appreciated.



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CITY OF PORTLAND ECONOMIC OPPORTUNITIES ANALYSIS:

Section 2 and 3 – Employment Land Needs and Supply Analysis



AUGUST 2015 Recommended Draft

This EOA report has been funded through a grant from the State of Oregon Department of Land Conservation and Development.

City of Portland Bureau of Planning & Sustainability

E. D. Hovee & Company, LLC

Economic & Development Services



EXECUTIVE SUMMARY

The EOA is an analysis of the 20-year supply and demand for employment development and land in the city. It is prepared according to State Administrative Rule OAR 660-09-0015 and consists of four sections:

1. Trends, Opportunities & Market Factors
2. Long Range Employment Forecast (Demand)
3. Buildable Land Inventory (Supply)
4. Community Choices (Comprehensive Plan proposals to meet employment land needs)

This report includes the second and third sections and presents the 2010-2035 employment forecast and resulting demand for employment land as well as the inventory of buildable employment land.

KEY FINDINGS

- The Metro regional employment forecast allocates 511,000 jobs to the City of Portland in 2035, an addition of 141,600 new jobs in the 2010-2035 period.
- This job forecast translates into a demand for 70 million square feet of floor area in typical commercial and industrial building types, the equivalent of 2,560 acres of employment land.
- Portland’s traded-sector economy needs an additional 350-580 acres of land for marine terminals, rail yards, and airport facilities. The range relates to two scenarios analyzed for marine terminal growth.
- Buildable Land Inventory identifies a supply of 3,200 acres of vacant and underutilized employment land, but it is not always the right type or in the right location.
- The City of Portland will need additional development capacity for industrial land, especially for Harbor Access Lands and in the Harbor and Airport Districts.
- Additional development capacity is also needed on the major institutional campuses, Central City Industrial, and Dispersed Employment geographies.

EMPLOYMENT FORECAST AND LAND DEMAND

The City of Portland employment forecast is based on the Metro regional forecast of job growth. According to this forecast, Metro has prepared a baseline forecast for the Portland region in which employment is expected to increase from just under 1 million jobs in 2010 to nearly 1.5 million in 2035 - a gain of over 537,000 jobs with an average annual growth rate in the range of 1.8% per year over the 2010-2035 period.

Metro allocates 511,000 of these projected 1.5 million total jobs expected in 2035 to the City of Portland. When compared with actual 2010 employment of 370,000 jobs, the projected Portland job gain is approximately 141,600 jobs over the 2010-35 forecast period – an annual average growth rate of 1.3% and a 26% capture rate of regional employment growth.

The Economic Opportunity Analysis translates this forecast growth into demand for additional employment related development and land supply. After accounting for jobs that locate in residential areas (schools, home occupations, non-conforming uses), there is an estimated demand for 2,560 acres of employment land citywide in six typical commercial and industrial building types (such as office buildings or warehouse/distribution buildings).

Portland is a key freight distribution hub on the West Coast. As such, substantial additional land is needed for air, marine, and rail terminals that support the overall traded-sector economy. These specialized types of freight transportation facilities are treated as separate line items of land demand, because they are estimated primarily by transportation throughput. They also represent specialized, land-intensive building types that do not match the typical building needs of other transportation sector employment growth. An additional 350 to 580 acres of land is needed for these facilities and is added to the demand for industrial land in other building types.

Figure 1. 2010-2035 Employment Forecast and Land Demand Summary

Aggregate Geography	Jobs		Acres	
	#	%	#	%
Central City	44,740	32%	150	6%
Industrial	31,630	22%	1,350	53%
Neighborhood Commercial	35,140	25%	690	27%
Institutions	22,730	16%	370	14%
Residential	7,400	5%	NA	-
Total	141,640	100%	2,560	100%

Traded Sector Support Facilities	Additional Acres
Rail Yards	200
Marine Terminals*	110/340
Airport Facilities	40
Total	350/580

* Two marine terminal forecast scenarios are analyzed. See Figure 17.

Source: E.D. Hovee & Company, LLC, and Bureau of Planning and Sustainability

BUILDABLE LAND INVENTORY

The Buildable Land Inventory (BLI) is based on a GIS model developed by the Bureau of Planning and Sustainability (BPS) that looks at the difference between existing and allowed development to determine the remaining development capacity under the current comprehensive plan. The capacity is reduced to account for constraints such as infrastructure, brownfields, and natural resources protection. It also reduces capacity if the site is likely to be developed as a mixed-use employment/residential building by discounting the portion of building space that would be residential space based on past development trends. The development capacity is also adjusted for market factors in some areas to reflect zoned capacity that is more than is currently being developed or expected to be developed in the foreseeable future.

The citywide employment development capacity of the existing Comprehensive Plan is about 152 million square feet, which is distributed across the different employment geographies. The employment land supply is presented in three stages – the base supply (vacant and underutilized parcels), the constrained supply, and the (final) adjusted market supply (see Figure 2).

Figure 2. Summary of 2035 Employment Development Capacity

Aggregate Geography	Acres	Bldg SQFT	% of Base
Central City	266	49,297,000	85%
Industrial	1,365	59,442,000	52%
Neighborhood Commercial	1,303	32,506,000	24%
Institutions	306	10,676,000	100%
Total	3,240	151,921,000	48%

Source: Bureau of Planning and Sustainability

LAND NEEDS RECONCILIATION

By subtracting effective land supply from demand, it is possible to determine whether and to what extent Portland’s employment land base will be adequate to serve forecast needs over the 2035 planning horizon. In cases where there is adequate inventory, a land surplus is indicated; where the inventory is not adequate, a resulting deficit is calculated.

Figure 3. 2035 Employment Land Needs Summary

Employment Geography	Added Jobs	Land Demand	Existing Supply	Surplus/Deficit	% Capacity
Central City Commercial	34,120	60	201	141	335%
Central City Industrial	10,620	90	65	-25	72%
Harbor & Airport Districts*	16,050	1,013	774	-239	76%
Harbor Access Lands*	2,070	207/437	113	-94/-324	55%/26%
Columbia East	9,310	350	356	6	102%
Dispersed Employment	4,200	130	121	-9	93%
Gateway Regional Center	3,970	50	137	87	274%
Town Centers	6,160	130	304	174	234%
Neighborhood Centers & Corridors	25,010	510	863	353	169%
Institutions	22,730	370	306	-64	83%
Residential	7,400	-	-	-	-
Total	141,640	2,910/3,140	3,240		

Aggregate Geography	Added Jobs	Land Demand	Existing Supply	Surplus/Deficit	% Capacity
Central City	44,740	150	266	116	177%
Industrial*	31,630	1,700/1,930	1,365	-335/-565	80%/71%
Neighborhood Commercial	35,140	690	1,303	613	189%
Institutions	22,730	370	306	-64	83%
Residential	7,400	-	-	-	-
Total	141,640	2,910/3,140	3,240		

* Total land demand shown here includes Traded Sector Support Facilities in marine, rail and air terminals.

Harbor Access Lands demand is shown with two marine-terminal forecast scenarios (see Figure 17).

Source: Bureau of Planning and Sustainability

Source: E.D. Hovee & Company, LLC, and Bureau of Planning and Sustainability

There are specific geographies that have a deficit or shortfall that will need to be addressed to provide an adequate supply of development capacity to meet the forecasted employment growth. Specifically, additional policy changes, zoning capacity, public investments, and development incentives will be needed to address capacity shortfalls in the **Central City Industrial, Harbor & Airport Districts, Harbor Access Lands, Dispersed Employment, and Institutions** geographies. The Comprehensive Plan update will need to identify changes to policy or zoning, public investments, development incentives or other means to address these deficits and meet the forecast demand.

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I. INTRODUCTION

As part of Periodic Review, the City of Portland is required to complete an Economic Opportunities Analysis (EOA) to comply with Oregon Statewide Planning Goal 9. The EOA evaluates the types and amounts of employment land needed to accommodate expected growth to 2035. The EOA is intended to inform the Comprehensive Plan Update, consistent with Statewide Planning Goal 9 and regional capacity analysis.

ORGANIZATION OF EMPLOYMENT LAND NEEDS ANALYSIS

The Task 2 / 3 supply and demand analysis report is organized to cover the following topics:

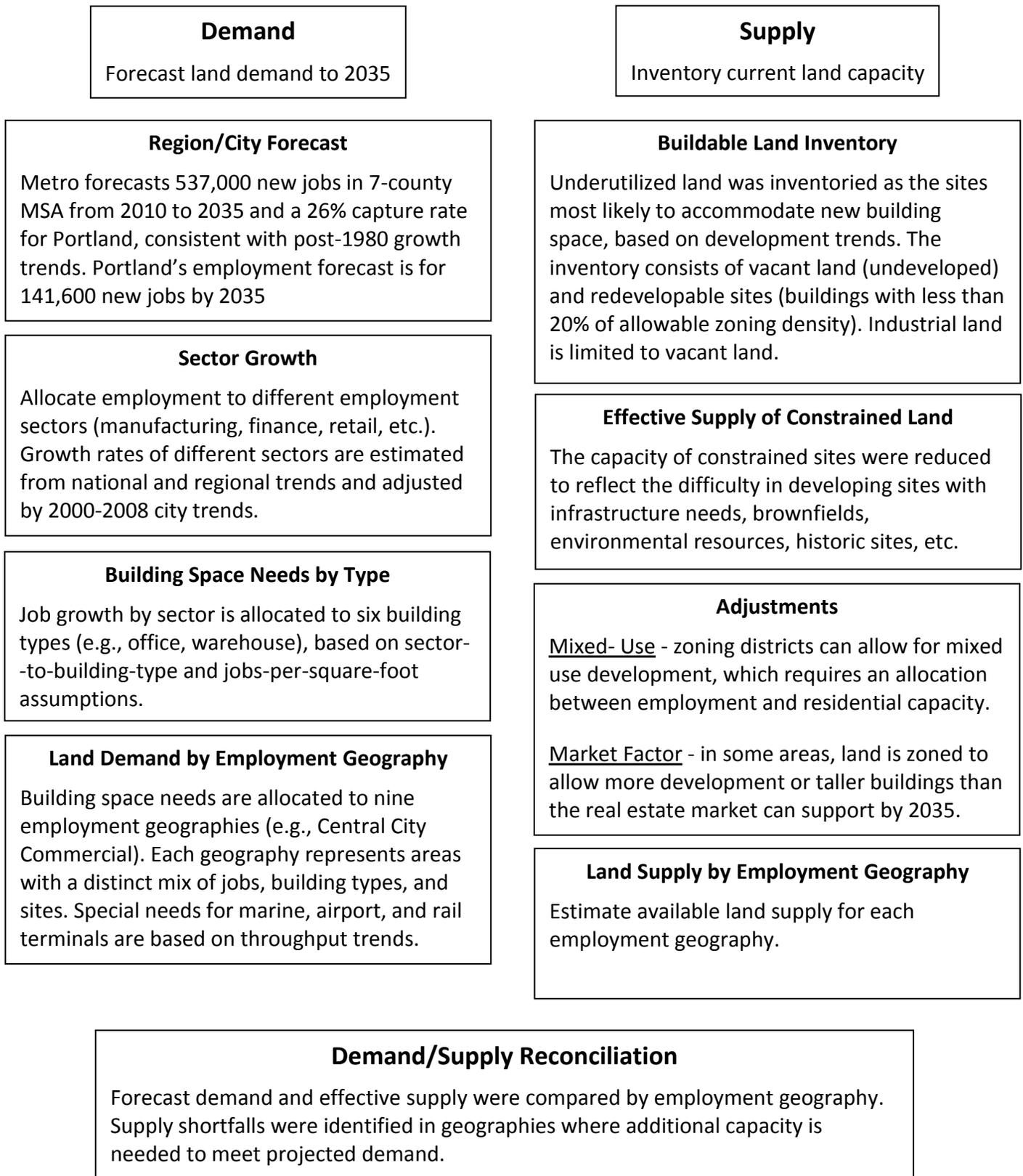
- Employment Forecast and Land Demand Analysis
- Buildable Land Inventory
- Land Needs and Supply Reconciliation
- Short-Term Land Needs Analysis
- Lot Size Analysis

METHODOLOGY

The EOA methodology of evaluating the adequacy of current development capacity has two parallel steps for estimating land demand to 2035 and current supply available to meet it, as summarized in (Figure 4). The first part determines the demand for developable land based on a future employment forecast. The process of estimating demand has many steps to translate Metro’s regional employment forecast (jobs) into a demand for land (building square footage/acres) by employment geography types. The second part establishes the amount of the employment land supply available for development and is based on the Buildable Land Inventory (BLI). The BLI estimates the development capacity of vacant and underutilized land that is available for development, while factoring various constraints on development such as lack of infrastructure, natural resources, or brownfields. The final step is a reconciliation or comparison between the demand for employment land and the available supply to identify any unmet land needs – the shortfalls or gaps. Measures to address these gaps to ensure an adequate supply of land to meet forecasted demand will be addressed through the comprehensive plan update process.

This report was updated in 2015. Appendix C of the EOA Section 4 Report includes a detailed description of revisions in the 2015 update. The citywide employment forecast was reduced to be consistent with Metro’s adopted employment allocation to the City of Portland in 2012. The short-term land supply demand horizon was extended to 2020 to address 5-year land needs. Harbor Access Lands was identified as a distinct employment geography and two marine terminal demand scenarios were analyzed there. The Employment Geographies map was revised to be consistent with the proposed update of the Comprehensive Plan. And the Buildable Land Inventory was updated, including revisions to the employment geographies, vacant and underutilized land map, and constraints mapping.

Figure 4. EOA Methodology



II. EMPLOYMENT & LAND DEMAND FORECAST

This chapter details the methodology used to forecast employment-related land needs within the City of Portland through 2035.

As stipulated by Statewide Planning Goal 9 (Economy of the State), the intent of the Economic Opportunities Analysis is to “compare the demand for industrial and other employment uses to the existing supply of such land.” This section details the employment forecast that drives the demand for employment land. While employment growth serves as a major driver for land demand, the forecast process also recognizes that some needs (such as regional transportation facilities) require industrial land that can be more accurately estimated by the transportation throughput (e.g, marine cargo or airport passengers) handled at these facilities.

EMPLOYMENT FORECAST METHODOLOGY

Metro prepares a regional forecast of population and employment growth for the 7-county PMSA region and then allocates that forecast to individual jurisdictions.¹ The Portland allocation anticipated job growth is translated into land demand via an excel worksheet model. The key steps in translating job growth into land demand are outlined below. The Portland employment forecast is dependent on two main factors – the total employment forecast for the region and the percent share of forecast growth assigned to Portland. In 2012, Metro adopted a single point regional forecast of 1.49 million total jobs in the region by 2035.² Supporting data tables are provided in Appendix C.

1. **Portland Metro Regional Employment Forecast.** The City of Portland employment forecast is based on the Metro regional forecast of job growth. With the baseline forecast, Portland PMSA non-farm employment would increase from recession dampened figure of less than 1 million jobs in 2010 to nearly 1.5 million in 2035, a gain of approximately 537,000 jobs with an average annual growth rate in the range of 1.8% per year over the 2010-2035 time period. Metro uses a forecasted employment figure as the starting point year (2010) of approximately 943,100 non-farm workers. For this EOA, the starting point has been adjusted to actual 2010 covered employment of 949,700 as reported by the Oregon Employment Department (OED) using the Quarterly Census of Employment and Wages (QCEW). Sector specific data is aggregated to cover 18 broad employment classifications consistent with the North American Industry Classification System (NAICS).
2. **Allocation of Metro Employment Forecast to City of Portland.** Metro allocates 517,000 total jobs by 2035 to the City of Portland. When compared with actual 2010 employment of 370,000 jobs, this results in a projected Portland job gain of

¹ The U.S. Census Bureau defines the Portland PMSA as a 7-county region consisting of Multnomah, Washington, Clackamas, Yamhill and Columbia Counties in Oregon together with Clark and Skamania Counties in Washington.

² Previously, Metro had used a range forecast. This forecast is based on Metro’s “GAMMA” run of the 2035 forecast that was provided to the City of Portland in October 2011. Metro continues to refine the local jurisdiction allocation process, which is expected to be finalized in June 2012. The final allocation may vary, but is not expected to materially change the results of this analysis.

approximately 141,600 over the 2010-35 forecast period – an annual average growth rate of 1.3%.

3. **Allocation of Job Growth by Employment Geography.** The employment forecast is geo-coded to each of 10 employment geographies and a remainder “residential” geography based on actual covered employment records in 2010. An additional geographic-shift factor is also applied to the employment forecast for each geography, calculated by their relative employment trends between 2000 and 2008 (the peak-to-peak period of the last business cycle). Thus, the forecast reflects both sector trends at the national and regional level and local geography trends at the employment district level. Resulting detailed working data tables provide employment by geography and NAICS categories.
4. **Allocation of Job Growth by Building Type.** While Metro forecasts are classified by NAICS-specific employment or industrial sectors, the employment growth is translated to the demand of building square footage and acres of land for commercial and industrial land uses by allocating sector-specific job growth to each of six building types. General industrial, warehouse and flex space/business park categories are building types common to industrial employment uses. Office, retail and institutional building types are for commercial uses.

The job growth allocations by geography (Step 3) are matched to the distribution of jobs by building type. Shifting geographic shares of employment accounted for by a particular building type are forecast forward to 2035. For example, geographies that have increased their share of the city’s office employment are expected to continue to do so over the next 25 years – but at a rate of change slower than that of the last decade.

This allocation is consistent with the Metro forecast distribution with minor adjustments based on a more detailed analysis of employment sector trends in Portland. For forecast steps 4-6, city-specific forecast modeling includes inputs from Metro (including the Metroscope model) together with results of an *Employment & Economic Trends Analysis* conducted by E. D. Hovee & Company, LLC for Metro in 2009, as further refined with input from the City of Portland Bureau of Planning and Sustainability.

5. **Building Space per Employee.** Industry standard estimates of the building square footage that houses a typical employee are applied to each of the six building types and to Portland’s 10 employment geographies. These estimates are consistent with the Metro analysis with City-provided adjustments, especially with respect to analysis conducted for the City of Portland’s industrial areas.³

³ City of Portland, 2004 Industrial Districts Atlas

- 6. Intensity of Development.** Floor area ratios (FARs) are a measure of building square footage on a site divided by site area (in square feet). FARs in this analysis reflect results of Metro employment study research together with input from the City of Portland Industrial Atlas (providing overall data for employees per acre as a composite control check on results of steps 5 and 6).

Anticipated intensity of development is intended to increase somewhat over the 25-year forecast period, as available vacant sites are in shorter supply. The rate of FAR increase is greater for commercial than industrial building types and geographies.

- 7. Building square feet is translated into land area** via Floor Area Ratios (FAR). A separate FAR is assumed for each building type and each geography. FARs are based on actual FARs that are increased over the 25 year forecast period to reflect increasing densities as the land supply becomes limited over time.

Figure 5. Forecast Employment Lands Assumptions Summary

Forecast Variable	Assumptions	Calculations in Appendix A
Employment Growth:		
1. Metro PMSA Job Forecast (2010-35)	537,000 jobs (1.8% AAGR)	Figure 28
2. Portland Capture of PMSA Job Growth (% Portland Growth)	26% Capture (1.3% AAGR)	Figure 29
1+2 Resulting Portland Job Forecast (25 Year)	141,600	Figure 30
Building- Land Need:		
3. Job Allocation to Building Types	Does not vary	Figure 31
4. Typical Building Square Feet per Job	Does not vary	Figure 33
5. Floor Area Ratios (FARs)	Central City increases by 34% Other non-industrial by 10% Industrial constant.	Figure 34

Note: AAGR depicts average annual growth rate, calculated as a compound average.

Source: E. D. Hovee & Company, LLC.

- 8. Employment Land Demand Results.** Results of this forecast and allocation process are presented in terms of added employment, building space needs, gross land acreage needs, and associated FARs over the 2010-35 horizon for each of the city’s 10 employment geographies.
- 9. Traded-Sector Support Facilities.** In addition to typical land absorption corresponding to employment growth in each standard building type, the City of Portland will need land set aside for atypical regional transportation facilities that support the regional economy such as airport aviation support, rail yard, and marine terminal needs. These added industrial land needs are more accurately estimated by the transportation throughput

handled at these significant regional transportation facilities (e.g., marine cargo and airport passengers). To prevent double counting, the typical land needs associated with the job growth of the sectors at these facilities (which are already counted in the forecast) are deducted from the total land forecast estimated by transportation throughput.

10. Total Land Demand for Employment. The overall demand for employment land is the combination of the demand for land for employment growth and traded-sector transportation facilities.

EMPLOYMENT GEOGRAPHIES

The results of the employment forecast and resulting demand for development land are reported by ten summary employment land geographies, allowing development assumptions to vary across the City and provide more detail in describing job growth trends and forecasts together with associated building and anticipated land acreage needs. The employment geographies are subareas of the city that represent types of business districts as examined and defined in Section 1. While each geography has a mix of sectors, some geographies also have clear sector specializations. For example, 62% of the Central City Commercial jobs in 2008 were in the office sectors, 64% of industrial area jobs were in the industrial sectors, and 98% of the institutional campus jobs were in health care and education (see Figure 11 in EOA Section 1).

Each “employment land geography” represents (1) a collection of established business districts by type that reflects business location preferences (agglomeration) and community location preferences (comprehensive plan); (2) a segment of citywide demand for employment land, consisting of a distinct mix of business sectors and building types; and (3) a segment of the city’s current developable land supply (see Figures 6, 7 and 8). Methodologically, the geographies represent a way of linking 25-year demand by site type to location advantages and developable land supply.

Figure 8 shows the employment geographies of the proposed Comprehensive Plan. It also depicts map changes from the existing Comprehensive Plan employment geographies that were used in EOA Section 1 to describe current conditions and trends. The proposed Comprehensive Plan geographies were used to estimate adequate existing and proposed capacity to meet the forecasted demand. Figure 9 depicts the configuration of the Harbor & Airport Districts and Harbor Access Lands geographies and the related multimodal freight infrastructure located there.

These employment geographies are summarized into four larger aggregate categories of: Central City, industrial, neighborhood commercial, and institutions. The residential geography is primarily associated with institutional uses occurring in residential areas, home occupations, non-conforming uses and ancillary employment with open space areas (ranging from golf courses to public parks).

Figure 6. Employment Geographies

Category	Employment Geography
Central City	Central City Commercial Central City Industrial
Industrial	Harbor & Airport Districts Harbor Access Lands Columbia East (east of 82 nd Ave) Dispersed Employment
Commercial	Gateway Regional Center Town Centers Neighborhood Centers & Corridors
Institutions	Institutions
Residential	Residential areas and open space not included in the other geographies

Institutional Campuses

Universities

- Reed College
- University of Portland
- Concordia University
- Warner Pacific University
- Lewis and Clark College
- Portland Community College – Southeast
- Portland Community College – Cascade
- Portland Community College – Sylvania
- Multnomah University
- Western States Chiropractic College

Hospitals

- Oregon Health & Science University
- Shriner’s Hospital
- Portland Veteran’s Hospital
- Providence Portland Medical Center
- Kaiser Medical Centers
- Legacy Emanuel Hospital
- Legacy Good Samaritan Hospital

Institutions included in other employment geographies:

- Portland State University (Central City)*
- Adventist Medical Center (Gateway)*

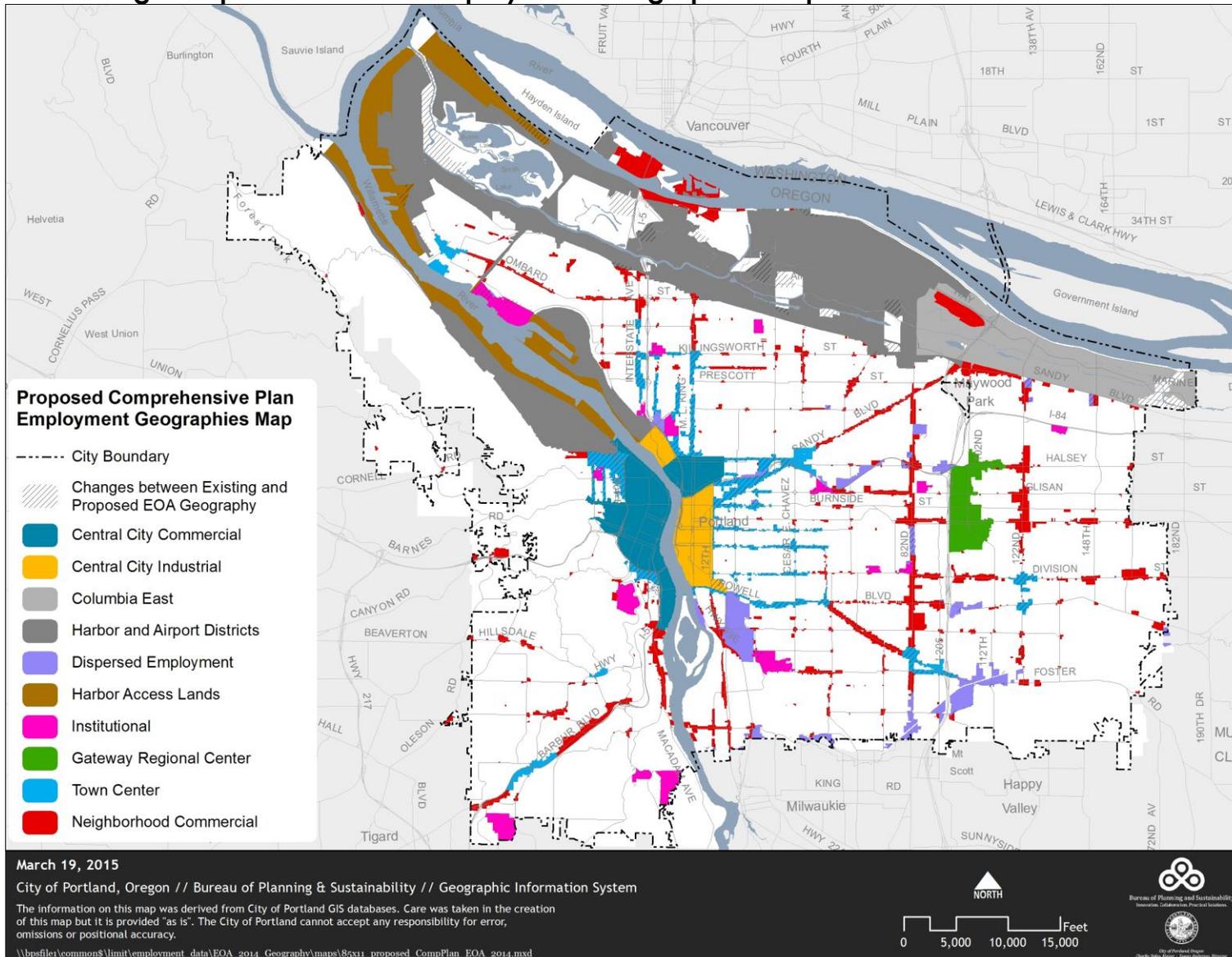
Figure 7. Predominant Site Conditions of Employment Geographies

Location	Types of Businesses	Density/site size	Features
Central City			
Central City Commercial			
Central City westside, Lloyd	Office, mixed employment	High, <1 acre	Regional CBD
Central City Industrial			
Central Eastside, L. Albina	Industrial, mixed employment	Medium, <3 acres	Incubator/industrial
Industrial			
Harbor & Airport Districts			
Harbor upland & Airport*	Distribution, manufacturing	Low, 1-100+ acres	Marine/rail/air hub
Harbor Access Lands			
Harbor frontage*	River-dependent/related industry	Low, 5-100+ acres	Deepwater channel
Columbia East			
Col. Corridor E of 82nd	Industrial, mixed employment	Low, 1-20 acres	Flex industrial parks
Dispersed Employment			
Neighborhoods	Industrial, mixed employment	Low, <1-10 acres	Freeway proximity
Commercial			
Gateway Regional Center			
I-84 at I-205	Mixed employment	Medium, <1-6 acres	Transit/freeway hub
Town Centers			
Neighborhoods	Institutional, mixed commercial	Low/med., <1-3 acres	Mixed-use centers
Neighborhood Centers & Corridors			
Neighborhoods	Retail, mixed employment	Low, <1-10 acres	Commercial corridors
Institutions			
Institutions			
Neighborhoods	Hospitals, colleges	Low/med., >10 acres	17 large campuses

* The Harbor & Airport Districts includes the Northwest, Swan Island, Rivergate, and Airport industrial districts, excluding Harbor Access Lands that extends generally one block from the deepwater channel.

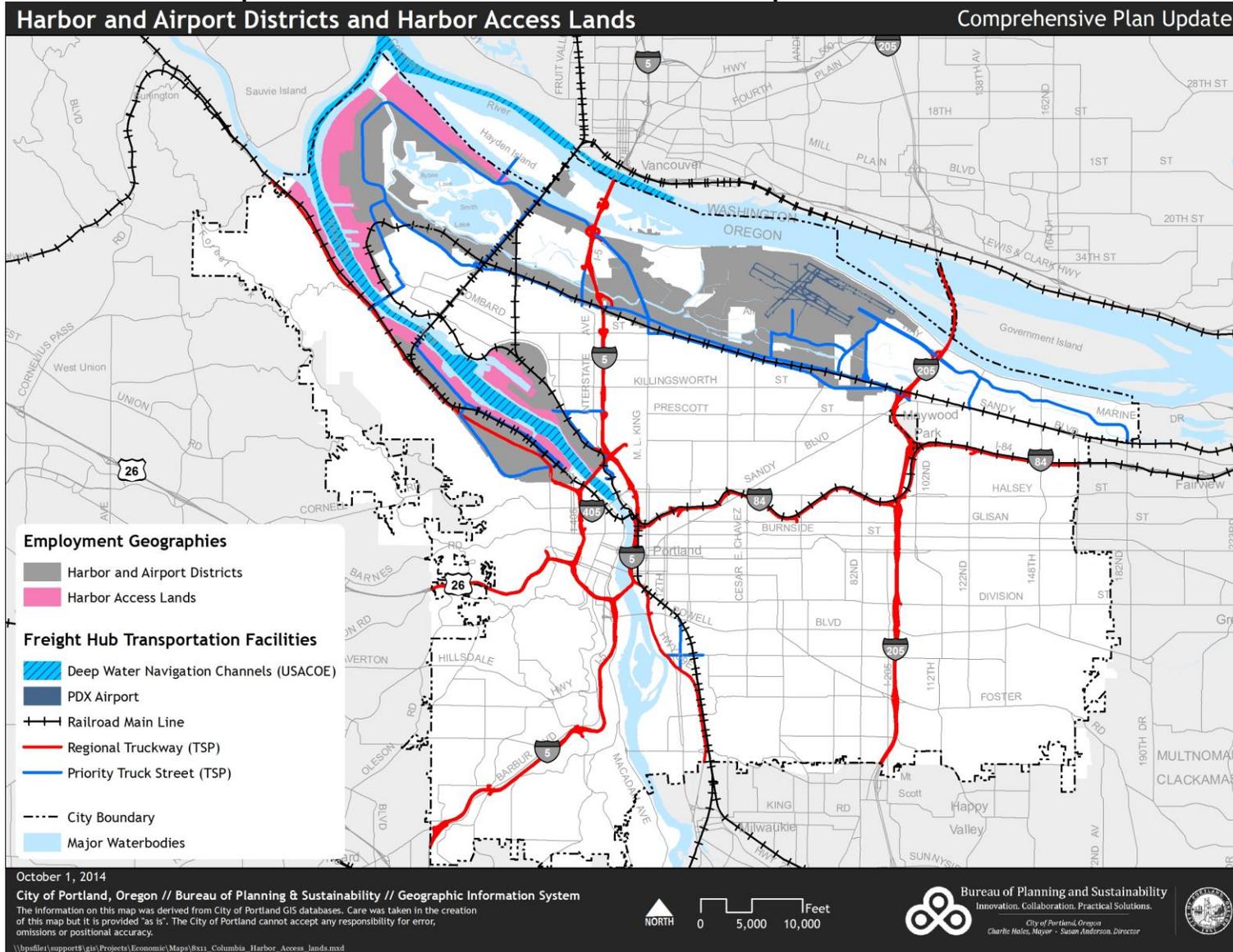
Source: Bureau of Planning and Sustainability

Figure 8. Existing Comprehensive Plan Employment Geographies Map



Source: E.D. Hovee & Company, LLC, City of Portland Bureau of Planning & Sustainability.

Figure 9. Harbor and Airport Districts and Harbor Access Lands Map



Source: E.D. Hovee & Company, LLC, City of Portland Bureau of Planning & Sustainability.

EMPLOYMENT FORECAST RESULTS

Overall, Portland’s employment growth is expected to capture approximately 26% of the region’s employment growth. The forecast reflects an expectation of continued, but relatively slower, decline in the City’s overall share of regional employment. In 2010 Portland had nearly 39% of the region’s job base. This forecast estimates that share will decline to 34% by 2035. While each of Portland’s 18 job sectors have varied shares of regional employment, the allocation assumes that each sector’s proportion of corresponding regional employment declines at a similar rate over the 25-year forecast period. Figure 10 shows the distribution of the employment forecast by sector. The institutional sectors (health and education) account for nearly 52,000 new jobs or 36% of the growth. While the manufacturing sector declines slightly as consistent with national and regional forecast expectations, the warehousing and distribution sectors are expected to see strong growth with over 16,000 new jobs by 2035.

Figure 10. City of Portland Employment Forecast by Sector

Employment Sector	2010	2035	Job Change 2010-35	Avg Rate of Growth 2010-35
Agriculture & Mining	392	353	(39)	-0.4%
Construction	14,224	21,539	7,315	1.7%
Manufacturing	25,035	24,076	(959)	-0.2%
Wholesale Trade	18,009	23,009	5,000	1.0%
Retail Trade	31,060	32,963	1,903	0.2%
Transportation, Warehousing & Utilities	23,676	34,978	11,302	1.6%
Information	9,640	13,761	4,121	1.4%
Finance	17,048	24,270	7,222	1.4%
Real Estate	7,946	15,366	7,420	2.7%
Professional Services	26,943	38,861	11,918	1.5%
Management	14,322	21,683	7,361	1.7%
Administrative & Waste Services	18,449	28,110	9,661	1.7%
Educational Services	37,937	61,196	23,259	1.9%
Health & Social Services	50,616	78,876	28,260	1.8%
Arts, Entertainment & Recreation	6,741	8,493	1,752	0.9%
Accommodation & Food Services	35,102	44,222	9,120	0.9%
Other Services	16,802	23,076	6,274	1.3%
Government (Civilian)	15,498	16,251	753	0.2%
TOTAL EMPLOYMENT	369,440	511,083	141,643	1.3%
City Share of Portland Metro Employment	39%	34%	26%	

Source: E. D. Hovee & Company, LLC based on Metro projection and City/Metro forecast 2035 allocation.

The City of Portland employment forecast allocation of 141,600 additional jobs is distributed to the employment geographies based on actual employment distribution in 2010 and trends from the recent 2000-2008 business cycle (Figure 11).

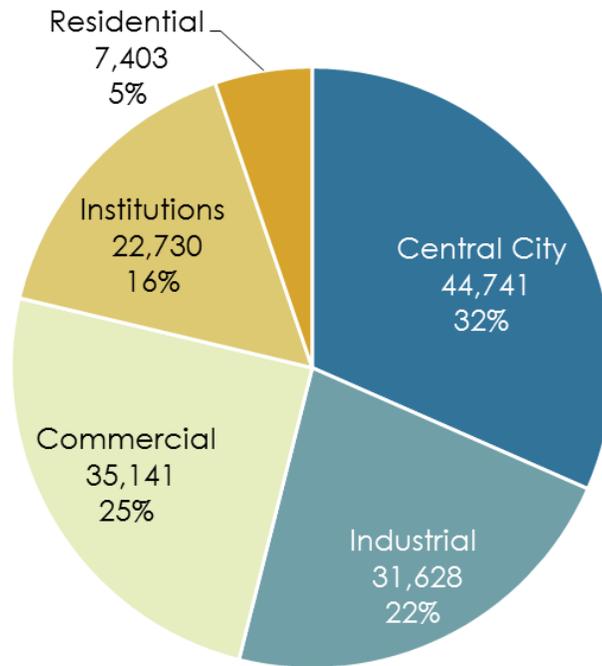
Figure 11. Employment Forecast by Employment Geography

Employment Geography	2010 Actual Jobs		Added Jobs		2035 Total	
	Number	Share	Number	Share	Number	Share
Central City Commercial	104,394	28%	34,124	24%	138,518	27%
Central City Industrial	19,171	5%	10,617	7%	29,788	6%
Harbor & Airport Districts	45,274	12%	16,046	11%	61,320	12%
Harbor Access Lands	8,579	2%	2,074	1%	10,653	2%
Columbia East	17,764	5%	9,308	7%	27,072	5%
Dispersed Employment	15,286	4%	4,200	3%	19,486	4%
Gateway Regional Center	10,059	3%	3,970	3%	14,029	3%
Town Centers	11,557	3%	6,160	4%	17,717	3%
Neighborhood Centers & Corridors	71,233	19%	25,011	18%	96,244	19%
Institutions	31,868	9%	22,730	16%	54,598	11%
Residential	34,675	9%	7,403	5%	42,078	8%
Total	369,860	100%	141,643	100%	511,503	100%
Aggregate Geography						
Central City	123,565	33%	44,741	32%	168,306	33%
Industrial	86,903	23%	31,628	22%	118,531	23%
Commercial	92,849	25%	35,141	25%	127,990	25%
Institutions	31,868	9%	22,730	16%	54,598	11%
Residential	34,675	9%	7,403	5%	42,078	8%
Total	369,860	100%	141,643	100%	511,503	100%

Source: E.D. Hovee & Company, LLC

The share of employment distributed to different areas is not expected to change very much. About one-third or 45,000 new jobs are expected in the Central City (Figure 12). Industrial area jobs are forecast to account for about 22% of citywide employment growth. Campus institutions are expected to expand with about 23,000 new jobs or 16% of the job growth, which will raise their share of the City's overall employment.

Figure 12. 2010-2035 Employment Growth Distribution



Source: E.D. Hovee & Company, LLC

EMPLOYMENT LAND DEMAND

The employment forecast allocation is translated into a resulting demand for building square footage and land (Figure 13). The employment growth is expected to generate the demand for nearly 77 million square feet of building space, requiring approximately 2,560 acres of buildable land area. The Central City land demand is 150 acres, and an additional 690 acres of land is needed for development in the Neighborhood Commercial geographies elsewhere in Portland. Job growth on institutional campuses will need capacity for about 13 million square feet of buildings or about 370 acres of buildable land. The largest demand for land will be for approximately 1,400 acres of industrial land (excluding freight terminals), which is to be expected given the lower employment densities (jobs per acre) and FARs for industrial buildings.

Also, approximately 7,400 of the new jobs created (or 5% of the total job growth) is allocated to residential and open-space designated areas of the city. This growth is primarily associated with institutional uses occurring in residential areas. It also includes schools, churches, home occupations and non-conforming uses and ancillary employment with open space areas (ranging from golf courses to public parks). For the purposes of forecasting future demand for employment land, it is assumed that the jobs in the residential areas locate on residential land that is not part of the employment buildable land supply and not considered further in the EOA.

Figure 13. Employment Forecast Land Demand (2010-2035)

Employment Geography	Added Jobs	Square Feet	Total Acres*	FAR*
Central City Commercial	34,124	13,598,000	60	5.20
Central City Industrial	10,617	5,218,000	90	1.33
Harbor & Airport Districts*	16,046	11,909,000	773	0.35
Harbor Access Lands*	2,074	1,494,000	97	0.35
Columbia East	9,308	6,140,000	350	0.40
Dispersed Employment	4,200	2,060,000	130	0.36
Gateway Regional Center	3,970	1,996,000	50	0.92
Town Centers	6,160	3,199,000	130	0.56
Neighborhood Centers & Corridors	25,011	11,549,000	510	0.52
Institutions	22,730	12,892,000	370	0.80
Residential	7,403	NA	NA	NA
Total	141,643	70,055,000	2,560	
Aggregate Geography				
Central City	44,741	18,816,000	150	2.88
Industrial	31,628	21,603,000	1,350	0.37
Neighborhood Commercial	35,141	16,744,000	690	0.56
Institutions	22,730	12,892,000	370	0.80
Residential	7,403	NA	NA	NA
Total	141,643	70,055,000	2,560	

* Total land and FAR shown here do not include Traded Sector Support Facilities in marine, rail and air terminals. See Figures 16 and 17.

Source: E.D. Hovee & Company, LLC

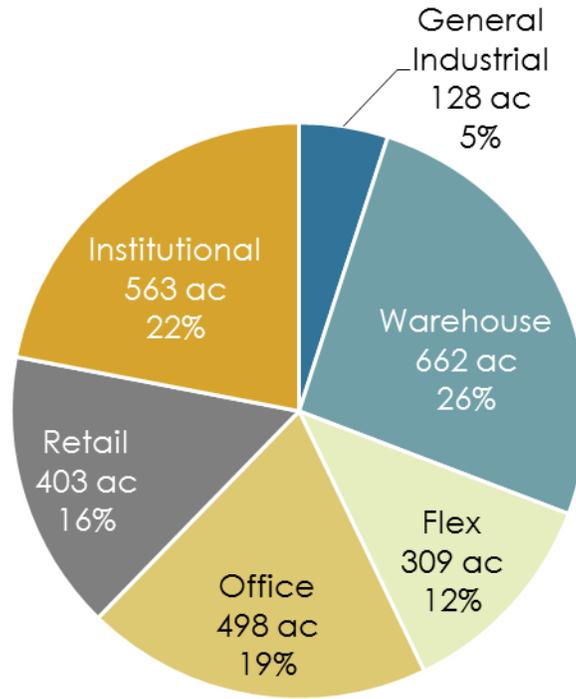
EMPLOYMENT LAND NEED BY BUILDING TYPE

Figure 14 and 15 disaggregate projected employment land need (in terms of jobs, building square feet and land acres) by building type. Building types roughly correspond to industrial or commercial sectors, however, each geography has a mix of these building types. For example, while much of professional services employment is accommodated by office space, a portion of the demand ends in street-level retail spaces, and another portion in flex (or business park) space.

The table also illustrates that most employment-related demand – even within some industrial areas – derives from the commercial building types (office, retail and institutional). Citywide, 57% of the land demand forecasted is associated with commercial building types – including office, retail and institutional space.

Figure 15 provides the detail for the different types of job growth and land demand within each of Portland's major employment geographies. For industrial buildings, major sources of demand are expected to be associated with warehouse and flex space, with little added net demand projected for general industrial space. With commercial buildings, the primary need is anticipated to be for institutional space (including education and health care) followed by office and retail space.

Figure 14. Employment Land Demand by Building Type



Source: E.D. Hovee & Company, LLC.

Commercial building types comprise smaller but still substantial shares of anticipated land need within industrial geographies. For example, in the Central City Incubator geography (the Central Eastside and Lower Albina) commercial building types account for two-thirds of projected land demand; and for the Columbia Harbor geography this proportion accounts for one-quarter of the land demand.

The employment forecast projects that a significant 36% of new employment is expected to be within the health and education sectors. A significant portion of these jobs will be within institutional campuses with about one-half of the institutional building space and land demand allocated for the 17 campuses that make up the institutional employment geography, with the other half spread across the other employment geographies. This distribution and demand is consistent with recent trends in which institutions, especially health care, appear to be decentralizing and bringing services closer to where people live.

Land demand is also influenced by FARs, as less dense building types (such as retail and warehousing) generate more land demand than building types such as office for an equivalent number of jobs. The FAR assumptions utilized in the forecast are presented in Figure 36 of Appendix A.

Figure 15. Employment Land Demand by Building Type

	Industrial Uses			Commercial Uses		
	Jobs	Bldg Sq Ft	Acres	Jobs	Bldg Sq Ft	Acres
	General Industrial			Office		
Central City Commercial	(178)	(62,000)	(0)	22,272	7,795,000	24
Central City Industrial	516	478,000	11	5,222	1,828,000	19
Harbor & Airport Districts*	347	322,000	21	6,044	2,115,000	133
Harbor Access Lands*	173	160,000	10	733	257,000	16
Columbia East	765	708,000	41	3,618	1,266,000	70
Dispersed Employment	561	519,000	34	3,129	1,095,000	69
Gateway Regional Center	16	5,000	0	1,062	372,000	5
Town Centers	54	19,000	1	1,328	465,000	16
Neighb. Centers & Corridors	106	98,000	9	10,372	3,630,000	128
Institutions	(0)	0	(0)	1,927	675,000	18
Total	2,255	2,247,000	128	57,892	19,498,000	498
	Warehouse & Distribution*			Retail		
Central City Commercial	134	47,000	0	6,015	2,827,000	21
Central City Industrial	995	775,000	17	1,479	695,000	31
Harbor & Airport Districts*	5,296	6,687,000	437	1,745	820,000	54
Harbor Access Lands*	477	601,000	40	157	74,000	5
Columbia East	1,825	2,304,000	132	1,535	722,000	41
Dispersed Employment	(12)	(15,000)	(1)	(280)	(131,000)	(9)
Gateway Regional Center	(29)	(10,000)	(0)	920	432,000	27
Town Centers	(4)	(1,000)	(0)	932	438,000	32
Neighb. Centers & Corridors	497	388,000	35	7,591	3,568,000	158
Institutions	11	4,000	0	2,013	946,000	42
Total	9,457	10,780,000	662	22,657	10,391,000	403
	Flex*			Institutional		
Central City Commercial	2,150	752,000	3	3,731	2,239,000	10
Central City Industrial	1,026	615,000	7	1,379	827,000	9
Harbor & Airport Districts*	2,357	1,812,000	118	256	153,000	10
Harbor Access Lands*	477	367,000	24	58	35,000	2
Columbia East	1,191	915,000	53	373	224,000	13
Dispersed Employment	659	506,000	33	143	86,000	6
Gateway Regional Center	19	7,000	0	1,983	1,190,000	17
Town Centers	124	44,000	2	3,725	2,235,000	82
Neighb. Centers & Corridors	1,520	910,000	68	4,924	2,954,000	107
Institutions	5	3,000	0	18,775	11,265,000	308
Total	9,831	5,931,000	309	39,552	21,208,000	563
	Total Industrial			Total Commercial		
Central City Commercial	2,106	737,000	3	32,018	12,861,000	54
Central City Industrial	2,537	1,868,000	36	8,081	3,350,000	59
Harbor & Airport Districts	8,001	8,821,000	576	8,045	3,088,000	197
Harbor Access Lands	1,127	1,128,000	74	947	366,000	23
Columbia East	3,781	3,927,000	225	5,527	2,212,000	124
Dispersed Employment	1,208	1,010,000	66	2,992	1,050,000	66
Gateway Regional Center	5	2,000	(0)	3,965	1,994,000	50
Town Centers	175	62,000	3	5,985	3,138,000	130
Neighb. Centers & Corridors	2,124	1,396,000	112	22,887	10,152,000	393
Institutions	16	7,000	0	22,715	12,886,000	368
Total	21,542	18,958,000	1,098	120,101	51,097,000	1,465

* Total land demand shown here includes Traded Sector Support Facilities in marine, rail and air terminals.

Source: E.D. Hovee & Company, LLC.

ADDITIONAL DEMAND FOR INDUSTRIAL LAND

Additional land demand is projected for freight terminals, a prominent land use in Portland, because their building density does not match typical industrial building types and their growth is more accurately estimated by transportation throughput than employment trends.

Portland is a key freight distribution hub and export gateway on the West Coast and is Oregon’s largest seaport, rail hub, and airport. As such, air, marine, and rail terminals are prominent land uses in Portland’s industrial districts. These freight terminals support the overall traded-sector economy by enhancing access of regional exporters to international and domestic markets, supporting local access and continuing investment in national-system freight infrastructure, and attracting diverse distribution and manufacturing businesses to the region. In turn, goods production industries (distinct from services) make up 81% of the export income in this region’s “trade-dependent” economy, in contrast to the 71% national average (see [Brookings Institution export analysis, 2013](#)).

The adopted 2009 Climate Action Plan notes the importance of freight system efficiency, and included the following objective:

“Improve the efficiency of freight movement within and through the Portland metropolitan area (Urban Form and Mobility Objective 7).”

Central to the efficiency of the freight system is the location of industrial areas and the integration with the regional transportation system. Minimizing emissions from freight movement requires protecting and improving intermodal facilities and continuing to connect them to the transportation system. Enhancing strong connections to marine and rail shipment is particularly important because movement of freight with those modes requires a much lower energy cost per ton. In the absence of strong rail and marine connections, more freight will be moved long distance through the Portland region in trucks.

Freight terminal land uses are exceptionally land-intensive. On-site employment is very low at these national/international transportation facilities, but substantial direct and supported job impacts of these facilities is located at other sites in the city, region, and Pacific Northwest.⁴ An alternative method is used here to estimate their land needs for two reasons. First, the warehouse and other standard building types used to estimate the land needs of job growth at these freight terminals (see Figure 15) do not match their large site size and low building density. Second, their land needs are more closely related to the volume of transportation throughput handled at these facilities than to related sector employment trends. The overall freight volume handled in the Portland region is forecast to roughly double in tonnage and triple in value between 2007 and 2040 (see EOA Section 1 and the Draft Portland/Vancouver Commodity Flow Forecast, 2014). The resulting additional land demand for these traded-sector support facilities is summarized in Figure 16.

⁴ Martin Associates, *Economic Impact of the Port of Portland*, 2011

Figure 16. Additional Land Demand for Traded Sector Support Facilities

Traded Sector Support Facilities	Demand (acres)
PDX Aviation Support	40
Rail Yard Expansion	200
Marine Terminals (Scenarios A/B)	110/340
Total	350/580

Source: Bureau of Planning and Sustainability.

In order to avoid double counting, the estimated land needs of freight terminals are calculated as the difference between their employment-based land need and the land need attributable to transportation throughput, as shown in Figure 17. Marine terminal land needs are expected to be met in the Harbor Access Lands geography, and the rail yard and airport-support facility land needs apply to the Harbor and Airport Districts geography. The overall employment forecast in these geographies reflects existing employers and does not change with this additional land demand.

Figure 17. Estimation of Land Demand for Traded-Sector Support Facilities

Traded Sector Support Facilities	Transportation-Trend Forecast (Acres)	Employment-Trend Forecast		Additional Land Need (Difference)
		New Jobs	Acres	
PDX Aviation Support Facilities*				
Air Transportation and Terminal Services	72	2,450	136	-64
Air Cargo and Car Rental	135	670	29	106
Other Airport Employers		140	4	-4
Total	207	3,260	169	37
Rail Yard Expansion				
Rail Yards	200	**	**	200
Marine Terminals				
Scenario A: Low Cargo Forecast***	125	325	19	106
Scenario B: Mid-range Cargo Forecast***	392	850	50	342

* The Airport Futures Plan (2010) used transportation-trend forecasts to estimate these land needs.

** Railroads are not included in Covered Employment data used in employment trends forecast.

*** Marine terminal growth scenarios compare (A) ECONW's "low" capacity need estimate (auto terminals only) and (B) ECONW's mid-range capacity need estimate for new auto, grain, and dry bulk facilities (EOA Task 1 Appendix C).

Source: Bureau of Planning and Sustainability

PDX Airport

The PDX Airport today occupies approximately 2,800 acres, excluding the adjacent Cascade Station and Portland International Center areas. The 2010 Airport Futures Plan and PDX Master Plan were adopted in 2011 by the City of Portland and Port of Portland as a long-range development plan for PDX. These plans included a detailed analysis of airport land needs to 2035 based on an aviation demand forecast (passengers and air cargo) and analysis of specific facility expansion needs. The PDX Master Plan identifies 207 acres of additional land need for new and expanded facilities. However, there is an overlap or double-counting with the

employment-based forecast. The employment located in the airport geography is forecast to generate 175 acres of land demand in standard building types. This employment land demand is deducted from the land need estimated in the Airport Futures Plan, which is derived from air travel demand forecasts rather than employment forecasts.

Figure 17 compares these forecast methods by types of airport facilities. The Airport Futures Plan found that projected passenger travel growth by 2035 can be accommodated by existing runways, so the employment growth associated with air transportation and terminal services can be accommodated. However, land needs for air cargo couriers, general aviation (non-scheduled flights), and rental car lots are more land-intensive than estimated by the employment-based forecast (see Appendix A, Figure 37). Combining the net result of all airport facilities, Airport Futures found an additional 37 acres of 2010-2035 land demand for airport facilities beyond the employment-based forecast. This additional demand for aviation support facilities is rounded to 40 acres and applied as a separate line item in the land demand forecast.

Rail Yard Expansion

Portland is the Pacific Northwest's rail transportation hub, and seven larger rail yards currently occupy approximately 700 acres in Portland's industrial districts. The employment-based forecast allocates no land for railroad or rail yard expansion, because rail transportation employment is not included in Covered Employment data used for the forecast. Rail yard expansion since 2004 has consisted of the Port of Portland's Ramsey Yard and South Rivergate Yard, providing approximately 25 acres of new yard space. While long-term needs and railroad investment plans remain uncertain, likely demand for expansion and modernization of yard facilities is estimated at approximately 200 acres, based on projected rail tonnage growth and the typical size of new rail yards.

Long-term rail transportation forecasts anticipate robust growth. BST Associates projected 2010-2030 freight rail tonnage growth by type for the Oregon Lower Columbia and Oregon Coast areas⁵:

- 4.1% (moderate) to 7.3% (high) average annual growth rate (AAGR) for marine-related rail, such as the trains served by Barnes, Ramsey and South Rivergate Yards in Portland;
- 2% AAGR for merchandise trains, such as those served by Albina Yard in Portland; and
- 3.5% AAGR for domestic intermodal trains, such as those served by Brooklyn and Lake Yards in Portland.

Put in context, growth at 2.9% AAGR would approximately double the local rail tonnage handled in 25 years.

In addition to the recent expansion at Ramsey and South Rivergate Yards, construction of a new domestic intermodal yard at Troutdale was discussed and met community objections. Afterward, Union Pacific moved their domestic intermodal operations from Albina Yard to Brooklyn Yard, to improve efficient use of available yard capacity. Nationally, Union Pacific constructed 5

⁵ BST Associates, *Pacific NW Marine Cargo Forecast Update and Rail Capacity Assessment*, October, 2011

intermodal yards between 2000 and 2005, ranging from 130 to 320 acres in size and averaging 224 acres. To accommodate increasing rail operations, rail yard land demand to 2035 is estimated at 200 acres, which conceptually could consist of a new domestic intermodal yard or the combined expansion of existing yards and smaller new yards.

A Union Pacific representative commented that a 200-acre rail demand forecast to 2035 is not unreasonable. The railroad's long-term plans are unclear in the current economic climate. Expansion for energy-related cargo exports is a wildcard that was not factored into local demand forecasts. The organization has a five-year plan that describes track capacity. For the Portland area, short-term plans assume working within their existing land holdings. The railroad generally focuses on consolidation and efficiencies within urban areas, and if necessary, relocation, such as the recent relocation of intermodal facilities to Brooklyn Yard.

Marine Terminals

Portland Harbor serves as a major economic engine for the regional economy. These port terminals function as public infrastructure, facilitating economic activity for other industries in the region. Studies indicate that cargo and manufacturing activities dependent on waterborne transportation contribute significantly to the metro region's economy. Estimates of the economic impacts generated by marine-related activity in Portland range from 20,000 to 100,000 jobs and from \$1.4 to 3.4 billion annually in regional income.⁶

Harbor industrial development tends to have low floor-to-area ratios (FAR) and a relatively low number of on-site jobs per acre. But industrial lands in general, and harbor lands in particular, are an important piece of the regional economic base, which supports a much larger number of jobs in other economic sectors. Despite declining employment in the Harbor Access Lands geography during the 2000-2008 business cycle, like the employment losses in Downtown Portland and some other geographies in this period, Portland Harbor experienced an increase in cargo tonnage at a faster pace than the rate of industrial land development in the area.⁷ Employment losses during this period are partly associated with the listing of the extensive Portland Harbor Superfund Project in 2000, which has constrained vacant land development that would typically result from business turnover on affected sites.

Given the robust cargo forecasts and projected marine terminal needs described in EOA Section 1 and the disconnected relationship between employment growth and cargo activity in the harbor, an alternative land needs forecast is particularly needed for marine terminal development. ECONorthwest identifies several forecast scenarios for marine cargo tonnage and associated land needs in Portland in EOA Section 1, Appendix C.⁸ The commodity forecasts summarized by ECONorthwest are expressed as a range. To inform community choices, two harbor growth scenarios are analyzed here. Scenario A is the low end of the demand forecast. Scenario B is the mid-range demand forecast. The impacts of these choice are described in more detail in Section 4.

⁶ Entrix, Inc., West Hayden Island (WHI) Economic Foundation Study, July 2010.

⁷ ECONorthwest, Portland Harbor: Industrial Land Supply Analysis, May 2012.

⁸ ECONorthwest, Portland Harbor: Industrial Land Supply Analysis, May 2012.

Harbor Growth Scenario A is derived from the low end of the demand forecast estimated by ECONorthwest at 187,000 metric tons for automobile cargo only (see Exhibit 3-6 in EOA Section 1, Appendix C). For “practical” site sizes of auto terminals (a conservative land need assumption), this tonnage results in 150 acres of overall land need by 2040, adjusted to 125 acres by 2035. The 125-acre overall land need for marine terminal growth is further adjusted to 106 acres (rounded to 110) to avoid double-counting land needs estimated by the employment-trends forecast (see Figure 17). This scenario could potentially be met in the existing Harbor Access Lands geography by vacant and redevelopable land development at T-6 (approximately 40 vacant acres), T-4 (approximately 30 redevelopable acres at the former Cargill terminal), and/or an assembled brownfield development site around the former Time Oil terminal (an assembled site of up to 84 acres is analyzed by ECONorthwest in EOA Section 1, Appendix C).

Harbor Growth Scenario B consists of ECONorthwest’s mid-range demand forecast (5,760,000 metric tons) with an expected land need of 470 acres (see Exhibit 3-7 in EOA Section 1, Appendix C), which is adjusted for the year 2035 to 392 acres (rounded to 390). Based on the development trends of new terminals being constructed on the West Coast, land need for marine cargo is typically expected to be for parcels larger than 100 acres to accommodate some form of rail access and ensure facility competitiveness.⁹ This scenario anticipates the need for 270 acres of land need for auto terminal development and 100-acre grain and dry bulk terminal sites large enough for conventional unit-train rail loop access. Again, as with Scenario A, these combined land needs are adjusted to approximately 340 acres (see Figure 17) to avoid double-counting land needs estimated by the employment-trends forecast. West Hayden Island is the only site in the Portland Urban Services Area where this combined need could potentially be met, due to the geometric requirements for a modern rail loop. The new on-site marine terminal employment in Scenario B is estimated to be 850 jobs.

TOTAL EMPLOYMENT LAND DEMAND

The employment growth forecast demand is combined with the traded sector transportation facilities to determine the total land need (Figure 18).

⁹ Entrix, Inc., West Hayden Island (WHI) Economic Foundation Study, July 2010.

Figure 18. 2035 Employment Development Capacity Demand

Employment Geography	Added Jobs	Building SQFT	Total Acres	Avg FAR
Central City Commercial	34,124	13,598,000	60	5.20
Central City Industrial	10,617	5,218,000	90	1.33
Harbor & Airport Districts	16,046	11,909,000	773	0.35
Harbor Access Lands	2,074	1,494,000	97	0.35
Columbia East	9,308	6,140,000	350	0.40
Dispersed Employment	4,200	2,060,000	130	0.36
Gateway Regional Center	3,970	1,996,000	50	0.92
Town Centers	6,160	3,199,000	130	0.56
Neighborhood Centers & Corridors	25,011	11,549,000	510	0.52
Institutions	22,730	12,892,000	370	0.80
Residential	7,403	NA	NA	NA
Total	141,643	70,055,000	2,560	
Aggregate Geography				
Central City	44,741	18,816,000	150	2.88
Industrial	31,628	21,603,000	1,350	0.37
Neighborhood Commercial	35,141	16,744,000	690	0.56
Institutions	22,730	12,892,000	370	0.80
Residential	7,403	NA	NA	NA
Total	141,643	70,055,000	2,560	
Additional Land Need for Traded Sector Support Facilities				
PDX Aviation Support	3,220		40	
Rail Yard Expansion	NA		200	
Marine Terminals (Scenarios A/B)	325/850		110/340	
Total			350/580	
Total Land Demand			2,910/3,140	

Source: E.D. Hovee & Company, LLC, and Bureau of Planning and Sustainability.

SHORT-TERM EMPLOYMENT FORECAST AND LAND DEMAND

The State of Oregon Administrative Rules also require cities to provide an adequate short-term land supply “to respond to economic development opportunities as they arise.” The Metro regional forecast predicts a robust recovery from the national recession. Consequently, the City of Portland is expected to add 95,000 jobs or 67% of the forecasted employment growth in the 2010-2020 period. If this predicted growth occurs, it will generate the demand for about 2,000 acres of employment land. Land demand over the remainder of the planning period is projected to grow at lower rates, following the job-growth trajectory shown in Figure 32. Additional freight terminal demand is expected to occur episodically after 2020 through individual terminal investment decisions, except that a currently proposed marine terminal (Pembina) is included in short-term demand. Short-term land need for this marine terminal is estimated at 36 acres, which assumes an approximate 40-acre development site and excludes 4 acres to prevent double-counting of land need estimated by the employment-trends forecast.

Figure 19. 2010-2020 Short-Term Employment Forecast and Land Demand

Employment Geography	Added Jobs	Building SQFT	Total Acres
Central City Commercial	22,600	8,951,000	40
Central City Industrial	7,560	3,885,000	75
Harbor & Airport Districts	12,660	10,067,000	659
Harbor Access Lands	1,630	1,263,000	118
Columbia East	6,980	4,867,000	279
Dispersed Employment	3,030	1,673,000	109
Gateway Regional Center	2,460	1,220,000	33
Town Centers	3,860	1,985,000	86
Neighborhood Centers & Corridors	16,280	7,658,000	362
Institutions	13,440	7,562,000	224
Residential	4,110	NA	NA
Total	94,610	49,131,000	1,985

Source: E.D. Hovee & Company, LLC., and Bureau of Planning and Sustainability

PARCEL SIZE DEMAND ASSESSMENT

This assessment is based on the same parcel distribution by geography as demand experienced 1999-2011 for parcels experiencing new construction (year built as of 2000 or later) but with smoothing (or interpolation) of demand to in-between sizes with no demonstrated demand from 1999-2011.

This parcel size distribution reflects the pattern of activity that occurred during the last decade, a period of slower job growth regionally and in Portland than is forecast over the next 25 years. Future parcel size requirements may well vary from experience of recent years.

A pivotal factor suggesting a need for a greater mix of large parcels is the need to accommodate more job growth than has occurred in the last decade. To the extent that achieving more aggressive job growth targets depends on ability to accommodate larger employers (especially within industrial geographies), more large acreage sites may be required. Otherwise, Portland runs a greater risk of losing these large employers to sites elsewhere in the region or outside the Portland metro area altogether. Also noted is that presence of constrained sites (as with brownfields and environmental constraints) within the remaining inventory may require larger sites in terms of gross acreage to get to the same net yield as may have been experienced previously with less constrained sites. Therefore, this demand assessment includes the additional need for one large (50 acre) site in the Harbor and Airport Districts. This demand assessment also includes the traded sector land needs, which are expected to be located in the area as well.

Figure 20. Land Demand by Parcel Size (acres)

EOA Geographies	Gross Acreage Land Need (2010-35) by Parcel Size								Total	Total >1
	< 1	1 - 3	3 - 5	6 - 10	10-20	20-50	50-100	> 100		
Central City Commercial	33	9	9	10	0	0	0	0	60	27
Central City Industrial	54	36	0	0	0	0	0	0	90	36
Harbor & Airport Districts	71	135	213	166	126	52	50	200	1,013	942
Harbor Access Lands	1	6	9	11	11	49	50	300	437	435
Columbia East	9	85	78	67	111	0	0	0	350	341
Dispersed Employment	38	26	23	23	20	0	0	0	130	92
Gateway Regional Center	18	13	11	9	0	0	0	0	50	32
Town Centers	84	46	0	0	0	0	0	0	130	46
Neighb. Centers & Corridors	276	77	91	65	0	0	0	0	510	234
Total	584	432	434	350	269	101	100	500	2,770	2,186
Aggregate Geographies										
Central City	86	45	9	10	0	0	0	0	150	64
Industrial	119	252	322	266	269	101	100	500	1,930	1,811
Neighborhood Commercial	379	136	102	74	0	0	0	0	690	311
Total	584	432	434	350	269	101	100	500	2,770	2,186

* Harbor Access Lands demand shown here includes marine terminal forecast Scenario B for 340 acres (see Figure 17).

Scenario A would exclude the 100+ acre site demand and add 70 acres to the 20-100 acre categories.

Source: E.D. Hovee & Company, LLC, and Bureau of Planning and Sustainability.

Conversely, there are factors which suggest at least some potential that demand will adjust to available supply over time on smaller parcels that previously may have been bypassed. These factors include increasing interest by firms already heavily invested in Portland to make do with existing sites and/or acquire smaller, nearby (and in some cases multiple) sites for incremental expansion. This approach can be facilitated with greater regulatory flexibility and targeted infrastructure investments to make more efficient use of a shrinking supply of remaining vacant as well as redevelopable in-city inventory.

This assessment also suggests the need for monitoring of actual development site sizes over the course of the forecast period – with capacity for plan adjustments if warranted by demonstrated site size demand not being met by the remaining site inventory.

III. SUPPLY: BUILDABLE LAND INVENTORY

As stipulated by Goal 9 (Economy of the State), the intent of the Economic Opportunities Analysis is to “compare the demand for industrial and other employment uses to the existing supply of such land.” This section analyzes the Buildable Land Inventory as Portland’s measure of employment land supply.

The Buildable Land Inventory (BLI) is based on a GIS model developed by the Bureau of Planning and Sustainability (BPS) that looks at the difference between existing and allowed development to determine the development capacity of the current comprehensive plan. This report summarizes the methodology and results of the employment land portion of the BLI. A full description of the BLI with supporting maps can be found in the *Buildable Land Inventory* background report.

METHODOLOGY

The BPS Development Capacity Analysis (DCA) model is a series of steps or filters to identify the acreage of land that is available for development or redevelopment in Portland.

1. Identify vacant land.
2. Identify land likely to redevelop.
3. Discount capacity based on physical constraints
4. Adjust capacity for mixed use development and market factors

Base Land Supply – Vacant and Redevelopable Land

The first step to inventory buildable land is a relatively straightforward process to identify vacant sites or land utilizing tax assessment data, Metro’s vacant land inventory, and verification process utilizing aerial photos and field checking. Parcels under 0.5 acres were not considered viable for industrial geographies and parcels less than 1,500 square feet were not considered viable for commercial development.

The development analysis in the Task 1 report shows that only 50-70% of the development activity in Portland is taking place on totally vacant sites. The second step in the inventory is a more complicated process to identify non-vacant parcels that are significantly under-developed or underutilized and are likely to redevelop. The DCA model uses existing building area to calculate the likelihood of redevelopment based on the rationale that parcels with smaller building coverage compared to what is allowed by current zoning regulations are likely to redevelop given the potential for a new larger building to absorb the value of the existing building into the development costs. Within the Central City, a parcel must have less than 20% of the allowed floor area and have an improvement-to-land ratio (I/L ratio) of less than 50%. I/L ratios are used because improvement and land values are more accurately recorded in the Central City. Outside the Central City, parcels within 500 feet of a “frequent service” transit line are mapped as underutilized if they are using less than 20% of their allowed floor area (regardless of the improvement-to-land ratio). Frequent service transit lines are defined as bus and light rail lines that run every 15 minutes or better during weekday peak hours. All other parcels are

mapped as underutilized if they are using less than 10% of their allowed floor area (regardless of the improvement-to-land ratio). For underutilized parcels that will redevelop, the existing building square footage is deducted from the zoned capacity, so only the net new development capacity is counted.

For the Industrial areas, underutilized parcels are treated differently. Industrial Sanctuary designated parcels are limited to vacant parcels. Underutilized parcels are not included in this analysis because there are no FAR limits in the Portland industrial zones and industrial development tends to have lower building coverage with large areas for outdoor storage and vehicle maneuvering areas. However, developed parcels designated Central Employment and Mixed Employment that currently utilize less than 10% of their allowed floor area (regardless of the improvement-to-land ratio) are considered underutilized and included in the land supply because these parcels tend to include a wider mix of uses with more intensive development.

Institutional uses warrant special consideration because their land use patterns are distinct from other employers. Medical and higher education institutions often tend to cluster all or a significant portion of their activity into campuses, requiring larger parcels or aggregations of parcels, developing land more intensively (e.g. with structured parking) and locating in a variety of zones other than commercial and industrial (such as residential). For the BLI, 17 individual campuses are identified and the development capacity is determined through an assessment of current land use approvals and base zoning minus existing buildings.

Development Constraints

Constrained lands include sites that lack needed infrastructure (e.g. sites without sewer service) or have other physical or regulatory constraints on development, such as environmentally sensitive areas, historic landmarks, steep slopes, and flood hazards. Each constraint is defined and mapped and a discount factor is determined to reflect the degree of site utilization expected on land affected by each constraint.

The discount factor is determined in a two-step process. The first step is characterizing the constraint as high, medium, or low based on consultation with the City of Portland's development review staff at the Bureaus of Development Services, Transportation, Water, and Environmental Services.¹⁰ Then this factor is adjusted based on a review of development rates of various constrained sites compared to unconstrained sites for the 1999-2011 period (Appendix B). This analysis included both the rate of development (avoidance) as well as the overall amount of development to determine the level of constraint. The constraint analysis considered the impact of 52 different characteristics that are grouped into six categories and sorted by geographic area.¹¹ An additional discount factor of -10% is applied to sites with two overlapping constraints or -20% for sites with more than three constraints. Institutional campuses are not included in this adjustment factor because the master planning process to establish the development capacity has already factored most of these constraints.

¹⁰ BPS, 2012 Buildable Land Inventory, Appendix A

¹¹ Constraint discount factors are not calculated for the Institutional geography because it assumed that these constraints are factored into the campus master plans that are the basis for determining the development capacity of the 17 campuses.

Figure 21. Development Constraint Factors

Constraint	Adjusted Capacity Utilization	Constraint	Adjusted Capacity Utilization
Environmental		Historic Landmarks	
Central City	75%	Central City	55%
Industrial	50%	Industrial	55%
Commercial	35%	Commercial	55%
Infrastructure		Low	
Central City	75%	Central City	85%
Industrial	75%	Industrial	85%
Commercial	75%	Commercial	85%
Brownfields		Greenway	
Central City	90%	Central City	75%
Industrial	40%	Industrial	50%
Commercial	50%	Commercial	55%

Source: E.D. Hovee & Company, LLC and Bureau of Planning and Sustainability

Adjustments

Mixed-Use Zoning

In most of the City of Portland’s commercial land use zones residential uses are an allowed use, and over the last 15 years Portland has seen a significant amount of mixed use, residential development in these areas, especially in the Central City. Therefore, in this capacity analysis a certain amount of the development capacity is assumed to develop as residential space and therefore not available for employment uses. The residential share is based on a review of building permit activity in commercial areas from 2002-2008.¹²

Figure 22. Mixed Use Zoning Residential Share Factors

Comprehensive Plan Designation		Residential Share	Central City Residential Share
EX	Central Employment	75%	63%
CX	Central Commercial	55%	40%
UC	Urban Commercial	75%	40%
CG	General Commercial	25%	40%
NC	Neighborhood Commercial	30%	40%
IR	Institutional Residential	5%	78%
ME	Mixed Employment	0%	63%

Source: Bureau of Planning and Sustainability

¹² The most robust permit data was in the EX, CX, and UC designations. For the GC, NC, IR, and ME designations there was less mixed use data, so the factors are more conservative and assume less mixed use residential space.

Market Development Rates

This factor adjusts the land supply to reflect market supportable building capacity for the commercial geographies. In the commercial areas outside the Central City, the commercial development capacity allowed by zoning regulations is greater than what the private market is expected to develop. For example, most town centers and commercial corridors allow for 3:1 FARs. Even after some of the floor area is allocated to residential space (see above), the commercial space is greater than what the private sector typically develops. Parking plays a substantial factor in these determinations because FARs over 0.50 typically require some mix of structured parking and/or high transit mode split. Future market conditions are difficult to predict. These market factors are based on the average FARs estimated by the demand forecast in these geographies (total building area divided by total land area). Therefore, the commercial or employment capacity is capped at a maximum market-supportable FAR.

Figure 23. Commercial FAR Market Factor

<u>Employment Geography</u>	<u>Commercial FAR Cap</u>
Gateway Regional Center	0.95
Town Centers	0.54
Neighborhood Commercial	0.52

Source: E.D. Hovee & Company, LLC

A review of development trends in the Central City shows that most development incorporates floor area bonuses that exceed the base standards in the BLI, therefore no market factor is needed in the Central City.¹³ The development capacity of industrial areas is not regulated by FARs so no factor is needed there. The Institutional campus capacity has been determined by the campus master plan process, so the market factor does not apply.

EMPLOYMENT LAND SUPPLY

The employment development capacity is about 152 million square feet, which is distributed across the different employment geographies. The employment land supply is presented in three stages – the base supply (vacant and underutilized parcels), the constrained supply (capacity after constraint deductions), and the (final) adjusted market supply (Figure 24). Appendix C includes a more detailed analysis of the land supply with vacant and redevelopment capacity distributed by lot size.

¹³ 2012 Central City Development Capacity Analysis

Figure 24. Buildable Land Inventory by Employment Geography

Employment Geography	Base Supply	Constrained Supply		Market Adjusted Supply		Acres
	Bldg Sq Ft	Bldg Sq Ft	% of Base	Bldg Sq Ft	% of Base	
Central City Commercial	54,137,000	45,517,000	84%	45,517,000	84%	201
Central City Industrial	4,161,000	3,780,000	91%	3,780,000	91%	65
Harbor & Airport Districts	66,215,000	35,664,000	54%	33,704,000	51%	774
Harbor Access Lands	15,374,000	4,932,000	32%	4,932,000	32%	113
Columbia East	23,330,000	15,519,000	67%	15,519,000	67%	356
Dispersed Employment	8,906,000	5,287,000	59%	5,287,000	59%	121
Gateway Regional Center	12,588,000	8,992,000	71%	5,483,000	44%	137
Town Centers	25,875,000	22,644,000	88%	7,485,000	29%	304
Neighborhood Centers & Corridors	97,316,000	72,838,000	75%	19,538,000	20%	863
Institutions	10,676,000	10,676,000	100%	10,676,000	100%	306
Total	318,578,000	225,849,000	71%	151,921,000	48%	3,240
Aggregate Geography						
Central City	58,298,000	49,297,000	85%	49,297,000	85%	266
Industrial	113,825,000	61,402,000	54%	59,442,000	52%	1,365
Neighborhood Commercial	135,779,000	104,474,000	77%	32,506,000	24%	1,303
Institutions	10,676,000	10,676,000	100%	10,676,000	100%	306
Total	318,578,000	225,849,000	71%	151,921,000	48%	3,240

Source: Bureau of Planning and Sustainability

The City of Portland has about 3,200 acres of buildable land. Approximately 68% of the development capacity is vacant land and 32% is underutilized, redevelopable land.

The Central City Commercial geography has a significant amount of zoned development capacity for employment uses – 54 million square feet. Various constraints reduce that capacity by 16% to 46 million square feet, the equivalent of 201 acres. The Central City Industrial geography is composed primarily of industrial zoned land, so there is less capacity – about 4.2 million square feet of base supply that constraints reduce by 9% to 3.8 million square feet, or 65 acres of buildable land.

The City of Portland’s industrial areas have about 2,472 acres of vacant land and 135 acres of redevelopable land, but 48% of that capacity is constrained, leaving about 1,365 acres available for future employment growth. Harbor & Airport Districts has the bulk of this industrial capacity – 774 acres, and about 113 acres are located along the waterfront in the Harbor Access Lands. The Columbia East geography has 356 acres of capacity, and another 121 acres is scattered through the Dispersed Employment areas.

The neighborhood commercial areas outside the Central City have a tremendous amount of development capacity, even after accounting for mixed use residential development, totaling about 136 million square feet. Constraints reduce this capacity by 23%, but it is the market adjustment factor (based largely on patterns of development activity experienced in recent years) that reduces the capacity by another 53%. The net result is capacity for 33 million square feet, or 1,303 acres.

Institutional campuses have the potential for about 10.7 million square feet of development, or 306 acres of capacity.

SHORT-TERM EMPLOYMENT LAND SUPPLY

The State of Oregon Administrative Rules also requires cities to assess the short-term land demand and supply. As defined in these rules, “engineering feasibility is sufficient to qualify land for the short term supply” and funding availability is not required. For the most part, the land within Portland has services available or proximate to the sites such that development is not dependent on major public infrastructure investments. The major short-term constraint will be brownfields, especially within the Portland Harbor Superfund area. Due to overlapping constraints with infrastructure deficiencies and natural resource protections, the overall impact to the land supply is relatively minor – about 360 acres of development capacity.

Figure 25. Short-Term Land Supply

Employment Geography	Building Square Feet			Acres
	Base Supply	Constrained Supply	Adjusted Supply	
Central City Commercial	54,137,000	40,309,000	40,309,000	178
Central City Industrial	4,161,000	3,439,000	3,439,000	59
Harbor & Airport Districts	66,215,000	29,169,000	27,209,000	625
Harbor Access Lands	15,374,000	2,578,000	2,578,000	59
Columbia East	23,330,000	14,832,000	14,832,000	340
Dispersed Employment	11,434,000	6,907,000	6,907,000	105
Gateway Regional Center	12,588,000	7,965,000	4,456,000	111
Town Centers	25,875,000	21,685,000	7,095,000	288
Neighborhood Centers & Corridors	97,316,000	69,915,000	18,368,000	811
Institutions	9,045,000	7,048,000	7,048,000	306
Total	319,475,000	203,847,000	132,241,000	2,883
Aggregate Geography				
Central City	58,298,000	43,748,000	43,748,000	237
Industrial	116,353,000	53,486,000	51,526,000	1,129
Neighborhood Commercial	135,779,000	99,565,000	29,919,000	1,210
Institutions	9,045,000	7,048,000	7,048,000	306
Total	319,475,000	203,847,000	132,241,000	2,883

Source: E.D. Hovee & Company, LLC, and Bureau of Planning and Sustainability

PARCEL SIZE ASSESSMENT

The parcel size assessment distributes the employment development capacity across the same range as demand assessment. This assessment does not include the Institutional campus geography because that capacity was calculated using master plan methodology. The industrial geographies only include parcels greater than 0.5 acres

As to be expected with a virtually land-locked, developed city, most of the development capacity is in smaller parcels. In fact, no vacant parcels greater than 100 acres are currently identified in the industrial geographies. About 51% of the Central City capacity and 30% of the Neighborhood Commercial capacity is tied up in small parcels that are less than one acre.

Figure 26. Land Supply by Parcel Size (acres)

EOA Geographies	Existing Buildable Land Inventory by Parcel Size (acres)								Total	Total >1
	< 1	1 - 3	3 - 5	6 - 10	10-20	20-50	50-100	> 100		
Central City Commercial	90	39	32	6	10	24	0	0	201	111
Central City Industrial	45	13	6	2	0	0	0	0	65	21
Harbor & Airport Districts	8	76	64	86	111	164	310	0	774	811
Harbor Access Lands	0	4	0	3	23	42	41	0	113	113
Columbia East	6	23	19	27	45	96	140	0	356	350
Dispersed Employment	7	22	19	2	6	21	45	0	121	114
Gateway Regional Center	14	61	33	14	15	0	0	0	137	123
Town Centers	153	88	35	21	5	2	0	0	304	151
Neighb. Centers & Corridors	227	218	101	59	91	96	71	0	863	636
Total	550	543	308	220	305	445	607	0	2,934	2,429
Aggregate Geographies										
Central City	135	52	38	8	10	24	0	0	266	131
Industrial	21	125	102	118	185	324	536	0	1,365	1,388
Neighborhood Commercial	394	367	169	94	111	98	71	0	1,303	909
Total	550	543	308	220	305	445	607	0	2,934	2,429

* Industrial geography parcels smaller than 1/2 acre are not included in the total supply.

Source: Bureau of Planning and Sustainability

IV. DEMAND & SUPPLY RECONCILIATION

As stipulated by Goal 9 (Economy of the State), the intent of the Economic Opportunities Analysis is to “compare the demand for industrial and other employment uses to the existing supply of such land.” This section compares the demand for employment land from the employment forecast with the land supply from BLI to identify gaps or land needs to meet future employment growth.

EMPLOYMENT LAND NEEDS

By subtracting effective land supply from demand, it is possible to determine whether and to what extent Portland’s employment land base will be adequate to serve forecast needs over the 2035 planning horizon. In cases where there is adequate inventory, a land surplus is indicated; where the inventory is not adequate, a resulting deficit is calculated.

Because calculations are made by employment geography, there may be an adequate land supply for some inventory categories, with deficits noted for others.

Figure 27. Employment Land Needs

Employment Geography	Added Jobs	Land Demand	Existing Supply	Surplus/Deficit	% Capacity
Central City Commercial	34,120	60	201	141	335%
Central City Industrial	10,620	90	65	-25	72%
Harbor & Airport Districts*	16,050	1,013	774	-239	76%
Harbor Access Lands*	2,070	207/437	113	-94/-324	55%/26%
Columbia East	9,310	350	356	6	102%
Dispersed Employment	4,200	130	121	-9	93%
Gateway Regional Center	3,970	50	137	87	274%
Town Centers	6,160	130	304	174	234%
Neighborhood Centers & Corridors	25,010	510	863	353	169%
Institutions	22,730	370	306	-64	83%
Residential	7,400	-	-	-	-
Total	141,640	2,910/3,140	3,240		
Aggregate Geography					
Central City	44,740	150	266	116	177%
Industrial*	31,630	1,700/1,930	1,365	-335/-565	80%/71%
Neighborhood Commercial	35,140	690	1,303	613	189%
Institutions	22,730	370	306	-64	83%
Residential	7,400	-	-	-	-
Total	141,640	2,910/3,140	3,240		

* Total land demand shown here includes Traded Sector Support Facilities in marine, rail and air terminals.

Harbor Access Lands demand is shown with two marine-terminal forecast scenarios (see Figure 17).

Source: Bureau of Planning and Sustainability

Figure 28. 2010-2035 Parcel Size Assessment Reconciliation

EOA Geographies	Gross Acreage Land Need (2010-35) by Parcel Size								Total	Total >1
	< 1	1 - 3	3 - 5	6 - 10	10-20	20-50	50-100	> 100		
Central City Commercial	58	30	23	-3	10	24	0	0	141	83
Central City Industrial	-9	-24	6	2	0	0	0	0	-25	-16
Harbor & Airport Districts	-63	-59	-149	-80	-15	112	260	-200	-240	-131
Harbor Access Lands	-1	-2	-9	-8	12	-7	-9	-300	-323	-322
Columbia East	-3	-63	-59	-39	-66	96	140	0	6	9
Dispersed Employment	-31	-4	-4	-22	-15	21	45	0	-9	22
Gateway Regional Center	-4	48	22	5	15	0	0	0	87	90
Town Centers	69	42	35	21	5	2	0	0	174	105
Neighb. Centers & Corridors	-50	141	10	-5	91	96	71	0	353	402
Total	-34	111	-126	-129	37	344	507	-500	164	243
Aggregate Geographies										
Central City	48	7	29	-1	10	24	0	0	116	68
Industrial	-98	-127	-221	-149	-84	222	436	-500	-565	-422
Neighborhood Commercial	16	231	66	21	111	98	71	0	613	598
Total	-34	111	-126	-129	37	344	507	-500	164	243

Source: E.D. Hovee & Company, LLC, and Bureau of Planning and Sustainability

OBSERVATIONS BY EMPLOYMENT GEOGRAPHY

These observations are based on an assessment of the overall capacity and demand to determine the land needs, as well as the range of parcel sizes. In cases where there is a shortfall, there may be a secondary analysis of the employment demand to determine the type of space/use that will be needed in the future.

Central City Commercial: The Central City Commercial areas have a surplus of capacity, even after accounting for mixed-use residential space, primarily due to the high FARs and continued availability of development sites in the Pearl and South Waterfront sub-districts.

Central City Industrial: The Central Eastside and Lower Albina districts have a strong demand for building space, especially for emerging small business that are seeking cheaper, Class B and C office space that account for about 49% of the employment growth. The existing buildable land supply only covers 72% of the demand. To effectively overcome the shortfall, additional capacity should be targeted to the specific demand opportunities of this “incubator” geography, particularly for Class B/C office and flex space development attractive to cost-conscious tenants. Additional development capacity could be provided through rezoning, such as to expand allowances for industrial office development, and/or incentives to leverage higher rates of redevelopment. These actions are discussed in the EOA Section 4 report.

Harbor Access Lands: This geography is the Portland Harbor industrial area, where sites generally have dock access to the deep-water navigation channel. This distinctive geography is the land area available for continuing growth of marine terminals and other marine industrial facilities at Portland Harbor. Two marine terminal growth scenarios are analyzed in this

geography to inform community choices. Under the low forecast scenario, the existing buildable land supply in the Harbor Access Lands geography meets 55% of forecast demand, leaving an estimated 94-acre shortfall in growth capacity to 2035. Under the mid-range forecast scenario, existing buildable land meets only 26% of forecast demand, resulting in a 324-acre shortfall. Options to meet these shortfalls involve policy tradeoffs addressing public spending priorities, environmental protection, neighborhood compatibility, economic development, transportation infrastructure, and equity, as described in the EOA Section 4 report.

Harbor and Airport Districts: The Harbor and Airport Districts contain more gross developable land (1,520 acres) than any other geography, though much of it is constrained by brownfield contamination, infrastructure deficiencies, and environmental protection regulations that reduce the effective supply to 774 acres. The Harbor and Airport Districts are also a distinctive geography with 24% of the land demand associated with traded-sector transportation support facilities for railroad and airport growth. The existing buildable land supply in this geography meets 76% of forecast demand, leaving an estimated 239-acre shortfall in 25-year growth capacity. Like Harbor Access Lands, options to meet these shortfalls involve policy tradeoffs as described in the EOA Section 4 report.

Columbia East: This industrial area has a minor surplus of 6 acres. There is a surplus of larger 20-50 acre and 50-100 acres sites, which is balanced by a deficit for some of the small to medium sized sites. Constraints, such as infrastructure deficiencies and brownfields, account for 33% of the base supply. If these constraints are partially remedied through public investment and incentives, additional surplus capacity could be available to meet comparable demand for warehouse and flex space development in the Harbor and Airport Districts.

Dispersed Employment: Forecast land demand for this relatively small employment geography results in a shortfall of 9 acres. Existing growth capacity meets approximately 93% of forecast demand. While this “business park” geography typically includes substantial landscaping and building amenities to attract office tenants, neighborhood compatibility concerns can limit options for expansion of this geography. Over two-thirds of forecast job growth and building area in the Dispersed Employment geography is for office sector businesses.

Gateway Regional Center: This geography has a surplus of 87 acres of development capacity, even after discounting the zoned capacity by 56% for constraint and market factors. The Gateway supply consists predominantly (55%) of smaller parcels of less than 3 acres, but this capacity is generally matched to the expected demand.

Town Centers: This mixed-use geography consists of the eight town centers. Five existing town centers are designated in Metro’s 2040 Plan, and the Comprehensive Plan Update proposes additional town center designations in the Northwest District, Killingsworth/Interstate, and Midway (122nd/Division). Strong employment growth is forecast in this geography, driven particularly by the institutional space needs that account for 70% of forecast Town Centers demand. The forecast land needs for town centers is based on the five existing town centers, and has not been updated to match those currently proposed. However, the capacity needs of the Town Centers and Neighborhood Commercial geographies are interrelated and more than amply met in the 25-year planning horizon. Specifically, the existing buildable land inventory meets an

estimated 274% of forecast demand for town center land needs and 234% of the related neighborhood commercial land needs. Moreover, demand for town center densities may be more accurately estimated by the existing town centers. Also, the level of existing development and market trends in these town centers varies widely. In the 2000-2008 business cycle, for example, most of the town center job growth was in Hollywood, attributable primarily to medical office expansion from the nearby Providence hospital campus.

Neighborhood Centers & Corridors: Nearly 18% of citywide employment growth is allocated to this extensive geography, which drives a demand for over 510 acres of employment land. This geography also has a surplus of about 350 acres of capacity, even after discounting the zoned capacity for mixed use residential and market factors. As with the Town Centers geography, most of the Neighborhood Commercial capacity is in smaller, underutilized, redevelopable sites. To the extent that capacity shortages are not effectively addressed in other geographies (especially for commercial and institutional uses), some of the unmet demand might be shifted to this employment geography.

Institutions: The larger campus institutions have strong demand corresponding to 16% of the city's projected employment growth. The unused portion of development capacity under current master plans and zoning accounts for a significant amount of development capacity, but still leaves a shortfall of about 2.2 million square feet of development or about 64 acres.

OTHER ISSUES

Short-Term Forecast and Land Needs

The Metro regional forecast predicts a robust recovery from the national recession. Consequently, the City of Portland is expected to add 95,000 jobs or 67% of the forecasted employment growth between 2010 and 2020. If this predicted growth occurs, it will generate the demand for 1,950 acres of employment land. The traded-sector transportation facilities represent a longer term investment in the regional economy, so that land demand is not included in the short-term forecast, except for one currently proposed marine terminal. Fortunately, most of Portland's land supply is available for development in the short-term, with the exception of brownfields. The constraint and market factor analysis of the Buildable Land Inventory also removes 52% of the gross development capacity of vacant and underutilized land. The remaining market-effective supply is expected to be generally available as short-term supply with the exception of brownfields. Relatively diverse surplus capacity in the Columbia East geography can likely meet short-term land needs in the Harbor and Airport Districts, but additional efforts will be needed to meet short-term capacity shortfalls in the Central City Industrial, Dispersed Employment, and Harbor Access Lands geographies.

Figure 29. 2010-2020 Short-Term Employment Land Needs

Employment Geography	2010-2020	2010-2020	Land Supply	Surplus/ Deficit
	Added Jobs	Land Demand		
Central City Commercial	22,600	40	178	138
Central City Industrial	7,560	75	59	-15
Harbor & Airport Districts	12,660	659	625	-35
Harbor Access Lands	1,630	118	59	-59
Columbia East	6,980	279	340	62
Dispersed Employment	3,030	109	105	-4
Gateway Regional Center	2,460	33	111	78
Town Centers	3,860	86	288	202
Neighborhood Centers & Corridors	16,280	362	811	449
Institutions	13,440	224	306	82
Residential	4,110	NA	NA	NA
Total	94,610	1,985	2,883	898

Source: E.D. Hovee & Company, LLC, and Bureau of Planning and Sustainability

Note: Harbor and Airport Districts demand does not include land for traded-sector support facilities.

Lot Size Assessment

The reconciliation of the lot size assessment varies widely, but overall about 53% of the demand is for parcels of less than 6 acres while 48% of the supply consists of small parcels less than 6 acres. Each of the employment geographies with a capacity shortfall has a different need for lot sizes.

In the Central City Industrial geography, the need is for small parcels of less than 3 acres, which matches the supply, but there is not enough overall capacity. The Harbor and Airport Districts and Harbor Access Lands are unique in that there is a need for smaller parcels of less than 20 acres with a small surplus of medium sized parcels of 20-100 acres, but large (550 acres) demand for 100+ acre sites, primarily for marine terminal and rail yard development. Columbia East and Dispersed Employment have a similar pattern of a need for small parcels with slight surpluses in the medium sized parcels. The town centers have a need for small parcels. Overall, there is a lot of surplus capacity of small parcels in the Neighborhood Commercial geography that could provide some relief for the smaller, incubator businesses and services forecasted for the other geographies.

Portland's land supply of larger sites will tighten over the long term as a land-locked city, and other jurisdictions in the metropolitan area can generally be expected to address that regional demand. Land-assembly and site-assistance efforts also provide opportunities to meet location-specialized demand in Portland, such as freight terminal expansion.

APPENDIX A. EMPLOYMENT FORECAST DETAILS

The tables in this appendix provide detail on five forecast elements:

- Metro’s forecast, the basis of the Portland forecast;
- 2008 City employment share, and the decreasing share trend employed in the low and mid forecasts;
- The allocation of jobs to building types (consistent across scenarios)
- Square foot per employee assumptions (consistent across scenarios)
- Floor Area Ratios (varies across scenarios)

Figure 30. Metro’s Seven County PMSA Forecast: Total Jobs by 2035

NAICS Employment Sector	7-County PMSA Forecast Employment						Job Change 2010-35	of Growth 2010-35
	Actual QCEW 2010	2015	2020	2025	2030	2035		
11 & 21 Agriculture & Mining	1,100	1,530	1,400	1,320	1,250	1,200	100	0.3%
23 Construction	43,620	61,550	65,010	69,010	74,060	79,930	36,310	2.5%
31-33 Manufacturing	#####	117,100	119,740	121,040	122,360	123,890	17,431	0.6%
42 Wholesale Trade	52,961	61,130	66,600	71,600	76,800	81,880	28,919	1.8%
44-45 Retail Trade	#####	113,200	114,820	118,270	123,490	129,200	28,597	1.0%
Transportation, 22, 48-49 Warehousing & Utilities	32,051	43,090	47,140	50,180	53,580	57,300	25,249	2.4%
51 Information	22,426	24,560	27,930	31,470	35,250	38,740	16,314	2.2%
52 Finance	39,322	49,170	53,710	58,110	62,370	67,740	28,418	2.2%
53 Real Estate	15,940	27,160	29,800	32,210	34,700	37,300	21,360	3.5%
54 Professional Services	51,937	59,540	67,390	74,590	82,340	90,650	38,713	2.3%
55 Management Administrative & Waste	23,067	24,960	28,700	32,590	37,140	42,260	19,193	2.5%
56 Services	51,601	68,100	75,430	82,280	88,790	95,140	43,539	2.5%
61 Educational Services	19,718	24,960	28,350	31,630	34,870	38,490	18,772	2.7%
62 Health & Social Services	#####	127,390	150,540	170,610	192,050	214,710	100,849	2.6%
Arts, Entertainment & 71 Recreation	13,571	14,240	16,030	17,700	19,260	20,690	7,119	1.7%
Accommodation & Food 72 Services	80,675	89,630	98,440	106,410	114,550	122,990	42,315	1.7%
81 Other Services	39,254	40,920	47,660	53,740	59,760	65,240	25,986	2.1%
92 Government (Civilian)	#####	142,570	150,950	159,400	167,560	179,590	38,060	1.0%
Total Employment	#####	#####	#####	#####	#####	#####	537,244	1.8%

Notes: QCEW is the Quarterly Census of Employment and Wages, Oregon Employment Department (OED).

All Metro gamma forecast numbers rounded to nearest ten employees.

2010 are Metro modeled forecast outcomes.

AAGR denotes annual average growth rate (compounded).

Source: Metro 2012 Adopted Forecast.

Figure 31. City Share of PMSA Employment: 2008 and Projected

NAICS Employment Sector	Portland as Share of Metro Area						
	Actual Jobs		Forecast City of Portland Employment				
	2008	2010	2015	2020	2025	2030	2035
11 & 21 Agriculture & Mining	1.5%	35.6%	35.2%	34.3%	33.0%	31.4%	29.4%
23 Construction	30.9%	32.6%	32.2%	31.4%	30.2%	28.7%	26.9%
31-33 Manufacturing	24.7%	23.5%	23.2%	22.6%	21.8%	20.7%	19.4%
42 Wholesale Trade	35.4%	34.0%	33.6%	32.7%	31.5%	30.0%	28.1%
44-45 Retail Trade	30.6%	30.9%	30.5%	29.7%	28.6%	27.2%	25.5%
22, 48-49 Transportation, Warehousing & Utilities	72.7%	73.9%	73.0%	71.1%	68.5%	65.1%	61.0%
51 Information	46.4%	43.0%	42.5%	41.4%	39.9%	37.9%	35.5%
52 Finance	44.7%	43.4%	42.8%	41.8%	40.2%	38.2%	35.8%
53 Real Estate	47.7%	49.8%	49.2%	48.0%	46.2%	43.9%	41.2%
54 Professional Services	50.6%	51.9%	51.2%	50.0%	48.1%	45.7%	42.9%
55 Management	60.4%	62.1%	61.3%	59.8%	57.6%	54.7%	51.3%
56 Administrative & Waste Services	37.9%	35.8%	35.3%	34.4%	33.1%	31.5%	29.5%
61 Educational Services*	194.2%	192.4%	190.0%	185.3%	178.4%	169.5%	159.0%
62 Health & Social Services	45.2%	44.5%	43.9%	42.8%	41.2%	39.2%	36.7%
71 Arts, Entertainment & Recreation	43.6%	49.7%	49.1%	47.8%	46.1%	43.8%	41.0%
72 Accommodation & Food Services	42.2%	43.5%	43.0%	41.9%	40.3%	38.3%	36.0%
81 Other Services	43.1%	42.8%	42.3%	41.2%	39.7%	37.7%	35.4%
92 Government (Civilian)*	12.5%	11.0%	10.8%	10.5%	10.2%	9.6%	9.0%
Total	38.3%	38.9%	39.4%	39.0%	37.9%	36.4%	34.4%

Notes: * Metro public education re-allocated to educational services to match OED.

All Metro gamma forecast numbers rounded to nearest ten employees.

2010 are Metro modeled forecast outcomes.

AAGR denotes annual average growth rate (compounded).

Source: Metro, Oregon Employment Department, and E. D. Hovee & Company, LLC.

Figure 32. City of Portland Employment Forecast by Sector

NAICS Employment Sector	Jobs within City of Portland						Job Change 2010-35	Avg Rate of Growth 2010-35
	QCEW 2010	Forecast Employment by Year						
	2010	2015	2020	2025	2030	2035		
11 & 21 Agriculture & Mining	392	538	480	436	392	353	(39)	-0.4%
23 Construction	14,224	19,821	20,416	20,864	21,279	21,539	7,315	1.7%
31-33 Manufacturing	25,035	27,195	27,118	26,391	25,353	24,076	(959)	-0.2%
42 Wholesale Trade	18,009	20,529	21,810	22,574	23,010	23,009	5,000	1.0%
44-45 Retail Trade	31,060	34,515	34,139	33,855	33,593	32,963	1,903	0.2%
22, 48-49 Transportation, Warehousing & Utilities	23,676	31,435	33,535	34,368	34,873	34,978	11,302	1.6%
51 Information	9,640	10,426	11,562	12,542	13,351	13,761	4,121	1.4%
52 Finance	17,048	21,053	22,425	23,358	23,825	24,270	7,222	1.4%
53 Real Estate	7,946	13,371	14,306	14,887	15,241	15,366	7,420	2.7%
54 Professional Services	26,943	30,504	33,668	35,876	37,636	38,861	11,918	1.5%
55 Management	14,322	15,305	17,161	18,761	20,318	21,683	7,361	1.7%
56 Administrative & Waste Services	18,449	24,045	25,972	27,275	27,971	28,110	9,661	1.7%
61 Educational Services	37,937	47,426	52,529	56,423	59,112	61,196	23,259	1.9%
62 Health & Social Services	50,616	55,927	64,448	70,319	75,223	78,876	28,260	1.8%
71 Arts, Entertainment & Recreation	6,741	6,985	7,668	8,152	8,429	8,493	1,752	0.9%
72 Accommodation & Food Services	35,102	38,514	41,249	42,927	43,915	44,222	9,120	0.9%
81 Other Services	16,802	17,298	19,646	21,327	22,538	23,076	6,274	1.3%
92 Government (Civilian)	15,498	15,418	15,919	16,183	16,167	16,251	753	0.2%
Total Employment	369,440	430,306	464,052	486,518	502,226	511,083	141,643	1.3%
City Share of Portland Metro Employment	38.9%	39.4%	39.0%	37.9%	36.4%	34.4%	26.4%	

Source: E. D. Hovee & Company, LLC based on Metro projection and City/Metro forecast 2035 allocation.

Figure 33. Employment to Building Types

NAICS Employment Sector		General					
		Industrial	Warehouse	Flex/BP	Office	Retail	Institution
11 & 21	Ag, Mining	3%	3%	3%	72%	18%	-
23	Construction	41%	-	14%	28%	17%	-
31-33	Manufacturing	76%	-	11%	5%	8%	-
42	Wholesale	-	65%	13%	13%	9%	-
44-45	Retail	-	-	-	-	100%	-
22, 48-49	Transport, Warehouse & Utilities	-	55%	11%	31%	3%	-
51	Information	-	-	35%	45%	20%	-
52	Finance	-	-	5%	88%	7%	-
53	Real Estate	-	-	24%	67%	8%	-
54	Professional Services	-	-	3%	91%	6%	-
55	Management	-	-	-	100%	-	-
56	Admin, Waste	-	-	31%	57%	12%	-
61	Education	-	-	-	10%	5%	85%
62	Health & Social Services	-	-	-	15%	15%	70%
71	Arts, Entertainment, Recreation	-	-	-	79%	21%	-
72	Accommodation & Food Service	-	-	-	45%	55%	-
81	Other Services	-	-	-	34%	66%	-
92	Government	-	-	-	87%	13%	-

Source: Metro, BPS, and E. D. Hovee & Company, LLC.

Figure 34. Net Job Growth by Building Type & Employment Geography (2010-35)

Employment Geography	General						Total
	Industrial	Warehouse	Flex/BP	Office	Retail	Institution	
Central City Commercial	(178)	134	2,150	22,272	6,015	3,731	34,124
Central City Industrial	516	995	1,026	5,222	1,479	1,379	10,617
Harbor & Airport Districts	347	5,296	2,357	6,044	1,745	256	16,046
Harbor Access Lands	173	477	477	733	157	58	2,074
Columbia East	765	1,825	1,191	3,618	1,535	373	9,308
Dispersed Employment	561	(12)	659	3,129	(280)	143	4,200
Gateway Regional Center	16	(29)	19	1,062	920	1,983	3,970
Town Centers	54	(4)	124	1,328	932	3,725	6,160
Neighb. Centers and Corridors	106	497	1,520	10,372	7,591	4,924	25,011
Residential	(105)	266	303	2,184	550	4,205	7,403
Institutions	(0)	11	5	1,927	2,013	18,775	22,730
Total	2,255	9,457	9,831	57,892	22,657	39,552	141,643
Aggregate Geography							
Central City	(178)	134	2,150	22,272	6,015	3,731	34,124
Industrial	1,846	7,587	4,684	13,524	3,157	830	31,628
Incubator	516	995	1,026	5,222	1,479	1,379	10,617
Neighborhoods	70	731	1,966	14,947	9,993	14,837	42,544
Institutions	(0)	11	5	1,927	2,013	18,775	22,730
Total	2,255	9,457	9,831	57,892	22,657	39,552	141,643

Source: Metro, BPS, and E. D. Hovee & Company, LLC.

Note: Figures exclude employment allocated to non-employment geographies including areas designated for residential and open space use.

Figure 35. Square Feet per Employee

Employment Geography	General					
	Industrial	Warehouse	Flex/BP	Office	Retail	Institution
Central City Commercial	350	350	350	350	470	600
Central City Industrial	926	780	599	350	470	600
Harbor & Airport Districts	926	1,263	769	350	470	600
Harbor Access Lands	926	1,263	769	350	470	600
Columbia East	926	1,263	769	350	470	600
Dispersed Employment	926	1,263	769	350	470	600
Gateway Regional Center	350	350	350	350	470	600
Town Centers	350	350	350	350	470	600
Neighborhood Centers and Corridors	926	780	599	350	470	600
Residential	926	780	599	350	470	600
Institutions	350	350	599	350	470	600
<i>Notes</i>	<i>Atlas + acts like office in urban geogs</i>	<i>Atlas + acts like office in urban geogs</i>	<i>Atlas + acts like office in urban geogs</i>	<i>Industry standard range: 250-350</i>	<i>Industry standard assumption</i>	<i>Metro assumption</i>

Sources: Metro, Portland Bureau of Planning & Sustainability, and E. D. Hovee & Company, LLC.

Figure 36. Floor Area Ratios

2010 Base Floor Area Ratios (FARs)

Employment Geography	General					
	Industrial	Warehouse	Flex/BP	Office	Retail	Institution
Central City Commercial	5.00	5.00	5.00	7.00	3.00	5.00
Central City Industrial	1.00	1.00	2.00	2.00	0.50	2.00
Harbor & Airport Districts	0.35	0.35	0.35	0.35	0.35	0.35
Harbor Access Lands	0.35	0.35	0.35	0.35	0.35	0.35
Columbia East	0.40	0.40	0.40	0.40	0.40	0.40
Dispersed Employment	0.35	0.35	0.35	0.35	0.35	0.35
Gateway Regional Center	0.60	0.60	1.50	1.50	0.35	1.50
Town Centers	0.50	0.50	0.50	0.60	0.30	0.60
Neighb. Centers and Corridors	0.30	0.25	0.30	0.60	0.50	0.60
Residential	0.40	0.40	0.40	0.55	0.40	0.55
Institutions	0.50	0.50	0.50	0.80	0.50	0.80

2035 Floor Area Ratios (FARs)

Employment Geography	General					
	Industrial	Warehouse	Flex/BP	Office	Retail	Institution
Central City Commercial	5.79	5.79	5.79	9.38	3.47	5.79
Central City Industrial	1.16	1.16	2.32	2.68	0.58	2.32
Harbor & Airport Districts	0.35	0.35	0.35	0.41	0.35	0.35
Harbor Access Lands	0.40	0.40	0.40	0.46	0.40	0.40
Columbia East	0.40	0.40	0.40	0.46	0.40	0.40
Dispersed Employment	0.35	0.35	0.35	0.41	0.35	0.35
Gateway Regional Center	0.69	0.69	1.74	2.01	0.41	1.74
Town Centers	0.58	0.58	0.58	0.80	0.35	0.69
Neighb. Centers and Corridors	0.35	0.29	0.35	0.80	0.58	0.69
Residential	0.46	0.46	0.46	0.74	0.46	0.64
Institutions	0.58	0.58	0.58	1.07	0.58	0.93

Source: Metro, Portland Bureau of Planning & Sustainability, and E. D. Hovee & Company, LLC.

Figure 37. Estimated 2010-2035 Land Need for Airport Facilities

Facility	Airport Futures		Job Trend	Additional Land
	Need	Acres	Demand	Demand for
			Acres	Airport Facilities
Air Transportation & Terminal Services		52	136	-84
Customer Parking	11,372 spaces	16		
Employee Parking	556 spaces	6		
RON Aircraft Parking	23 acres	23		
Airport Maintenance	2 acres	2		
Airport Fire & Rescue	3 acres	3		
Aircraft Fuel Storage	2 acres	2		
Rental Car Agencies		21	11	10
Rental Car Ready/Return	1219 spaces	12		
Rental Car Service	9.2 acres	9		
General Aviation	20 acres	20	0.2	20
Air Cargo Couriers		113	18	95
Air Cargo Warehouse	613,000 s.f.	14		
Air Cargo Landside	1,005,000 s.f.	23		
Air Cargo Ramp	369,000 s.y.	76		
Other Airport Employers			4	-4
Total		207	169	37

Source: Bureau of Planning and Sustainability

APPENDIX B. CONSTRAINED LANDS DEVELOPMENT RATES

The constraint analysis considered the impact of different characteristics that are grouped into seven broad categories and mapped according to the BLI.

Figure 38. BLI Constraints

<p>Infrastructure</p> <hr/> <p><i>Transportation</i></p> <ul style="list-style-type: none"> 2008 Volume to Capacity Ratios Streets Connectivity Standards ODOT Highway Interchanges Improved and Unimproved Streets Pedestrian System <p><i>Water Service</i></p> <ul style="list-style-type: none"> Water Deficient Service Areas <p><i>Sewer Service</i></p> <ul style="list-style-type: none"> Infrastructure Constrained Areas: Sewer <p><i>Stormwater</i></p> <ul style="list-style-type: none"> Stormwater System Depth to Seasonal High Water Soil Infiltration Capability Wellfield Protection Areas <p>Environmental</p> <hr/> <ul style="list-style-type: none"> Wetlands Environmental Conservation Overlay Zones All slopes over 25% FEMA 100-Year Floodplain Map 	<p>Brownfields</p> <hr/> <ul style="list-style-type: none"> DEQ Environmental Cleanup Sites I (ECSI) DEQ Confirmed Release Sites (CRL) DEQ Underground Storage Tank Cleanup Sites (UST) <p>Greenway</p> <hr/> <ul style="list-style-type: none"> Willamette Greenway Setback <p>Low</p> <hr/> <ul style="list-style-type: none"> Scenic Area View Corridors Historic and Conservation Districts Archaeological Areas <p>Historic</p> <hr/> <ul style="list-style-type: none"> Historic and Conservation Landmarks <p>Full</p> <hr/> <ul style="list-style-type: none"> OS Comprehensive Plan Map Designation Environmental Protection Zones FEMA Floodway Map Beds and banks of navigable waterways Public rights-of-way Land within the City but outside the Urban Growth Boundary
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Source: Bureau of Planning and Sustainability

A discount factor is determined to reflect the degree of impact each constraint has on development. The first step is characterizing the constraint as high, medium, or low based on consultation with the City of Portland’s development review staff at the Bureaus of Development Services, Transportation, Water, and Environmental Services. Then the factor is adjusted based on a review of development rates of various constrained sites compared to unconstrained sites for the 1999-2011 period. This analysis included both the rate of development (avoidance) as well as the overall amount of development to determine the level of constraint by type of constraint and by geographic area.

Figure 39. Development Rate Calculations by Constraint Type and Aggregated Geography

	1999-2011 Land Development Rate	Development Rate as % of Unconstrained	1999-2011 FAR	1999-2011 FAR % of Unconstrained	2010-2035 Composite Rate	Jun 2011 BLI Constraint	Adjusted Constraint	Comments
Environmental (Wetlands, C zones, Floodplain, Slopes)								
Central City	5.1%	31.1%	1.02	44.1%	13.7%	55%	75%	
Industrial	20.6%	40.8%	0.15	47.4%	19.4%	55%	50%	
Commercial	18.0%	38.5%	0.28	71.0%	27.4%	55%	35%	
Infrastructure								
Central City	9.2%	55.4%	0.36	15.7%	8.7%	85%	75%	
Industrial	14.1%	27.8%	0.17	53.5%	14.9%	85%	75%	
Commercial	20.8%	44.5%	0.21	52.4%	23.3%	85%	75%	
Brownfields								
Central City	39.0%	100.0%	2.14	92.1%	92.1%	85%	90%	
Industrial	31.3%	61.8%	0.20	62.9%	38.9%	85%	40%	
Commercial	48.8%	100.0%	0.19	47.9%	47.9%	85%	50%	
Historic Landmarks								
Central City	17.6%	100.0%	4.32	186.3%	186.3%	55%	55%	Too few cases
Industrial	0.0%	0.0%	0.00	0.0%	0.0%	55%	55%	
Commercial	100.0%	100.0%	0.39	100.1%	100.1%	55%	55%	
Low (Historic Districts, View Corridors)								
Central City	4.5%	27.2%	0.69	29.6%	8.1%	85%	85%	Too few cases
Industrial	0.0%	0.0%	0.00	0.0%	0.0%	85%	85%	
Commercial	32.4%	69.6%	0.76	192.6%	134.0%	85%	85%	
Greenway								
Central City	11.0%	66.5%	1.81	78.1%	51.9%	55%	75%	
Industrial	30.1%	59.6%	0.23	72.1%	42.9%	55%	50%	
Commercial	4.7%	10.1%	0.82	207.9%	21.0%	55%	55%	
Unconstrained								
Central City	16.6%	100.0%	2.32	100.0%	100.0%			
Industrial	50.6%	100.0%	0.32	100.0%	100.0%			
Commercial	46.6%	100.0%	0.39	100.0%	100.0%			

Source: E.D. Hovee & Company, LLC and Bureau of Planning and Sustainability

APPENDIX C. BUILDABLE LAND INVENTORY TABLES

Detailed tables of the Buildable Land Inventory, March 9, 2015, are provided in the following pages.

The net building square footage is the total building square footage allowed under current comprehensive plan designations less existing building square footage.

In the industrial geographies, vacant land and underutilized parcels smaller than 0.5 acres are not included. Vacant land supply in the Harbor and Airport Districts excludes 45 acres of land held as long-term aviation reserve that exceeds forecast airport land demand.

Institutional campus capacity is based on approved master plans, although vacant and underutilized parcels are reported.

Figure 40. Existing Buildable Land Inventory – Net Building Square Footage (part 1)

Employment Geography	Less than .5 acres			.5 to 1 acre			1 to 3 acres			3 to 5 acres			6 to 10 acres		
	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment
Central City Commercial	7,458,954	7,168,395	7,168,395	15,082,741	13,262,744	13,262,744	10,562,071	8,838,975	8,838,975	8,043,441	7,165,619	7,165,619	1,467,324	1,466,445	1,466,445
Vacant	5,024,102	4,831,410	4,831,410	9,613,958	8,300,630	8,300,630	6,776,999	5,754,933	5,754,933	5,729,395	5,232,750	5,232,750	1,467,324	1,466,445	1,466,445
Redevelopment	2,434,852	2,336,985	2,336,985	5,468,783	4,962,114	4,962,114	3,785,072	3,084,042	3,084,042	2,314,045	1,932,868	1,932,868	0	0	0
Central City Industrial	869,924	813,310	813,310	1,935,945	1,768,046	1,768,046	779,761	735,157	735,157	418,253	355,991	355,991	156,725	107,390	107,390
Vacant	517,375	481,089	481,089	1,588,023	1,443,271	1,443,271	669,450	624,846	624,846	377,287	318,407	318,407	71,119	37,267	37,267
Redevelopment	352,549	332,221	332,221	347,922	324,775	324,775	110,310	110,310	110,310	40,965	37,584	37,584	85,606	70,123	70,123
Columbia East	68,322	48,329	48,329	433,726	273,239	273,239	1,733,500	994,145	994,145	1,276,242	813,788	813,788	1,688,867	1,185,501	1,185,501
Vacant	68,322	48,329	48,329	433,726	273,239	273,239	1,696,117	980,738	980,738	1,222,732	760,279	760,279	1,631,745	1,128,378	1,128,378
Redevelopment	0	0	0	0	0	0	37,383	13,408	13,408	53,510	53,510	53,510	57,122	57,122	57,122
Dispersed Employment	574,417	486,760	486,760	392,721	302,229	302,229	1,058,976	964,494	964,494	1,243,260	815,384	815,384	87,417	68,362	68,362
Vacant	411,765	341,904	341,904	278,923	199,532	199,532	673,107	619,556	619,556	891,055	557,954	557,954	77,736	58,680	58,680
Redevelopment	162,653	144,856	144,856	113,798	102,697	102,697	385,869	344,938	344,938	352,205	257,430	257,430	9,681	9,681	9,681
Harbor Access Lands	15,401	4,121	4,121	58,769	19,678	19,678	792,719	159,444	159,444	0	0	0	712,955	137,162	137,162
Vacant	15,401	4,121	4,121	58,769	19,678	19,678	792,719	159,444	159,444	0	0	0	712,955	137,162	137,162
Redevelopment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harbor & Airport Districts	322,017	222,379	222,379	546,823	333,418	333,418	5,305,626	3,305,611	3,305,611	4,200,872	2,795,405	2,795,405	6,116,175	3,733,979	3,733,979
Vacant	296,115	203,042	203,042	471,523	287,332	287,332	4,356,793	2,491,811	2,491,811	3,460,304	2,137,397	2,137,397	6,116,175	3,733,979	3,733,979
Redevelopment	25,902	19,338	19,338	75,300	46,086	46,086	948,833	813,800	813,800	740,568	658,007	658,007	0	0	0
Institutions	115,142	98,993	98,993	185,281	150,267	150,267	547,201	501,121	501,121	211,523	211,523	211,523	413,929	408,680	408,680
Vacant	27,763	24,876	24,876	70,722	50,512	50,512	82,478	79,853	79,853	0	0	0	73,174	67,925	67,925
Redevelopment	87,379	74,117	74,117	114,559	99,755	99,755	464,723	421,268	421,268	211,523	211,523	211,523	340,754	340,754	340,754
Neighb. Centers & Corridors	8,369,894	7,377,669	2,529,903	10,486,461	9,013,718	2,604,137	24,239,252	20,999,875	4,940,778	11,458,184	9,500,028	2,289,372	6,910,433	5,622,587	1,345,485
Vacant	2,207,670	1,893,701	941,703	2,404,360	2,053,136	868,822	4,930,012	3,906,226	1,345,207	2,784,657	2,373,626	899,379	2,257,363	1,703,804	578,799
Redevelopment	6,162,224	5,483,968	1,588,199	8,082,102	6,960,582	1,735,315	19,309,240	17,093,649	3,595,571	8,673,528	7,126,402	1,389,993	4,653,070	3,918,782	766,686
Gateway Regional Center	424,413	345,002	209,110	634,386	516,248	360,687	4,840,996	4,064,126	2,436,215	3,537,351	2,476,419	1,311,382	1,641,898	875,837	572,277
Vacant	195,649	177,630	115,674	296,577	233,587	202,328	1,784,821	1,319,622	888,452	1,490,073	994,080	656,292	115,187	81,550	57,594
Redevelopment	228,764	167,371	93,437	337,809	282,662	158,359	3,056,175	2,744,505	1,547,763	2,047,279	1,482,339	655,090	1,526,711	794,287	514,683
Town Centers	4,250,089	3,889,602	1,779,372	5,302,560	4,845,755	1,995,748	7,945,151	7,308,225	2,166,396	3,111,738	2,815,239	857,304	3,213,218	2,799,527	506,588
Vacant	1,385,433	1,277,955	757,187	1,389,458	1,292,599	714,408	2,092,273	1,859,454	886,967	914,607	770,198	339,456	385,765	217,689	94,835
Redevelopment	2,864,656	2,611,648	1,022,185	3,913,102	3,553,156	1,281,340	5,852,878	5,448,771	1,279,429	2,197,131	2,045,042	517,848	2,827,453	2,581,838	411,753
Outside Geographies	411,917	318,675	318,675	100,780	87,148	87,148	770,814	644,578	644,578	818,086	342,668	342,668	189,055	125,799	125,799
Vacant	133,059	94,644	94,644	60,953	47,490	47,490	408,609	352,498	352,498	699,068	246,903	246,903	93,604	48,648	48,648
Redevelopment	278,858	224,031	224,031	39,827	39,657	39,657	362,205	292,080	292,080	119,018	95,766	95,766	95,452	77,151	77,151
Grand Total	22,764,189	20,604,783	13,510,895	35,764,084	31,139,496	21,724,346	58,814,298	48,664,567	25,835,730	34,368,815	27,418,001	17,084,374	22,603,527	16,529,177	9,655,576
Aggregate Geography															
Central City	8,328,878	7,981,705	7,981,705	17,018,686	15,030,791	15,030,791	11,341,831	9,574,132	9,574,132	8,461,693	7,521,609	7,521,609	1,624,049	1,573,835	1,573,835
Industrial	980,158	761,589	761,589	1,432,039	928,564	928,564	8,890,821	5,423,694	5,423,694	6,720,374	4,424,577	4,424,577	8,605,414	5,125,003	5,125,003
Neighborhood Commercial	13,044,396	11,612,273	4,518,385	16,423,408	14,375,722	4,960,572	37,025,399	32,372,226	9,543,389	18,107,274	14,791,686	4,458,059	11,765,549	9,297,951	2,424,349
Institutions	115,142	98,993	98,993	185,281	150,267	150,267	547,201	501,121	501,121	211,523	211,523	211,523	413,929	408,680	408,680
Outside Geographies	411,917	318,675	318,675	100,780	87,148	87,148	770,814	644,578	644,578	818,086	342,668	342,668	189,055	125,799	125,799
Total	22,880,490	20,773,235	13,679,347	35,160,193	30,572,491	21,157,342	58,576,067	48,515,751	25,686,913	34,318,950	27,292,063	16,958,436	22,597,996	16,531,268	9,657,666

Source: Bureau of Planning and Sustainability

Figure 41. Existing Buildable Land Inventory – Net Building Square Footage (part 2)

Employment Geography	10 to 20 acres			20 to 50 acres			More than 50 acres			Total Before Constraints	Total After Constraints	Total Adjusted Capacity	Employment Geography
	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment				
Central City Commercial	3,846,700	2,211,264	2,211,264	7,676,187	5,403,200	5,403,200	0	0	0	54,137,418	45,516,641	45,516,641	Central City Commercial
Vacant	2,577,380	1,498,461	1,498,461	6,204,834	4,358,700	4,358,700	0	0	0	37,393,992	31,443,329	31,443,329	Vacant
Redevelopment	1,269,320	712,803	712,803	1,471,352	1,044,500	1,044,500	0	0	0	16,743,426	14,073,312	14,073,312	Redevelopment
Central City Industrial	0	0	0	0	0	0	0	0	0	4,160,607	3,779,894	3,779,894	Central City Industrial
Vacant	0	0	0	0	0	0	0	0	0	3,223,255	2,904,880	2,904,880	Vacant
Redevelopment	0	0	0	0	0	0	0	0	0	937,352	875,014	875,014	Redevelopment
Columbia East	4,175,124	1,962,393	1,962,393	5,582,630	4,197,991	4,197,991	8,439,811	6,091,741	6,091,741	23,329,900	15,518,799	15,518,799	Columbia East
Vacant	4,175,124	1,962,393	1,962,393	5,582,630	4,197,991	4,197,991	8,439,811	6,091,741	6,091,741	23,181,885	15,394,759	15,394,759	Vacant
Redevelopment	0	0	0	0	0	0	0	0	0	148,015	124,040	124,040	Redevelopment
Dispersed Employment	448,556	246,238	246,238	1,381,040	929,710	929,710	4,294,052	1,960,903	1,960,903	8,906,021	5,287,319	5,287,319	Dispersed Employment
Vacant	429,890	228,733	228,733	1,297,140	862,041	862,041	3,869,291	1,792,295	1,792,295	7,517,142	4,318,790	4,318,790	Vacant
Redevelopment	18,665	17,505	17,505	83,899	67,669	67,669	424,762	168,608	168,608	1,388,880	968,528	968,528	Redevelopment
Harbor Access Lands	3,828,944	1,013,492	1,013,492	3,136,373	1,812,583	1,812,583	6,844,578	1,790,058	1,790,058	15,374,339	4,932,417	4,932,417	Harbor Access Lands
Vacant	3,762,054	982,785	982,785	3,136,373	1,812,583	1,812,583	6,844,578	1,790,058	1,790,058	15,307,449	4,901,710	4,901,710	Vacant
Redevelopment	66,891	30,706	30,706	0	0	0	0	0	0	66,891	30,706	30,706	Redevelopment
Harbor & Airport Districts	8,733,231	4,831,675	4,831,675	13,293,376	7,161,036	7,161,036	28,019,141	13,502,903	13,502,903	66,215,243	35,664,026	33,703,826	Harbor & Airport Districts
Vacant	7,052,983	3,825,774	3,825,774	12,489,855	6,604,339	6,604,339	27,970,408	13,485,842	13,485,842	61,918,039	32,566,474	30,606,274	Vacant
Redevelopment	1,680,248	1,005,901	1,005,901	803,521	556,697	556,697	48,733	17,061	17,061	4,297,204	3,097,552	3,097,552	Redevelopment
Institutions	1,358,631	1,355,693	1,355,693	2,660,874	1,606,056	1,606,056	3,551,957	3,524,122	3,524,122	9,044,538	7,856,455	7,856,455	Institutions
Vacant	520,681	517,864	517,864	2,020,558	989,912	989,912	441,122	413,287	413,287	3,236,498	2,144,230	2,144,230	Vacant
Redevelopment	837,950	837,830	837,830	640,317	616,144	616,144	3,110,835	3,110,835	3,110,835	5,808,039	5,712,225	5,712,225	Redevelopment
Neighb. Centers & Corridors	13,024,936	10,210,661	2,052,426	14,185,307	5,892,257	2,166,026	8,641,139	4,221,700	1,609,674	97,315,607	72,838,494	19,537,802	Neighb. Centers & Corridors
Vacant	1,386,237	1,061,958	377,167	5,825,183	3,093,500	1,460,730	6,842,496	3,159,166	1,350,845	28,637,977	19,245,118	7,822,652	Vacant
Redevelopment	11,638,699	9,148,703	1,675,259	8,360,124	2,798,756	705,296	1,798,643	1,062,534	258,829	68,677,630	53,593,377	11,715,149	Redevelopment
Gateway Regional Center	1,508,503	714,299	593,382	0	0	0	0	0	0	12,587,548	8,991,931	5,483,052	Gateway Regional Center
Vacant	54,086	40,564	29,301	0	0	0	0	0	0	3,936,393	2,847,033	1,949,640	Vacant
Redevelopment	1,454,417	673,734	564,081	0	0	0	0	0	0	8,651,155	6,144,897	3,533,412	Redevelopment
Town Centers	1,930,580	879,940	129,169	121,958	105,822	50,243	0	0	0	25,875,294	22,644,111	7,484,820	Town Centers
Vacant	135,278	132,585	37,636	41,030	24,894	23,441	0	0	0	6,343,844	5,575,374	2,853,931	Vacant
Redevelopment	1,795,302	747,355	91,532	80,928	80,928	26,802	0	0	0	19,531,450	17,068,738	4,630,889	Redevelopment
Outside Geographies	1,613,378	1,217,133	1,217,133	3,857,675	1,034,533	1,034,533	2,596,463	328,994	328,994	10,358,169	4,099,528	4,099,528	Outside Geographies
Vacant	825,582	664,947	664,947	2,539,353	462,267	462,267	2,565,797	298,328	298,328	7,326,024	2,215,725	2,215,725	Vacant
Redevelopment	787,796	552,186	552,186	1,318,323	572,266	572,266	30,666	30,666	30,666	3,032,145	1,883,804	1,883,804	Redevelopment
Grand Total	41,698,012	25,633,974	16,604,051	52,255,670	28,404,655	24,622,845	62,428,303	31,231,722	28,619,696	327,304,683	227,129,615	153,200,553	Grand Total
Aggregate Geography													Aggregate Geography
Central City	3,846,700	2,211,264	2,211,264	7,676,187	5,403,200	5,403,200	0	0	0	58,298,025	49,296,535	49,296,535	Central City
Industrial	17,185,855	8,053,798	8,053,798	23,393,419	14,101,320	14,101,320	47,597,583	23,345,606	23,345,606	113,825,503	61,402,561	59,442,361	Industrial
Neighborhood Commercial	16,464,019	11,804,900	2,774,977	14,307,265	5,998,078	2,216,269	8,641,139	4,221,700	1,609,674	135,778,449	104,474,536	32,505,674	Neighborhood Commercial
Institutions	1,358,631	1,355,693	1,355,693	2,660,874	1,606,056	1,606,056	3,551,957	3,524,122	3,524,122	9,044,538	7,856,455	7,856,455	Institutions
Outside Geographies	1,613,378	1,217,133	1,217,133	3,857,675	1,034,533	1,034,533	2,596,463	328,994	328,994	10,358,169	4,099,528	4,099,528	Outside Geographies
Total	40,468,584	24,642,788	15,612,865	51,895,420	28,143,187	24,361,377	62,387,142	31,420,422	28,808,396	327,304,683	227,129,615	153,200,553	Total

Source: Bureau of Planning and Sustainability

Figure 42. Existing Buildable Land Inventory – Net Land Acres (part 1)

Employment Geography	Less than .5 acres			.5 to 1 acre			1 to 3 acres			3 to 5 acres			6 to 10 acres		
	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment
Central City Commercial	33	32	32	67	59	59	47	39	39	36	32	32	6	6	6
Vacant	22	21	21	42	37	37	30	25	25	25	23	23	6	6	6
Redevelopment	11	10	10	24	22	22	17	14	14	10	9	9	0	0	0
Central City Industrial	15	14	14	33	31	31	13	13	13	7	6	6	3	2	2
Vacant	9	8	8	27	25	25	12	11	11	7	5	5	1	1	1
Redevelopment	6	6	6	6	6	6	2	2	2	1	1	1	1	1	1
Columbia East	2	1	1	10	6	6	40	23	23	29	19	19	39	27	27
Vacant	2	1	1	10	6	6	39	23	23	28	17	17	37	26	26
Redevelopment	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1
Dispersed Employment	13	11	11	9	7	7	24	22	22	29	19	19	2	2	2
Vacant	9	8	8	6	5	5	15	14	14	20	13	13	2	1	1
Redevelopment	4	3	3	3	2	2	9	8	8	8	6	6	0	0	0
Harbor Access Lands	0	0	0	1	0	0	18	4	4	0	0	0	16	3	3
Vacant	0	0	0	1	0	0	18	4	4	0	0	0	16	3	3
Redevelopment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harbor & Airport Districts	7	5	5	13	8	8	122	76	76	96	64	64	140	86	86
Vacant	7	5	5	11	7	7	100	57	57	79	49	49	140	86	86
Redevelopment	1	0	0	2	1	1	22	19	19	17	15	15	0	0	0
Institutions	3	2	2	4	3	3	13	12	12	5	5	5	10	9	9
Vacant	1	1	1	2	1	1	2	2	2	0	0	0	2	2	2
Redevelopment	2	2	2	3	2	2	11	10	10	5	5	5	8	8	8
Neighb. Centers & Corridors	370	326	112	463	398	115	1,070	927	218	506	419	101	305	248	59
Vacant	97	84	42	106	91	38	218	172	59	123	105	40	100	75	26
Redevelopment	272	242	70	357	307	77	852	755	159	383	315	61	205	173	34
Gateway Regional Center	11	9	5	16	13	9	121	101	61	88	62	33	41	22	14
Vacant	5	4	3	7	6	5	45	33	22	37	25	16	3	2	1
Redevelopment	6	4	2	8	7	4	76	68	39	51	37	16	38	20	13
Town Centers	173	158	72	215	197	81	323	297	88	126	114	35	131	114	21
Vacant	56	52	31	56	53	29	85	76	36	37	31	14	16	9	4
Redevelopment	116	106	42	159	144	52	238	221	52	89	83	21	115	105	17
Outside Geographies	9	7	7	2	2	2	18	15	15	19	8	8	4	3	3
Vacant	3	2	2	1	1	1	9	8	8	16	6	6	2	1	1
Redevelopment	6	5	5	1	1	1	8	7	7	3	2	2	2	2	2
Grand Total	635	565	262	834	724	321	1,808	1,528	569	941	748	321	697	522	233
Aggregate Geography															
Central City	48	46	46	100	89	89	60	52	52	43	38	38	9	8	8
Industrial	23	17	17	33	21	21	204	125	125	154	102	102	198	118	118
Neighborhood Commercial	553	492	189	694	608	205	1,514	1,325	367	721	596	169	477	384	94
Institutions	3	2	2	4	3	3	13	12	12	5	5	5	10	9	9
Outside Geographies	9	7	7	2	2	2	18	15	15	19	8	8	4	3	3
Total	635	565	262	834	724	321	1,808	1,528	569	941	748	321	697	522	233

Source: Bureau of Planning and Sustainability

Figure 43. Existing Buildable Land Inventory – Net Land Acres (part 2)

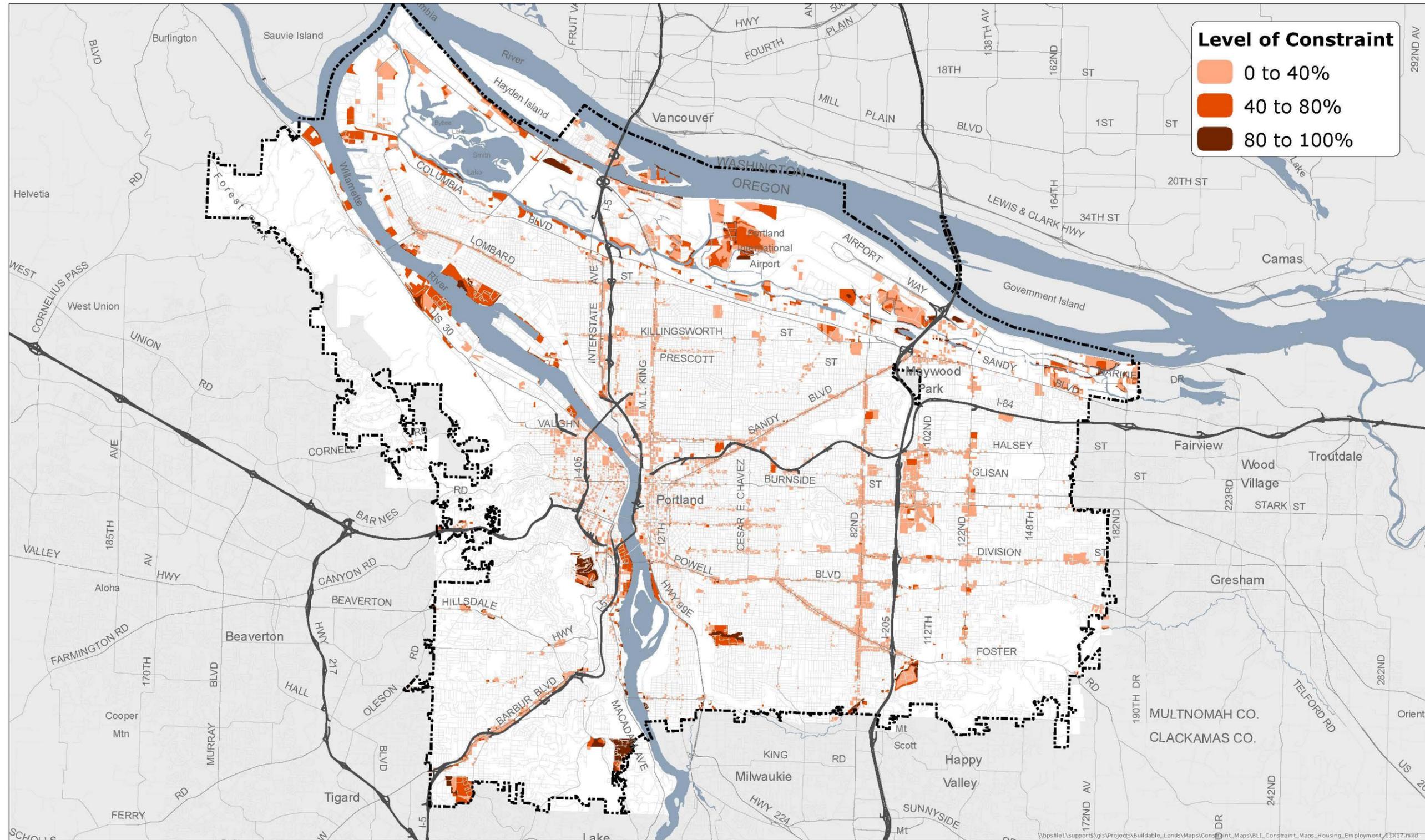
Employment Geography	10 to 20 acres			20 to 50 acres			More than 50 acres			Total Before Constraints	Total After Constraints	Total Adjusted Capacity	Employment Geography
	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment				
Central City Commercial	17	10	10	34	24	24	0	0	0	239	201	201	Central City Commercial
Vacant	11	7	7	27	19	19	0	0	0	165	139	139	Vacant
Redevelopment	6	3	3	6	5	5	0	0	0	74	62	62	Redevelopment
Central City Industrial	0	0	0	0	0	0	0	0	0	72	65	65	Central City Industrial
Vacant	0	0	0	0	0	0	0	0	0	56	50	50	Vacant
Redevelopment	0	0	0	0	0	0	0	0	0	16	15	15	Redevelopment
Columbia East	96	45	45	128	96	96	194	140	140	536	356	356	Columbia East
Vacant	96	45	45	128	96	96	194	140	140	532	353	353	Vacant
Redevelopment	0	0	0	0	0	0	0	0	0	3	3	3	Redevelopment
Dispersed Employment	10	10	6	6	32	21	21	99	45	45	204	121	Dispersed Employment
Vacant	10	10	5	5	30	20	20	89	41	41	173	99	Vacant
Redevelopment	0	0	0	0	2	2	2	10	4	4	32	22	Redevelopment
Harbor Access Lands	88	23	23	72	42	42	157	41	41	353	113	113	Harbor Access Lands
Vacant	86	23	23	72	42	42	157	41	41	351	113	113	Vacant
Redevelopment	2	1	1	0	0	0	0	0	0	2	1	1	Redevelopment
Harbor & Airport Districts	200	111	111	305	164	164	643	310	310	1,520	819	774	Harbor & Airport Districts
Vacant	162	88	88	287	152	152	642	310	310	1,421	748	703	Vacant
Redevelopment	39	23	23	18	13	13	1	0	0	99	71	71	Redevelopment
Institutions	31	31	31	61	37	37	82	81	81	208	180	180	Institutions
Vacant	12	12	12	46	23	23	10	9	9	74	49	49	Vacant
Redevelopment	19	19	19	15	14	14	71	71	71	133	131	131	Redevelopment
Neighb. Centers & Corridors	575	451	91	626	260	96	381	186	71	4,296	3,216	863	Neighb. Centers & Corridors
Vacant	61	47	17	257	137	64	302	139	60	1,264	850	345	Vacant
Redevelopment	514	404	74	369	124	31	79	47	11	3,032	2,366	517	Redevelopment
Gateway Regional Center	38	18	15	0	0	0	0	0	0	314	224	137	Gateway Regional Center
Vacant	1	1	1	0	0	0	0	0	0	98	71	49	Vacant
Redevelopment	36	17	14	0	0	0	0	0	0	216	153	88	Redevelopment
Town Centers	78	36	5	5	4	2	0	0	0	1,051	920	304	Town Centers
Vacant	5	5	2	2	1	1	0	0	0	258	227	116	Vacant
Redevelopment	73	30	4	3	3	1	0	0	0	794	694	188	Redevelopment
Outside Geographies	37	28	28	89	24	24	60	8	8	238	94	94	Outside Geographies
Vacant	19	15	15	58	11	11	59	7	7	168	51	51	Vacant
Redevelopment	18	13	13	30	13	13	1	1	1	70	43	43	Redevelopment
Grand Total	1,171	763	364	1,326	683	506	1,538	864	695	8,872	6,393	3,209	Grand Total
Aggregate Geography													Aggregate Geography
Central City	17	10	10	34	24	24	0	0	0	311	266	266	Central City
Industrial	395	190	185	511	334	324	1,015	590	536	2,454	1,493	1,365	Industrial
Neighborhood Commercial	691	504	111	631	264	98	381	186	71	5,662	4,360	1,303	Neighborhood Commercial
Institutions	31	31	31	61	37	37	82	81	81	208	180	180	Institutions
Outside Geographies	37	28	28	89	24	24	60	8	8	238	94	94	Outside Geographies
Total	1,171	763	364	1,326	683	506	1,538	864	695	8,872	6,393	3,209	Total

Source: Bureau of Planning and Sustainability

APPENDIX D. BUILDABLE LAND INVENTORY MAP

A map of the Buildable Land Inventory, March 2015, by constraint levels is provided below. The underutilized parcels and constraint levels identified are based on the proposed Comprehensive Plan, including proposed land use designations on the plan map and 60% brownfield redevelopment capacity in Industrial and Neighborhood Commercial geographies.

Figure 44. Buildable Land Inventory Map of Proposed Comprehensive Plan



Buildable Lands Inventory | Employment Buildable Lands

City of Portland | Bureau of Planning and Sustainability | Geographic Information System

This work was supported, in part, by a grant from the Oregon Department of Land Conservation and Development.

The information on the map was derived from digital data-bases on the City of Portland, Bureau of Planning and Sustainability GIS. Care was taken in the creation of this map but it is provided "as is". The City of Portland cannot accept any responsibility for error, omissions, or positional accuracy, and therefore, there are no warranties which accompany this product. However, notification of any errors will be appreciated.

March 13, 2015



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CITY OF PORTLAND ECONOMIC OPPORTUNITIES ANALYSIS:

Section 4 – Community Choices



August 2015 Recommended Draft

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City of Portland Bureau of Planning & Sustainability

EXECUTIVE SUMMARY

The EOA is an analysis of the 20-year supply and demand for employment land in the city. It is prepared according to State Administrative Rule OAR 660-09-0015 and consists of four sections:

1. Trends, Opportunities & Market Factors
2. Long Range Employment Land Forecast (Demand)
3. Buildable Land Inventory (Supply)
4. Community Choices

This report is the fourth section of the EOA. It assesses the likely development capacity of the community choices proposed in the updated Comprehensive Plan map, policies, and investments to support and meet the employment land needs identified in Sections 1-3. Section 4 also summarizes additional implementation strategies expected to implement the proposed policies and meet identified employment land needs.

KEY FINDINGS

- The 2012 Metro regional employment forecast allocates 141,600 new jobs to the City of Portland by 2035.
- This forecast job growth translates to a demand for 2,910 acres of employment land by 2035.
- The proposed Comprehensive Plan provides for adequate development capacity to meet this employment land demand through:
 - 427 acres of additional development capacity in existing industrial districts through map changes, public infrastructure investments (for example, transportation access improvements near vacant land), and strategies to improve industrial land retention, brownfield redevelopment, intensified use of developed land, and expansion. Taken together, these actions make it possible to use the existing gross land supply more efficiently by removing existing constraints.
 - 216 acres of additional development capacity for major campus institutions, the Central City industrial areas (Central Eastside and Lower Albina), and the town centers.
 - 350 acres of total land capacity for marine terminals, rail yards, and airport facilities. This is adjusted from the previous draft EOA to reflect a policy decision to meet the lower end of the marine terminal commodity movement forecast, rather than the middle or higher end of the forecast range.

KEY OPPORTUNITIES

The proposed Comprehensive Plan includes key opportunities to support forecast job growth and meet employment land needs. The Comprehensive Plan provides a broader framework for economic development to support job growth and prosperity, including business development,

sector initiatives, innovation, workforce development, poverty reduction, and other interrelated programs.

Figure 1. Proposed Employment Land Development Capacity Summary

Aggregate Geography	2010-35 Demand		Supply (acres)			Reconciliation	
	Added Jobs	Land (acres)	Existing Plan BLI	Proposed Plan BLI*	Other Gains**	Surplus/ Deficit	Supply/ Demand
Central City	44,740	150	266	390	390	240	260%
Industrial	31,630	1,700	1,365	1,521	1,792	92	105%
Neighborhood Commercial	35,140	690	1,303	1,492	1,492	802	216%
Institutions	22,730	370	306	522	522	152	141%
Total	141,640	2,910	3,240	3,925	4,195		

* Proposed Plan BLI (Buildable Land Inventory) includes gains from plan map changes, planned infrastructure projects, and brownfield strategy proposals.

** Other gains result from proposed strategies for industrial land intensification, retention, and site-assistance.

Source: Bureau of Planning and Sustainability

To fill the need for all types of employment land, the following strategies have been identified:

Citywide

- Establish a job capture rate target to help measure Portland’s performance over time.
- Create a strong business climate through regulatory improvements, cost-competitiveness, and business development.
- Provide a competitive employment land supply with a wide range of types, sizes and locations.
- Expand exports and grow traded sector businesses as an impetus to overall economic growth and prosperity.

Central City

- Promote and invest in the Central City as the region’s and state’s office, employment, and cultural center.
- Protect and facilitate the long-term success of the Central City Industrial districts, and facilitate their evolution into a higher density mix of employment uses.
- Expand industrial office overlay zoning and office development incentives to meet development capacity needs of the Central City Industrial districts.
- Support initiatives to advance Portland as a national leader in urban innovation and sustainability, supporting higher density mixed use development in the Central City and entrepreneurship in the expanding creative and green sectors of the economy.

Industrial and Employment Districts

- Promote industrial retention, growth, and traded sector competitiveness as a West Coast freight hub and the state’s largest industrial area.
- Protect Prime Industrial Areas for long-term retention and reduce non-industrial use allowances in industrial and employment zones.
- Create and implement a comprehensive toolkit of brownfield redevelopment incentives and tools, and support prompt resolution and cleanup of the Portland Harbor Superfund Site and associated brownfields.
- Implement strategic freight investments and business climate improvements to support industrial land intensification and reinvestment.
- Designate portions of airport area golf courses for a mix of industrial use, natural resource area, and public access to open space, to help meet industrial development capacity needs.
- Designate additional Dispersed Employment areas, particularly in East Portland, to meet development capacity needs.
- Expand natural resource protection, restoration and enhancement, and ecological site design to support concurrent improvement of watershed health and industrial capacity.

Neighborhood Business Districts

- Promote the growth, economic equity and vitality of Neighborhood Business Districts as dynamic areas of small business development and a foundation of neighborhood livability.
- Designate additional Town Centers and Neighborhood Centers to meet capacity needs in Town Centers, provide for concentrated employment and residential density, and foster healthy and connected neighborhoods.
- Designate neighborhood commercial areas between centers to expand local access to goods and services and promote neighborhood-serving business.
- Prioritize commercial revitalization investments in underserved neighborhoods.

Campus Institutions

- Promote the stability and growth of campus institutions as essential service providers and major employers.
- Designate campus institutions as employment land with associated zoning to accommodate capacity needs.
- Create campus development regulations that support projected institutional growth and neighborhood livability through suitable density, adequate infrastructure, context-supportive edges, and attractive amenities.
- Invest in transportation improvements that acknowledge and accommodate forecast institutional growth.

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I. INTRODUCTION

This report is the fourth and concluding section of the EOA. It assesses the likely development capacity that could result from the community choices proposed in the updated Comprehensive Plan. These include changes to Comprehensive Plan map land use designations, policy changes, and new investments. Section 4 also summarizes additional implementation strategies expected to implement the proposed policies and meet identified employment land needs. This draft is based on the Proposed Draft of the Comprehensive Plan.

Statewide Planning Goal 9 and the associated administrative rules require cities to provide for economic development and job growth in their comprehensive plans. Goal 9 requires cities to show they can meet employment land needs through adopted policies and implementation measures. They must provide for an adequate number of sites of suitable sizes, types and locations needed to accommodate the forecasted employment growth.

The proposed Portland Comprehensive Plan proposes a variety of approaches to meet these requirements:

- Policies to maintain an adequate supply of land with the necessary supporting public facilities.
- Policies and programs to implement brownfield redevelopment strategies.
- Comprehensive plan map and zoning code changes.
- Capital improvement programming and funding.
- Regulatory and fee improvements.
- Tax incentives and other assistance.
- Property acquisition and parcel assembly.
- Public-private partnerships.

The overall objectives for economic development in the proposed Comprehensive Plan mirror those in the Portland Plan. They call for a growing city economy, traded sector competitiveness, and equitable household prosperity. They seek continuing growth of a balanced, diverse economy that supports a socially and economically diverse population. In turn, the Comprehensive Plan proposes land use and development policies to meet the varying land needs across the employment geographies identified in the EOA, including the Central City, Industrial and Employment Districts, Campus Institutions, and Neighborhood Business Districts.

This report starts with a brief section on citywide opportunities and then focuses on proposed policies and strategies addressing each employment geography to support its growth potential. The Comprehensive Plan identifies a broad range of community choices that guide and support employment land development. The summary of those choices described here center on key policies, infrastructure investments and land use map changes that will ensure Portland will provide adequate growth capacity to meet 20-year forecast for employment growth.

II. CITYWIDE CHOICES

The Comprehensive Plan proposes new policy directions in four areas that support job growth and related development capacity:

1. A clear job growth target
2. A strong business climate
3. A competitive land supply
4. Competitive traded sectors

EMPLOYMENT GROWTH TARGET

Proposed Comprehensive Plan Policy 6.3. Employment growth. Strive to capture at least 25 percent of the seven-county region’s employment growth (Multnomah, Washington, Clackamas, Yamhill, Columbia, Clark, and Skamania Counties).

The City of Portland has had a housing growth policy since the early 1990s to capture 20% of the region’s housing growth, which has been successfully met. At one time Portland was thought to be running out of capacity to develop new housing. Setting a housing growth target was used to support finding new ways to reach the goal – expanding multifamily housing capacity, expanding tax incentives and tools to support multi-family housing development, and supporting livability investments that expand demand for housing growth in Portland.

Setting a job-growth target in Policy 6.3 provides a comparable opportunity to respond to emerging economic challenges and measure success in our responses. Additional policies that contribute to meeting this growth target include 6.1 Diverse and Growing Economy, 6.7 Competitive Advantages, 6.10 Business Innovation, and policies cited in the sections below on improved business climate, traded sector competitiveness, and specific employment geographies.

In contrast to most of Oregon, Portland by 2013 had recovered all of the jobs it lost during the Great Recession. Multnomah County added about 31,000 jobs between 2010 and 2013, leading the region’s recovery with an average annual job-growth rate of 2.4% during this upswing period. This recent job growth in Portland is consistent with long-term trends, and signals an upturn from the relatively flat job growth over the 2000-2008 business cycle, when the City captured only 5% of regional employment gains.

Despite Portland’s strong historic and continued role as a major job center for the entire regional labor market, the experience of the last two economic downturns (since 2000) indicates that this continued role is not assured. Portland is typical of large cities that support a diverse and growing population attracted by economic opportunity.

With 370,000 jobs as of 2010, Portland accounts for 39% of the jobs in the 7-county metro area (PMSA), much higher than its 26% share of the region’s 2.2 million residents. Long-term trends and forecast growth indicate moderate erosion of Portland’s role as a regional job center, expected to decline from 39% of regional employment in 2010 to 34% by 2035.

The proposed job-growth target in Policy 6.3 is consistent with the historic capture rate for Multnomah County from 1980-2008 of 25%, with a high of 31% in the 1990s.¹ The trend-line analysis in EOA Section 1 indicates a job growth level that would represent a 28% city capture rate of PMSA job growth to 2035. The Metro regional employment forecast of 141,600 new jobs for the City of Portland by 2035 equates to a 26% capture rate of regional employment growth.

The proposed job growth target is complemented by Policy 6.28, which addresses increasing Income Self Sufficiency. It adds further guidance on job growth, supporting adequate land supply and public facilities to expand access to self-sufficient wages and career ladders for low-income people. This policy implements similar direction set in the Portland Plan. Policy 6.28 responds to the increasing job-polarization trends of recent decades, during which job growth has been in the low- and high-wage occupations with shrinking job opportunities in middle-wage occupations.

Middle-wage jobs are particularly concentrated in the industrial districts. In contrast, employment in the Central City and campus institutions is concentrated in high-wage occupations requiring college education, and neighborhood business districts are concentrated in low-wage occupations. In turn, workers of color and residents in East Portland rely disproportionately on industrial district jobs for self-sufficient wages and upward mobility (see EOA Section 1).

STRONG BUSINESS CLIMATE

Proposed Comprehensive Plan Policy 6.8. Business environment. Use plans and investments to help create a positive business environment in the city and provide strategic assistance to retain, expand, and attract businesses.

Policy 6.17. Regulatory climate. Improve development review processes and regulations to encourage predictability and support local and equitable employment growth and encourage business retention. Five sub-policies provide a framework of direction on regulatory improvements.

Improving Portland’s regulatory and overall business climate was a primary theme of the Portland Plan Business Survey (2010) results and the Economic Development Policy Expert Group comments and business workshop comments on the Comprehensive Plan Working Draft.

In the business focus group results, described in Section 1 of the EOA, the most frequently mentioned responses to the question about how to position Portland to remain a prosperous city were the following:

¹ The long-term employment trends analysis is based on county data because reliable, comparable city data is not available before 2000.

- Need for greater regulatory flexibility better tailored to unique needs of individual businesses and/or business types.
- More recognition of the contribution of business to Portland’s vitality – a change from regulators to partners asking “what can we do to help”.
- Greater emphasis on cultivating business opportunity in Portland – with active marketing but without “picking winners.”
- Need for better business access to resources, incentives and/or tax structure reform – ranging from reforming the business income tax to loan/incentive programs for small business to a point person/advocate for business in City Hall.

Business owners and real estate investors make decisions about where and how to invest based on the alternatives available. For many commercial businesses, the choice is between Portland and other communities in the metro area. For industrial and other traded sector businesses that compete globally, choices are often with locations well beyond the Portland metro area.

Making Portland’s business districts more attractive and competitive to a broader range of businesses will help diversify and expand the economy. Portland’s Central City, freight-oriented industrial areas, large hospital and college campuses, and other commercial centers and corridors make up a varied urban economy. In order to overcome constraints and strengthen location advantages to remain Oregon’s largest job center, the Comprehensive Plan includes policies and actions that will help Portland’s business districts be more attractive and support job growth.

In addition to Policies 6.8 and 6.17 cited above, other proposed policies that support a stronger business climate are 6.9 Small Business Development, 6.18 Short-Term Land Supply, 6.23 Clusters, 6.22 Traded Sector Diversity, and 6.32 Minority-Owned, Woman-Owned and Emerging Small Business (MWESB) Assistance.

COMPETITIVE LAND SUPPLY

Policy 6.13. Land Supply. Provide supplies of employment land that are sufficient to meet the long-term and short-term employment growth forecasts, adequate in terms of amounts and types of sites, available and practical for development. Types of sites are distinguished primarily by EOA employment geographies, although capacity needs for building types with similar site characteristics can be met in other employment geographies.

The Oregon statewide planning rules require that all cities have an adequate land supply to meet the needs for future job growth. Policy 6.13 is an overall response to meet this state requirement. The Comprehensive Plan recommends changes needed for the employment land supply to be sufficient to meet forecast job growth through 2035. These changes address shortfalls identified in five of the city’s ten employment geographies.

This policy is implemented by a variety of measures in the proposed Comprehensive Plan:

- Designation of additional land area for employment development in each of the EOA employment geographies as shown in Figure 1.

- New policy support for brownfield redevelopment, providing regionally competitive development sites, and land supply for near-term development.
- Policies and strategies that allow additional development capacity to meet identified shortfalls.

Resulting development capacity in each employment geography is shown in Figure 2. A map of the ten employment geographies is included as Figure 3. The increase in development capacity expected to result from investments identified in the Transportation System Plan (TSP) are included.

Figure 2. Proposed Employment Land Development Capacity

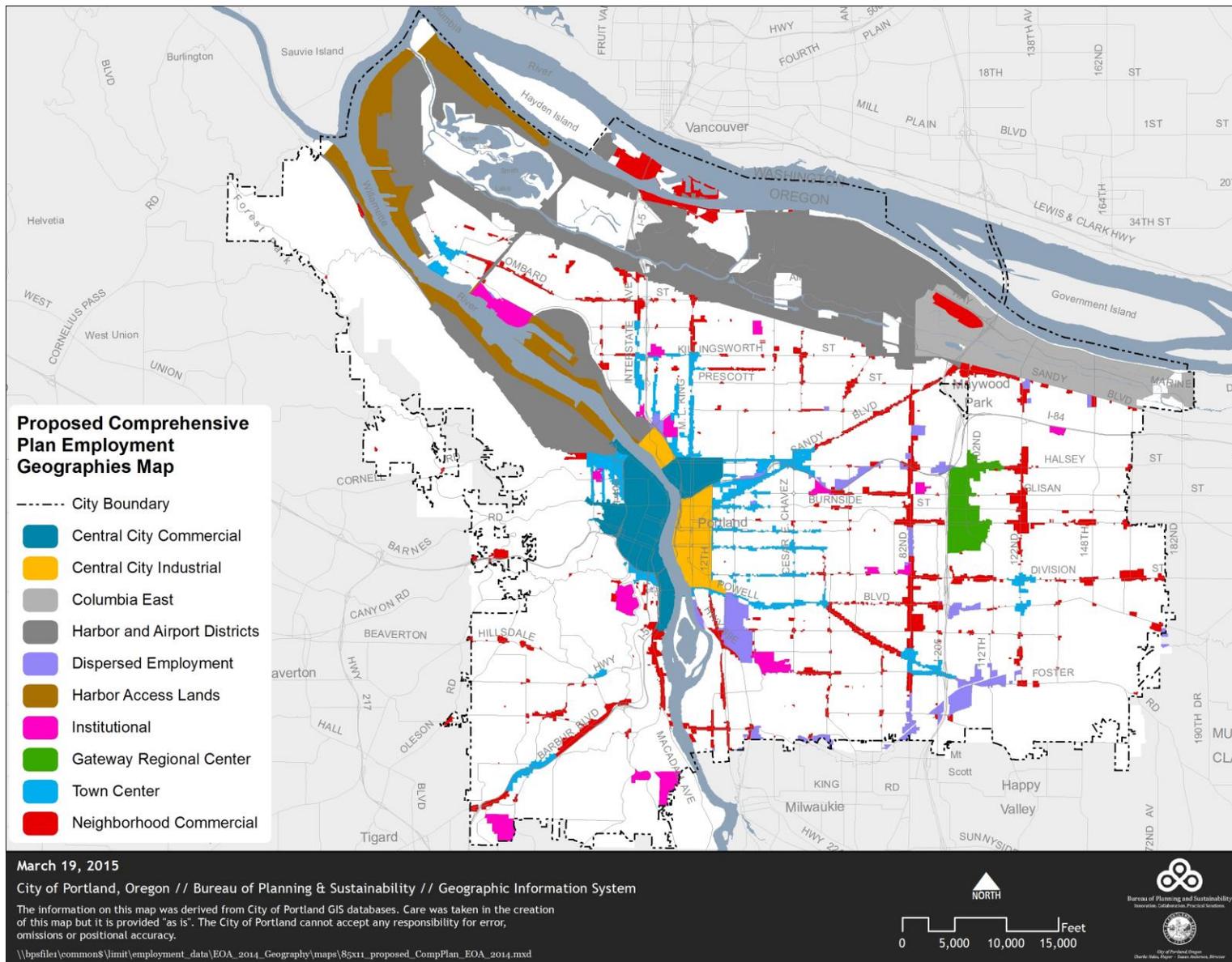
Employment Geography	2010-35 Demand		Supply (acres)			Reconciliation	
	Added Jobs	Land (acres)	Existing Plan BLI	Proposed Plan BLI*	Other Gains**	Surplus/ Deficit	Supply/ Demand
Central City Commercial	34,120	60	201	201	201	141	336%
Central City Industrial	10,620	90	65	188	188	98	209%
Harbor & Airport Districts	16,050	1,013	774	898	1,065	52	105%
Harbor Access Lands	2,070	207	113	136	169	-38	82%
Columbia East	9,310	350	356	346	416	66	119%
Dispersed Employment	4,200	130	121	141	141	11	109%
Gateway Regional Center	3,970	50	137	164	164	114	328%
Town Centers	6,160	130	304	381	381	251	293%
Neighb. Centers & Corridors	25,010	510	863	947	947	437	186%
Institutions	22,730	370	306	522	522	152	141%
Residential	7,400						
Total	141,640	2,910	3,240	3,925	4,195		
Aggregate Geography							
Central City	44,740	150	266	390	390	240	260%
Industrial	31,630	1,700	1,365	1,521	1,792	92	105%
Neighborhood Commercial	35,140	690	1,303	1,492	1,492	802	216%
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* Proposed Plan BLI (Buildable Land Inventory) includes gains from plan map changes, planned infrastructure projects, and brownfield strategy proposals.

** Other gains result from proposed strategies for industrial land intensification, retention, and site-assistance.

Source: Bureau of Planning and Sustainability

Figure 3. Proposed Comprehensive Plan Employment Geographies Map



Policy 6.14 Brownfield Redevelopment calls for the cleanup and redevelopment of 60% of the city’s brownfield acreage by 2035. In contrast, continuation of current approaches and trends would support a brownfield redevelopment rate of 40% by 2035.

This policy target is based on the 2012 [Portland Brownfield Assessment](#), which includes a citywide brownfield inventory, financial feasibility analysis, and recommendations of national best practices. Strategies to develop a comprehensive local brownfield toolkit of incentives and best practices are described below in the industrial districts section of this report.

Policy 6.16 Regionally Competitive Development Sites broadly supports use of incentives, investments, and other efforts to improve the regional competitiveness of vacant and underutilized sites in Portland.

These measures aim to moderate the long-term national and regional trend for job sprawl. The city’s declining regional share of employment and commercial/industrial space, especially during the 2000-08 business cycle, suggest significant opportunity for improvement in regional markets. Further policy direction on cost-competitiveness is discussed below addressing specific employment geographies and their growth-capacity needs.

Policy 6.18 Short-Term Land Supply calls for a competitive and diverse supply of development-ready sites to meet 5-year increments of demand. The proposed Comprehensive Plan proposes two approaches to meet this policy.

First, while short-term land needs between 2010 and 2020 are already met in most geographies, actions are needed to meet identified needs in the others. The most challenging geography for meeting short-term land needs is Harbor Access Lands. Here the City has limited ability to resolve, by 2020, Superfund and brownfield constraints on vacant sites; however, recent and planned transportation investments and site-development assistance have supported redevelopment and infill that appear sufficient to be meet forecast growth. In the Central City Industrial and Dispersed Employment geographies, short-term land supply needs will be met by rezoning for expanded development capacity. Second, **Policy 6.19. Evaluate Land Needs** proposes that the City update its short-term land supply analysis and strategy every 5-7 years to coincide with regional forecast updates. These updates are expected to include specific actions to replenish short-term land supply as needed in each employment geography.

EXPORT AND TRADED SECTOR COMPETITIVENESS

Policy 6.21 Traded Sector Competitiveness. Align plans and investments with efforts to improve the city and regional business environment for traded sector and export growth. Participate in regional and statewide initiatives.

Traded sector businesses have a central role in driving and expanding the regional economy across the board.² To succeed and grow, these businesses must stay competitive in the changing

² Traded sector businesses are companies that sell many of their products and services to people and businesses outside the Portland region, nationally and globally. Examples include most manufacturing and many professional and business service companies as well as smaller craft businesses with local and global customers. Traded sector businesses may be locally owned and can be small, medium or large in size.

global marketplace. Traded sector companies and related industries tend to collect in regions where they have competitive advantages, a phenomenon called industry clusters. This supports greater access to specialized services and suppliers, a strong industry knowledge base, and skilled, experienced workers.

Global trends have put increasing pressure on regions to strengthen their competitiveness for traded sector growth, which drives regional prosperity. In response, the Oregon Business Plan, regional economic development strategies, and the Portland Economic Development Strategy all focus their attention on traded sector competitiveness and growth. Portland’s Economic Development Strategy concentrates the City’s business development resources on a targeted set of traded sector clusters in advanced manufacturing, athletic and outdoor, clean tech, and software.

Proposed Comprehensive Plan policies reinforce this state and regional economic development direction in Policy 6.21 (above), 6.23. Clusters, 6.24. Trade and Freight Hub, 6.26. Import Substitution, 6.27. Business Opportunities in Urban Innovation, and 6.22 Traded Sector Diversity.

III. CENTRAL CITY

Currently, the Central City accounts for 123,500 jobs – about one-third of the jobs in Portland. By 2035, more than 44,700 additional jobs are projected for the area, requiring 150 acres of development capacity in the city center.

What types of businesses locate here? Central City businesses are concentrated in the “office sectors” – professional and business services, headquarters offices, finance, information, and government. Central City is also a diverse business district with specializations in higher education, small-scale industry, and entertainment/tourism/retail services. The EOA identifies two types of Central City employment geographies, each having a different mix of businesses, facilities, and land needs:

- The “Central City Commercial” geography is the region’s high-density core, consisting of Downtown (the Central Business District), Lloyd, South Waterfront, and the University and River Districts. Office sectors make up 72% of Downtown jobs and 58% in the Lloyd District (see EOA Section 1). Entertainment, restaurants, retail, and higher education are also major parts of this employment geography.
- The Central City Industrial geography, consisting of the Central Eastside and Lower Albina, has a mix of small-scale industrial, lower-cost office, and diverse commercial space. These districts meet demand for close-in industrial space and have become a dynamic “incubator” location for new and expanding businesses.

Why are these employment geographies important? While nationally other central cities have lost out to suburban competition, Central City Portland is experiencing strong growth as a high-density mixed use neighborhood. It contains over half of the regional office market and has benefited from an emphasis on access, especially transit, and livability for residents, workers and visitors. This is the preferred location for faster-growing office sector businesses that make up 34% of forecast citywide job growth. Land use and infrastructure policies prioritize Central City as the region’s core location for concentrated growth and increasing density.

2010-2035 job growth potential: 45,000 net new jobs. Central City accounts for 32% of the citywide job forecast. Metro’s robust regional job growth forecast in the office sectors suggests substantial opportunity to compete for a larger Central City share of office development that has been occurring primarily in suburban locations, where lower land costs, larger sites, and less-expensive surface parking patterns prevail.

EMPLOYMENT LAND CAPACITY OF THE PROPOSED COMPREHENSIVE PLAN

While the Central City Commercial geography easily has the development capacity to meet 2035 demand, the EOA forecasts that, without action, the Central City Industrial geography would meet only 72% of demand (a 25-acre shortfall).

The Central City 2035 plan, and specifically the Southeast Quadrant Plan, is proposing to increase employment capacity in the Central Eastside through expansion of the land area allowing industrial office development and other land use changes. These proposed changes are

estimated to result in an additional 123 acres of Central City Industrial capacity, accommodating 209% of forecast demand.

Similarly, the 15-acre deficit in “short-term” land supply needed by 2020 in the Central City Industrial geography is expected to be met by plan map amendments and expected rezoning by 2017.

CENTRAL CITY GROWTH AND LAND USE DIRECTION

Policy 6.34 Central City. Improve the Central City’s regional share of employment and continue its growth as the unique center of both the city and the region for innovation and exchange through commerce, employment, arts, culture, entertainment, tourism, education, and government.

The land use and development policies for the Central City are being developed in the Central City 2035 Plan Update, which is underway as a separate process from the Comprehensive Plan Update; however, the proposed Comprehensive Plan does include key policy directions emphasizing accelerated job growth, the innovation and exchange advantages of being a large-scale economic center, diversity as a business and cultural center, and industrial retention.

Over the last 20 years, the development focus of the Central City Commercial geography has shifted from office to residential and mixed use as new drivers of core area development. In recent years, this has had the previously unanticipated effect of generating new office demand closer to residential, notably in the Pearl District. The increased role that a mixed residential-commercial neighborhood can play for the downtown core area received particular attention and recommended priority from developers participating in the Central City office focus group.

Downtown Portland has 49% of the multi-tenant office space in the region. On average, the CBDs in eight peer cities (including Denver, Austin, and Charlotte) have a 27% share of the multi-tenant office space in their respective regions. In the 2000-08 business cycle, the Central City’s average annual job growth rate of 0.7% exceeded the national average of 0.5%. **Proposed policies reinforce this competitive position of the Central City as the dominant office center in the region.**

RETENTION AND EVOLUTION OF CENTRAL CITY INDUSTRIAL AREAS

Policy 6.35. Central City industrial districts. Protect and facilitate the long-term success of Central City industrial districts, while supporting their evolution into places with a broad mix of businesses with high employment densities.

The Central City Industrial districts are a preferred, close-in location for many warehouse, manufacturing, and industrial service business. The industrial setting also provides a cost-competitive “incubator” location for new and expanding businesses, creative services, and cost-conscious offices. The combination of these competitive roles has made these districts a dynamic job growth center. This strong job growth trend has continued through the Great Recession and recent recovery period.

Proposed land use direction in the Central City Industrial geography supports the retention and continuing evolution as industrial/incubator districts, recognizing the strong market niche and job growth advantages of these land use roles. Much of the recent job growth within these districts has been fueled by the renovation of multi-story buildings into uses that support higher (largely service sector) job densities while offering competitive rents. In effect, incubator space and incubator districts represent an increasingly important hybrid or crossover product positioned between traditional office and industrial-service segments of employment building space spectrum. Incubator space is intended to:

- Offer greater flexibility to the user including pure office, exclusive industrial-distribution, and also mixed office-industrial functions.
- Be oriented to information and design applications for which Portland is becoming better known both on the West Coast and nationally.
- Offer employment and functional business space at a cost below that of prime office but with better finishes and in a more urbanized setting than would be possible in an exclusively industrial sanctuary setting.

There is a question as to how this adaptive reuse model can also be applied to leverage new construction, once the stock of the most prime existing multi-story older industrial spaces has been renovated. The primary challenge for creating new incubator space is to deliver a product that meets current business needs at rental rates low enough to be competitive for start-up and emerging creative firms. The alternative would be to forego this opportunity for in-city incubator areas, with more potential demand transferred to other parts of Portland, the region or outside the metro area. For example, additional employment land along SE 82nd Avenue and in the Gateway Regional Center could potentially serve this function.

EXPAND CENTRAL CITY INDUSTRIAL DEVELOPMENT CAPACITY

Existing development capacity in the Central City Industrial geography meets only 72% of forecast demand. In 2002, capacity was expanded in part of the Central Eastside by establishing the EOS Overlay (Employment Opportunity Subarea of the Central City Plan District), which defined and allowed “industrial office” uses there. Industrial office uses are limited primarily to information sector businesses, such as graphics and software. This zoning innovation helped accelerate job growth in the Central Eastside by reuse of underutilized second-floor space. The predominant industrial zoning in this geography has created an affordable environment for robust job growth by cost-conscious office tenants. Continued growth in this market appears to be reliant on hybrid zoning that retains industrial sanctuary cost levels while expanding development capacity of Class C office tenants.

The Central City 2035 Plan update underway will be designating additional capacity in these industrial areas by expanding the area allowing industrial office development and site assistance to overcome development constraints for new construction. Changes will be made to existing Employment Opportunity Subarea (EOS) overlay to preserve building square footage for industrial and industrial office use by limiting retail sales and services to 5,000 square feet per site and allowing additional industrial office in rehabilitated multi-story structures. EOS will be expanded to the ODOT blocks, North of Burnside, the Southern Triangle, and IG zoned properties along Hawthorne, Madison, Main, Yamhill and Belmont. On EOS sites 20,000 square

feet or larger, industrial office uses are limited to a maximum floor area ratio of 3:1. In core areas of the Central Eastside, industrial office capacity will be allowed with a FAR of up to 3:1 only when ground floor use is dedicated to manufacturing and production, warehouse and freight movement, wholesale sales or industrial services. A significant increase in employment capacity is gained through a flexible employment zone (EX no housing) that will be applied to the OMSI station area to promote Employment Transit-Oriented Development. Resulting capacity gains are included in the Buildable Land Inventory of the proposed Comprehensive Plan, adding 123 acres of Central City Industrial development capacity. This resulting capacity will accommodate 209% of forecast demand by 2035.

URBAN INNOVATION INITIATIVES

Policy 6.27. Business opportunities in urban innovation. Strive to have Portland’s built environment, businesses, and infrastructure systems showcase examples of best practices of innovation and sustainability.

Portland universities and businesses are active in research and development and the commercialization of new technologies. The development of the South Waterfront and University districts are directly linked to efforts to create a world-class educational and research complex anchored by OHSU and PSU with increasing opportunities for research commercialization.

Policies and programs, such as Clean Energy Works Oregon and Solarize Portland have contributed to growing the market for green building technologies and practices and have demonstrated how job creation can be part of reducing energy use and resource consumption.

Portland has a solid record of business growth related to urban innovation including startups and niche product development. Examples are bicycle manufacturing, green building and stormwater products and services, local food businesses, planning and design, and international tourism. Connections to other cities, nationally and internationally, and widening recognition of Portland as a sustainability leader have contributed to making the region and city more innovative and prosperous.

The proposed Comprehensive Plan will provide a 25-year supply of additional employment land in the Central City by preserving and enhancing the area’s industrial districts while increasing their development capacity, and making the city center even more attractive for research and development, new technologies and healthcare.

IV. INDUSTRIAL AND EMPLOYMENT DISTRICTS

Currently, Industrial and Employment Districts account for 87,000 jobs – about 25% of the jobs in Portland. By 2035, more than 31,600 additional jobs are projected for these areas, requiring 1,700 acres of developable industrial land.

What types of businesses locate here? Industrial employers, mainly in manufacturing and distribution, concentrate along the Portland Harbor and the Columbia Corridor, which make up Oregon’s freight infrastructure hub and largest industrial area. They particularly need one-story buildings, medium to large sites, and locations buffered from housing. Central City Industrial and Dispersed Employment areas also have a range of commercial and industrial businesses. The EOA identifies four types of Industrial and Employment District geographies (counting Central City separately), each representing a different mix of businesses, facilities and land needs:

- The Harbor and Airport Districts geography is a heavy industrial setting occupied primarily by manufacturing and distribution businesses that need multimodal freight access.
- Harbor Access Lands along the deep-water shipping channel are occupied almost entirely by river- or rail-dependent industry, including marine terminals, manufacturing, construction, vessel services, and accessory uses, including headquarters offices associated with nearby industry.
- The Columbia East district, located east of the Portland Airport and 82nd Ave., is a mix of industrial and business flex space.
- The Dispersed Employment geography consists of primarily small business-park and flex-space sites occupied by low-density office and light industrial businesses in residential settings near freeways or truck routes.

Why are these geographies important? Portland is the core of the region’s distribution and manufacturing economy. It includes the state’s (and the Columbia River Basin’s) largest seaport, rail hub, and airport.

The region’s traded sectors, which bring income into the region and drive regional prosperity, are primarily industrial. The 87,000 jobs in these districts are also Portland’s primary middle-wage job base and provide upward-mobility opportunities that expand income self-sufficiency and reduce racial disparities. The higher employment “multiplier” impact of industrial activity (see explanation in EOA Section 1), compared to commercial activity, means that industrial district jobs generate additional employment and prosperity benefits in the region.

2010-2035 job growth potential: 31,600 net new jobs. These districts account for 22% of the citywide job forecast. Compared to commercial sectors, industrial sector trends are complicated by slower job growth and faster output growth, driven by global market pressures to raise productivity. Portland’s industrial job growth forecast is moderate, faster than national trends and slower than regional trends. Portland remains a preferred location for general industrial and warehouse development in the region, drawing on its advantages of multimodal freight-hub infrastructure, proximity to customers and suppliers in diverse industrial districts, and established industrial sanctuary zoning.

EMPLOYMENT LAND CAPACITY OF THE PROPOSED COMPREHENSIVE PLAN

The existing Comprehensive Plan does not provide adequate capacity to meet forecast demand in the combined industrial and employment districts to 2035. Forecast land needs exceed the existing supply of buildable land by 335 to 565 acres in these districts (the range relates to marine terminal commodity forecasts), providing only 71% to 80% of the needed growth capacity.

Local options to expand industrial development capacity are limited by various factors: the prevalent demand for one-story buildings on large sites; Portland’s inability to annex industrial land beyond West Hayden Island; and the budget tradeoffs of increasing public investment in brownfields and freight transportation infrastructure to facilitate industrial land intensification. Moreover, these geographies are regionally significant locations for both industry and natural resources, and Comprehensive Plan policies support allocating more land to meet the needs of both.

The new Comprehensive Plan proposes a balanced package of policies, map changes, and infrastructure investment strategies to meet forecast land needs in Portland’s industrial and employment districts. These strategies are intended to support both industrial growth and improved watershed health in industrial districts while meeting other plan objectives. This package of strategies was shaped with advice from the Industrial Land/Watershed Health Working Group, which included members from a broad mix of affected stakeholders, and which met for over a year.

Overall, the estimated industrial land capacity of the proposed Comprehensive Plan is expected to be adequate to meet forecast demand, based on the following three general assumptions:

1. *The plan accommodates the low end of the marine-terminal commodity movement forecast of 125 acres by 2035 for marine terminal land demand.*

Community agreement is lacking at this time to designate additional industrial land on West Hayden Island. The recommended Comprehensive Plan map designation of Rural Farm Forest maintains West Hayden Island as a holding zone for future determination of the mix of land uses, if and when it is annexed into the City of Portland. West Hayden Island represents the only opportunity to meet the mid-range marine terminal commodity movement forecast for Portland Harbor, which is approximately 390 acres, as described in EOA Sections 1-2. Therefore, implicit in this mapping decision is a policy choice to accommodate the low end of the marine terminal commodity movement forecast. The result is a demand scenario of 125 acres for marine terminal development in the Harbor Access Lands geography.

The proposed Comprehensive Plan calls for frequent reevaluation of demand in EOA updates every 5-7 years. These updates will provide the opportunity to re-assess the commodity flow forecast and demand for marine terminal capacity.

2. *The Comprehensive Plan can meet overall 2035 demand for industrial development and job growth across all of the industrial geographies even with the Harbor Access Lands geography meeting only 82% of forecast demand.*

Not all of the job growth (and land demand) in the Harbor Access Lands geography is river-related. Some elements, such as administrative support, can be located in other geographies. Portland’s combined industrial geographies provide a diverse supply of industrial development sites to meet overlapping demand for industrial building types, and the aggregate industrial geographies are expected to maintain adequate capacity to meet forecast demand.

3. *The City must act to retain prime industrial land and to continue to get greater development and productivity from its supply of sites.*

Future industrial capacity depends on getting more industrial growth on less land by 2035. This requires rules for industrial land retention, new incentives and programs to increase brownfield redevelopment, and public investments and efforts to encourage more intensified use of developed sites.

Significant land use actions that reduce industrial district capacity below forecast demand are expected to explain how those reductions will be addressed through long-range programs (e.g., brownfield remediation), be offset with equivalent capacity gains, or seek a Goal 9 exception. Five-year updates of the EOA are proposed to monitor effectiveness, adjust strategies, and maintain an adequate short-term land supply.

Figure 5 provides a summary of the capacity impacts of the proposed strategies to provide adequate industrial development capacity and improve watershed health. These capacity impacts are analyzed by geography and strategy. The “Periodic Review” section of the table includes the forecasted demand, the capacity in the proposed Comprehensive Plan from the map changes, brownfields cleanup, intensification and retention, and the resulting surplus or deficit.

The “Integrated 2035 Strategies” section of the table reflects the potential capacity impact of future watershed health improvements. Improvements include the rezoning of approximately 550 acres of land from industrial to open space. The Watershed Health Strategies also identify significant natural resources that should be protected through future updates to the City’s environmental and greenway overlay zones. These capacity estimates are intended as placeholders and are not intended to be binding. The estimates are based on natural resource information from the adopted 2012 Natural Resource Inventory (NRI), however the City expects to update the NRI as part of future legislative projects. The capacity estimates also have a placeholder for future acquisition sites to accommodate restoration projects required to Portland Harbor Superfund Natural Resources Damages Assessment (NRDA) mitigation requirement.

Taking into consideration the strategies to both improve employment capacity and to improve watershed health, the analysis indicates there is an expected shortfall of development capacity in the Harbor Access Lands and Harbor & Airport Districts geographies. Future post-acknowledgement plan amendments to protect these natural resources will need to explain how industrial development capacity needs will be met, or take an exception to Goal 9.

Figure 4. Proposed Industrial and Employment Districts Capacity

Employment Geography	Land Demand (acres)	Supply (acres)				Reconciliation	
		Existing Plan BLI	Proposed Plan BLI (1)	Other Gains (2)	Integrated Strategies (3)	Surplus/ Deficit	Supply/ Demand
Proposed Capacity Summary by Employment Geography							
Harbor & Airport Districts	1,013	774	898	1,065	967	-46	95%
Harbor Access Lands	207	113	136	169	132	-75	64%
Columbia East	350	356	346	416	376	26	108%
Dispersed Employment	130	121	141	141	141	11	109%
Total	1,700	1,365	1,521	1,792	1,617	-83	95%

Proposed Strategies to Provide Growth Capacity and Improve Watershed Health	Capacity Impacts of Proposed Strategies				Total Industrial
	Harbor & Airport	Harbor Access	Columbia East	Dispersed Empl.	
Industrial land retention - prime industrial area retention, reduced non-industrial use allowances	27	2	21		50
Brownfield redevelopment - comprehensive program and incentives, Superfund, land bank	89	23	8	4	124
Industrial land intensification - strategic freight projects, Kenton line, regulatory improvements	112	30	50		192
Airport golf courses - map designation, rezoning, investments, site assistance, restoration	123				123
New Mixed Employment areas - map designation, rezoning, investments				9	9
Other plan map changes - OS designation on natural areas and parks	-53				
Watershed health improvements - environmental zoning, NRDA, enhancement, ecological design	-98	-37	-40		-175
Total	200	19	39	14	271

1. Proposed Plan BLI (Buildable Land Inventory) includes gains from plan map changes, planned infrastructure projects and brownfield proposals.
 2. Other gains result from proposed strategies for industrial land intensification, retention, and site-assistance.
 3. Integrated strategies include estimated capacity impacts of proposed watershed health improvement strategies, including 25-acre capacity impact from NRDA (Natural Resources Damages) requirements of harbor Superfund.
- Source: Bureau of Planning and Sustainability

The existing Buildable Land Inventory of 113 acres in the Harbor Access Lands geography meets only 55% of forecast land needs. Development opportunities exist to meet the 125-acre marine terminal demand estimate, including approximately 40 acres at Port of Portland’s T-6 (near Suttle Road), 30 acres at T-4 (former Cargill site), and 55-84 acres at the former Time Oil terminal and aggregated nearby sites. Proposed public investments (e.g., improvements at Suttle Road and Time Oil Road) and site assistance are expected to help overcome development constraints at these sites. The small 38-acre Harbor Access Land shortfall can be accommodated in other industrial areas. Not all of the existing jobs in the area are dependent on access to the Portland Harbor. With a tight land supply, over time some of the industrial demand will relocate in industrial areas nearby. For example, expanding harbor businesses like Evraz Steel have grown on nearby sites off of the harbor. A capacity-management approach is proposed to

maintain a diverse supply of industrial sites overall to meet the short-term and 2035 land needs of the aggregated industrial geographies citywide.

INDUSTRIAL GROWTH AND LAND USE DIRECTION

Policy 6.37. Industrial land. Provide industrial land that encourages industrial business retention, growth, and traded sector competitiveness as a West Coast trade and freight hub, a regional center of diverse manufacturing, and a widely accessible base of family-wage jobs, particularly for under-served and under-represented people.

Policy 6.38. Industrial sanctuaries. Protect industrial land as industrial sanctuaries identified on the Comprehensive Plan Map primarily for manufacturing and distribution uses and to encourage the growth of industrial activities in the city.

These policies support continuing industrial growth and acknowledge its household and regional prosperity benefits. Proposed industrial land use policies respond to the range of forecast land demand in different types of industrial and employment areas, including Policy 6.38. Industrial Sanctuaries, 6.40. Harbor Access Lands, 6.42 Multimodal Freight Corridors, 6.43. Columbia East, and 6.44 Dispersed Employment Areas. The proposed Comprehensive Plan retains its 1980 “Industrial Sanctuary” designation and policy as the primary land use direction for industrial districts. The Industrial Sanctuary concept is designed to limit non-industrial uses in order to encourage industrial retention, reinvestment and growth. Other large cities have also adopted similar, more restrictive industrial zoning approaches in recent years, including Seattle, Vancouver B.C., and Los Angeles on the West Coast.

INDUSTRIAL LAND RETENTION

Policy 6.39. Prime industrial land retention. Protect the multimodal freight-hub industrial districts at Portland Harbor, Columbia Corridor, and Brooklyn Yard as prime industrial land that is prioritized for long-term retention. (This policy goes on to call for protecting prime industrial land from conversion and offsetting capacity reductions with additional capacity.)

These policies prioritize Prime Industrial areas (see map in Comprehensive Plan Figure 6.1) for long-term retention, and they support reduction of zoning allowances for non-industrial uses. Since 1990, approximately 400 acres of former industrial or mixed employment land in or adjacent to Prime Industrial areas has been rezoned for non-industrial use. In addition, substantial public acquisition of designated Industrial Sanctuary land has occurred in these areas for natural areas, parks, jails, and other public facilities that do not serve industrial uses.

The following proposed actions will implement the industrial land retention policies with corresponding increases in development capacity due to shifting non-industrial development demand to other geographies, such as Central City Commercial or Neighborhood Commercial, where there is a surplus of capacity to accommodate that demand.

- Amend zoning regulations to prohibit quasi-judicial map amendments from Industrial Sanctuary to another designation on Prime Industrial land. Future legislative projects are expected to analyze and estimate the loss of prime industrial land capacity, including existing industrial development and vacant capacity. Findings will need to explain how forecast demand for Prime Industrial development capacity will be met. An industrial capacity inventory system based on the BLI will be used to track program activities that are or are expected to increase, reduce, or mitigate for loss of industrial land capacity to conversion, regulation, or acquisition for other purposes.
- Amend zoning regulations to reduce allowance for non-industrial uses in industrial zones; reduce land-intensive non-industrial allowances in IH and IG zones, such as parks and open areas, self-service storage, commercial outdoor recreation and major event entertainment; and reduce retail allowances and prohibit residential use in EG zones.
- Develop inter-governmental coordination procedures for proposed public acquisitions to track and mitigate impacts on industrial land supply.

Proposed land retention policies and these implementation actions are expected to result in development capacity gains of 27 acres in the Harbor and Airport Districts, 2 acres in Harbor Access Lands, and 21 acres in Columbia East. Calculation of these gains is based on two primary assumptions. First, industrial land conversion trends through rezoning and public acquisition for non-industrial use are not expected to continue without offsetting capacity losses by equivalent gains elsewhere in Portland. Second, a 50-acre capacity gain is expected from shifting an estimated 50% of forecast retail land development in these districts to other employment geographies. To implement this change, zoning code amendments are expected to substantially reduce future retail allowances in General Employment (EG) zones to approximately 20,000 square feet per site.

BROWNFIELD REDEVELOPMENT

Policy 6.46. Industrial brownfield redevelopment. Provide incentives, technical assistance and direct support to overcome financial-feasibility gaps to enable remediation and redevelopment of brownfields for industrial growth.

Policy 6.41. Portland Harbor Superfund Site. Take a leadership role in prompt resolution and cleanup of the Portland Harbor Superfund Site and redevelopment of associated brownfields. Encourage a science-based and cost-effective cleanup solution that facilitates re-use of land for river- or rail-dependent or related industrial uses.

Brownfields are vacant or underutilized properties where real or potential contamination complicates redevelopment. Proposed Policies 6.46 and 6.41 provide direction for a broad-ranging brownfield strategy to substantially increase industrial brownfield redevelopment as outlined below. Further direction is provided in proposed Policies 6.14. Brownfield Redevelopment and 7.15. Brownfield Remediation. Increasing brownfield redevelopment is a broadly supported option to increase industrial land capacity because it meets multiple objectives, including improvement of public health and environmental quality, reduction of urban sprawl, and expansion of industrial development capacity in advantageous locations.

Portland’s industrial districts contain an estimated 620 acres of brownfields, accounting for over 60% of brownfields on employment lands citywide, as inventoried in the 2012 Portland Brownfield Redevelopment Assessment. The pace of recent development trends in Portland reviewed in EOA Sections 1 and 3 indicate that only 40% of the city’s industrial brownfield acreage is likely to redevelop by 2035 under current conditions. Essentially, cleanup costs and financial risks exceed potential redevelopment revenues on most brownfields; however, other states have adopted aggressive tax incentives and a variety of other brownfield tools to overcome this financial gap. The Portland Brownfield Assessment estimated the total financial feasibility gap of the current citywide brownfield inventory at about \$210 million, out of a total estimated cleanup cost of \$240 million. That study also analyzed the return on investment of applying tax incentives to cover \$210 million gap, estimating that future state income and property taxes after redevelopment would typically recover the costs of these incentives within one to four years.

In addition to on-site contamination, liability for future cleanup of river sediment contamination in the Portland Harbor Superfund Site has been a significant deterrent to brownfield redevelopment along the harbor. While progress on this Superfund project has been long delayed, it is anticipated that the U.S. Environmental Protection Agency will issue a Record of Decision, allocate liability among responsible parties, and move forward with cleanup actions well within the 2035 planning horizon. Proposed Comprehensive Plan Policy 6.40. Portland Harbor Superfund Site supports City efforts toward prompt resolution and cleanup.

The following proposed actions are expected responses to implement brownfield policies. Estimates of resulting development-capacity gains in the proposed Comprehensive Plan assume implementation of these actions. While the City can influence brownfield redevelopment, cooperation with state and federal agencies is also necessary, including legislative changes and new funding sources to accelerate brownfield cleanup.

- Create an industrial/commercial brownfield redevelopment program to implement a comprehensive brownfield toolkit of incentives and best practices. Hire staff to develop and implement the program.
- Draft and lobby for enabling legislation and funding to substantially expand brownfield redevelopment, including tax incentives, authorization of land banks with liability protection, and other brownfield best practices.
- Create and fund financial gap incentives for cleanup and redevelopment of underutilized, contaminated sites. Design incentives to substantially increase industrial redevelopment but not be available to entities identified as being responsible for the contamination.
- Obtain Superfund liability relief for brownfield purchasers. Obtain EPA commitment and staff resources to provide prospective purchaser agreements and de minimis settlements on harbor brownfields. Consider a city insurance pool or other incentives to minimize in-water liability cost gaps for innocent purchasers.
- Take a leadership role and promote prompt resolution and cleanup of the Portland Harbor Superfund site.

- Create a local industrial land bank. Facilitate strategic brownfield and other industrial redevelopment unlikely to occur in the private market, such as large industrial sites.

Proposed brownfield policies and these implementation actions are expected to result in development capacity gains of 89 acres in the Harbor and Airport Districts, 23 acres in Harbor Access Lands, 8 acres in Columbia East, and 4 acres in Dispersed Employment areas. Calculation of these capacity gains is based on increasing the brownfield redevelopment rate from 40% (estimate used in existing Buildable Land Inventory) to 60% by 2035, consistent with the 60% target set in Policy 6.14 Brownfield Redevelopment. This gain appears to be realistic, based on the estimated capacity impacts of recommended “best practice” incentives and tools in the Portland Brownfield Redevelopment Assessment.

INDUSTRIAL LAND INTENSIFICATION

6.45. Industrial land use intensification. Encourage reinvestment and intensification of industrial land use, as measured by output and throughput per acre.

Policy 6.24. Trade and freight hub. Encourage investment in transportation systems and services that will retain and expand Portland’s competitive position as a West Coast trade gateway and freight distribution hub.

Not all job growth will be accommodated on vacant or underutilized land. Strategic freight investments and business climate improvements offer key opportunities to encourage industrial reinvestment and more intensive use of existing buildings and developed land by raising the City’s value proposition among competing industrial locations. Proposed Policies 6.38 and 6.23 (above) and Policy 6.17. Regulatory Climate and 8.30. Public-Private Partnerships provide supporting direction to pursue these opportunities. Business community participation in public investment planning and regulatory improvement processes can help to further target public actions to industry priorities and intensification opportunities, as supported by proposed Policy 2.1. Partnerships and Coordination.

Industrial land “intensification” means more intensive use of existing industrial buildings and businesses on already developed sites. For example, the heavy industrial, freight-hub location advantages that characterize most of Portland’s Prime Industrial areas are unique in the region. However, retention and expansion of capacity in these heavy industrial geographies enables the region to more effectively compete for and efficiently serve these types of employment land demand. Policy 6.45 (above) acknowledges that floor area or employment density are not the only measures of productivity and that intensification through productivity gains in output-per-acre on manufacturing facilities or throughput-per-acre on distribution facilities is appropriate.

In North America and Europe, significant examples of new and modern, multi-story industrial development have been limited. Building elevators are an efficiency bottleneck for most manufacturing and warehousing. Instead, industry preferences and development trends have shifted toward more large, single-story buildings and more outdoor maneuvering area to accommodate efficient truck movement and bigger trains and ships, driven by increasingly competitive global markets (see business focus group results in EOA Section 1). Within this

context, however, various recent development examples in Portland indicate opportunities to increase intensification through business expansion, infill, or redevelopment:

- Site investments that expand output capacity at developed sites are common. The recent expansion of South Rivergate Rail Yard (TSP Project 30047) improved unit-train access and encouraged capacity expansion at nearby Canpotex and Columbia Grain marine terminals. The proposed Rivergate Overcrossing (TSP Project 115610) nearby is similarly expected to facilitate continuing expansion at Evraz Steel.
- Underused or obsolete facilities can be redeveloped. Proposed site improvements (TSP Project 112080) at Port of Portland T-4 will facilitate redevelopment of the former Cargill terminal.
- Office functions are expanding at industrial headquarters sites, such as the proposed redevelopment of Daimler offices on Swan Island.
- The proposed double-tracking improvements and eight proposed overcrossings along Union Pacific’s Kenton Line (TSP Projects 40085 and others) will alleviate congestion from forecast rail volume growth on this corridor and improve rail yard capacity.
- An expanding market for micro-business incubator facilities has spurred reuse of underutilized upper floors and redevelopment in the Central Eastside District. Another example that extends beyond the Central City is the recently developed five-story industrial building on NW York St. in the Harbor and Airport Districts geography.

To implement Policies 6.45 and 6.24 (above) and freight transportation policies 9.29 – 9.35, an extensive program of strategic freight investments are proposed in the Transportation System Plan, consistent with the Regional Transportation Plan. These infrastructure projects address identified deficiencies, accommodate forecast growth, improve Portland’s competitiveness as a leading export region, and some of them facilitate development or intensification of particular sites. Freight volumes handled in the region are expected to roughly double in tonnage and triple in value between 2007 and 2040 (2014 Commodity Flow Forecast). In addition to the freight projects proposed in the TSP, the following proposed actions are expected responses to implement industrial land intensification and related freight infrastructure and regulatory climate policies. Estimates of resulting development-capacity gains in the proposed Comprehensive Plan assume implementation of these actions.

1. Update the Portland Freight Master Plan project list and incorporate changes into the Transportation System Plan Update. Develop a list of priority freight projects that improve Portland’s industrial location value and freight district access.
2. Pursue funding sources to increase freight system improvements. Expand opportunities for public-private funding partnerships.
3. Improve Portland’s industrial regulatory climate to support job growth (see further explanation above on new citywide directions). Conduct a study to evaluate cumulative city regulatory and fee costs, and develop implementation strategies. Explore process improvements to reduce uncertainty, timing, complexity, other transactions costs, and emphasize regional competitiveness in new regulations and fees without rolling back regulatory standards.

4. Consider establishing an industrial land bank and incentives to facilitate more intensive industrial redevelopment on underutilized sites.

Proposed policies and these implementation actions are expected to result in industrial land intensification with estimated development capacity gains of 112 acres in the Harbor and Airport Districts, 30 acres in Harbor Access Lands, and 50 acres in Columbia East.

Calculation of these capacity gains is based on two factors. First, the redevelopment/infill rate is expected to increase to 15% from the current estimates in the Buildable Land Inventory (BLI) of 8% in Harbor and Airport Districts, 1% in Harbor Access Lands, and 7% in Columbia East. Existing BLI estimates are based on the amount of underdeveloped land with General Employment (EG) zoning. The 15% target represents conservative expansion of the 13% redevelopment/infill trend in Columbia East from 1999 to 2011 (see EOA Section 1), taking into account expected tightening transportation budgets for freight investments and proposed environmental zoning on developed land described in the next section. The Columbia East development trend is used here because the associated job growth trends during this period approximate forecast growth much closer than in the other industrial geographies.

Second, the 15% intensification rate is applied to the total land demand forecast of the industrial geographies, including additional acreage needs for marine, air, and rail terminals. For example, approximately 50 acres of the forecast 200-acre land need for railroad yards is expected to be met in the Harbor and Airport Districts by the proposed Kenton Line double-tracking and associated overcrossing improvements (TSP Projects 40085, 30055, 40001, and others). The Port of Portland's 2013 Rail Plan identified the Kenton Line as the only rail segment in Portland where forecast growth is expected to exceed practical capacity by 2030, and the proposed double-tracking improvements are recommended as a major regional project to address this congestion. These improvements are also expected to improve rail yard efficiency and functional capacity in Portland through substantial train storage capacity and improved rail mobility, which is the basis for the 50-acre estimate of railroad land needs to be met by infill and redevelopment.

INDUSTRIAL DISTRICT EXPANSION

Policy 6.51. Golf course reuse and redevelopment. Facilitate a mix of industrial, natural resource, and public open space uses on privately owned golf course sites in the Columbia Corridor that property owners make available for reuse.

New Industrial Sanctuary areas are designated on the proposed Comprehensive Plan Map at three airport area golf courses (Colwood, Riverside, and Broadmoor). These map changes represent 35% of the development capacity gains in the Harbor and Airport District. Proposed Policy 6.51 (above) provides further direction for their land use and development. This proposed policy advances a multi-objective planning approach to accommodate a mix of new industrial areas, existing and enhanced natural resource areas, and public access to open space at these sites. The plan map also designates various additional sites as Mixed Employment land to meet capacity needs in Dispersed Employment areas.

Capacity impact estimates of map changes are based on assumptions that development of buildable land in new industrial and employment areas is expected to be (1) serviceable by public facilities and (2) financially viable on average to meet forecast demand within the 2035

planning horizon. The serviceability of sites is supported by proposed investments in the Citywide Systems Plan and Transportation System Plan and proposed Policy 8.21. System Capacity. Site assistance to accommodate financial feasibility of development on these sites by 2035 is also supported by Policy 6.16. Regionally Competitive Development Sites. Implementation efforts are expected to address development feasibility constraints as needed.

Airport Area Golf Courses

The Trust for Public Land and property owners of the 138-acre Colwood golf course obtained conditional approval of a quasi-judicial plan map and zoning amendment in 2014 to rezone 49 acres for industrial uses with the remainder as public open space and natural area. The proposed Comprehensive Plan includes this map change at the Colwood site and similar land use proposals at two nearby golf courses, designating approximately 90 additional acres at Riverside and 15 acres at Broadmoor as Industrial and retaining the Open Space designation on 215 acres.

These map designations were drawn to avoid encroaching on natural resources protected through existing environmental overlay zones, and to create large, functional industrial sites and open spaces with opportunities for substantial environmental restoration. The buildable land inventory estimates 95 acres of capacity after constraints at these sites. The assumed capacity of these map changes includes 28 additional acres, accounting for the entire 49-acre site at Colwood where development is underway, rather than the 21 acres of capacity included in the BLI. With public infrastructure investment and site assistance, the full 155 acres of industrially designated land at these sites may be available for development, assuming that street access is existing and all of the designated industrial area is available for development.

While the Broadmoor and Riverside golf courses could potentially remain in operation indefinitely, national market trends indicate an oversupply of golf courses in the coming years relative to population demographics, particularly in inner city locations. Given these trends and continuing intensification of industrial development in the surrounding area, it is reasonable to expect potential reuse of these sites in the 2035 planning horizon and the proposed Comprehensive Plan proposal would accommodate that change. Proposed public investments (e.g., improvements at 33rd Avenue) and site assistance are expected to help overcome development constraints at these sites. Development requirements are expected to include adequate infrastructure improvements, natural resource protection and enhancement, and expanded public access to open space, consistent with proposed Policy 6.48. Golf Course Reuse and Redevelopment.

West Hayden Island

West Hayden Island was brought into the Urban Growth Boundary in 1983 for marine industrial development, and Metro designates the site as Regionally Significant Industrial Area in the Urban Growth Management Functional Plan (Title 4), as well as regionally significant fish and wildlife habitat (Title 13). Metro requires that the City of Portland develop a district plan for West Hayden Island, in cooperation with the Port of Portland. The district plan was not completed in the updated Comprehensive Plan, therefore the recommended Comprehensive Plan Map designation of Rural Farm Forest maintains West Hayden Island as a holding zone for future determination of the mix of land uses, if and when it is annexed in to the City of Portland. West Hayden Island represents the only opportunity to meet the mid-range marine terminal commodity movement forecast for Portland Harbor as described in EOA Sections 1-2. Therefore,

implicit in this mapping decision is a policy choice to accommodate the low end of the marine terminal commodity movement forecast. The result is a demand scenario of 125 acres for marine terminal development in the Harbor Access Lands geography.

New Mixed Employment Areas

A variety of map changes are proposed in the Comprehensive Plan Update to expand capacity and improve the land use efficiency and functions of Dispersed Employment areas:

- New Mixed Employment areas have been designated at development opportunity sites near freeway interchanges or truck routes in East Portland, including existing farm sites (currently designated residential or commercial) and underutilized commercial sites.
- New Mixed Employment areas have been designated as transition areas between industrial districts and residential neighborhoods at NW Vaughn St. and N Columbia Blvd. at Denver St.
- Existed General Commercial areas with redevelopment potential for higher employment density have been changed to Mixed Employment designations, including portions of SE 82nd Ave. and N Hayden Meadows Dr.
- Existing Central Employment sites in employment use have been changed to Mixed Employment designations in Dispersed Employment areas (e.g., Freeway Lands and Montgomery Park sites) and in Central Gateway (see explanation in Neighborhood Business Districts section below), focusing their development potential on employment uses rather than mixed use/residential use.

The Employment Capacity Zoning Project is underway as part of the Periodic Review Task 5 Implementation to propose zoning map and code changes that implement these new Comprehensive Plan designations.

WATERSHED HEALTH IMPROVEMENTS

Policy 6.49. Industrial growth and watershed health. Facilitate concurrent strategies to protect and improve industrial capacity and watershed health in the Portland Harbor and Columbia Corridor areas.

Development capacity impacts are also expected to result from actions to meet City environmental policies and regulatory obligations. As noted above, Portland’s industrial districts along the Willamette and Columbia Rivers serve as regionally significant industrial and natural resource locations. Recognizing the parallel public objectives for limited land in these geographies, Policy 6.46 above describes expectations for concurrent improvements in both industrial capacity and watershed health. Other proposed Comprehensive Plan Policies to protect and improve watershed health include 7.19. Natural Resource Protection, 7.21 pertaining to Environmental Protection Programs, 7.22. Land Acquisition Priorities and Coordination, additional policies specific to the Willamette, Columbia, and Columbia Slough watersheds, and

policies calling for designing with nature, resource efficient development, and hazard resilient development.

To implement watershed health policies on balance with economic development policies, a strategy of additional natural resource protection, enhancement and ecological site design is proposed as summarized below. This multi-faceted strategy was developed in consultation with the Industrial Land/Watershed Health Working Group described above. Implementation of this strategy is expected to be pursued concurrently with actions to support industrial capacity gains, in accordance with Policy 6.49. Industrial Growth and Watershed Health. **Update Environmental and Greenway Overlay Zones and Regulations**

- Complete multi-objective plans for the River Plan/North Reach and Columbia Corridor, to address some combination of the following:
 - Applying new overlays to unprotected higher functioning or priority resources (e.g. high- and medium-ranked natural resources in the City’s Natural Resource Inventory (NRI), potential off-site mitigation and restoration sites).
 - Removing overlays from land with no NRI resources.
 - Adjusting the protection level to better correspond to the level of natural resource function and improve program consistency (e.g. c-zone to p-zone or vice versa).
 - Updating area-specific environmental and greenway regulations that improve natural resource function through industrial development and redevelopment (e.g., streamlined procedures for site enhancements or ecological site design (see section D below), and allow prospective mitigation credit for proactive restoration activities, etc.).
- Pursue targeted update of Environmental Overlay Zone chapter of the Zoning Code (citywide regulations) including streamlining for resource enhancement, streamlining to encourage industrial intensification, clarification of mitigation requirements (e.g., potential standards, additional flexibility for off-site mitigation or participation in mitigation bank), and provisions needed to respond to new ESA listings.
- Complete future regulatory and/or program updates as needed to comply with the Endangered Species Act in response to litigation against FEMA relating to floodplain development.

Enhance/Restore Protected Natural Resources

- Identify priorities, estimated costs, and funding options (revenue sources, partnerships, incentives) in the Columbia Corridor and Portland Harbor. Specifically explore and pursue the following:
 - Restoration investments in public or land trust ownership or conservation easements.

- Dedicated, long-term revenue sources for acquisition, restoration, and maintenance.
 - Options for public/private partnerships and investments.
 - Incentives for natural resource enhancement, such as tax credits.
 - Innovative institutional and funding structures.
 - Community and political support and commitment for proactive, long-term restoration investments.
- Prioritize target mitigation/restoration sites in the Columbia Corridor and Portland Harbor.
 - Work with private mitigation bankers and other partners to explore and develop banks that sell wetland, riparian, in-water and grassland-related mitigation credits for City-required mitigation or NRDA/Superfund mitigation.

Advance Ecological Site Design

- Encourage ecological site design through best practices research and seeking partnerships and pilot projects.
- Establish or reinstate financial incentives, such as the eco-roof incentive program
- Provide education and technical assistance.
- Evaluate and pursue, as appropriate, code amendments, including regulatory incentives and performance based approaches.
- Develop resource handbook or design competition to encourage eco-industrial site design.

Capacity Assumptions for Additional Natural Resource Protection

The following analysis is intended to estimate the potential development capacity impacts of future legislative projects that will among other items, update the City’s existing greenway and environmental overlay zones. The analysis also estimates potential development capacity impacts associated with Portland Harbor Superfund’s Natural Resources Damages Assessment required restoration activities. This analysis and associated assumptions do not specifically dictate or bind future City decisions. In the future, when specific regulatory actions are proposed, development capacity impacts and Goal 9 compliance will be addressed along with other goals as part of that project.

It is estimated that future updates to the City’s environmental and greenway overlay zones could reduce development capacity by 150 acres on vacant and underutilized sites:

- 98 acres in the Harbor and Airport Districts

- 12 acres in Harbor Access Lands
- 40 acres in Columbia East

These capacity impacts represent the potential incremental impact of updated regulations beyond the capacity reductions attributed to physical features (floodplains, wetlands, etc.) that have already been applied as part of the Buildable Land Inventory methodology.

An additional 25 acres of capacity reduction is assumed in anticipation of the use of some vacant or underutilized sites for restoration to meet Natural Resource Damage Assessment requirements associated with Portland Harbor Superfund.

Future regulatory updates are also expected to expand environmental overlay zoning on developed sites in Columbia East and in the Harbor and Airport Districts. These overlay zone expansions are estimated to apply to approximately 2% of the developed sites in Columbia East, and 3.5% of the developed sites in the Harbor and Airport Districts, respectively.

An additional 1% of the developed sites in Columbia East, and 2% of the developed sites in the Harbor and Airport Districts, are assumed to shift from existing environmental conservation zone to environmental protection zone. These areas are within 50 feet of a stream or wetland. Most of these natural resource areas on developed sites have existing environmental constraints other than or in addition to environmental overlay zones.

In the Harbor Access Lands, greenway and environmental overlay zone updates are expected to apply to approximately 12% of developed sites; however, in each of these geographies, the regulatory updates would apply to natural resources that are currently constrained and subject to existing regulations (e.g., Willamette greenway overlay zones, balanced cut and fill) or other environmental constraints. As a result, the incremental impact of future regulations on developed sites is expected to be negligible.

More detailed descriptions of these analyses are provided in Appendix A.

Other elements of the strategy to improve watershed health are not assumed to have significant impacts on development capacity. Restoration efforts are assumed to focus primarily on protected natural resource or open space areas. Efforts to encourage ecological site design are assumed to include a mix of non-regulatory and regulatory tools that will support both development and watershed goals for certainty and overall cost-effectiveness.

SHORT-TERM LAND SUPPLY

EOA Section 3 identifies significant deficits of short-term development capacity in the Harbor and Airport Districts, Harbor Access Lands, and Dispersed Employment areas. These short-term deficits are expected to be met by announced development projects, intensified use of developed sites, and proposed map amendments and rezoning.

In the Harbor and Airport Districts, an estimated 39-acre deficit in existing short-term land supply estimated geography can be amply met by proposed investments and efforts to encourage intensified use of developed land (estimated at 15% of demand, as discussed above) and the proposed 49-acre development project at Colwood Golf Course. Surplus short-term capacity of 62 acres in the Columbia East geography is also available to partially meet demand for comparable building types.

In the Harbor Access Lands geography, most of the vacant land supply consists of brownfields affected by Portland Harbor Superfund liability. These harbor brownfield sites are not included in the short-term land supply, and the City has limited ability to overcome those development constraints by 2020; however, substantial development is underway or proposed in this geography that appears to be generally at pace to meet short-term forecast demand for 114 acres by 2020, leaving an estimated 20-acre shortfall (see Figure 8 in Appendix B). This shortfall can potentially be met by surplus capacity available in other industrial geographies; for example, the large Evraz steel foundry in the Harbor Access Lands geography has accommodated substantial expansion over the last decade at a nearby site away from the river.

- Redevelopment of the Daimler Trucks headquarters offices broke ground in 2014 on a new 269,000 square foot nine-story building that is expected to result in approximately 400 new jobs. This development represents equivalent capacity of approximately 18 acres (measured by floor area, or 21 acres measured by expected jobs).
- The Canpotex potash terminal at Port of Portland T-5 announced \$140 million of facility investments in 2014 and plans to double their existing storage capacity, consisting of a 320,000 square foot storage building, by 2020. This intensified use of non-vacant land represents an approximate capacity gain of 21 acres, since this site is not included in the Buildable Land Inventory.
- Other major facility investments since 2012 have also been identified by the Port of Portland on existing Harbor Access Land sites, which translate less clearly into equivalent building square footage. These investments include \$50 million for a new dry-dock at Vigor Industrial, \$44 million for upgraded storage and handling at Columbia Grain, \$21 million for expanded grain storage and moving facilities at LD Commodities, and \$10 million in new ship loading facilities at the Kinder Morgan Bulk Terminal.

The modest 4-acre deficit in short-term land supply estimated in the Dispersed Employment areas is expected to be met rezoning projects underway in Task 5 of the Comprehensive Plan Update, including new areas of General Employment zoning and increases in industrial development allowances in the Neighborhood Commercial geography.

The proposed Comprehensive Plan will provide a 20-year supply of additional employment land capacity in Portland’s industrial districts through brownfield redevelopment, intensification of land uses, and expansion of industrial sanctuaries.

V. NEIGHBORHOOD BUSINESS DISTRICTS

Currently, Neighborhood Business Districts account for 93,000 jobs – about 25% of the jobs in Portland. By 2035, more than 35,000 additional jobs are projected for these areas, requiring 700 acres of business commercial capacity.

What types of businesses locate here? Neighborhood business districts are mainly home to the retail, personal service, and related sectors that serve customers on-site. These businesses generally need ground-floor space along pedestrian- or auto-oriented streets. The EOA identifies three types of Neighborhood Business District geographies:

- Gateway is designated by Metro as a Regional Center and is planned to transition to a high-density, mixed use area. Gateway has concentrations of businesses in health care and retail.
- Town Centers are planned for midrise, mixed-use development and include concentrations of institutional, retail, and office sector businesses. They include Hillsdale, Hollywood, Lents, St. Johns, and West Portland, which are designated in Metro’s 2040 Growth Concept, and new town centers are proposed in Northwest District, Killingsworth/Interstate, and Midway (122nd/Division).
- The numerous mixed use commercial corridors across Portland have a diverse business mix and concentrations of small businesses. These districts are designated as Neighborhood Centers, Civic Corridors, Neighborhood Corridors, and interspersed nodes.

Why are these employment geographies important? Neighborhood Business Districts are a foundation of neighborhood livability in attracting pedestrian and social activity, defining neighborhood character, providing diverse destinations, and conveniently serving daily shopping needs. The 93,000 jobs in these districts account for 25% of the citywide employment. Neighborhood business districts also provide major economic benefits by keeping local dollars circulating within Portland, particularly through small business vitality. Small businesses are concentrated in this employment geography more than others, supporting Portland’s identity as a small business city.

2010-2035 job growth potential: 35,100 net new jobs. These districts account for 25% of the citywide job forecast. Many of these districts are experiencing significant growth and change, providing synergistic locations for concentrated housing and commercial growth in “complete neighborhoods” with convenient access to services.

EMPLOYMENT LAND CAPACITY OF THE PROPOSED COMPREHENSIVE PLAN

The Neighborhood Business Districts currently have surplus development capacity to accommodate nearly twice their aggregate forecast demand by 2035. Substantial surplus capacity exists in the Gateway, Town Centers, and Neighborhood Centers and Corridors geographies. Surplus short-term capacity to meet demand by 2020 is also available in these three geographies (see EOA Task 2/3 Report).

NEIGHBORHOOD BUSINESS GROWTH AND LAND USE DIRECTION

Policy 6.61. Neighborhood business districts. Provide for the growth, economic equity, and vitality of neighborhood business districts.

Policy 6.65. Neighborhood-serving business. Provide for neighborhood business districts and small commercial nodes in areas between centers to expand local access to goods and services. Allow nodes of small-scale neighborhood serving commercial uses in large planned developments and as a ground floor use in high density residential areas.

The primary land use and development policies for this employment geography are summarized in the section below on centers and corridors. The areas are designated for mixed residential and employment uses and higher densities to support complete neighborhoods and healthy communities. Policies 6.61 and 6.65 (above) provide further land use direction on their primary commercial market function of neighborhood serving businesses. The livability and economic equity of Portland neighborhoods rely on these neighborhood serving businesses.

PROPOSED COMPREHENSIVE PLAN MAP CHANGES

Numerous map changes are proposed in the Comprehensive Plan to implement the centers and corridors framework. A Mixed Use Zoning Project is underway as part of the Comprehensive Plan Update (in Task 5 in the periodic review work plan) to clarify and implement these new designations. Existing commercial zones already allow multifamily residential use and densities that are generally consistent with these designations. The proposed plan designates:

- Three new Town Centers at Northwest District, Killingsworth/Interstate, and Midway. Town Centers are intended to accommodate low-rise to midrise density of up to 10 stories.
- Twenty-two Neighborhood Centers throughout the city, supporting the objectives of healthy and complete neighborhoods. Neighborhood Centers are intended to accommodate low-rise density of up to 4 stories.
- A network of Civic Corridors and Neighborhood Corridors for midrise and low-rise densities, respectively, which take advantage of their redevelopment potential and transit connections. Civic corridors are the city's busiest, widest and most prominent streets.
- A Mixed Employment area in Central Gateway that supplements the tightening capacity for industrial-office incubator space in the Central City and compete more effectively in the regional office development market.

SYSTEM OF CENTERS AND CORRIDORS

Goal 3.D. A system of centers and corridors. Portland’s interconnected system of centers and corridors provides diverse housing options and employment opportunities, robust multimodal transportation connections, access to local services and amenities, and supports low-carbon complete, healthy, and equitable communities.

Policy 3.13. Role of centers. Enhance centers as anchors of complete neighborhoods that include concentrations of commercial and public services, housing, employment, gathering places, and green spaces.

Policy 3.16. Investments in centers. Encourage public and private investment in infrastructure, economic development, and community services in centers to ensure that all centers will support the populations they serve.

One of the primary themes of the proposed Comprehensive Plan is the urban form framework of centers and corridors that are well served by pedestrian, bicycle, and transit systems. Centers and mixed use corridors are places with concentrations of businesses and services, housing, gathering places and green spaces that provide residents with options to live a healthy, active lifestyle. When services and other destinations are clustered in compact areas economic viability is strengthened and walking, transit and bicycling become more practical. The proposed of Neighborhood and Town Centers and Civic and Residential Corridors vary in size and character depending on their location, but all of them contribute to increasing economic opportunities and neighborhood vitality.

Currently, only 64% of Portlanders live in complete neighborhoods with frequent transit service, schools, parks or greenspaces, and businesses and other amenities close enough to safely and easily walk or bike for meeting. In some areas, services are scattered or missing, or streets may lack sidewalks, bikeways or other safe connections providing local access. The Portland Plan set the objective that 80% of Portlanders live in a complete neighborhood by 2035. The proposed Comprehensive Plan supports this objective by concentrating growth in centers and corridors that are dispersed across Portland neighborhoods.

In the past, Portland has primarily used zoning that promotes a compact mix of commercial uses and housing to cultivate places with a sufficient mix of uses and services; however, zoning alone has not been successful in producing these results evenly across the city. Emerging opportunities to increase development of centers and corridors include expanding demand for multifamily housing in close-in locations, associated retail and service needs as well as continuing expansion of the health care and education sectors in centers and corridors. Policy 3.16 (above) and the Transportation System Plan and Citywide Systems Plan propose concentrated investments in centers and corridors that make them more attractive and affordable locations to develop. Additionally, the Portland Plan’s Healthy Connected City strategy introduces a broader range of tools, including community partnerships and investments that will help achieve these objectives.

SMALL BUSINESS SUPPORT AND NEIGHBORHOOD REVITALIZATION

Policy 6.9. Small business development. Facilitate the success and growth of small businesses and coordinate plans and investments with programs that provide technical and financial assistance to promote sustainable operating practices.

Policy 6.66 Investment priority. Prioritize commercial revitalization investments in neighborhoods that serve communities with limited access to goods and services.

Policy 6.63 Small, independent businesses. Facilitate the retention and growth of small and locally-owned businesses.

Community-driven revitalization efforts underway offer potential to increase small business development, improve economic equity, and reduce retail and service disparities among Portland neighborhoods. **Small businesses are at the core of Portland’s neighborhood business districts. Collectively, they offer diverse potential to improve job growth, increase self-employment, and add to the city’s economic resiliency.**

Policies 6.66 and 6.63 reinforce new directions for commercial revitalization set in the Portland Neighborhood Economic Development Strategy and Portland Plan. These strategies propose a community-driven neighborhood economic development approach to build local capacity, minimize involuntary displacement and spur commercial activity in underserved neighborhoods. This approach includes support for entrepreneurship and microenterprise development, as well as expanding community partnerships to leverage more public investments to advance neighborhood economic development goals.

While much of the public sector role has focused on one-time capital investments and incentives, a pivotal difference can be in the form of day-to-day technical, marketing, and related business assistance. Portland has a solid base of business districts with supportive community organizing and small business resources. Recent initiatives include the East Portland Action Plan, the Neighborhood Economic Development Strategy, and the Neighborhood Prosperity Initiative. PDC’s Neighborhood Economic Development Strategy includes a multi-pronged approach to measuring neighborhood business vitality, including new business licenses, new business growth, positive job growth, resident income, transit access, and retail needs satisfaction.³

GATEWAY AS PORTLAND’S SECOND BUSINESS CENTER

Policy 3.28. Role of Gateway. Encourage growth and investment in Gateway to enhance its role as East Portland’s center of employment, commercial and public services.

For the Gateway Regional Center, substantial new office development has not yet occurred despite direct proximity to east-west and north-south freeway (I-84/I-205) and light rail transit service coupled with availability of tax increment funding through the urban renewal area. Barriers to successful office development have included lack of a critical mass of professional and financial sector office activity, lower market rents that are inadequate to support mid-to-high

³ For detailed information on the neighborhood vitality index, please read the Neighborhood Economic Development strategy: http://www.pdc.us/bus_serv/ned.asp

rise construction costs, and relative fragmentation of many of the vacant and lesser valued property holdings.

Policy 3.28 supports a range of demand opportunities in Gateway to expand low/mid-rise institutional and office development:

- Institutional development accounts for 60% of the forecast building area in Gateway to 2035, building on the expansion potential of Adventist hospital and a variety of other health care and education facilities there.
- The Mixed Employment area designated in Central Gateway takes advantage of the area’s potential to accommodate spillover demand from the tightening capacity for industrial office incubator space in the Central City.
- Gateway and the nearby Portland International Center at PDX are Portland’s largest concentrated area of office development capacity, outside of the Central City, available to establish a critical mass of office activity that could compete more effectively with lower-rise and larger footprint office parks currently focused in the suburban market around Portland. Greater diversity of office products would better enable Portland to recapture its competitive share of the office space market that has been lost over the last couple of decades. Gateway’s relative affordability and proximity to PDX is among its location advantages for businesses requiring immediate access to air transport through personnel, customers, or high-value freight.

The majority of the land supply is associated with smaller, underutilized redevelopment sites rather than vacant sites; however, the current development trends indicate that the market is developing at a relatively low 0.5 FAR, which is consistent with a significant existing amount of surface parking lot area. **Achieving higher FARs in Gateway and the town centers will depend on opportunities to reduce the proportion of land in surface parking.** One of the key elements will be to find innovative approaches to reduce the parking footprint while assuring customer and employee accessibility. These strategies include support for prototype developments to show market viability. Innovations could include taking advantage of the reduced parking standards already in place, un-bundling of parking in real-estate transactions (for example, listing the price of a parking space separate from the residential or commercial lease, as an add-on), maintaining on-street parking, and initial structured parking with major development projects outside of the Central City.

COMMERCIAL CAPACITY IN UNDERSERVED NEIGHBORHOODS

Commercial vitality is widely uneven among neighborhood business districts, and only 60% of Portlanders currently live within a half-mile of a full-service grocery store or market that sells healthy, fresh food. The Portland Plan’s Healthy Connected City goal emphasizes creating complete neighborhood centers that provide access to services and destinations, locally and across the city. In response, **the proposed Comprehensive Plan map designates new Neighborhood Commercial areas in underserved areas.** Policy 6.65 Neighborhood-Serving Business also supports adding commercial and mixed use development capacity in underserved neighborhoods. Related policies that further support reducing neighborhood retail and service

disparities include Policy 6.9. Small Business Development, 6.69. Temporary and Informal Markets and Structures, and 4.80 Neighborhood Food Access.

The proposed Comprehensive Plan will provide a 20-year supply of additional commercial land in neighborhood business districts by enhancing the capacity of existing centers and corridors, investing in new centers and corridors, providing small business support and neighborhood revitalization programs, and addressing the needs of underserved neighborhoods.

VI. CAMPUS INSTITUTIONS

Currently, institutional campuses (hospitals, colleges and universities) account for 31,900 jobs – about 9% of the jobs in Portland. By 2035, 22,730 additional jobs are projected for these areas, requiring 370 acres of development capacity for campus institutions.

What types of businesses locate here? The health care and education sectors are concentrated in large hospital and college campuses and smaller neighborhood facilities. The institutional geography consists of 17 of Portland’s 19 large hospital and college campuses (excluding PSU in the Central City Commercial geography and Adventist hospital in Gateway). Their campuses vary from large pastoral expanses (some exceed 100 acres) to concentrated urban complexes of mid-rise buildings.

Why is this geography important? Portland has an exceptional collection of higher education and health care institutions that provide access to essential services, such as education and workforce training and health care. They are centers of innovation and learning in the community. These institutions are also major employers, anchoring the health care and education sectors, which accounted for 88,500 jobs, or 24% of the employment in the city in 2010, and have been leading sources of job growth locally, regionally, and nationally. The jobs in this geography are also relatively stable, continuing to grow during the 2008-2010 Great Recession, and are concentrated in high-wage occupations.

2010-2035 job growth potential: 22,700 net new jobs. The Institutional geography accounts for 16% of the citywide job forecast. The health care and education sectors concentrated in this geography have been the city’s biggest job growth sectors, making up 36% of forecast job growth and 27% of forecast citywide employment in 2035.

EMPLOYMENT LAND CAPACITY OF THE PROPOSED COMPREHENSIVE PLAN

The current growth capacity in most of the Campus Institutions geography consists of the maximum development allowance set in their conditional use master plans and impact mitigation plans. This existing capacity meets only 83% of forecast demand by 2035, leaving a 64-acre shortfall of needed developable land. The proposed Comprehensive Plan meets this capacity shortfall primarily by designating each campus as employment land with expected development (FAR) allowances that exceed forecast development. The draft floor area allowances being considered in the Institutional Zoning Project now underway meet an estimated 141% of forecast demand overall, as described further below.

INSTITUTIONAL GROWTH AND LAND USE DIRECTION

Policy 6.55 Campus institutions. Provide for the stability and growth of Portland’s major campus institutions as essential service providers, centers of innovation, workforce development resources, and major employers.

Policy 6.56 Campus land use. Provide for major campus institutions as a type of employment land, allowing uses typically associated with health care and higher

education institutions. Coordinate with institutions in changing campus zoning to provide land supply that is practical for development and intended uses.

These policies and the Comprehensive Plan Map propose a major shift in land use direction for campus institutions, designating them as employment districts, where uses typically associated with their operations are allowed, rather than conditional uses in residentially designated areas. The average age of the 15 residentially designated institutions at their current locations is nearly 80 years. **The average size of these campuses in total employment is comparable to Town Centers.**

This policy shift also supports the forecast job growth at campus institutions. Implementation of these policies is expected to include zone changes to allow forecast development, as well as transportation and other infrastructure projects to adequately serve these campuses.

PROPOSED COMPREHENSIVE PLAN MAP CHANGES

The current residential land use designation on most of this geography in the Comprehensive Plan Map is proposed to be changed to Institutional Campus, a new employment land designation. This map designation is generally applied to the current master planned campus boundaries. Proposed Policy 10.1.20 Institutional Campus describes the intended use, intensity and public services provision at these map designations, including the intent to foster the growth of the institution while enhancing the livability of surrounding residential neighborhoods and the viability of nearby business areas. The Portland Plan specifically supports this map change in Action 69, calling for new land use and investment approaches to support the growth and neighborhood compatibility of college and hospital campuses.

Continuing development of Portland’s campus institutions is complicated by the historic development of these campuses in unusual locations not consistent with typical commercial siting criteria. As a result, campus institutions commonly have limited transit or arterial street access, proximity to residential neighborhoods that constrain campus expansion, and zoning regulations that appear to increasingly impede effective site planning to respond to rapidly changing educational and health care needs. The current residential map designations contribute to this mismatch.

Meeting forecast institutional land needs is challenging, not only because of the size of the gap (64 acres) but also the physical setting of many institutions, often bounded by residential neighborhoods. Options generally include:

- Increased density of development within the existing footprint through infill and redevelopment.
- Increasing the campus footprint (with land acquisition), often requiring re-zoning and conditional use master plan (CUMP) approval processes.
- Creating satellite campuses taking advantage of opportunities elsewhere in Portland, such as designated mixed use centers and corridors.

The approach proposed in the Comprehensive Plan combines each of these options. Moderate campus-wide densities can accommodate substantial growth, while limiting development at

campus edges near single-family neighborhoods. The proposed map designations are based on the current master plans, which can extend outward from the current footprint, such as inclusion of the planned riverfront expansion area at the University of Portland. Policy 6.60. Satellite Facilities also encourages continuing off-site expansion where practical for some types of uses, such as OHSU outpatient and research facilities in nearby South Waterfront and Providence offices in nearby Hollywood.

REGULATORY REFORM

Policy 6.57 Development impacts. Protect the livability of surrounding neighborhoods through adequate infrastructure and campus development standards that foster suitable density and attractive campus design.

Policy 6.58 Community amenities and services. Encourage campus development that provides amenities and services to surrounding neighborhoods, emphasizing the role of campuses as centers of community activity.

Policy 6.59 Campus edges. Provide for context-sensitive, transitional uses and development at the edges of campus institutions to enhance their integration into surrounding neighborhoods, including mixed-use and neighborhood-serving commercial uses where appropriate.

These proposed policies provide balanced direction for new development standards to accommodate institutional growth and neighborhood compatibility and livability.

Implementation of these policies is underway in the Campus Institutional Zoning Project as part of the Comprehensive Plan Update (Task 5).

The current zoning regulatory approach of conditional use master plans and impact mitigation plans has been widely criticized. This zoning approach does not designate adequate 20-year growth capacity for campus institutions. Representatives of long-established institutions have objected that their conditional use status treats them as “guests in the neighborhood.” Required ten-year and interim updates of master plans entail extensive Type 3 review and tend to hamper flexibility for technological and market changes in the rapidly growing health care and education fields. In response, institutions may overestimate planned development to meet potential future needs, which can contribute to protracted neighborhood disputes from development impacts in these discretionary review processes.

The current conditional-use status of campus institutions, requiring campus master plans and periodic updates, is expected to be replaced by institutional campus base zones that allow typical institutional uses and establish development standards to protect surrounding neighborhood livability, consistent with proposed Policies 6.57 - 6.59.

Draft zoning concepts in the Campus Institutional Zoning Project propose new zones to implement the Institutional Campus map designations. Two to three types of campus zones will encompass the broad range of conditions and suitable development capacity among campuses, such as the following: a medical campus zone allowing 3:1 Floor Area Ratio (FAR), or up to 4:1 in Regional and Town Centers; an urban higher education campus zone allowing 2:1 FAR or up to 3:1 in designated Regional and Town Centers; and a lower density higher education campus

zone allowing 0.5:1 FAR. **The resulting development capacity will be adequate to meet forecast land needs for each type of campus** (see Figure 2).

SATELLITE AND SMALLER URBAN CAMPUSES IN CENTERS AND CORRIDORS

Policy 6.60 Satellite facilities. Encourage opportunities for expansion of uses, not integral to campus functions, to locate in centers and corridors to support their economic vitality.

Policy 6.60 encourages expansion of less integral institutional facilities in satellite locations, which in turn frees up space for core services on the campuses. For example, Providence Hospital has taken this approach by locating some of their administrative office facilities in nearby Hollywood Town Center. Another example is the location of OHSU outpatient and research facilities at satellite facilities in nearby South Waterfront, linked to the OHSU hospital by an aerial tram. These institutional satellite facilities can be a source of both services and employment in mixed-use centers and corridors.

A related trend and capacity-expansion opportunity is the location of smaller standalone campuses in centers and corridors. For example, PCC is making significant investments in its Cascade and Southeast campuses that integrate the campus into the existing commercial corridors. Other related examples include proposed expansion of the University of Oregon and Oregon State University facilities in the Central City.

ADEQUATE TRANSPORTATION ACCESS AND SERVICE

Traffic impacts and related transportation system deficiencies are commonly cited as the most challenging compatibility issue of campus institutional growth on neighborhood livability. Additionally, EOA focus groups identified improved transit service as the single greatest public infrastructure need. Because most of Portland’s major medical and educational institutions have been in place for many years, the need for continued public investment and service reconfiguration can be easily overlooked.

The proposed designation of campus institutions on the Comprehensive Plan Map has helped to specifically account for institutional growth in transportation modeling for the Transportation System Plan (TSP) update. In turn, proposed projects in the TSP are expected to be implemented as needed to provide adequate system capacity.

As major employers, transportation demand management (TDM) plans offer another significant opportunity to more efficiently serve transportation needs of institutions and reduce traffic impacts on surrounding neighborhoods. Proposed Policy 9.53. Transportation Demand Management supports creation and maintenance of ongoing TDM programs.

The proposed Comprehensive Plan will provide a 20-year supply of additional land for campuses and institutions through regulatory reform, encouraging satellite facilities, and addressing traffic impacts and transportation deficiencies.

APPENDIX A. INDUSTRIAL CAPACITY IMPACTS OF NATURAL RESOURCE PROTECTION REGULATIONS

ESTIMATING THE DEVELOPMENT CAPACITY IMPACTS OF POTENTIAL FUTURE NATURAL RESOURCE PROTECTION

The impacts of potential future regulations have been estimated to inform City strategies to meet Statewide Planning Goal 9 and relevant Comprehensive Plan policies. The development capacity impact estimates are incremental, accounting for existing environmental constraints and associated capacity reductions applied by the Buildable Land Inventory (BLI).

Specifically, for vacant and underutilized sites, the BLI already deducts 100% of development capacity for floodways and environmental protection overlay zones, and 50% of the capacity for environmental conservation overlay zones, steep slopes, wetlands, and the 100-year floodplain. The BLI also deducts 50% of the site area from development capacity for nearly all vacant and underutilized sites that contain existing greenway overlay zones.

The incremental development capacity impact of potential future regulations is estimated in Figures 6, 7, and 8 below, based on the following assumptions and analysis. This analysis provides a reasonable basis for planning, given City goals, policies, recent planning analyses, and regulatory obligations, but is not intended to bind future City policy and regulatory decisions.

HARBOR AND AIRPORT DISTRICTS, AND COLUMBIA EAST

In the Harbor and Airport Districts, and in Columbia East, environmental overlay zones are assumed to be applied to land with natural resources that rank high or medium in the Natural Resources Inventory (NRI). For purposes of this analysis it is assumed that:

- The environmental protection overlay zone (p-zone) would be applied to protect natural resources within 50 feet of rivers, streams, drainageways, and wetlands; and the p-zone would be applied to the wetlands and waterways themselves. It is assumed that the p-zone would be applied to these natural resource areas if they are currently unprotected by environmental overlay zones. It is also assumed that the environmental conservation zone (c-zone) would be converted to the p-zone to provide additional protection for natural resources within 50 feet of water bodies.
- The environmental conservation overlay zone would be applied to high- and medium-ranked natural resources located more than 50 feet from rivers, streams, drainageways, and wetlands.
- The BLI constraint methodology would be applied to estimate the incremental impacts of the expanded or modified environmental overlay zones.

- Environmental overlay zones would not be applied to low-ranked natural resources or to natural resources in the Airport Districts that rank high in the NRI, solely because they are Special Habitat Areas (SHAs) that support grassland associated wildlife species. This is because environmental program updates for those SHAs were addressed relatively recently in the Airport Futures project (adopted in 2011).

Applying these assumptions to vacant and under-utilized sites in the Harbor and Airport Districts, the p-zone would be applied to an additional 136 acres of high- and medium-ranked natural resources within 50 feet of water bodies (88 acres of which are currently within the c-zone). The c-zone would be applied to an additional 66 acres of high- and medium-ranked natural resources located more than 50 feet from water bodies. The employment capacity impact of these regulatory updates is estimated to be an additional 97 acres beyond the capacity reductions already applied by the BLI constraints.

Applying these assumptions to vacant and under-utilized sites in Columbia East, the p-zone would apply to an additional 45 acres of high- and medium-ranked natural resources within 50 feet of water bodies (27 acres of which are in the existing c-zone). The c-zone would be applied to an additional 27 acres of high- and medium-ranked natural resources located more than 50 feet from water bodies. The employment capacity impact of these regulatory updates is estimated to be an additional 39 acres beyond the capacity reductions already applied by the BLI constraints.

HARBOR ACCESS LANDS

In the Harbor Access Lands geography, nearly all the vacant and underutilized sites contain Willamette River Greenway overlay zones. For these sites, it is assumed that:

- Future updates to the greenway overlay zones will retain key elements of existing regulations, including the greenway setback, greenway review for development on vacant and under-utilized sites that must establish river-dependent or river-related uses, and a planting or landscape requirement.
- A new natural resource-focused overlay zone will be applied to the 115 acres of high- and medium-ranked natural resources on vacant or underutilized sites containing existing greenway overlay zones. It is assumed that this new overlay zone would be similar in construct to the environmental conservation zone, but would be specifically designed for areas with river-related and river-dependent uses in the Portland Harbor.
- The updated regulations will include a new, streamlined standards-based review track for new development, as well as clearer mitigation requirements that would allow mitigation to occur on- or off-site. A new clear and objective standards track should significantly reduce the frequency in which a land use review is triggered by new development or redevelopment projects on already developed sites.

Given that the BLI already deducted at least 50% of the development capacity for entire vacant and underutilized sites within the existing Greenway overlay zones, and because it is assumed

future greenway regulations would contain similar elements as the existing Greenway overlay zones, no incremental impact on development capacity is assumed for future regulatory updates on sites within the Willamette Greenway.

The only high- and medium-ranked natural resources that are in the Harbor Access Lands geography but outside the Willamette Greenway are located on Port of Portland-owned Terminal 6 (T-6). To estimate the potential development capacity impact of future environmental regulatory updates on the vacant and underutilized portions of T-6, it is assumed that the environmental conservation overlay zone would be applied to high- and medium-ranked significant natural resources that are not within the existing overlay zone, including Special Habitat Areas. Applying this analysis, the c-zone would be applied to an additional 28 acres, with a capacity impact of an additional 12 acres, beyond the environmental constraints already applied by the BLI.

IMPACTS OF FUTURE CITY ENVIRONMENTAL REGULATIONS ON DEVELOPED PROPERTIES

As noted above, the BLI and EOA assigned potential new employment capacity only to vacant or under-utilized properties in the Columbia East and Columbia Harbor EOA geographies, including the Harbor Access Lands portion of the Columbia Harbor geography. Potential new employment capacity was not assigned to developed properties in these geographies.

Given that the BLI did not allot future development capacity to developed industrial sites it is appropriate to view the impact of future regulations in terms of impacts on intensification of existing uses. Like the analysis of impacts on vacant and underutilized sites, it is appropriate to view the impacts of potential future environmental regulations as incremental relative to existing regulations and other constraints.

It is also assumed that the updated regulations would strike a balance among City policies for economic development and watershed health, for example, while it is expected that existing regulations will be improved and/or expanded to address unprotected natural resources, the updated regulations are also expected to include streamlined provisions, such as new or updated standards, or clearer allowances for off-site mitigation, that improve development and certainty, reduce the number of discretionary land use reviews required, and facilitate intensification of existing uses.

In terms of developed sites potentially affected by future environmental and greenway overlay zone updates, analysis suggests that these updates would have a relatively minimal impact, as summarized in the following bullets:

- There are 7,661 acres of developed sites in the Harbor and Airport Districts. Of the 615 acres of high- and medium-ranked NRI resources on these sites, (315 acres high, 300 acres medium) 340 acres or about 55% are within existing environmental overlay zones. The approximately 275 acres that are not within existing environmental overlay zones represent 3.5% of the developed site area in this portion of the geography. In addition, the vast majority of this area is currently constrained by existing wetlands, floodway, floodplain, or other environmental constraints.

- There are 1,705 acres of developed sites in the Columbia East geography. Of the 258 acres of high- and medium-ranked NRI resources these sites (139 acres high, 119 acres medium), 221 acres or about 86% are within existing environmental overlay zones. The 37 acres of high- and medium ranked NRI resources that are not within existing environmental overlay zones represent about 2% of the developed land in Columbia East. Some of this area is currently constrained by existing wetlands, floodway, floodplain, or other physical environmental constraints.
- There are approximately 1,996 acres of developed sites in the Harbor Access Lands, including sites in the greenway-i and greenway-g, overlay zones, and at Terminal 6. This area includes 237 acres of high and medium-ranked natural resources, or about 12% of the developed site area. Of these acres, 226 acres are on sites with existing greenway overlay zone or are affected by other environmental constraints. The area of currently unconstrained high and medium-ranked natural resources is about 11 acres or less than 1% of the developed sites in the Harbor Access Lands.

CAPACITY IMPACTS OF NATURAL RESOURCE DAMAGE ASSESSMENT AND RESTORATION

In addition to cleaning up contamination at the Portland Harbor Superfund site, responsible parties will be required to meet the Natural Resource Damage Assessment (NRDA) requirements of Superfund. Under NRDA, responsible parties must sponsor environmental restoration on their property or other designated sites to remedy past damages to fish, wildlife, and users of the Willamette River (e.g., boaters, fishers, etc.). A list of potential NRDA restoration sites has been identified by the Portland Harbor Natural Resource Trustees. A number of these sites have industrial or employment zoning. To account for the potential employment capacity impacts of future NRDA restoration, an additional 25-acre reduction in employment capacity is assumed as a contingency. This number reflects the employment capacity allocated by the BLI to the Linnton Plywood Site (~25 acres) and vacant portions of the site owned by Portland General Electric, including the Harborton Wetlands (~42 acres). NRDA restoration opportunities are currently being planned for both of these sites, or portions of the sites. The 25 acres also reflects an additional increment of capacity reduction based on the vacant portion of the Owens Corning site which is largely in the floodplain (~11 acres). For purposes of this analysis it is assumed that these sites are at least 70% constrained by a combination of greenway regulations and other constraints.

Figure 5. Harbor and Airport Districts - Capacity Impacts of Potential Environmental Zoning Changes on Vacant and Underutilized Land
Natural Resources Inventory (NRI) resources and environmental overlay zones within 50 feet of streams and wetlands (acres) (1)

NRI Ranking	Environmental Conservation Zone	Environmental Protection Zone	No Environmental Overlay Zone	Total
High	61.56	0.00	17.88	79.44
Medium	26.10	0.00	30.85	56.95
Total	87.66	0.00	48.73	136.39

Employment Capacity Impact of potential future environmental regulations on significant natural resources within 50 feet of streams (acres)

NRI Ranking	No BLI Env. Constraints, No Env. Zone	Emp. Capacity Impact (2)	Yes BLI Env. Constraints, No Env. Zone (3)	Emp. Capacity Impact (4)	Yes Env. Conservation Zone	Emp. Capacity Impact (5)	Total Employment Capacity Impact	Total
High	2.82	-2.82	2.99	-1.50	25.83	-11.62	-15.94	31.64
Medium	9.82	-9.82	8.90	-4.45	20.83	-9.37	-23.64	39.55
Totals	12.64	-12.64	11.89	-5.95	46.66	-21.00	-39.58	71.19

Employment Capacity Impact of potential future environmental regulations on significant natural resources within wetlands and 50 feet of wetlands (acres)

NRI Ranking	No BLI Env. Constraints, No Env. Zone	Emp. Capacity Impact (2)	Yes BLI Env. Constraints, No Env. Zone (3)	Emp. Capacity Impact (4)	Yes Env. Conservation Zone	Emp. Capacity Impact (5)	Total Employment Capacity Impact	Total
High	2.34	-2.34	10.25	-5.13	35.73	-16.08	-23.54	48.32
Medium	10.73	-10.73	1.40	-0.70	5.25	-2.36	-13.79	17.38
Totals	13.07	-13.07	11.65	-5.83	40.98	-18.44	-37.34	65.70

Employment Capacity Impact of potential future environmental regulations on significant natural resources more than 50 feet from streams and wetlands (acres)

NRI Ranking	No BLI Env. Constraints, No Env. Zone	Emp. Capacity Impact (6)	Yes BLI Env. Constraints, No Env. Zone (3)	Emp. Capacity Impact (7)	Yes Env. Conservation Zone	Emp. Capacity Impact (8)	Total Employment Capacity Impact	Total
High	1.17	-0.59	2.29	-0.23	19.78	0.00	-0.81	23.24
Medium	33.33	-16.67	29.26	-2.93	52.44	0.00	-19.59	115.03
Totals	34.50	-17.25	31.55	-3.16	72.22	0.00	-20.41	138.27

Total Employment Capacity Impacts **-97.32**

(1) Acreage includes wetlands and land within 50 feet of wetlands and streams, but does not include the area of streams. Land within 50 feet of streams and wetlands receive either a High or Medium NRI rank in this geography.

(2) It is assumed that environmental protection zone (p-zone) would be applied to significant natural resources within 50 feet of streams and wetlands. For resources with no BLI constraints the capacity reduction would be 100% of the resource area, consistent with the BLI and EOA methodology which eliminated 100% of employment capacity for land within the pzone.

(3) Calculated by subtracting the area of natural resources in the environmental conservation overlay from the total area of land with environmental BLI constraints.

(4) It is assumed that the p-zone would be applied to High and Medium ranked natural resources within 50 feet of streams and wetlands. For resources with BLI environmental constraints but no environmental overlay zone, the employment capacity impact would be -50%. The BLI and EOA deducted 50% employment capacity for 1 environmental constraint, and 10% each for up to 2 more constraints. This assumes the resources have 1 BLI environmental constraint, and that applying the p-zone would remove the remaining 50% capacity.

(5) The impact on employment capacity impact of applying the p-zone to significant natural resources that are within 50 feet of streams and wetlands, and within the environmental conservation overlay zone (c-zone) is - 45%. The BLI/EOA deducted 50% capacity to the portion of properties within the environmental conservation overlay zone (c-zone). Deducting an additional 45% (rather than 50%) accounts for the likelihood that these natural resources in the c-zone have more than one BLI environmental constraint.

(6) The impacts on employment capacity impact of applying or modifying environmental overlay zoning on land that is further than 50 feet from streams and wetlands, and that has no BLI environmental constraints, are: - 50% for High-ranked NRI resources (assumes c-zone is applied); -50% for Medium-ranked resources (assumes c-zone is applied).

(7) The impacts on employment capacity impact of applying the environmental overlay zone to High and Medium ranked resources further than 50 feet from streams and wetlands, and that has BLI environmental constraints but no overlay zone are is -10% (assumes c-zone is applied).

(8) The impact on employment capacity impact of applying the environmental overlay zone to High and Medium ranked resources further than 50 feet from streams and wetlands, and that is within the c-zone is -0% since no change in overlay zone is anticipated.

Source: Bureau of Planning and Sustainability

Figure 6. Harbor Access Lands (T-6 only) - Capacity Impacts of Potential Environmental Zoning Changes on Vacant and Underutilized Land

Natural Resources Inventory (NRI) resources and environmental overlay zones (acres)

NRI Ranking	Environmental Conservation Zone	Environmental Protection Zone	No Environmental Overlay Zone	Total
High	3.56	0	4.41	7.97
High - SHA Only	0	0	10.43	10.43
Medium	2.44	0	12.86	15.3
Total	6.0	0	27.7	33.7

Employment Capacity Impact of potential future environmental regulations on significant natural resources (acres)

NRI Ranking	No BLI Env. Constraints, No Env. Zone	Emp. Capacity Impact (1)	Yes BLI Env. Constraints, No Env. Zone (2)	Emp. Capacity Impact (3)	Yes Env. Conservation Zone	Emp. Capacity Impact (4)	Total Employment Capacity Impact	Total
High	1.76	-0.88	2.65	-1.33	3.52	0.00	-2.21	7.93
High - SHA only	10.43	-5.22	0.00	0.00	0.00	0.00	-5.22	
Medium	7.75	-3.88	5.11	-0.51	2.36	0.00	-4.39	15.22
Totals	19.94	-9.97	7.76	-1.84	5.88	0.00	-11.81	33.58

(1) Capacity reduction = -0.5 x area of natural resources with no BLI environmental constraints, consistent with the BLI methodology, assuming that c-zone would be applied here.

(2) Calculated by subtracting the area of natural resources in the environmental conservation overlay from the total area of land with environmental BLI constraints.

(3) Capacity reduction of -0.1 x the area of natural resources with BLI constraints and no overlay zone, reflects the assumption that c-zone would be applied here, and is consistent with the BLI and EOA methodology.

(4) It is assumed that natural resources already within the c-zone would remain so, with no incremental impact on development capacity.

Source: Bureau of Planning and Sustainability

Figure 7. Columbia East - Capacity Impacts of Potential Environmental Zoning Changes on Vacant and Underutilized Land

Natural Resources Inventory (NRI) resources and environmental overlay zones within 50 feet of streams and wetlands (acres) (1)

NRI Ranking	Environmental Conservation Zone	Environmental Protection Zone	No Environmental Overlay Zone	Total
High	10.27	0	6.89	17.16
Medium	17.06	0	11.68	28.74
Total	27.33	0	18.57	45.9

Employment Capacity Impact of potential future environmental regulations on significant natural resources within 50 feet of streams (acres)

NRI Ranking	No BLI Env. Constraints, No Env. Zone	Emp. Capacity Impact (2)	Yes BLI Env. Constraints, No Env. Zone (3)	Emp. Capacity Impact (4)	Yes Env. Conservation Zone	Emp. Capacity Impact (5)	Total Employment Capacity Impact	Total
High	0.29	-0.29	0.01	-0.01	1.20	-0.54	-0.84	1.50
Medium	2.05	-2.05	2.65	-1.33	3.18	-1.43	-4.81	7.88
Totals	2.34	-2.34	2.66	-1.33	4.38	-1.97	-5.64	9.38

Employment Capacity Impact of potential future environmental regulations on significant natural resources within wetlands and 50 feet of wetlands (acres)

NRI Ranking	No BLI Env. Constraints, No Env. Zone	Emp. Capacity Impact (2)	Yes BLI Env. Constraints, No Env. Zone (3)	Emp. Capacity Impact (4)	Yes Env. Conservation Zone	Emp. Capacity Impact (5)	Total Employment Capacity Impact	Total
High	1.49	-1.49	5.10	-2.55	9.07	-4.08	-8.12	15.66
Medium	6.98	-6.98	0.00	0.00	13.88	-6.25	-13.23	20.86
Totals	8.47	-8.47	5.10	-2.55	22.95	-10.33	-21.35	36.52

Employment Capacity Impact of potential future environmental regulations on significant natural resources more than 50 feet from streams and wetlands (acres)

NRI Ranking	No BLI Env. Constraints, No Env. Zone	Emp. Capacity Impact (6)	Yes BLI Env. Constraints, No Env. Zone (3)	Emp. Capacity Impact (7)	Yes Env. Conservation Zone	Emp. Capacity Impact (8)	Total Employment Capacity Impact	Total
High	1.01	-0.51	0.18	-0.02	0.11	0.00	-0.52	1.30
Medium	23.30	-11.65	2.01	-0.20	8.52	0.00	-11.85	33.83
Totals	24.31	-12.16	2.19	-0.22	8.63	0.00	-12.37	35.13

Total Employment Capacity Impacts **-39.36**

- (1) Acreage includes wetlands and land within 50 feet of wetlands and streams, but does not include the area of streams. Land within 50 feet of streams and wetlands receive either a High or Medium NRI rank in this geography.
- (2) It is assumed that environmental protection zone (p-zone) would be applied to significant natural resources within 50 feet of streams and wetlands. For resources with no BLI constraints the capacity reduction would be 100% of the resource area, consistent with the BLI and EOA methodology which eliminated 100% of employment capacity for land within the pzone.
- (3) Calculated by subtracting the area of natural resources in the environmental conservation overlay from the total area of land with environmental BLI constraints.
- (4) It is assumed that the p-zone would be applied to High and Medium ranked natural resources within 50 feet of streams and wetlands. For resources with BLI environmental constraints but no environmental overlay zone, the employment capacity impact would be -50%. The BLI and EOA deducted 50% employment capacity for 1 environmental constraint, and 10% each for up to 2 more constraints. This assumes the resources have 1 BLI environmental constraint, and that applying the p-zone would remove the remaining 50% capacity.
- (5) The impact on employment capacity impact of applying the p-zone to significant natural resources that are within 50 feet of streams and wetlands, and within the environmental conservation overlay zone (c-zone) is - 45%. The BLI/EOA deducted 50% capacity to the portion of properties within the environmental conservation overlay zone (c-zone). Deducting an additional 45% (rather than 50%) accounts for the likelihood that these natural resources in the c-zone have more than one BLI environmental constraint.
- (6) The impacts on employment capacity impact of applying or modifying environmental overlay zoning on land that is further than 50 feet from streams and wetlands, and that has no BLI environmental constraints, are: - 50% for High-ranked NRI resources (assumes c-zone is applied); -50% for Medium-ranked resources (assumes c-zone is applied).
- (7) The impacts on employment capacity impact of applying the environmental overlay zone to High and Medium ranked resources further than 50 feet from streams and wetlands, and that has BLI environmental constraints but no overlay zone are is -10% (assumes c-zone is applied).
- (8) The impact on employment capacity impact of applying the environmental overlay zone to High and Medium ranked resources further than 50 feet from streams and wetlands, and that is within the c-zone is -0% since no change in overlay zone is anticipated.

Source: Bureau of Planning and Sustainability

APPENDIX B. CAPACITY DETAILS OF THE PROPOSED COMPREHENSIVE PLAN

Figure 8. Proposed Short-Term Land Development Capacity

Employment Geography	Building Square Feet			BLI Acres	Other Gains*	2010-20 Demand	Surplus/ Deficit
	Base Supply	Constrained Supply	Adjusted Supply				
Central City Commercial	54,137,000	40,309,000	40,309,000	178		40	138
Central City Industrial	11,499,971	9,815,388	9,815,388	169		75	95
Harbor & Airport Districts	66,215,000	29,169,000	27,209,000	625	89	659	54
Harbor Access Lands	15,374,000	2,578,000	2,578,000	59	39	118	-20
Columbia East	23,330,000	14,832,000	14,832,000	340	39	279	101
Dispersed Employment	11,434,000	6,907,000	6,907,000	105	10	109	6
Gateway Regional Center	12,588,000	7,965,000	4,456,000	111		33	78
Town Centers	25,875,000	21,685,000	7,095,000	288		86	202
Neighborhood Centers & Corridors	97,316,000	69,915,000	18,368,000	811		362	449
Institutions	9,045,000	7,048,000	7,048,000	306		224	82
Total	326,813,971	210,223,388	138,617,388	2,993	178	1,985	1,186
Aggregate Geography							
Central City	65,636,971	50,124,388	50,124,388	347		114	233
Industrial	116,353,000	53,486,000	51,526,000	1,129	178	1,165	142
Neighborhood Commercial	135,779,000	99,565,000	29,919,000	1,210		482	729
Institutions	9,045,000	7,048,000	7,048,000	306		224	82
Total	326,813,971	210,223,388	138,617,388	2,993	178	1,985	1,186

* Assume gains from meeting 15% of demand by industrial land intensification, proposed Harbor Access Land projects at Daimler and Canpotex, and expansion of Dispersed Employment development allowances in Neighborhood Commercial corridors.

Source: Bureau of Planning and Sustainability

Figure 9. Buildable Land Inventory of Proposed Comprehensive Plan Designations and Constraint Assumptions – Net Building Square Footage

Employment Geography	Less than .5 acres			.5 to 1 acre			1 to 3 acres			3 to 5 acres			6 to 10 acres		
	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment
Central City Commercial	7,497,811	7,197,059	7,197,059	15,159,776	13,330,873	13,330,873	10,559,634	8,854,404	8,854,404	8,027,270	7,167,651	7,167,651	1,467,613	1,466,108	1,466,108
Redevelopment	2,484,177	2,377,157	2,377,157	5,548,327	5,032,736	5,032,736	3,783,209	3,099,972	3,099,972	2,331,958	1,956,998	1,956,998	643	0	0
Vacant	5,013,635	4,819,902	4,819,902	9,611,449	8,298,137	8,298,137	6,776,424	5,754,433	5,754,433	5,695,311	5,210,654	5,210,654	1,466,969	1,466,108	1,466,108
Central City Industrial	3,361,652	3,162,509	3,162,509	3,780,408	3,434,098	3,434,098	2,992,892	2,432,880	2,432,880	1,419,501	1,199,283	1,199,283	1,094,996	628,213	628,213
Redevelopment	750,856	715,121	715,121	843,766	767,459	767,459	643,237	509,799	509,799	24,840	24,495	24,495	85,606	70,123	70,123
Vacant	2,610,796	2,447,388	2,447,388	2,936,642	2,666,639	2,666,639	2,349,655	1,923,080	1,923,080	1,394,661	1,174,788	1,174,788	1,009,390	558,090	558,090
Columbia East	68,322	50,988	50,988	433,737	265,545	265,545	1,675,314	1,027,609	1,027,609	1,276,778	862,286	862,286	1,276,977	885,539	885,539
Redevelopment	0	0	0	0	0	0	37,160	21,176	21,176	53,536	39,381	39,381	57,099	57,099	57,099
Vacant	68,322	50,988	50,988	433,737	265,545	265,545	1,638,154	1,006,432	1,006,432	1,223,242	822,904	822,904	1,219,877	828,440	828,440
Dispersed Employment	552,062	435,062	435,062	443,425	354,999	354,999	673,933	558,874	558,874	919,217	593,121	593,121	282,189	255,512	255,512
Redevelopment	188,812	171,992	171,992	176,043	161,535	161,535	342,403	261,434	261,434	265,292	149,945	149,945	105,462	105,462	105,462
Vacant	363,250	263,070	263,070	267,381	193,463	193,463	331,530	297,440	297,440	653,924	443,176	443,176	176,727	150,049	150,049
Harbor Access Lands	15,401	5,314	5,314	58,775	22,322	22,322	792,697	197,720	197,720	0	0	0	712,955	205,003	205,003
Redevelopment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vacant	15,401	5,314	5,314	58,775	22,322	22,322	792,697	197,720	197,720	0	0	0	712,955	205,003	205,003
Harbor & Airport Districts	376,787	271,277	271,277	582,570	388,889	388,889	4,653,472	2,972,371	2,972,371	3,229,148	2,111,735	2,111,735	5,983,080	4,172,686	4,172,686
Redevelopment	41,731	27,578	27,578	45,428	28,848	28,848	307,896	183,806	183,806	148,650	118,343	118,343	0	0	0
Vacant	335,056	243,699	243,699	537,142	360,041	360,041	4,345,576	2,788,566	2,788,566	3,080,497	1,993,392	1,993,392	5,983,080	4,172,686	4,172,686
Institutions	260,311	191,840	191,840	500,753	385,580	385,580	1,830,164	1,446,792	1,446,792	188,806	188,806	188,806	432,724	418,800	418,800
Redevelopment	134,000	94,064	94,064	303,572	269,733	269,733	1,698,317	1,332,945	1,332,945	188,806	188,806	188,806	340,764	340,764	340,764
Vacant	126,310	97,776	97,776	197,180	115,847	115,847	131,847	113,847	113,847	0	0	0	91,959	78,036	78,036
Neighb. Centers & Corridors	11,178,460	10,107,567	2,849,455	11,975,107	10,639,592	3,025,003	23,535,660	20,462,265	6,000,511	9,689,025	8,189,013	2,532,413	7,735,522	5,976,336	1,714,647
Redevelopment	8,574,632	7,816,335	1,911,413	9,305,598	8,363,288	2,139,317	18,435,304	16,409,813	4,447,992	7,075,891	5,980,156	1,528,964	5,368,495	4,268,800	1,053,559
Vacant	2,603,827	2,291,232	938,042	2,669,508	2,276,303	885,686	5,100,356	4,052,452	1,552,519	2,613,134	2,208,858	1,003,449	2,367,027	1,707,536	661,088
Gateway Regional Center	532,092	447,243	289,118	881,477	736,477	424,659	5,422,965	4,608,982	2,488,758	4,248,019	3,019,688	1,356,047	2,147,191	1,270,414	647,569
Redevelopment	269,797	203,585	130,752	522,078	440,278	216,938	3,478,927	3,178,590	1,491,006	2,729,399	1,980,013	714,992	1,928,941	1,124,937	589,976
Vacant	262,295	243,658	158,366	359,399	296,200	207,722	1,944,038	1,430,392	997,752	1,518,620	1,039,674	641,055	218,250	145,478	57,594
Town Centers	4,131,514	3,776,144	1,689,717	5,672,299	5,201,874	2,437,300	7,182,080	6,450,308	2,857,003	2,782,392	2,517,923	1,047,974	1,978,882	1,756,415	708,315
Redevelopment	2,977,045	2,716,417	1,097,342	4,231,019	3,871,481	1,694,702	5,270,561	4,742,222	1,882,284	2,075,750	1,902,516	705,215	1,600,662	1,450,370	524,594
Vacant	1,154,468	1,059,728	592,375	1,441,280	1,330,393	742,598	1,911,519	1,708,086	974,719	706,643	615,407	342,759	378,220	306,045	183,720
Outside Geographies	480,778	400,941	400,941	343,255	261,067	261,067	1,231,534	913,626	913,626	0	0	0	4,517,552	3,179,676	3,179,676
Redevelopment	395,899	334,423	334,423	285,361	222,229	222,229	165,961	122,424	122,424	0	0	0	1,823,062	1,231,195	1,231,195
Vacant	84,879	66,518	66,518	57,893	38,839	38,839	1,065,573	791,202	791,202	0	0	0	2,694,491	1,948,481	1,948,481
Grand Total	28,455,190	26,045,946	16,543,281	39,831,581	35,021,316	24,330,334	60,550,345	49,925,831	29,750,548	31,780,155	25,849,505	17,059,315	27,629,680	20,214,704	14,282,070
Aggregate Geography															
Central City	10,859,463	10,359,569	10,359,569	18,940,184	16,764,972	16,764,972	13,552,526	11,287,284	11,287,284	9,446,770	8,366,934	8,366,934	2,562,609	2,094,321	2,094,321
Industrial	1,012,573	762,640	762,640	1,518,507	1,031,754	1,031,754	7,795,415	4,756,574	4,756,574	5,425,142	3,567,141	3,567,141	8,255,200	5,518,741	5,518,741
Neighborhood Commercial	15,842,065	14,330,955	4,828,290	18,528,882	16,577,943	5,886,962	36,140,705	31,521,555	11,346,272	16,719,437	13,726,623	4,936,434	11,861,595	9,003,165	3,070,531
Institutions	260,311	191,840	191,840	500,753	385,580	385,580	1,830,164	1,446,792	1,446,792	188,806	188,806	188,806	432,724	418,800	418,800
Outside Geographies	480,778	400,941	400,941	343,255	261,067	261,067	1,231,534	913,626	913,626	0	0	0	4,517,552	3,179,676	3,179,676
Total	28,455,190	26,045,946	16,543,281	39,831,581	35,021,316	24,330,334	60,550,345	49,925,831	29,750,548	31,780,155	25,849,505	17,059,315	27,629,680	20,214,704	14,282,070

E.D. Hovee & Company, LLC, and City of Portland Bureau of Planning and Sustainability:
Economic Opportunities Analysis – Sections 2/3 Supply & Demand

Figure 9. Buildable Land Inventory of Proposed Comprehensive Plan Designations and Constraint Assumptions – Net Building Square Footage (Part 2)

Employment Geography	10 to 20 acres			20 to 50 acres			More than 50 acres			Total Before Constraints	Total After Constraints	Total Adjusted Capacity	Employment Geography
	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment				
Central City Commercial	3,846,801	2,211,257	2,211,257	7,676,155	5,403,093	5,403,093	0	0	0	54,235,060	45,630,446	45,630,446	Central City Commercial
Redevelopment	1,269,311	712,804	712,804	1,471,303	1,044,455	1,044,455	0	0	0	16,888,929	14,224,123	14,224,123	Redevelopment
Vacant	2,577,490	1,498,452	1,498,452	6,204,853	4,358,637	4,358,637	0	0	0	37,346,131	31,406,322	31,406,322	Vacant
Central City Industrial	0	0	0	0	0	0	127,685	52,273	52,273	12,777,134	10,909,257	10,909,257	Central City Industrial
Redevelopment	0	0	0	0	0	0	0	0	0	2,348,304	2,086,998	2,086,998	Redevelopment
Vacant	0	0	0	0	0	0	127,685	52,273	52,273	10,428,830	8,822,258	8,822,258	Vacant
Columbia East	4,175,044	2,035,727	2,035,727	5,180,616	3,668,344	3,668,344	9,314,254	6,322,373	6,322,373	23,332,719	15,067,422	15,067,422	Columbia East
Redevelopment	0	0	0	0	0	0	0	0	0	147,795	117,657	117,657	Redevelopment
Vacant	4,175,044	2,035,727	2,035,727	5,180,616	3,668,344	3,668,344	9,314,254	6,322,373	6,322,373	23,184,924	14,949,765	14,949,765	Vacant
Dispersed Employment	448,579	184,401	184,401	1,866,765	1,519,106	1,519,106	5,445,874	2,692,871	2,692,871	10,079,981	6,158,882	6,158,882	Dispersed Employment
Redevelopment	18,786	16,369	16,369	83,849	64,493	64,493	522,717	220,194	220,194	1,514,553	979,432	979,432	Redevelopment
Vacant	429,793	168,032	168,032	1,782,917	1,454,613	1,454,613	4,923,156	2,472,677	2,472,677	8,565,428	5,179,450	5,179,450	Vacant
Harbor Access Lands	3,239,663	968,988	968,988	3,136,372	1,865,138	1,865,138	7,433,578	2,665,507	2,665,507	15,374,040	5,924,678	5,924,678	Harbor Access Lands
Redevelopment	66,891	30,706	30,706	0	0	0	0	0	0	66,891	30,706	30,706	Redevelopment
Vacant	3,172,773	938,282	938,282	3,136,372	1,865,138	1,865,138	7,433,578	2,665,507	2,665,507	15,307,149	5,893,972	5,893,972	Vacant
Harbor & Airport Districts	7,901,184	4,844,617	4,844,617	16,598,345	9,271,066	9,271,066	31,784,535	17,311,199	17,311,199	70,732,333	41,072,563	39,112,363	Harbor & Airport Districts
Redevelopment	1,112,133	825,551	825,551	803,524	577,067	577,067	0	0	0	2,417,632	1,733,613	1,733,613	Redevelopment
Vacant	6,789,050	4,019,067	4,019,067	15,794,821	8,693,999	8,693,999	31,784,535	17,311,199	17,311,199	68,314,702	39,338,950	37,378,750	Vacant
Institutions	2,960,939	2,723,286	2,723,286	7,402,342	3,554,702	3,554,702	4,773,038	4,548,641	4,548,641	18,349,076	13,458,448	13,458,448	Institutions
Redevelopment	2,022,538	1,795,029	1,795,029	431,334	415,437	415,437	3,426,636	3,373,966	3,373,966	8,545,968	7,810,744	7,810,744	Redevelopment
Vacant	938,401	928,257	928,257	6,971,008	3,139,265	3,139,265	1,346,402	1,174,676	1,174,676	9,803,107	5,647,704	5,647,704	Vacant
Neighb. Centers & Corridors	8,115,699	6,195,248	1,699,976	10,634,789	5,445,272	2,103,842	6,912,501	3,402,058	1,529,542	89,776,763	70,417,352	21,455,390	Neighb. Centers & Corridors
Redevelopment	6,729,748	5,050,320	1,243,412	4,947,060	2,330,411	712,464	1,517,823	945,355	286,336	61,954,552	51,164,478	13,323,456	Redevelopment
Vacant	1,385,951	1,144,928	456,564	5,687,729	3,114,862	1,391,379	5,394,678	2,456,703	1,243,206	27,822,211	19,252,874	8,131,934	Vacant
Gateway Regional Center	5,712,160	3,934,805	1,205,412	321,216	321,216	153,952	0	0	0	19,265,120	14,338,824	6,565,516	Gateway Regional Center
Redevelopment	5,297,136	3,623,811	1,116,157	305,698	305,698	144,124	0	0	0	14,531,977	10,856,912	4,403,944	Redevelopment
Vacant	415,024	310,993	89,255	15,517	15,517	9,828	0	0	0	4,733,143	3,481,913	2,161,572	Vacant
Town Centers	1,045,474	581,820	286,118	249,702	213,707	114,389	841,102	238,260	236,280	23,883,446	20,736,450	9,377,096	Town Centers
Redevelopment	950,437	486,871	234,958	161,215	150,325	66,615	207,892	37,442	37,442	17,474,580	15,357,644	6,243,151	Redevelopment
Vacant	95,038	94,948	51,160	88,487	63,382	47,775	633,210	200,818	198,838	6,408,866	5,378,806	3,133,945	Vacant
Outside Geographies	3,145,894	2,056,443	2,056,443	19,778,661	12,891,689	12,891,689	2,961,045	2,890,305	2,890,305	32,458,719	22,593,748	22,593,748	Outside Geographies
Redevelopment	3,069,917	1,993,074	1,993,074	16,105,932	9,808,787	9,808,787	1,586,989	1,567,846	1,567,846	23,433,122	15,279,979	15,279,979	Redevelopment
Vacant	75,977	63,369	63,369	3,672,728	3,082,901	3,082,901	1,374,056	1,322,459	1,322,459	9,025,597	7,313,769	7,313,769	Vacant
Grand Total	40,591,438	25,736,591	18,216,225	72,844,964	44,153,331	40,545,320	69,593,612	40,123,488	38,248,992	370,264,391	266,308,071	196,253,246	Grand Total
Aggregate Geography													Aggregate Geography
Central City	3,846,801	2,211,257	2,211,257	7,676,155	5,403,093	5,403,093	127,685	52,273	52,273	67,012,194	56,539,703	56,539,703	Central City
Industrial	15,764,471	8,033,733	8,033,733	26,782,098	16,323,653	16,323,653	53,978,240	28,991,950	28,991,950	119,519,074	68,223,546	66,263,346	Industrial
Neighborhood Commercial	14,873,333	10,711,872	3,191,506	11,205,707	5,980,195	2,372,184	7,753,603	3,640,318	1,765,822	132,925,329	105,492,627	37,398,002	Neighborhood Commercial
Institutions	2,960,939	2,723,286	2,723,286	7,402,342	3,554,702	3,554,702	4,773,038	4,548,641	4,548,641	18,349,076	13,458,448	13,458,448	Institutions
Outside Geographies	3,145,894	2,056,443	2,056,443	19,778,661	12,891,689	12,891,689	2,961,045	2,890,305	2,890,305	32,458,719	22,593,748	22,593,748	Outside Geographies
Total	40,591,438	25,736,591	18,216,225	72,844,964	44,153,331	40,545,320	69,593,612	40,123,488	38,248,992	370,264,391	266,308,071	196,253,246	Total

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Figure 10. Buildable Land Inventory of Proposed Comprehensive Plan Designations and Constraint Assumptions – Net Land Area in Acres

Employment Geography	Less than .5 acres			.5 to 1 acre			1 to 3 acres			3 to 5 acres			6 to 10 acres		
	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment
Central City Commercial	33	32	32	67	59	59	47	39	39	35	32	32	6	6	6
Redevelopment	11	10	10	24	22	22	17	14	14	10	9	9	0	0	0
Vacant	22	21	21	42	37	37	30	25	25	25	23	23	6	6	6
Central City Industrial	58	55	55	65	59	59	52	42	42	25	21	21	19	11	11
Redevelopment	13	12	12	15	13	13	11	9	9	0	0	0	1	1	1
Vacant	45	42	42	51	46	46	41	33	33	24	20	20	17	10	10
Columbia East	2	1	1	10	6	6	38	24	24	29	20	20	29	20	20
Redevelopment	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1
Vacant	2	1	1	10	6	6	38	23	23	28	19	19	28	19	19
Dispersed Employment	13	10	10	10	8	8	15	13	13	21	14	14	6	6	6
Redevelopment	4	4	4	4	4	4	8	6	6	6	3	3	2	2	2
Vacant	8	6	6	6	4	4	8	7	7	15	10	10	4	3	3
Harbor Access Lands	0	0	0	1	1	1	18	5	5	0	0	0	16	5	5
Redevelopment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vacant	0	0	0	1	1	1	18	5	5	0	0	0	16	5	5
Harbor & Airport Districts	9	6	6	13	9	9	107	68	68	74	48	48	137	96	96
Redevelopment	1	1	1	1	1	1	7	4	4	3	3	3	0	0	0
Vacant	8	6	6	12	8	8	100	64	64	71	46	46	137	96	96
Institutions	6	4	4	11	9	9	42	33	33	4	4	4	10	10	10
Redevelopment	3	2	2	7	6	6	39	31	31	4	4	4	8	8	8
Vacant	3	2	2	5	3	3	3	3	3	0	0	0	2	2	2
Neighb. Centers & Corridors	494	446	126	529	470	134	1,039	903	265	428	362	112	342	264	76
Redevelopment	379	345	84	411	369	94	814	724	196	312	264	68	237	188	47
Vacant	115	101	41	118	100	39	225	179	69	115	98	44	104	75	29
Gateway Regional Center	13	11	7	22	18	11	135	115	62	106	75	34	54	32	16
Redevelopment	7	5	3	13	11	5	87	79	37	68	49	18	48	28	15
Vacant	7	6	4	9	7	5	49	36	25	38	26	16	5	4	1
Town Centers	168	153	69	230	211	99	292	262	116	113	102	43	80	71	29
Redevelopment	121	110	45	172	157	69	214	193	76	84	77	29	65	59	21
Vacant	47	43	24	59	54	30	78	69	40	29	25	14	15	12	7
Outside Geographies	11	9	9	8	6	6	28	21	21	0	0	0	104	73	73
Redevelopment	9	8	8	7	5	5	4	3	3	0	0	0	42	28	28
Vacant	2	2	2	1	1	1	24	18	18	0	0	0	62	45	45
Grand Total	806	728	319	968	856	400	1,814	1,525	688	836	678	327	804	594	347
Aggregate Geography															
Central City	91	86	86	132	118	118	98	81	81	60	52	52	25	17	17
Industrial	23	18	18	35	24	24	179	109	109	125	82	82	190	127	127
Neighborhood Commercial	675	611	202	781	699	243	1,466	1,280	443	647	539	188	475	367	121
Institutions	6	4	4	11	9	9	42	33	33	4	4	4	10	10	10
Outside Geographies	11	9	9	8	6	6	28	21	21	0	0	0	104	73	73
Total	806	728	319	968	856	400	1,814	1,525	688	836	678	327	804	594	347

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Figure 10. Buildable Land Inventory of Proposed Comprehensive Plan Designations and Constraint Assumptions – Net Land Area in Acres (Part 2)

Employment Geography	10 to 20 acres			20 to 50 acres			More than 50 acres			Total Before Constraints	Total After Constraints	Total Adjusted Capacity	Employment Geography
	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment				
Central City Commercial	17	10	10	34	24	24	0	0	0	239	201	201	Central City Commercial
Redevelopment	6	3	3	6	5	5	0	0	0	75	63	63	Redevelopment
Vacant	11	7	7	27	19	19	0	0	0	165	139	139	Vacant
Central City Industrial	0	0	0	0	0	0	2	1	1	221	188	188	Central City Industrial
Redevelopment	0	0	0	0	0	0	0	0	0	41	36	36	Redevelopment
Vacant	0	0	0	0	0	0	2	1	1	180	152	152	Vacant
Columbia East	96	47	47	119	84	84	214	145	145	536	346	346	Columbia East
Redevelopment	0	0	0	0	0	0	0	0	0	3	3	3	Redevelopment
Vacant	96	47	47	119	84	84	214	145	145	532	343	343	Vacant
Dispersed Employment	10	4	4	43	35	35	125	62	62	231	141	141	Dispersed Employment
Redevelopment	0	0	0	2	1	1	12	5	5	35	22	22	Redevelopment
Vacant	10	4	4	41	33	33	113	57	57	197	119	119	Vacant
Harbor Access Lands	74	22	22	72	43	43	171	61	61	353	136	136	Harbor Access Lands
Redevelopment	2	1	1	0	0	0	0	0	0	2	1	1	Redevelopment
Vacant	73	22	22	72	43	43	171	61	61	351	135	135	Vacant
Harbor & Airport Districts	181	111	111	381	213	213	730	397	397	1,624	943	898	Harbor & Airport Districts
Redevelopment	26	19	19	18	13	13	0	0	0	56	40	40	Redevelopment
Vacant	156	92	92	363	200	200	730	397	397	1,568	903	858	Vacant
Institutions	68	63	63	170	82	82	110	104	104	421	309	309	Institutions
Redevelopment	46	41	41	10	10	10	79	77	77	196	179	179	Redevelopment
Vacant	22	21	21	160	72	72	31	27	27	225	130	130	Vacant
Neighb. Centers & Corridors	358	274	75	470	240	93	305	150	68	3,963	3,109	947	Neighb. Centers & Corridors
Redevelopment	297	223	55	218	103	31	67	42	13	2,735	2,259	588	Redevelopment
Vacant	61	51	20	251	138	61	238	108	55	1,228	850	359	Vacant
Gateway Regional Center	143	98	30	8	8	4	0	0	0	481	358	164	Gateway Regional Center
Redevelopment	132	90	28	8	8	4	0	0	0	363	271	110	Redevelopment
Vacant	10	8	2	0	0	0	0	0	0	118	87	54	Vacant
Town Centers	42	24	12	10	9	5	34	10	10	970	843	381	Town Centers
Redevelopment	39	20	10	7	6	3	8	2	2	710	624	254	Redevelopment
Vacant	4	4	2	4	3	2	26	8	8	260	219	127	Vacant
Outside Geographies	72	47	47	454	296	296	68	66	66	745	519	519	Outside Geographies
Redevelopment	70	46	46	370	225	225	36	36	36	538	351	351	Redevelopment
Vacant	2	1	1	84	71	71	32	30	30	207	168	168	Vacant
Grand Total	1,062	699	421	1,760	1,033	878	1,758	997	914	9,785	7,093	4,231	Grand Total
Aggregate Geography													Aggregate Geography
Central City	17	10	10	34	24	24	2	1	1	460	390	390	Central City
Industrial	362	184	184	615	375	375	1,239	666	666	2,744	1,566	1,521	Industrial
Neighborhood Commercial	543	395	117	488	257	101	339	160	77	5,415	4,309	1,492	Neighborhood Commercial
Institutions	68	63	63	170	82	82	110	104	104	421	309	309	Institutions
Outside Geographies	72	47	47	454	296	296	68	66	66	745	519	519	Outside Geographies
Total	1,062	699	421	1,760	1,033	878	1,758	997	914	9,785	7,093	4,231	Total

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APPENDIX C. 2015 UPDATE OF ECONOMIC OPPORTUNITIES ANALYSIS

On October 3, 2012, Portland City Council adopted the Portland Economic Opportunities Analysis (EOA) by Ordinance No. 185657, which also included the other background reports required as factual basis for the Comprehensive Plan Update. In January 2014, the Port of Portland withdrew their annexation application for marine terminal development at West Hayden Island, which was anticipated to address industrial land and marine terminal capacity needs identified in the EOA. In April 2014, the City of Portland asked the Oregon Land Conservation and Development Commission (LCDC) to withdraw the 2012 EOA and resubmit a revised version with Task 3 of the Comprehensive Plan Update work plan, in order to consider changes that address marine terminal land needs, Metro’s updated employment forecast, and an updated Buildable Land Inventory. The 2015 EOA Update consists of the following groups of amendments to the 2012 EOA.

HARBOR ACCESS LANDS GEOGRAPHY AND MARINE TERMINAL FORECAST

“Harbor Access Lands” was identified as a distinct employment geography in the 2015 EOA update, and a lower marine terminal demand scenario was analyzed and applied there to be consistent with community choices concerning development of West Hayden Island.

The 2012 EOA (adopted version) identified harbor access lands, located generally between the deepwater navigation channel and the nearest parallel street, as a subarea of the “Columbia Harbor” employment geography. The 2015 EOA splits Columbia Harbor into two distinct geographies, Harbor Access Lands and the Harbor and Airport Districts. This change simplifies analysis of this marine industrial geography and responds to an issue raised in the LCDC objection of the 2012 EOA by Schnitzer Steel Industries, Inc. The marine-related functional distinction of land demand in the Harbor Access Lands geography is reinforced by Portland’s “River Industrial” zoning overlay that applies to nearly all of this geography, requiring that primary uses be river-dependent or river-related.

The boundary of Harbor Access Lands was refined to include larger portions of Port of Portland Terminals 4 and 6. This boundary change resulted in a small 7-acre shift in forecast demand (along with corresponding job growth and building area) from the Harbor and Airport Districts into the Harbor Access Lands geography, from what was calculated in the January 2015 EOA.

The description of the marine terminal commodity movement forecast was also revised in the 2015 update of the EOA to consider two growth scenarios: (A) a scenario that accommodates the low end of the marine terminal commodity movement forecast, and (B) a scenario that accommodates the mid-range marine terminal commodity movement forecast used in the 2012 EOA. The scenarios are explained further in EOA Section 2 (see Figure 17) and are based on an industrial land supply analysis of Portland Harbor prepared by ECONorthwest and incorporated into the EOA in Section 1, Appendix C. Land availability to meet the most likely forecast

depends particularly on community choices concerning annexation and zoning of West Hayden Island for marine terminal development. As described earlier in this report, staff has presented revised Farm and Forest land use recommendations for West Hayden Island. This corresponds to a policy recommendation to accommodate the low end of the marine terminal commodity movement forecast.

REGIONAL FORECAST UPDATE

The citywide employment forecast was reduced to be consistent with Metro’s adopted employment allocation to the City of Portland in 2012.

The 2012 EOA was based on a Metro’s draft “Gamma” forecast, and the subsequent version adopted by Metro later in 2012 reduced Portland’s allocation from 147,000 to 141,600 new jobs. The 2015 EOA Update applies Metro’s adopted regional 2035 employment forecast and Portland’s citywide allocation of projected job growth. The resulting 4% reduction in the citywide employment forecast has a fairly even impact on forecast growth across employment geographies, based on the forecast methodology described in EOA Section 2.

SHORT-TERM LAND SUPPLY

The demand horizon for short-term land supply was extended to 2020, since the previous forecast to 2015 is now out of date.

The 2000-2015 forecast in the 2012 EOA was replaced with a 2010-2020 forecast in the 2014 EOA update, in order to evaluate the adequacy of the current short-term land supply to accommodate forecast growth over the next five years. The short-term land supply, which is intended to represent development-ready sites, is identified in the EOA by removing brownfields from the full Buildable Land Inventory (see EOA Section 3). The estimate of short-term land supply has also been updated with the December 31, 2014 Buildable Land Inventory revision, reflecting continuing updates by Oregon DEQ in their inventories of potentially contaminated sites used to identify brownfields. The short-term land supply does not include additional capacity identified in the March 9, 2015 BLI, which will result from planned infrastructure improvements, because those infrastructure projects will only be partially completed by 2020.

EMPLOYMENT GEOGRAPHIES MAP UPDATE

The EOA map of employment geographies was revised to be consistent with the proposed update of the Comprehensive Plan.

Employment geographies are used to estimate segments of employment land demand and supply, in order to evaluate the growth capacity of the city’s primary types of business districts. Employment geography boundaries are based on business location preferences (recent inventories) and community location preferences reflected by the Comprehensive Plan map. The 2012 EOA identified employment geographies, consistent with the existing Comprehensive Plan map. The employment geographies map was revised in the 2015 EOA update to be consistent with the proposed Comprehensive Plan map and remain relevant over the coming 20 years of business and job growth.

EOA Section 1 applies the 2012 version of the employment geographies map, which was used to evaluate job growth and development trends. The Proposed Employment Geographies Map is used in EOA Section 2-3 (Figure 8) and Section 4 (Figure 1) to evaluate the existing (baseline) and proposed land supply to meet demand to 2035. Figure 8 in EOA Section 2-3 depicts the specific changes between the existing and proposed employment geographies maps.

The updated BLI uses the proposed employment geography boundaries and distinguishes the existing and proposed capacity by two factors: the existing and proposed land use designations on the plan map and reduced brownfield constraint assumptions. For example, the golf courses added to the Harbor and Airport Districts geography have no existing capacity under the current Open Space designation and about 95 acres of proposed plan capacity in the proposed industrial designations. The demand forecast has not been revised to reflect the proposed employment geographies, because (1) geography demand is arguably better estimated by the existing mix of businesses and (2) the map changes consist primarily of vacant and underutilized sites and have relatively minimal impact on forecast demand in the industrial and institutional geographies where growth capacity is at issue.

BUILDABLE LAND INVENTORY (BLI) UPDATE

The BLI was revised in the 2015 EOA update to include updated employment geographies, vacant and underutilized sites, and constraints mapping.

The 2012 Buildable Land Inventory (BLI) that was used in the 2012 EOA has been updated to the March 9, 2015 version of the BLI in the 2015 EOA update. While the BLI methodology has not changed, several changes have occurred since 2012 in the mapping of vacant and underutilized sites and relative constraints mapping on those sites. Changes include removal of sites that developed in the intervening period, addition of brownfield sites from more up-to-date DEQ inventories, and revised mapping of substandard street constraints, wetlands, and DOGAMI landslide data.

The January 2015 draft of the EOA used results from the December 31, 2014 BLI, which was completed prior to identification and impact modeling of planned transportation projects in the proposed draft of the Transportation System Plan (TSP) and Citywide Systems Plan (CSP). Transportation capacity is one of a number of land constraints included in the BLI methodology. Specifically, some employment land is constrained by traffic congestion that will be remedied through a TSP project. The March 2015 BLI has been updated to include capacity impacts of the BLI transportation constraints and the proposed TSP project list.

CAPACITY IMPACTS OF PROPOSED COMPREHENSIVE PLAN

This report, EOA Section 4, was rewritten to describe the proposed policies, map designations, investments and strategies that address employment land supply and evaluate their capacity impacts.

The purpose of EOA Section 4 has shifted in the 2015 EOA update. In the 2012 EOA, Section 4 reviewed a range of plan implementation options to meet forecast demand in each forecast geography. In the 2015 EOA update, Section 4 has been rewritten to (1) specifically describe the

community choices proposed in the updated Comprehensive Plan that address employment land demand and capacity and (2) assess the likely development capacity impacts of those choices.

Proposed community choices include specific policies, plan map changes, infrastructure projects, and expected implementation strategies that affect land demand and capacity in each employment geography. For example, a balanced program of Industrial Land/Watershed Health strategies is summarized in Section 4 that is expected to meet forecast industrial demand while improving watershed health. These strategies are intended to clarify the expected results of interrelated economic development and environmental policies proposed in the updated Comprehensive Plan.

The BLI methodology is used to estimate capacity impacts of most of these proposed measures. An updated summary of proposed BLI capacity is included in Appendix B. Estimated impacts of potential environmental zoning changes in industrial districts, consistent with the adopted Natural Resources Inventory, is included in Appendix A. Proposed capacity of the Institutions geography is estimated by the proposed density allowances being considered in the Institutional Zoning Project in Periodic Review Task 5 of the Comprehensive Plan Update.

... COMPREHENSIVE PLAN UPDATE ...

Citywide Systems Plan

Recommended Draft

August 2015

Portland's Comprehensive Plan Update
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City of Portland, Oregon
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Ord. 187831, Vol. 1.3.C, page 2074

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LETTER	Send a letter with your comments to: Council Clerk 1221 SW 4th Avenue, Room 130 Portland, OR 97204
IN PERSON	Attend a public hearing to offer oral testimony directly to the City Council November 19, 2015, 2 p.m. 1221 SW 4th Avenue, Council Chambers, Portland, OR 97204 Time and date subject to change. Check our website for specific dates and additional information. www.portlandoregon.gov/bps/pdxcompplan <i>To be considered formal testimony, you must include your name and mailing address in your letters, emails or online comments. Comments received without your full name and mailing address will not be included in the record, and the City will not be able to notify you of future hearing dates. In addition, if your name does not appear in the record for this proceeding, you may be precluded from appealing the Council's final decision.</i> Check www.portlandoregon.gov/bps/pdxcompplan for updated information on these and other events.



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ACKNOWLEDGEMENTS

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Reader's Guide

The Comprehensive Plan guides the location of population and job growth as well as public investments in infrastructure, such as streets, sidewalks, parks and stormwater systems, over the next 20 years. It is one of multiple tools that implement the Portland Plan, the City of Portland's strategic roadmap. The Comprehensive Plan sets guidelines for community involvement and influences private development and public facilities — all to ensure Portland is on a path to becoming a more prosperous, healthy, educated, equitable and resilient city.

The Citywide Systems Plan (CSP), a support document to the Comprehensive Plan, guides infrastructure investments to meet the needs of current and future Portlanders.

Purpose of the Citywide Systems Plan

The Citywide Systems Plan is a 20-year (2013-2033), coordinated municipal infrastructure plan for areas within the City of Portland's urban service boundary. Portland's municipal infrastructure assets are physical systems that provide services and are maintained by the City. These include transportation networks; water storage and distribution; sewer and stormwater collection and treatment facilities; parks and recreation facilities; other facilities such as City Hall, office buildings, and fire and police stations; and technology assets.

The State of Oregon's Growth Management Act requires cities and counties to develop and implement public facilities plans. At a minimum, the public facilities plan (PFP) must describe transportation, water, and sewer facilities needed to support the land uses designated in the acknowledged Comprehensive Plan. Portions of the Citywide Systems Plan will serve as the City's State-mandated public facilities plan.

The Citywide Systems Plan includes inventory, condition, and future project information for City transportation, water, sanitary sewer, and stormwater systems, as required by Oregon Planning Goal 11: Public Facilities and Oregon Revised Statute 197. To provide a more complete picture of the City's infrastructure, the Plan also includes similar information for parks, recreation, and other facilities and systems provided by the City of Portland. Reporting on these facilities and systems is not required by State statutes.

Plan Overview

The Citywide Systems Plan includes the following chapters:

- **Chapter 1. Infrastructure Planning and Coordination** provides an overview of the regional and local planning context for the Citywide Systems Plan and the process for developing the Plan.
- **Chapter 2. Asset Management** describes the City's asset management approach and details key trends and needs.
- **Chapter 3. Guiding Principles** discusses how the Plan relates to and supports the Comprehensive Plan's integrated Guiding Principles.

- **Chapter 4. Summary of Infrastructure and Service Delivery** provides an overview of the City's infrastructure systems and the investment strategy outlined in the Plan.
- **Chapter 5. Goals and Policies** includes goals and policies from the Public Facilities and Services and Transportation chapters of the Comprehensive Plan Goals and Policies.
- **Chapters 6 through Chapter 10** include more detailed inventories of existing systems, discussions of infrastructure needs, and investment strategies for the City's major infrastructure systems – sewer and stormwater, water, transportation, parks and recreation, and other essential facilities and services (e.g. public safety and technology).

Process

The Citywide Systems Plan (CSP) was developed by the Citywide Systems Team, a cross-bureau group with representatives from the Bureau of Planning and Sustainability, Bureau of Transportation, Bureau of Environmental Services, Portland Water Bureau, Portland Parks & Recreation, and Office of Management and Finance. The document draws from other plans and projects, including the Portland Plan, other components of the Comprehensive Plan Update, community and agency input, and a wide variety of bureau and agency plans.

The Citywide Systems Plan reflects community conversations that occurred as part of the Comprehensive Plan Update, including Policy Expert Group discussions, public workshops and comments from individuals, associations, businesses, and agencies. A Working Draft of the CSP was available for public review and comment from October through December 2013 – prior to the formal legislative review process.

Chapter 1

Infrastructure Planning and Coordination

Public Facility Provision in Portland

The City of Portland is the primary urban public facility and service provider for water, sewer, stormwater, transportation, civic, parks and recreation within its municipal boundaries. The City of Portland provides these facilities and services to protect the health and safety of Portlanders, safeguard the natural environment, and support economic prosperity. To meet these goals, the City of Portland's infrastructure bureaus steward public investments in these public facilities systems.

A variety of other public agencies work in partnership with the City to provide complementary infrastructure necessary to provide these systems to all Portlanders. The role of these agencies is discussed in greater detail in the relevant system-specific chapters of this plan. For example, drainage districts provide flood management (see Chapter 6); the Rockwood PUD provides water service to portions of east Portland (see Chapter 7); TriMet provides much of the City's public transportation system; the Port of Portland provides air and marine transportation; and Metro provides regional parks (see Chapter 9).

In addition, non-City agencies and companies provide the entirety of public facilities for public education; energy; waste; telecommunications; library; public health; and justice services:

- Public education is provided by Portland Public Schools and the David Douglas, Parkrose, Reynolds, Centennial, and Riverdale School Districts, as well as public colleges and universities. The City partners with school districts on related school facility planning and siting.
- Solid waste, composting, and recycling are provided by Metro, the City and private companies. Metro is the regional solid waste authority, charged with ensuring that the region's solid waste is managed in a manner that protects public health and safety and safeguards the environment. The City partners with Metro and supports Metro's work to ensure sound landfill management. The City regulates collection and hauling; Metro regulates facilities and operates transfer stations; and private companies collect, transfer, process, and dispose of solid waste, compost, and recycling.
- Energy and communications are provided by private utilities and companies. Telephone and communications service is provided by Qwest, Comcast, Verizon, and various wireless providers. Gas and electricity are provided by Northwest Natural, Pacific Power, Portland General Electric, and various small fuel oil companies.
- Libraries are provided by Multnomah County.
- Public health, human services, and justice services are primarily provided by Multnomah County and the State of Oregon.

The City has an interest in coordinating with these agencies and companies to ensure adequate service provision to current and future Portlanders. Additionally, the City plays a role in regulating the siting of, licensing, and/or franchising of some of these facilities.

The Citywide Systems Plan

The Citywide Systems Plan (CSP) is a coordinated 20-year plan for the City of Portland's municipal infrastructure systems, including transportation, water, stormwater, sewer, parks and natural areas, and other publicly owned facilities and systems. Many of these systems are supplemented by public facilities that are owned and managed by other public agencies, nonprofit organizations, and private entities. The CSP acknowledges these critical relationships but only describes and plans for City systems.

The Citywide Systems Plan represents a significant update to the 1989 Public Facilities Plan to reflect updated regional and local planning and practices. It serves as a long-range, coordinated plan to guide future public infrastructure investments. Portions of the plan – including Citywide, Bureau of Environmental Services, Portland Water Bureau, and Portland Bureau of Transportation chapters - serve as the City's state-mandated public facilities plan, as required by Oregon Planning Goal 11: Public Facilities and Oregon Revised Statute 197.

However, the CSP goes beyond the State planning requirements and includes a more coordinated and comprehensive look at the City's infrastructure based on community values and best practices. To this end, the CSP includes chapters related to parks and recreation and other essential facilities, such as technology and civic assets. The CSP recognizes the critical roles these systems play in meeting the needs of Portlanders and supporting the overall mission of the City of Portland.

The 1989 Public Facilities Plan and the list of significant projects intended to implement the plan are outdated. City infrastructure bureaus have completed a number of facilities plans that have not been included in a citywide public facilities plan. The CSP incorporates these updated plans, improves coordination between infrastructure planning efforts, and considers the community's infrastructure priorities in a consistently manner.

The CSP reflects a number of significant changes since the 1989 Public Facilities Plan in the internal and external conditions surrounding local capital planning, including:

- The City of Portland has grown significantly, adding over 155,000 residents between 1990 and 2011. By 2035, the city is expected to grow by approximately 260,000 people (123,000 households) and 142,000 new jobs.
- The Portland metropolitan region – of which the City of Portland is the employment, housing, and transportation center – has grown by over 1 million people.
- The planning area for the City of Portland changed significantly with the annexation of the Pleasant Valley area. A public facilities plan for Pleasant Valley was completed, but was not integrated into a citywide public facilities plan.
- Metro completed the Region 2040 Growth Concept and the Urban Growth Management Functional Plan, which provide long-term guidance for future growth and development.
- City priorities have shifted and now include the need to:
 - Address aging infrastructure;
 - Improve equity and address service deficiencies;

- Focus growth in centers and corridors;
 - Support economic development and household prosperity;
 - Incorporate sustainable development; green infrastructure; and the protection, restoration, and management of natural systems;
 - Build resilience to natural hazards, manmade disasters, and a changing climate through carbon emission reductions, natural hazard mitigation, and preparation;
 - Meet new and expanded State and federal regulations; and
 - Foster inter-bureau collaboration.
- The Portland Plan, adopted in 2012, provides a strategic framework for both the City's short-term actions and long-range goals and policies, focused around priorities of equity, prosperity, health and education.
 - The City has advanced its asset management practices, providing more comprehensive and detailed information about the investments needed to provide and maintain infrastructure services.
 - The City recognizes the value of green infrastructure and natural system approaches that can improve infrastructure performance and reduce costs while also improving neighborhood livability and watershed health.
 - Analytical tools and technology are vastly different: Metro now provides a centralized data resource; the City has a demographer on staff; and GIS, computer modeling, and other technologies allow for fundamentally new analysis and exploration of data.

Purpose and Objectives

The Citywide Systems Plan has been developed to meet a number of objectives. It is intended to:

- Guide and coordinate future public infrastructure investments to maintain existing systems, resolve existing deficiencies, serve new residential and employment growth, and meet long-term infrastructure needs.
- Reflect current practices and policies, as expressed in the Comprehensive Plan and system-specific plans.
- Meet State planning requirements under the growth management act.
- Incorporate and respond to the community vision and goals highlighted in visionPDX and the Portland Plan.
- Provide policy recommendations and a list of significant projects for the Comprehensive Plan.

Meeting Growth Management Planning Requirements

The Citywide Systems Plan responds to State, regional, and local growth management and infrastructure planning requirements as well as community objectives. An update of the 1989 Public Facilities Plan is necessary to meet these planning requirements and accurately reflect community values and goals.

State Planning Requirements

Comprehensive Planning

In 1973, Oregon adopted Senate Bill 100 establishing a statewide land use planning program to “provide for the protection of farm and forest lands, conservation of natural resources, orderly and efficient development, coordination among local governments, and citizen involvement”. “The program affords all Oregonians predictability and sustainability to the development process by allocating land for industrial, commercial, and housing development, as well as transportation and agriculture.” Oregon’s land use program is administered at the State level by the Department of Land Conservation and Development (DLCD) and is guided by the Land Conservation and Development Commission (LCDC), a volunteer citizen board.

Under the program, all cities and counties in Oregon are required to create, adopt, and implement local comprehensive plans to guide growth and development, and to protect resources within their jurisdictions. These plans must meet mandatory State standards included in the 19 Statewide Planning Goals, which address land use, development, housing, transportation, and conservation of natural resources.

History of Portland’s Comprehensive Plan

The City of Portland adopted its first Comprehensive Plan in October 1980, after significant public input and planning. The Plan has been amended many times since. Portland’s Comprehensive Plan includes three primary elements: a set of goals and policies that apply to the entire city; a list of significant public facility projects; and a set of mapped features. These features include land use designations, street classifications, the city limits, and the urban service boundary.

Since the Comprehensive Plan’s adoption in October 1980, all of City Goal 6 (Transportation) and parts of City Goal 11 (Public Facilities) have been amended. The Transportation Goal received major revisions in 1992, 1996 and 2002. In October 2004, the Transportation System Plan received a technical update. The Public Facilities Goal was amended with an urban services study (1983) and transportation policy updates (1996 and 2002).

The City’s List of Significant Projects was adopted with the completion of the City’s first Citywide Systems Plan in 1989. It has been amended by subsequent updates of the Transportation System Plan and by updates to the sanitary sewer element in 2011.

In 2009, the City began the first major update to the Comprehensive Plan since it was adopted in 1980. The Working Draft Part 1 of the update, released for public review in January 2013, included draft goals and policies for public facilities and transportation. The Working Draft Part 2, released for public review in October 2013, included an initial draft of the Citywide Systems Plan as well as the Map App, an interactive online mapping tool that illustrated existing conditions and potential planning and investment options. A Proposed Draft of the full Comprehensive Plan update was published for legislative review in July 2014.

Public Facilities Planning

The State of Oregon's Growth Management Act requires cities and counties to develop and implement public facilities plans. At a minimum, the public facilities plan (PFP) must describe transportation, water, sewer, and stormwater facilities needed to support the land uses designated in the acknowledged Comprehensive Plan. Public facilities plans typically have a 20-year time horizon and help to identify capital improvement projects (5-year horizon) and capital budgets (1-year horizon).

State requirements for public facilities plans are found in Statewide Goal 11: Public Facilities, Oregon Statute 197 and Oregon Administrative Rule 660. To meet these State requirements, the Citywide Systems Plan, which will serve as the City of Portland's public facilities plan, includes:

- An inventory and general assessment of the conditions of all of the significant public facility systems which support the land uses in the acknowledged comprehensive plan;
- A list of significant public facilities to support the land uses designated in the acknowledged comprehensive plan;
- Rough cost estimates of each public facility project;
- A map or written description of each public facility project's general location or service area;
- Policy statements or urban growth management agreements identifying the provider of each public facility system;
- An estimate of when each facility will be needed; and
- An assessment of the financial capacity of the City to complete needed infrastructure improvements and a discussion of existing and potential funding mechanisms. '

DLCD evaluates public facilities plans for inclusion of required elements; whether the plan contains all agreements (urban growth management, any special districts, or State agency coordination); and whether the public facilities plan is consistent with the acknowledged Comprehensive Plan, the Metro Functional Plan, and statewide planning goals.

The Public Facilities Plan (PFP) is a support document to a comprehensive plan. Some elements of a PFP must be adopted as part of the City's Comprehensive Plan. These elements are:

- A list of significant projects;
- A map or written description of the project locations or service areas; and
- Policies or urban growth management agreement(s) designating the provider of each public facility system.

The Citywide Systems Plan as Portland's Public Facilities Plan

For this update, the City of Portland has chosen to develop this Citywide Systems Plan, which serves the same long-range purpose as a public facilities plan. The term "public facilities plan" is found in State administrative rules, Portland's previous plans, and planning literature generally. This Citywide Systems Plan represents a more comprehensive and holistic view of the City's infrastructure service delivery.

While it has been developed to meet the State requirements for public facility plans as described in the previous section, it also includes system planning that extends beyond that mandate.

For example, the Citywide Systems Plan includes facility plans for parks, recreation, and other essential facilities; addresses maintenance needs; and includes programmatic investments that are key to meeting service demands. Where applicable, the Citywide Systems Plan identifies these non-required components. The City has included these additional components in the interest of comprehensive infrastructure planning and in support of City and applicable State goals. The City does not intend for these components to be reviewed for compliance with Oregon Statute 197 or Oregon Administrative Rule 660.

Regional Plans and Requirements

In addition to complying with State planning requirements, many infrastructure systems also look to Metro, the area's regional government, for planning guidance. The following plans have major impacts on planning for the City's infrastructure:

2040 Growth Concept and the Urban Growth Management Functional Plan

The 2040 Growth Concept, adopted by the Metro Council, provides a long-range plan for the future growth and development of the Portland metropolitan region. It is based on a set of shared regional values, including thriving neighborhoods and communities; abundant economic opportunity; clean air and water; protecting streams and rivers; preserving farms and forestland; access to nature; and a sense of place. The Growth Management Functional Plan provides tools that help meet goals in the 2040 Growth Concept.

Regional Transportation Plan

Metro's adopted Regional Transportation Plan (RTP) shapes future planning to protect the livability of the region's communities and sustain the region's well-being and economic prosperity. The Plan is intended to advance regional policies, public priorities, and local efforts to implement the 2040 Growth Concept to keep the region a great place to live and work for everyone.¹ The City of Portland's Transportation System Plan, which serves as the transportation component of this plan, will be updated as part of the Comprehensive Plan Update process to be consistent with the RTP.

Community Investment Strategy

Metro's Community Investment Strategy (2010) recommends both public and private investments necessary to maintain prosperity, sustainability and equity in the Portland metropolitan region. It is based on an assessment of the region's urban growth boundary. The Community Investment Strategy supports investments within existing communities to promote economic development, protect natural areas, and

¹ Metro. "2035 Regional Transportation System Plan Update". <http://www.metro-region.org/index.cfm/go/by.web/id=25038>

improve livability. More specifically, it recommends continued investments in the region's centers and corridors and regional collaboration to identify and address critical infrastructure gaps.

The Intertwine

The City of Portland is one of over 100 regional public, private, and non-profit partners in the Intertwine Alliance. The Intertwine provides a vision, objectives, and a plan for an “exceptional, multi-jurisdictional, interconnected system of neighborhood, community and regional parks, natural areas, trails, open spaces, and recreation opportunities” in the Portland metropolitan region. Chapter 9: Parks and Recreation includes information and investments related to the City of Portland’s park, natural area, and trail components of this regional network.

Local Plans

The Portland Plan

The Portland Plan, adopted in 2012, set four shared priorities – prosperity, education, health, and equity – to guide the actions of the City and other government agencies in Portland over the next 25 years. The Comprehensive Plan is one of a set of important tools for implementing the Portland Plan priorities and guiding policies.

According to The Portland Plan, “For Portland to be prosperous, educated, healthy and equitable, quality, reliable basic services must be provided for all.” The Citywide System Plan supports this goal and continues the integration of the Portland Plan’s strategic priorities and guiding policies. The four shared priorities, and their implications for infrastructure planning and future investment, are discussed in Chapter 3: Guiding Principles. The legacy of these priorities and policies can also be seen in the goals and policies included in Chapter 5.

City of Portland and Multnomah County Climate Action Plan and Climate Change Preparation Strategy

Portland’s Climate Action Plan is a strategy to put Portland and Multnomah County on a path to achieve a 40 percent reduction in carbon emissions by 2030 and an 80 percent reduction by 2050 (compared to 1990 levels). The plan builds upon a legacy of forward-thinking climate protection initiatives that have resulted in significant total and per person reductions in local carbon emissions. The Climate Action Plan identifies several 2030 objectives and near-term carbon reducing actions in a variety of areas that are relevant to the Citywide Systems Plan, including energy, land use, transportation, and natural systems. The Climate Change Preparation Strategy focuses on understanding how climate affects the community today and how those impacts are expected to change in the coming century. In addition to identifying vulnerabilities and risks, the strategy outlines key objectives and actions to build resiliency to heat, drought, wildfire, floods, and landslides into the City’s everyday operations, services, and built and natural infrastructure.

Transportation System Plan

The Transportation System Plan (TSP) is Portland's long-range plan to guide transportation investments. The TSP meets State and regional planning requirements and addresses local transportation needs for cost-effective street, transit, freight, bicycle, and pedestrian improvements. The Plan provides transportation choices for residents, employees, visitors, and firms doing business in Portland, making it more convenient to walk, bicycle, take transit, and drive less to meet their daily needs. The TSP provides a balanced transportation system to support neighborhood livability and economic development.

The Transportation System Plan is being updated to reflect the Comprehensive Plan Update and the update of the Regional Transportation Plan. The TSP serves as the transportation component of the Citywide Systems Plan, as authorized in State public facility planning statutes (OAR 660-011 and ORS Chapter 197).

Portland Watershed Management Plan

In 2006, Portland City Council adopted the Portland Watershed Management Plan (PWMP) in order to focus efforts to protect and restore Portland's natural systems while also addressing relevant environmental regulations. The PWMP is a citywide plan that lays out an integrated, system-wide approach to improving watershed health. Although the Bureau of Environmental Services is the lead implementation bureau, the PWMP relies on and informs projects and programs of other bureaus and relates to many infrastructure investments.

Other City and Agency Plans

The Citywide Systems Plan (CSP) draws from other plans and policies created and adopted by the City's planning and infrastructure bureaus and by agency partners. Individual bureau or asset plans form the foundation of the CSP. In many cases, these plans provide more detailed information regarding infrastructure needs and investment strategies. Area and neighborhood plans, developed through partnerships between the City and local neighborhood associations, organizations, and community members, identify community needs and desired improvements for consideration in long-term infrastructure plans.

With the exception of the Transportation System Plan, discussed above, referenced bureau and agency plans are not adopted as part of the CSP or the Comprehensive Plan. A list of supporting plans and reports can be found in Appendix C.

Process and Public Involvement

Periodic Review Work Program

Portland is updating its Comprehensive Plan, as required by the State of Oregon, through a process called "periodic review." According to the state, the fundamental purpose of periodic review is to ensure local comprehensive plans are:

- Updated to respond to changes in local, regional, and State conditions;

- Coordinated with other comprehensive plans and investments; and
- In compliance with the statewide planning goals, statutes, and rules.

The Bureau of Planning and Sustainability developed a work plan for this update that has been approved by City Council and the Oregon Department of Land Conservation and Development (DLCDD). The work plan includes the following tasks:

- Task 1: Community Engagement: Providing open and meaningful opportunities for individuals and organizations to effectively influence the Comprehensive Plan update.
- Task 2: Inventory and Analysis: Conducting research and analysis necessary to provide a solid factual base for the Comprehensive Plan update.
- Task 3: Consideration of Alternatives: Exploring the social, economic, environmental, and energy implications of alternative patterns of development.
- Task 4: Policy Choices: Considering and making a variety of policy choices.
- Task 5: Implementation: Identifying and developing implementation measures necessary to carry out the policy choices.

The Citywide Systems Plan is a component of Task 4 and builds on the work completed in Tasks 1 through 3.

Interbureau Coordination

The Citywide Systems Plan was developed by the Citywide Systems Team. The Citywide Systems Team is an interbureau working group comprised of representatives from the Bureau of Environmental Services, Bureau of Transportation, Portland Water Bureau, Portland Parks & Recreation, Office of Management and Finance, and Bureau of Planning and Sustainability. The group is overseen by these bureaus' directors and convened by the Bureau of Planning and Sustainability.

Community Involvement

Development of the Citywide Systems Plan draws on multiple other planning processes that were completed in coordination with the community including:

- The work of Comprehensive Plan Update **Policy Expert Groups**, composed of community and government representatives, who developed, reviewed and provided comments to City staff on policy directions for the Comprehensive Plan Update.
- The **Working Draft Part 1** of the Comprehensive Plan Update, which focused extensively on the draft goals and policies that shape this Plan. These draft goals and policies are included in Chapter 5.
- The **Working Draft Part 2** of the Comprehensive Plan Update, which provided an opportunity for public review of the Citywide Systems Plan and the infrastructure investment strategy.
- The **Portland Plan**, which set strategic priorities and guiding policies that provide a framework for the investments included in this Plan. The Portland Plan was developed in partnership with Portland agencies and institutions, community members, and businesses.

- Various **bureau and agency plans** including Parks 2020, the Portland Watershed Management Plan, and the Transportation System Plan. Many of these plans were developed in consultation with the community.
- The City's **annual budget process** and Budget Advisory Committees, which involve community members in shaping the City's Capital Improvement Plan, which is reflected in the CSP's investment strategy.

In addition, development of the Citywide Systems Plan has offered various opportunities for direct public review and input. These opportunities included:

- **Online and mail comment options:** Both email and mail comment options were available so residents, businesses, agency partners and organizations could submit comments on the draft Comprehensive Plan Update.
- **An online Map App:** The investment strategies outlined in this plan were included as map layers in the Comprehensive Plan Update's online Map App. The Map App was an interactive online tool that allowed community members, business owners, agency representatives, and other interested people to compare infrastructure needs and investments with potential areas of growth, demographic information, and other policy choices to identify and prioritize investment needs. Visitors to the Map App were able to view the maps, combine map layers, see areas of concern or change, make comments, and view comments from others.
- **Community events:** Staff attended 98 workshops, meetings, and other community events during the three-month comment period, with approximately 1,950 people attending the sessions. These events included:
 - Fifty-one community meetings, where organizations invited staff to introduce and engage members with tools and products like the Citywide Systems Plan, Map App, and the Companion Guide. Many of these meetings were tailored to specific group interests or geographies.
 - Thirty-three training events, where staff primarily focused going through the Map App and the Companion Guide.
 - Three information sessions hosted by the Bureau of Planning and Sustainability, held in downtown and in East Portland.
 - Three District Mapping Conversations, held in West, East, and North Portland, involving interactive discussions focused on specific issues and questions facing those districts.
 - Three community events where staff set up tables and talked to the public in North Portland, East Portland, and Downtown.

During review of the Working Draft (fall 2013), the Bureau of Planning and Sustainability received over 1100 comments through the outreach methods described above. Over 725 of these comments related specifically to infrastructure or to the Citywide Systems Plan. The City received over 4,000 public comments during review of the Proposed Draft – of which 1068 related to transportation and 125 related to other public facilities. The Citywide Systems Plan has been updated to reflect community conversations that occurred as part of the Comprehensive Plan Update, including Policy Expert Group discussions, public workshops and comments from individuals, associations, businesses, and agencies.

Chapter 2

Asset Management

Effectively Managing the City's Infrastructure Systems

In 2013, the replacement value of the City of Portland's built infrastructure was estimated at \$31.3 billion.² Providing, operating, and maintaining the City's infrastructure has become increasingly important as current systems age and Portland's population grows.

Asset management is a tool to identify the most cost-effective way to protect assets, provide community services, and safeguard public health, environmental quality, and economic security. Asset management is commonly defined as meeting agreed upon customer service levels, while minimizing life cycle costs at an acceptable level of risk. It focuses on delivering value to the customer – both in terms of the services provided and the rates charged – in an efficient and transparent manner.

The goal of asset management is to make better decisions about infrastructure acquisition, planning, design, construction, operation and maintenance, and renewal or replacement. Five core questions of asset management help achieve this goal:

- What is the current state of the assets?
- What is the required sustained level of service?
- Given the system, which assets are critical (based on risk) to sustained performance?
- What are the best "minimum life-cycle cost," Capital Improvement Program (CIP), and Operation and Maintenance (O&M) strategies?
- Given the above, what is the best financing strategy?

Asset management involves continuous improvement. City bureaus are committed to improving asset management practices to accurately inform strategic decision making and effective infrastructure management. For example, the City continues to develop more sophisticated methods for assessing and tracking the condition of its infrastructure.

Maintaining Existing Assets

Because Portland's city limits cannot expand significantly, the majority of new growth will be accommodated within the City of Portland's current boundaries. This means existing transportation, water, sewer, stormwater, and parks and recreation systems will serve the majority of current and new residents' and businesses' needs over the coming decades, resulting in additional demands on existing infrastructure. These systems also will be used more heavily as new residents of Portland's suburbs come into the city to work, shop, or play.

² City of Portland, "Citywide Assets Report", 2013, Available at: <http://www.portlandoregon.gov/bps/article/49854> .

The City has a large infrastructure maintenance deficit, due largely to the age of many systems, chronic underinvestment in preventative maintenance and capital repair, increasing maintenance costs, and the lack of revenue to allow more sustainable investment. At current funding levels, some of Portland's infrastructure will continue to deteriorate. This will increase the risk of asset failures, reduce levels of service, and perpetuate long-standing inequities.

Managing risk

Asset management involves comprehensively examining the risks of infrastructure failure. Infrastructure can fail due to poor condition or impacts from a natural or man-made event. They can also fail to provide the intended service, fail to meet regulatory goals, or fail to be cost effective. The City's infrastructure bureaus are undertaking risk management analyses to help identify strategic investments that will cost-effectively reduce the likelihood of asset failure. For example, the Bureau of Environmental Services and Portland Water Bureau both evaluate the age and condition of pipes. They combine this data with information about what could cause a pipe to fail, how likely these events are to occur, and the potential consequences of a failure. This analysis enables the Bureaus to identify the most critical and cost-effective repair or replacement projects. Actions to manage risk should increase the City's ability to meet community needs while protecting human and environmental health. However, new funding strategies or sources will also be needed to fully address deficiencies.

Complying with regulatory mandates

In addition to meeting maintenance and repair needs, the City also must maintain compliance with a variety of federal and State regulations, primarily related to protecting public health and environmental quality. At the federal level, many of these mandates are related to the Clean Water Act, Clean Air Act, Safe Drinking Water Act, Endangered Species Act, and Americans with Disabilities Act. Complying with these mandates is a City priority and represents a large component of infrastructure spending. Because of this priority, meeting regulatory mandates can mean that other maintenance, repair, and improvement projects must be put on hold, or additional funding must be allocated. As regulations are created or revised in the future, the City will need to continue to examine investment approaches and priorities to ensure infrastructure systems adequately serve the community. More detailed information on regulatory mandates can be found in the system-specific chapters of this plan.

Accommodating growth

The majority of the City's residential and employment growth over the next 20 years will occur on vacant sites or as redevelopment within the city's existing boundaries. As such, the ability of the City's infrastructure to accommodate growth depends primarily on the City's ability to resolve current deficiencies — to serve under-served areas and to improve or maintain the condition of existing infrastructure.

Major redevelopment efforts can have significant implications on existing assets and the type and extent of new infrastructure needed to serve an area. Without careful planning, such projects can overstretch the ability of existing built and natural infrastructure to meet community needs, particularly in under-served areas. As redevelopment is planned, it will be important to consider the full implications of such efforts on

infrastructure needs and financial resources, and to coordinate planning with bureaus whose infrastructure might be impacted.

To better accommodate growth and reduce system loads, bureaus are actively researching and using a variety of demand management strategies. The ability of bureaus to innovate, reduce demand, or increase efficiency through new technologies and practices will be instrumental in their ability to serve the city in the future.

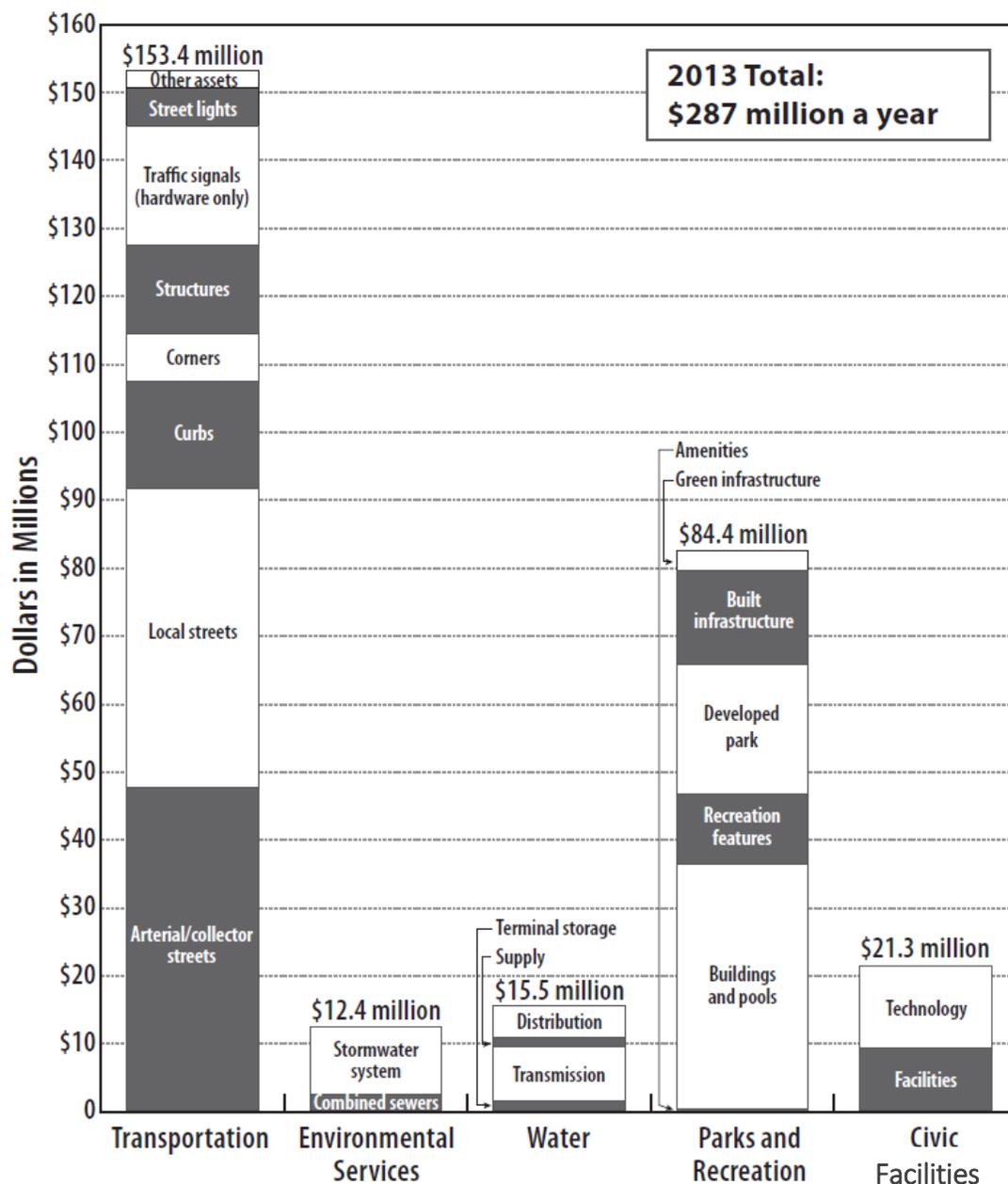
Infrastructure funding gaps

Conservatively, the City's infrastructure bureaus estimate that the City needs to invest approximately \$287 million more than current funding levels per year for each of the next 10 years to replace existing aging assets, maintain existing facilities, address regulatory requirements, and/or meet service levels, see Figure 2.1. This gap will likely grow for each of the next 10 years. That level of reinvestment would require spending at least 25 to 40 percent more than the City currently spends on major maintenance and capital projects. New assets often add to ongoing operations and maintenance needs, potentially adding to the funding gap. Some new assets may also replace existing asset functions and add new functionality. The City's estimated annual funding gap includes:

- **Transportation:** Significant maintenance needs for the City's street system – one of City's most valuable assets – make up the largest portion of the City's annual \$153.4 million transportation funding gap. The funding gap for collector and arterial streets is estimated at \$47.6 million with another \$44 million for local streets, based on pavement condition. There are also significant funding gaps for the sidewalk system (\$15.7 million annually to repair, restore or replace curbs and \$7.1 million annually to build and maintain ADA accessible corners); bridges (\$12.9 million); signal hardware (\$17.5 million); street lights (\$5.8 million); and other assets (\$2.8 million).
- **Environmental Services:** The City's \$12.4 million annual funding gap for environmental services reflects unmet replacement and maintenance needs for sewer and stormwater systems. The estimated funding gap makes broad assumptions about the rehabilitation and capacity needs in the City's separated stormwater areas, for which more detailed assessment and planning is currently underway.
- **Water:** The City's annual \$15.5 million funding gap for water assets includes unmet replacement and maintenance needs in the distribution system (including pipes, services, valves, and hydrants); needs to replace or upgrade sections of transmission conduits; and maintenance needs for the Bull Run watershed road system.
- **Parks & Recreation:** The City's parks and recreation system has an expected total capital annual funding need of \$84.4 million for parks and recreation facilities for each of the next 10 years. This includes \$47.8 million for expanding the system to provide standard levels of service for all residents in addition to \$36.6 million in funding needed to maintain existing assets.
- **Other civic facilities:** The City's \$21.4 million annual funding gap for civic facilities includes funding necessary to meet industry standards for major maintenance of City facilities, such as office buildings, police and fire facilities, spectator facilities, and maintenance facilities, as well as annual funding to ensure replacement and upgrades of technology on accepted schedules.

To maintain a high level of infrastructure services, the City will need to reassess service level standards, identify strategic investments, consider the full long-term costs of improvements, pursue innovative funding sources and partnerships, and work with the community to make tough choices about funding priorities. Chapters 6 through 10 of this document provide more detailed system-specific information on the asset management needs and approaches of the various City infrastructure bureaus.

Figure 2.1 Annual Funding Gap, by Asset Group (in millions per year, December 2013)



Managing the city's green infrastructure

The city's green infrastructure -- including natural areas, tree canopy, streams and rivers, and engineered features like green streets and ecoroofs -- provides many infrastructure and ecosystem services. For example, green infrastructure can manage stormwater, improve water quality, reduce flooding risk, provide wildlife habitat, provide areas for recreation, and improve resilience to natural hazards and climate change. A single green infrastructure asset may provide many different infrastructure services. For instance, a greenstreet facility might help retain and infiltrate stormwater, provide habitat and access to nature, and calm traffic.

Protecting and enhancing this green infrastructure is critical to the City's ability to provide public services in a cost-effective and sustainable way. However, green infrastructure presents unique asset management challenges:

- Some green infrastructure assets are owned and/or managed by the City (e.g. green streets, City-owned parks and natural areas), while many others are not (e.g. streams and rivers; private vegetated stormwater facilities; and natural areas and trees on land not owned by the City). However, the City relies on the infrastructure functions and ecosystem services provided by both public and private green infrastructure.
- From a financial planning perspective, green infrastructure assets cannot be accounted for in the same ways as grey infrastructure assets, like pipes. For example, the infrastructure service value of green infrastructure assets (e.g. trees) cannot be determined by its replacement cost and the value may appreciate over time.
- The nature and frequency of maintenance, replacement and/or restoration of green infrastructure assets is different than traditional infrastructure assets, such as pipes and streets, and has a bearing on operations and maintenance (O&M) budgets. Some green infrastructure projects have lower up-front capital costs than traditional infrastructure, but may require more regular maintenance. In other cases, capital funding (e.g., to purchase a new park or natural area) is available, but O&M funding is not.

The City is actively working to develop and improve asset management practices for green infrastructure that address these challenges. However, green infrastructure assets are not fully incorporated into the asset management information and tables (e.g. inventory, condition, replacement value) in the Citywide Systems Plan.

Growth forecasts and locations

Today, more than 605,000 people live in Portland. Over the last 30 years, Portland's population has increased by more than 200,000 residents, primarily due to annexations in east and west Portland during the 1980s and 1990s. According to the Metro 2040 regional forecast, by 2035, Portland is expected to grow by nearly 280,000 people (132,000 households) and 147,000 new jobs within its current boundaries.

In addition, the four-county Portland metropolitan area is anticipated to grow from approximately 1.6 million residents in 2010 to over 2.8 million residents in 2035.³

Portland's existing zoning has more than enough development capacity to accommodate anticipated future residential growth and most projected employment growth, except for industrial and institutional uses. This surplus capacity creates an opportunity to make choices about where to focus or prioritize growth.

Buildable lands inventory

The Buildable Lands Inventory (BLI) is an assessment of the city's capacity to accommodate projected changes in housing and employment. A series of maps documents potential physical and market constraints to achieving forecasted increases in households and jobs. These maps were used to determine whether land in the city has full, diminished, or no capacity to accommodate additional housing units or additional jobs forecasted for the next 20 years.

A number of infrastructure related constraints were considered to pose physical or market constraints on new development and were accounted for in the inventory. These constraints included:

- Transportation Vehicular Level of Service
- Transportation Street Improvements
- Water Service
- Sewage Conveyance
- Stormwater Constraints
- Airport Flight Limitations

More information on the Buildable Lands Inventory is available at <http://www.portlandoregon.gov/bps/59296>.

Growth scenarios and preferred development pattern

The Growth Scenarios report is a background report of the Comprehensive Plan and is a required element of Portland's Periodic Review work program (Task 3). The purpose of this report is to describe how and where Portland is expected to grow over the next 25 years, and to measure the performance of different alternate growth patterns and their ability to help meet Portland's goals and objectives. This analysis is rooted in the Measures of Success adopted in the Portland Plan.

The Growth Scenarios report offers a basis for making informed decisions about which investments and growth patterns will bring the greatest benefit to the most Portlanders, reduce disparities, increase opportunities, and move the city closer to meeting performance goals, such as improving access to living-wage jobs, providing safe and convenient access to goods and services within walking distance of where

³ Metro, "Population and Housing Forecasts for 2035, by City and County." dated January 15, 2013; Online: <http://www.oregonmetro.gov/index.cfm/go/by.web/id=42397>.

people live, reducing risks due to natural hazards, enhancing watershed health, and reducing carbon emissions.

The initial Growth Scenarios analysis included four growth scenarios:

- Default – The Default Scenario is based on existing development patterns and development trends. This scenario distributes future growth in the same places Portland has seen growth over the past 15 years.
- Centers – The Centers Scenario focuses more growth in established centers like Lents, Hillsdale, and Gateway and less growth along the length of commercial and mixed use streets.
- Corridors – The Corridors Scenario focuses more development along streets like SE Powell, SE Foster, SW Barbur and N Lombard and less growth in centers.
- Central City Focused – The Central City Focused Scenario concentrates nearly all growth in the Central City and the inner neighborhoods near the Central City, both east and west of the Willamette River.

More information on the Growth Scenarios is available at <http://www.portlandoregon.gov/bps/62384>.

The Growth Scenarios analysis and public input were used to develop a preferred development scenario, in which growth is primarily accommodated in centers and corridors distributed throughout the city. This preferred development scenario guided refinement of the Comprehensive Plan Urban Design Direction and Comprehensive Plan Map. The Citywide Systems Plan is intended to provide a general plan for serving the land use designations and densities designated in the Comprehensive Plan Map.

Centers and Corridors as focus areas for growth

Metro 2040, the Portland Plan, the Growth Scenarios Report, and the Comprehensive Plan Update all support and/or examine continued residential and mixed use growth in centers and along key corridors. This focus is intended to improve access to services and opportunities for active transportation, enhance household and economic prosperity, help the city achieve its climate preparation and carbon emission reduction goals, and promote community and watershed health. Community conversations about the location, type, extent, and level of development in each center and corridor were part of the Comprehensive Plan Update.

These same plans, as well as the Economic Opportunities Analysis (EOA), expect high levels of employment growth and intensification in industrial sanctuaries, campus institutions, and dispersed industrial and employment areas throughout the city to accommodate future job growth.

Many centers, corridors, and employment areas will require additional public infrastructure investment over the next twenty years to resolve existing deficiencies, accommodate additional growth, encourage and support private investment and job creation, and develop complete communities. As more detailed area-specific planning is completed for these areas, future refinements to the Citywide Systems Plan may be necessary to fully reflect recommended infrastructure investments.

Investment strategies for centers and corridors

The Comprehensive Plan supports strategic public and private investments in housing, jobs, and infrastructure in centers and corridors. These investments will improve equity and help ensure Portlanders live in healthy, complete, and prosperous neighborhoods.

Centers and corridors vary in terms of their current and expected future size, character, and demographic makeup. They also vary in terms of how prepared they are, in terms of physical infrastructure and facilities, to be able to succeed as anchors to healthy connected neighborhoods.

The Comprehensive Plan supports four investment strategies that tailor the type of investment to the expected population of the area, infrastructure needs, and presence of people who might be vulnerable to displacement. Figure 2.2 shows how designated centers vary according to these factors. The combination of these factors plays out in four different investment strategies described below.

1. Invest to reduce disparities and improve livability

This strategy is appropriate for centers and corridors that are not expected to grow significantly, but that have existing infrastructure deficiencies. Addressing these deficiencies will improve health and livability for area residents. For example, investments could fill gaps in streets, bicycle and pedestrian routes, and local parks. Economic development programs could support existing and new businesses and improve neighborhood prosperity and vitality.

2. Invest to enhance neighborhoods, maintain affordability and accommodate growth

This strategy is aimed at centers and corridors that lack basic infrastructure or shops and services and that either have a lot of residents now, or will in the future. These areas also have many people who may be vulnerable to displacement as property values rise.

In these areas, infrastructure investment could include improving streets, creating new parks, and addressing other deficiencies. Economic development programs could preserve and increase jobs, businesses, and community services in these areas. Housing security programs, like homeownership and rental assistance, could help keep the neighborhood affordable for a range of households.

3. Respond to opportunities and maintain existing services

Some centers and corridors have limited infrastructure needs and are not expected to grow significantly. In these areas, investments focus on maintaining livability and existing infrastructure as well as responding to opportunities.

4. Invest to fill service gaps, maintain affordability and accommodate growth

Some centers and corridors have already benefited from public and private investments in things like light rail, complete streets and neighborhood business districts. In these areas, future investments should focus on making sure infrastructure can serve new residents, filling remaining service gaps, and providing affordable housing.

Figure 2.2 Investment Strategies for Centers

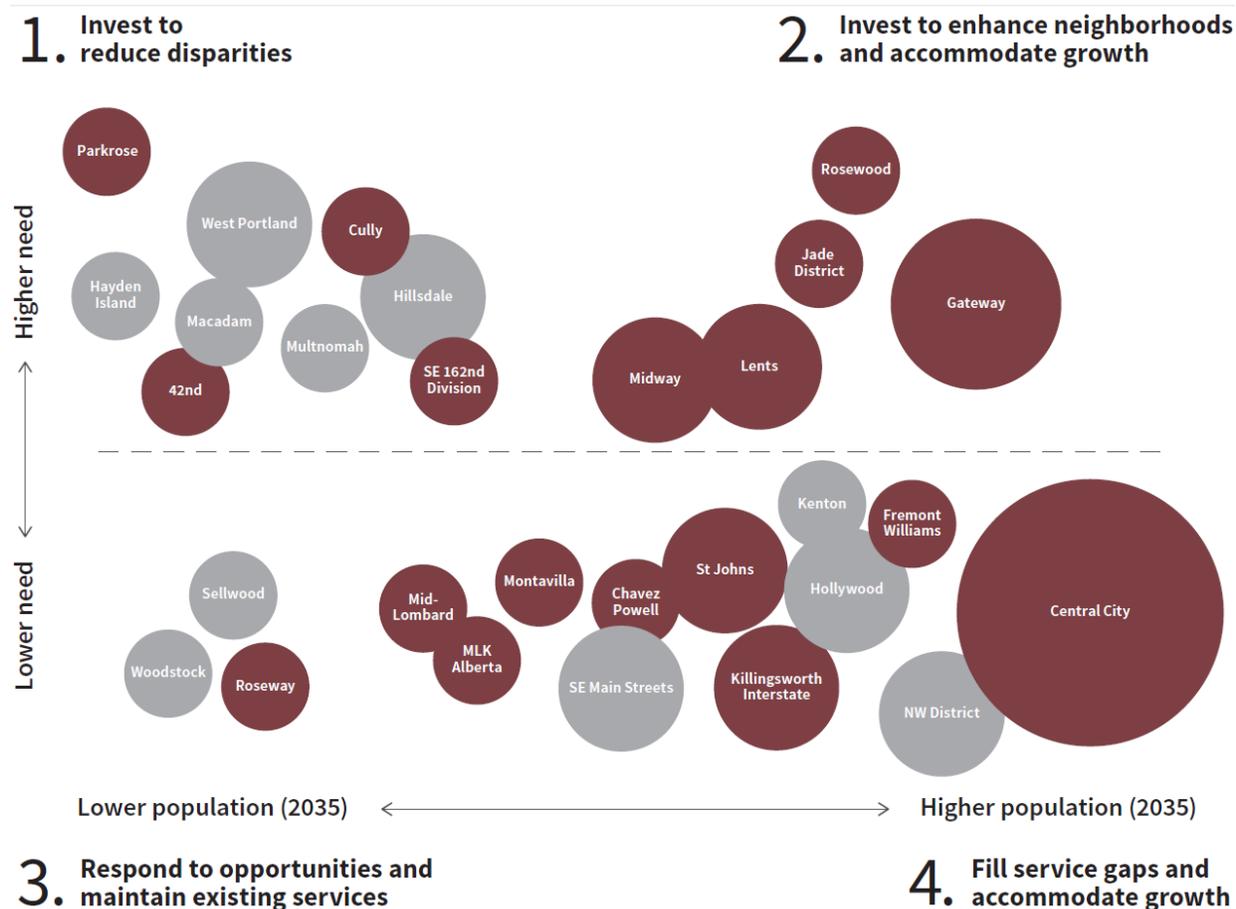


Figure 2.2 shows how Portland’s Centers vary in future population, infrastructure needs, and presence of people who might be vulnerable to displacement. The four investment strategies are described in more detail above.

Vulnerability to displacement

In some centers and corridors, many households have the resources and financial security to benefit from and adapt to neighborhood growth and development. However, other centers and corridors – those shown in dark red on Figure 2.2 - are home to more people (renters, households with low income and education levels, and communities of color) that may not be poised to take advantage of growth or may be at risk of involuntary displacement as development occurs.

Summary of system capacity to accommodate growth

Environmental Services

The Bureau of Environmental Services (BES) plans for its facilities based on the maximum densities allowed within existing Comprehensive Plan land use designations. Additional investments in the sewer system will be necessary to address high risk assets, to provide stated levels of service, and to meet regulatory requirements. BES expects to be able to maintain and improve the sewer systems to handle growth needs as long as sewer rates are sufficient to finance system maintenance and capacity upgrades. However, site-specific issues, such as topography and the proximity of existing sewer or stormwater systems, mean that it may not be technically or economically feasible to serve all properties.

The City's stormwater system is composed of combined sewers (sanitary and storm) and separated storm sewers and drainage systems. Stormwater management also relies on the natural rivers and streams that convey stormwater and on stormwater management systems that are owned by other public agencies and private property owners. In areas of the city where the City's stormwater system is constrained, existing and possible future development may exceed the natural and built systems' ability to manage stormwater. This could contribute to flooding, erosion, and damage to homes, business, roads, natural areas, and streams.

Choices about how the city grows will have a substantial effect on the stormwater system. Adequately serving future growth will require investments in traditional piped systems and green infrastructure by the City, other public agencies, special districts, and private property owners to ensure effective stormwater management.

Water

The Portland Water Bureau's primary distribution system can reliably deliver water through 2035, mostly using existing facilities. The Water Bureau is planning water infrastructure improvements to address increasing retail demands within the city limits; demand is expected to increase from 61.5 million gallons per day in 2005 to 79 million gallons per day in 2030. Serving Portland's future population also relies on the continued adequacy and reliability of water systems owned by special districts that serve areas within Portland's urban services boundary.

The Water Bureau also supplies water to regional wholesale customers. Population in areas served through these wholesale contracts is expected to increase significantly, resulting in potentially large increases in water demand. The Water Bureau, in collaboration with the Regional Water Providers Consortium, will also continue investing in water conservation programs that help manage demand and extend the life of the water supply system.

Transportation

The success of Portland's transportation system in meeting future local and regional mobility needs will depend on the City's — and its partners' — ability to maintain existing assets and make strategic investments. The City faces significant funding challenges, maintenance backlogs for existing assets, and

deficiencies in service provision. Future transportation investments will be needed to provide complete, safe, and accessible pedestrian, bicycle, and transit systems and to support freight mobility and access.

Providing a well-functioning, multimodal transportation system for Portland's residents, businesses, and visitors also depends significantly on the ability of the City's partners, including Multnomah County, the Oregon Department of Transportation, TriMet to provide and maintain their facilities, which are critical components of the overall transportation system.

Parks & Recreation

To maintain Portland's quality of life while accommodating growth, it will be necessary to preserve and enhance access to a variety of high-quality park and recreation experiences by acquiring and protecting a range of parks and natural areas, maintaining existing facilities, and providing additional recreation facilities and services. The actual number and type of parks and recreational facilities needed will vary based on where and how growth occurs, the ability of existing facilities to serve additional users and meet diverse needs, and what opportunities arise to locate and build additional parks and facilities. Planning for Portland's future park and recreation system will require providing park experiences that are tailored to both a growing and diverse population and also to the unique characteristics of Portland's parks and natural areas.

Adequately serving current and future Portlanders will also require ensuring that the City's diverse park system provides a variety of active and passive recreational experiences that respond to the unique community and environmental context of different areas of the city. In addition, growth may also place additional pressure on heavily used facilities, such as swimming pools, and it may exacerbate service deficiencies in currently under-served areas. These pressures may be particularly acute in centers that currently lack sufficient park amenities, where both existing facilities and acquisition opportunities are scarce.

Other City Facilities and Systems

Meeting the needs of current and future Portlanders also relies on the City's ability to maintain and enhance other essential facilities and systems – including office buildings, technology, vehicles and apparatus – that are vital to the efficiency and effectiveness of all City agencies, and play an instrumental role in the City's capacity for emergency response.

Non-City Infrastructure Systems

The City does not directly provide public facilities for public education, energy, waste, telecommunications, library, public health, and justice services. However, the current and future capacity of these systems to meet the desired level of service is critical to the city's overall ability to serve current residents and businesses, meet the demands of growth, and be healthy, prosperous, and resilient. Because of this, the City of Portland has an interest in coordinating with these agencies and companies. For example:

- **Public Education:** The City partners with school districts on school facility planning and siting and has begun to consider school district capacity when planning for growth. In addition, the City

encourages school facilities to be multi-functional neighborhood anchors, designed and programmed to serve community members of all generations and abilities, helping Portland become a more age-friendly city.

- **Energy:** Private utilities and companies provide energy facilities and services in Portland. While the City of Portland does not directly provide energy facilities and services, it does regulate placement of these facilities within the right-of-way and on public property. In addition, the City promotes efficient, reliable, and sustainable energy resources, investments, and consumption practices. In particular, the City encourages the use of smart grid technologies; low-carbon and renewable energy sources; and onsite and district-scale renewable energy production to improve the efficiency, reliability, affordability, and sustainability of the energy supply and distribution system.
- **Solid waste, composting, and recycling:** Solid waste, composting, and recycling facilities and services are regulated and provided through a partnership between the City of Portland, Metro, and private companies. The City supports sustainable waste reduction, recovery, and management and acknowledges the important upstream impacts of consumption and disposal of goods and materials. The City also supports efforts to ensure materials are used and reused to the fullest extent possible prior to disposal.
- **Technology and communications:** Private utilities and companies provide technology and communication facilities and services to the general public. The City provides certain technology and communications services to support service delivery by the City and other governmental partners, and it promotes access to affordable and reliable technology and communications for all Portlanders. The City acknowledges that information and technology services have become essential infrastructure, and supports investments and partnerships to ensure all Portlanders are able to access and benefit from emerging technologies, keep Portland competitive, and build on the city's tradition of open-source collaboration and innovation.

Chapter 3

Guiding Principles

The Comprehensive Plan includes a set of integrated Guiding Principles – equity, prosperity, human health, watershed health, and resilience – that bridge policy approaches throughout the Comprehensive Plan. These Guiding Principles have direct implications for the City of Portland’s infrastructure investment and management over the coming decades. The following sections address each of these principles and highlight supportive infrastructure investments and approaches intended to meet them.

Guiding Principles

The Guiding Principles encapsulate the Portland Plan’s key priorities of equity, prosperity, health, and resiliency into the Comprehensive Plan and implementation tools. The Principles guide projects, programs, and land use decisions that are subject to the Comprehensive Plan. They are intended to be relevant to every project, program, or land use decision that updates or amends an element of the Comprehensive Plan or one of its implementation tools, including amendments to the Citywide Systems Plan. The Principles encourage balanced, integrated multi-disciplinary approaches among topics such as housing, economic development, and transportation.

Guiding Principles. When making and adopting legislative land use decisions, consider the impacts of:

- **Equity and environmental justice.** Encourage land use decisions that reduce existing disparities, minimize burdens, extend benefits, and improve socio-economic opportunities for under-served and under-represented populations.
- **Economic prosperity.** Encourage land use decisions that support the city’s economy and foster employment growth, competitiveness, and equitably-distributed household prosperity.
- **Human health.** Encourage land use decisions that avoid or minimize negative health impacts and improve opportunities for Portlanders to lead healthy, active lives.
- **Environmental health.** Encourage land use decisions that recognize, incorporate, and sustain valuable ecosystem services related to air, water, and land quality, and the intrinsic value of nature.
- **Resilience.** Encourage land use decisions that improve the ability of individuals, communities, economic systems, and the natural and built environment to recover from natural and human-made disasters, climate change, and economic shifts.

Equity

Portland is becoming an increasingly diverse city, home to people of many races, ethnicities, ages, abilities, and incomes. To serve the needs of a diverse city, the Portland Plan identifies equity as a key strategic priority and a frame for decision-making, investment, community engagement, and measurement of success.

In keeping with the federal Civil Rights Act of 1964, “It is the policy of the City of Portland, that no person shall be denied the benefits of or be subjected to discrimination in any City program, service, or activity on the grounds of race, religion, color, national origin, English proficiency, sex, age, disability, religion, sexual orientation, gender identity, or source of income.”

The Portland Plan defines equity as “when everyone has access to the opportunities necessary to satisfy their essential needs, advance their well-being and achieve their full potential.” As part of adopting the Portland Plan in 2012, City Council directed the implementation of the City’s Civic Rights Title VI Plan to remove barriers and conditions that disadvantaged groups from receiving access to, participation in, and benefits of City programs, services, and activities.

The Comprehensive Plan Update’s Vision for 2035 highlights the importance of equity, including ensuring “everyone has access to opportunity and is engaged in shaping the decisions that affect their lives.” Equity is further integrated into the plan as a guiding principle and through a variety of goals and policies that support decisions that reduce existing disparities, minimize burdens, extend benefits, and improve socio-economic opportunities for under-served and under-represented populations.

Portland’s Demographics

Growing diversity and shifts in Portland’s population and household makeup have, and will continue to, bring corresponding changes in the values and needs of the community. These shifts result in changes in the types of transportation, water, park, and civic facilities needed to adequately serve the community.

Changing demographics may require the City to modify existing infrastructure practices or design systems that can anticipate and adapt to changing needs. For example, the City will need to continue to improve transportation infrastructure so all Portlanders, including older residents, families with children, people with disabilities, and residents with limited disposable income can walk, bike, or take transit in their neighborhoods and to destinations throughout the city. The City may also need to plan for improved or different parks and recreation facilities to accommodate diverse recreational needs and shifts in use patterns.

Race and Ethnicity

According to the U.S. census, communities of color made up approximately 15% of Portland’s population in 1980. In 2010, these communities represented 24% of the population, lower than the national average of 33%. In 2010, the City’s population was approximately 7% Asian, 6% Black or African American, 1% American Indian and Alaskan Native, 1% Native Hawaiian and Pacific Islander, 5% two or more races, 76% white, and 4% some other race. Additionally, approximately 9% of Portlanders identify as Latino or Hispanic, an increase of over 50% from 2000.

Portland’s youth, those 25 years old and younger, are more diverse than the city as a whole. In 2010, more than 36% of Portland youth are people of color — Black or African American, Native American, Native Hawaiian, Pacific Islander, Native Alaskan, Asian, or multiracial. In addition, more than 18% of all youth identify as Latino or Hispanic.

Age

The age of Portland's population has remained relatively constant over the past decade. In 2010, approximately 29% of Portlanders were 24 or younger, 36% were between 25 and 44 years of age, 25% were between 45 and 64, and 11% were 65 or older. In general, areas farther from the city's core, such as East Portland and St. Johns, tend to have higher youth populations.

Disability

In 2000, approximately 19% of Portlanders over age 5 had a disability that impacted their daily activities. These disabilities included sensory, physical, and mental disabilities. Rates of disability are highest for those over 65, at 42.5%, and lowest for people between 5 and 20 years of age, at 8.9%. The Americans with Disabilities Act (ADA), enacted on July 26, 1990, provides protections to individuals with disabilities in the areas of employment, State and local government services, public accommodations, and telecommunications.

The Title II of the ADA prohibits State and local governments from discriminating on the basis of disability, but moreover, its goal is to promote equal access and full participation for all. The City of Portland works to ensure every program, service, benefit, activity, and facility operated or funded by the City of Portland is accessible to people of all abilities. The City strives to eliminate barriers that may prevent persons with disabilities from accessing facilities or participating in City programs, services, and activities. The City is currently developing a citywide transition plan to determine what physical barriers might prevent persons with disabilities from accessing facilities owned or operated by the City.⁴

Income

In 2011, the median household income in Portland was \$48,831. This was \$7,023 less than the median household income in the Portland-Vancouver metropolitan region. The region's lowest median incomes can be found in North/Northeast Portland, Southeast Portland, and outer east Portland. Median household income has increased by approximately 21.6% since 2000, less than the rate of inflation. Approximately 28% of Portland households earn less than \$25,000 annually, while 31% earn more than \$100,000 annually.

Fourteen percent of Portland's families were living below the poverty level⁵ in 2011. Poverty affects over a quarter of youth under 18 (27%) and 10% of people 65 and older. Similarly, 14% of local families access food stamp or SNAP benefits.

⁴ City of Portland, Americans with Disabilities Title II Program. Online, available at <http://www.portlandoregon.gov/bibs/62112>

⁵ In 2011, the poverty threshold was \$22,350 for a family of four.

Investing to reduce disparities

To equitably serve Portlanders, the City must work to reduce existing disparities in infrastructure service. In order to meet the Comprehensive Plan's equity principle, the City's infrastructure must be provided in equitable ways to ensure all Portlanders have access to opportunity.

Providing basic infrastructure services in currently under-served areas is a challenge – particularly for transportation, parks and recreation, and stormwater services. Resolving these deficiencies and filling gaps in existing networks will aid the City in serving existing residents and accommodating new growth. The Citywide Systems Plan presents an opportunity to reduce these disparities through policies and investments.

The Bureau of Transportation faces some significant deficiencies, based on existing levels of service and design standards. Issues include street connectivity, pedestrian and bike access and facilities, safety improvements, and substandard streets. Resolving these deficiencies would provide Portlanders with greater transportation access to employment, housing, schools, parks, commercial and community services, and other destinations throughout the city and region. The transportation investment strategy, described in Appendix A and in the Transportation System Plan, includes investments to improve multi-modal connectivity by expanding the active transportation network, maintaining transportation infrastructure, and improving safety.

Portland Parks & Recreation bases its service on sufficiency and access to park and recreation facilities. Unfortunately, many areas of Portland – especially outer east, southwest and central northeast – lack sufficient facilities such as developed parks, community centers, and trails and natural areas. In addition, many areas lack the supporting pedestrian infrastructure to allow safe pedestrian access to parks and recreation facilities. In park-deficient areas, local residents may lack opportunities to recreate, experience nature, and take advantage of the physical, mental, and community health benefits parks provide. Portland Parks & Recreation has identified a need to acquire and develop parks and recreation facilities in currently deficient areas.

Environmental Services' investments in sewer and stormwater systems and wastewater treatment are prioritized by risk due to age, condition, capacity, and regulatory mandates. Typically, high-risk areas are located in Portland's inner neighborhoods, where infrastructure is the oldest. Sewer failures or stormwater issues can result in flooding in basements and streets, sewer backups, landslides, and erosion, posing hazards to residents, businesses, and the environment. In these areas, the Bureau's Investment Strategy, described in Chapter 6 and Appendix A, includes projects to reduce risks and improve sewer capacity. In East Portland, the sewer system is relatively new. There, and in other areas of the city, the Citywide System Plan identifies investments in programs to address stormwater and natural system deficiencies and ensure the benefits of green infrastructure are equitably distributed. Examples include the Johnson Creek flood mitigation program, as well as increased tree planting in canopy-deficient areas, and community watershed stewardship grants and education programs.

Responding to local context

Each area of Portland has its own distinctive characteristics that are valued by community members. Different places are distinguished by their communities and their unique topographies, natural features, histories, assets, patterns of development, and building types.

Instead of following a one-size-fits-all approach, growth, investment, and change can be used to enhance the strengths and assets of each area. The use of infrastructure service and design standards that reflect the unique physical and service needs of different areas of the city will ensure infrastructure is context-sensitive and provides appropriate levels of service. The public facility policies and investments in the Citywide System Plan reflect a move towards context-sensitive approaches. For example, transportation policies support a flexible approach to street design and development standards to respond to local context while ensuring multi-modal movement and access. Similarly, stormwater investments account for unique watershed conditions, including hydrology, natural resources, and level of development.

Promoting inclusive public process

The City supports appropriate and inclusive public involvement in infrastructure investment decision-making – from project identification and prioritization to design and construction. The Community Involvement chapter of the Comprehensive Plan's Goals and Policies, as well as guidance provided by the Community Involvement Program, support inclusive, meaningful, and transparent public involvement. Community involvement in infrastructure decision-making should be tailored to respond to the unique needs of the project and the impacted community.

Using an equity lens

Putting equity into practice requires considering relevant data and questions and setting priorities to advance equity in decision-making. City infrastructure bureaus have been working both internally and with community members and partners to improve common understanding of infrastructure equity. Meeting the needs of a diverse and changing population requires addressing existing disparities while remaining mindful of, and adapting to, changes in community needs over time. There is, and will continue to be, a need for capacity-building, data refinement, risk assessment, community involvement, and the evolution of policies and practices to fully understand and address the equity impacts of infrastructure decisions.

The following questions can serve as an initial step to implementing an equity lens to ensure equitable outcomes in infrastructure investment decision-making. These questions can be asked at different phases of an infrastructure project, policy, or program to begin to assess potential equity impacts:

- What is the existing level-of-service in the project area? How does it compare to the existing levels-of-service across the City?
 - If the level-of-service in the area is less than other areas in the city, what are the economic, social, and environmental impacts of that reduced level of service? Does the project remedy those impacts?
 - If the level-of-service in the area is equal to or greater than other areas of the city, what are the drivers, desired results, or outcomes of the infrastructure project or program?

- What are the demographics of the area?
- Are there current or historical disparities related to infrastructure service? How does the service provided by the proposed asset maintenance, rehabilitation or renewal relate to those disparities? Could the project be improved to further reduce existing disparities?
- Who benefits most from the infrastructure project? Does the infrastructure project positively benefit racial, ethnic, or low-income communities, or people with disabilities?
- Are there potential negative consequences, impacts or burdens of the infrastructure project on racial, ethnic, or low-income communities, or people with disabilities? If so, what are the strategies to mitigate these negative impacts?
- How does the infrastructure project support inclusive, meaningful, and transparent public involvement, particularly for those most impacted?
- Does the infrastructure project support local job creation and economic development opportunities for impacted communities? Will local residents and businesses have preference for construction contracts or employment?
- Based on the information gathered and the answers to these questions, does the project or program support increased equity in the City?

Investment, Gentrification and Displacement

Public and private investments in Portland's neighborhoods have resulted in gentrification and displacement of communities of color, low-income people, and minority-owned businesses. The Portland Plan sets an expectation that an equitable city should be proactive about the inequitable impacts that neighborhood change and gentrification can have on vulnerable households. Specifically, it called for approaches to help evaluate and better manage potential gentrification impacts of new policies, programs, and investments.

Investment in public infrastructure can cause direct displacement, through the use of eminent domain and other tools to “make way” for a new public facility. Investment can also be an indirect factor – inducing gentrification by increasing property values and housing prices, resulting in displacement due to diminished neighborhood affordability.

As part of efforts to evaluate potential gentrification impacts on local communities, the Bureau of Planning and Sustainability (BPS) commissioned a Gentrification and Displacement Study, authored by Dr. Lisa Bates. The study provides a methodology for assessing the risk of displacement, based on vulnerable population criteria (People of Color, low-income, renters, low-education attainment), changing demographics, and real estate market activity. The resulting map of neighborhood typologies, see Figure 3.1, shows where neighborhoods fall on a spectrum of gentrification risk. The study also includes a review of national best practices, including policy tools and programs that Portland could use to mitigate gentrification such as community benefit agreements. This analysis forms the foundation for the assessment of “vulnerability to displacement” used in the investment strategy for centers and corridors, described on pages 21 and 22.

When planning public investments, the City should use this map and analysis to identify critical opportunities to use the equity lens described above, involve local communities in decision-making, and link planned public investments in at-risk areas with strategic housing, economic development and other tools to address displacement risk for impacted communities.

Prosperity

Infrastructure can be an important component of a successful economic development strategy, or it can be a key barrier to competitiveness and sustainability. Planning efforts for economic development should consider the opportunities of existing infrastructure capacity, challenges or deficiencies, and strategies to finance priority improvements. Economic development also offers potential opportunities to fund infrastructure improvements through public/private partnerships and other financing mechanisms.

Economic Shifts and Employment Forecasts

Portland is the metropolitan area's regional job center and is home to 39% of the region's jobs, even though it is home to only 26% of the population. While Portland's job growth has been nearly flat (5%) since 2010, Metro expects the city will see higher rates of job growth over the next 20 years. It expects 147,000 new jobs in Portland, representing about 27% of the region's expected job growth. This level of growth is comparable to the city's historic "capture rate" of 25% of regional growth.

Manufacturing remains a key employment sector in the city. Jobs in the manufacturing sector offer opportunities for living-wage careers for residents, potentially without requiring higher education. They also have a high "employment multiplier" effect – one manufacturing job supports 3.69 total jobs in the region. Manufacturing output has been growing faster than output from service sectors. Beyond manufacturing, institutional and office are also leading employment sectors.

Over the next 20 years, Portland will see growth in all five employment geographies – in the Central City, industrial areas, commercial areas, institutions like hospitals and universities, and in residential areas. Supporting employment growth and the success of existing businesses in each of these areas may result in different infrastructure needs and investment priorities.

Building a resilient economy

Competitiveness

The growth of global markets and the tightening of employment land markets in the inner portions of the Portland region mean Portland must continue to provide sufficient, high-quality employment land and necessary infrastructure to remain competitive and attract and retain businesses. To accomplish this, the City strives to provide adequate industrial and employment lands, served by associated infrastructure services, and to keep utility and infrastructure costs competitive. The Portland region's growing export activity is concentrated in manufacturing (e.g. high tech, metals, and transportation equipment), where job growth has been modest but output growth continues to outpace service sectors. The region also has growing export specializations in software, apparel, and clean-tech.

The Citywide Systems Plan includes investments in basic infrastructure services, such as transportation, water, and sewer, necessary to support economic activity. It also includes investments in parks, recreation, natural areas, trails, and other quality of life improvements, which are key to attracting and keeping a quality workforce.

Capacity and Viability

To maintain its economic competitiveness, the City must provide adequate employment capacity and protect the viability of its industrial areas and harbor, which may require infrastructure improvements geared toward the types of industries in these areas. Infrastructure improvements will also be needed to allow economic development of new areas or more intense development of existing commercial and industrial zones.

Portland's Economic Opportunities Analysis (EOA) (2012), recommends infrastructure investment as a strategy to help meet Portland's future industrial and institutional capacity needs. It recommends prioritizing infrastructure investments that will result in greater utilization of existing industrial properties to meet capacity needs. Such infrastructure investments could include improvements to transportation and transit systems, sewer and water facilities, as well as telecommunications infrastructure. For institutional campuses, public transit infrastructure is the highest investment need.⁷

The Citywide Systems Plan identifies transportation, sewer, and water facilities that will be necessary to support employment designations identified in the Comprehensive Plan.

Transportation and Freight Movement

Many local industries and businesses depend on reliable and efficient transportation systems, particularly for freight. Portland's transportation system is critical to the regional economy, as it provides connections to major markets within the city, access to major rail, marine and air cargo routes, and is a key link in the interstate highway system.

Congestion can impede freight movement, cause delays to businesses and commuters, and increase the cost of doing business in Portland. In general, as roadways reach capacity, small increases in the number of vehicles result in large increases in delays.⁸ Conversely, small decreases can also reduce congestion significantly. Successful travel reduction strategies, such as providing affordable, reliable, and connected active transportation systems, and investments in critical infrastructure can improve freight movement, reduce commute times, and help attract and keep a quality workforce in Portland.

Portland's Economic Opportunities Analysis (EOA) recommends "strategic investments in the freight transportation systems and infrastructure needed to grow Portland's competitive position in the rapidly growing and changing international marketplace."⁹ The EOA highlights the importance of continued investments in Portland's transportation infrastructure as outlined in the City's adopted Freight Master Plan (2006), which details policies, strategies, and desired improvements to freight management and movement in the City. Priority is given to the Freight Master Plan's program of strategic investments to encourage reinvestment and industrial expansion in Columbia Harbor as Oregon's international trade

⁷ City of Portland (2012). *Economic Opportunities Analysis – Section 4 Alternative Choices*. p. 26. Retrieved from <http://www.portlandonline.com/portlandplan/index.cfm?c=51427&a=392786>

⁸ Dill, 2007.

⁹ City of Portland (2012). *Economic Opportunities Analysis – Section 4 Alternative Choices*. p. 19. Retrieved from <http://www.portlandonline.com/portlandplan/index.cfm?c=51427&a=392786>

gateway, freight distribution hub, and international airport. The Transportation chapter of this Plan integrates recommendations and projects identified by the Freight Master Plan.

The Economic Opportunities Analysis also recommends prioritizing and better linking freight transportation improvements with other infrastructure investments in employment districts. To begin, it recommends working with regional partners to develop a regional freight rail strategy focused on enhancing rail access, travel time, and the efficiency of rail operations for competitive access to markets.

Funding investments

Portland, like many cities across the nation, faces infrastructure funding challenges. Although the City is implementing best management practices and working with public and private partners to improve the efficiency and effectiveness of its infrastructure systems, new ways to fund infrastructure will be needed in the future, either to replace currently outdated funding systems or supplement inadequate funding levels. Portland's Economic Opportunities Analysis (2012) recommends that the City, and the region, pursue alternative infrastructure investment and funding strategies to maintain a competitive and innovative business environment. In particular, the EOA lists maintenance and upgrades to the transportation system, particularly for freight mobility, and broadband investments to support high tech industry as key infrastructure investment areas in need of alternative funding strategies.¹⁰

Maintaining Affordability

In order to support community prosperity and affordability for households and businesses, the City aims to cost-effectively provide high-quality, reliable infrastructure services to the community. To accomplish this goal, the City is working to prioritize preventative maintenance to minimize future costs, compare the costs and benefits of proposed actions, employ risk management principles to direct public resources at the most urgent needs, and utilize diverse funding streams.

Education

Creating an educated Portland requires that all youth have the necessary support and opportunities to thrive – both as individuals and as contributors to a healthy community and a prosperous, sustainable economy.¹¹

Supporting youth success

The City's infrastructure, particularly its transportation systems, parks and recreation facilities, natural areas, and police and emergency services are critical to creating neighborhoods that support youth success. The Portland Plan sets a 2035 goal that all youth live in safe and supportive neighborhoods with safe and affordable transportation options, multiple opportunities for daily physical activity and healthy eating, public safety services, and quality schools that offer multiple community-serving functions.

¹⁰ City of Portland (2012). *Economic Opportunities Analysis – Section 4 Alternative Choices*. p. 11. Retrieved from <http://www.portlandonline.com/portlandplan/index.cfm?c=51427&a=392786>

¹¹ City of Portland (2012). *The Portland Plan*. p. 33.

The Citywide Systems Plan includes a variety of investments that help to create complete neighborhoods that support youth success. The Plan includes active transportation investments to create safe walking and biking routes throughout the city to key destinations like schools, centers, employment areas, transit, parks and natural areas. It also includes programs and investments to maintain and improve parks, recreation facilities and school grounds to increase access to recreation. The Plan supports investments, programs, and partnerships to bring nature into the city through enhanced habitat corridors, tree planting, and the use of vegetated stormwater facilities, like green streets and stormwater swales. Finally, the Citywide System Plan also supports continued collaboration between the City and local school districts around safe routes to schools, recreational programs, and neighborhood and police services.

Human and watershed health

A healthy city requires quality basic services to protect and promote human health and safety and watershed health. The City's transportation, water, sewer, stormwater, trails, green infrastructure, parks natural areas and recreation, and police and fire facilities and services are all critical to protecting and maintaining health and quality of life. The Citywide Systems Plan includes investments in projects and programs to manage and maintain these public infrastructure systems to provide these essential services.

Creating healthy, complete neighborhoods

In complete neighborhoods, people have safe and convenient access to the places, goods, and services needed in daily life. These neighborhoods include housing options, employment options, grocery stores and other commercial services, quality public schools, parks, trails, natural areas and recreational facilities, affordable active transportation options, and civic amenities. A complete neighborhood must also meet the needs of people of all ages and abilities.

Complete neighborhoods can improve human and watershed health by protecting air and water quality through more trees and other green infrastructure; creating safe and convenient options to walk, bike, or take transit; and providing access to nearby parks and natural areas. These elements further promote human and environmental health by reducing auto emissions and other pollutants, and by supporting community resiliency and preparedness in an emergency or disaster. Maintaining existing built and natural infrastructure, as well as providing new infrastructure, is critical to creating complete neighborhoods.

The Citywide Systems Plan includes a variety of investments aimed at creating healthy, complete neighborhoods – including investments in active transportation networks, parks and natural areas, green infrastructure, and emergency response.

Connecting people and places

Connecting Portlanders through active and low-carbon transportation options to their neighborhoods and to key destinations across the city and the region is integral to improving personal, public, and environmental health. These key destinations include places like work, school, shops, and parks and recreational opportunities. Such transportation choices reduce the need to drive, which can promote health by increasing physical activity, reducing household costs, increasing access to the outdoors, and

reducing carbon and other air and water pollutants. Making active transportation a safe and convenient option requires creating a network of safe, accessible and attractive streets, trails, and greenways that encourage active living and community interaction and that integrate nature into neighborhoods. In addition to human and environmental health benefits, shifting travel to active transportation can increase capacity on roadways for freight and automobile movement. Preserving this capacity supports economic prosperity and reduces the need for additional roadway capacity as the city and region grow. The Citywide Systems Plan includes projects and programs to improve active transportation and greenway networks and to improve the safety of the city's roadways.

Protecting and improving watershed health

Healthy watersheds provide a broad array of ecosystem services. Trees, natural areas and other green infrastructure help keep the air and water cool and clean, support stream flow and stormwater management, protect and enhance biodiversity, and reduce the risks and impacts of natural hazards and climate change. These "ecosystem services" are critical for protecting public health and safety and ensuring the effectiveness of Portland's infrastructure systems. They also help the City meet environmental regulations.

The Natural Resource Inventory, adopted as part of the factual basis for the Comprehensive Plan, will inform programs to protect and restore the rivers, streams, wetlands, and vegetation that provide these ecosystem services, and that are vital components of City's stormwater infrastructure system in many Portland neighborhoods. In addition, the Portland Plan establishes objectives and actions for protecting and improving watershed health and associated benefits by 2035.

Multiple bureaus, including Portland Parks & Recreation and the Bureau of Environmental Services, play a role in protecting, restoring, and enhancing watershed health in the city. The Citywide Systems Plan identifies priority projects and program investments needed to sustain and improve key watershed functions relating to hydrology (how water interacts with the natural and built landscapes), water quality, habitat and wildlife, and to meet existing and emerging regulatory obligations.

Designing with nature

The Citywide Systems Plan and the Comprehensive Plan Update's draft goals and policies encourage infrastructure design that protects and enhances watershed health and ecosystem services and avoids the costs associated with degraded natural resources. The updated goals and policies call for treating stormwater as a resource, protecting existing green infrastructure and adding tree canopy and landscaped stormwater facilities into development and street design in order to mimic the natural functions of a healthy watershed. The Citywide Systems Plan includes policies and investments intended to further integrate green infrastructure into infrastructure planning, design, and implementation, while complementing Comprehensive Plan policies that encourage environmentally-friendly development and building design.

Resilience

Preparing for climate change

Portland's climate is changing. Temperatures have increased by an average 1.3° F over the past century in the Pacific Northwest. Precipitation in the Pacific Northwest has generally increased, especially in the spring. The future impacts Portland experiences from climate change will depend largely on whether global carbon emissions decline quickly, plateau, or continue to rise.

In the Pacific Northwest, climate change projections indicate an increase in average annual temperature of 3.3° F to 9.7° F by the end of this century, with greater warming happening in the summers. These projections forecast decreases in summer precipitation (by as much as 30 percent) and increases in winter precipitation over the coming century. In the future, Portland will likely experience hotter, drier summers, and warmer, wetter winters, with more heat waves occurring during the summers.

Portland's infrastructure is vulnerable to several climate change risks including increased flooding and landslides in the winter, and high temperatures, drought, and wildfires in the summer. Portland's built infrastructure has been designed to withstand the historic climatic record. Events outside of that past experience, or an increased number of damaging events, can significantly impact important infrastructure services such as water, sewer, stormwater, flood management, and transportation. Climate change impacts can result in some infrastructure systems becoming more frequently stressed, overloaded, damaged, or at times, partially or totally unavailable. The Citywide Systems Plan includes investments to help ensure the reliability of the City's infrastructure, including improvements to water supply sources and stormwater management facilities.

Portland's green infrastructure, including trees, ecoroofs, green street facilities, natural areas, wetlands, natural waterways, and floodplains, could also be affected by climate change. For example, hotter summers can stress vegetation and make it more susceptible to diseases, pests, and invasive species. Increased flooding onto developed lands threatens homes, businesses, and roadways, and is likely to result in increased pollution and sediment entering streams, reducing water quality. However, investment in green infrastructure could mitigate stress on other assets and on Portland's residents and businesses. For example, increased tree canopy can reduce the severity of heat waves, and green streets can reduce urban flooding. The Citywide Systems Plan includes a variety of investments to protect, enhance, and restore the city's natural areas, urban canopy, and other green infrastructure.

Considering the impacts of climate change and identifying the vulnerabilities and risks of those impacts, enables the City to make more informed infrastructure investment decisions to better prepare and adapt for climate change and improve the resiliency of critical infrastructure. Climate change vulnerabilities must be incorporated into the risks of failure of the City's built and green infrastructure so assets can be appropriately maintained, designed, and replaced to improve the resiliency of systems to hotter drier summers, wetter winters, and storms of increased intensity.

Preparing for and responding to natural hazards¹²

The City of Portland faces potential impacts from a wide variety of natural hazards including earthquakes, severe weather, floods, landslides, urban wildland fires, and volcanic activity. The City's infrastructure facilities and services are vulnerable to natural hazards and are also key to recovering from such events. The City's Natural Hazard Mitigation Plan identifies natural hazards, assesses the related threat and vulnerability to the city's facilities, and recommends mitigation strategies to address high risk assets. The following types of infrastructure are important to hazard preparedness, response, and recovery:

- **Essential facilities** are necessary for continuation of operations and include police and fire stations, City Hall, the 1900 Building, the City's Emergency Coordination Center, the 911 Call Center, and the Justice Center.
- **Critical facilities and infrastructure** include "systems and assets necessary to ensure continuity of security, safety, health and sanitation services, support the area's economy and/or maintain public confidence. Incapacitation or destruction of any of these systems or assets would have a debilitating impact on the area either directly, through interdependencies and/or through cascading effects."¹³ Critical infrastructure includes public services that have a direct impact on quality of life such as communication technology (phone lines or Internet access); vital services such as public water supply, sewage treatment; and transportation facilities, such as airports, heliports, highways, bridges, tunnels, roadbeds, overpasses, railways, bridges, rail yards, depots and waterways, harbors, and dry docks.
- **Lifelines** include utility systems (potable water, wastewater, oil, natural gas, electric power facilities, and communication systems) and transportation systems (airways, bridges, roads, tunnels, and waterways). Communications facilities are also important lifelines.
- **High Potential Loss Facilities** include facilities that would have a high loss (environmental, economic, or human life and safety) associated with their failure, such as nuclear power plants, levees, dams, and military installations. In Portland, City-owned high potential loss facilities include Portland Water Bureau reservoirs, such as those at Mount Tabor and Washington Park.

The Citywide Systems Plan includes investments to improve the resiliency of the City's infrastructure to natural and other hazards. These include projects to reduce risks to essential and critical infrastructure; improve and restore the city's green infrastructure; enhance the seismic resilience of facilities; and provide redundant (i.e. backup) infrastructure for assets like water and sewage pump stations.

Adapting to social and economic changes

Resilient infrastructure must be adaptable to social and economic shifts as well as natural and climactic changes. Many types of infrastructure built today – including roads, pipes, and parks – are expected to last for many decades. Planning, managing, and investing in the City's infrastructure in ways that reflect changing demographics and economic needs will be integral to meeting the needs of the community over coming decades.

¹² Adapted from City of Portland, Natural Hazard Mitigation Plan, 2010.

¹³ Portland/Vancouver Urban Area Critical Infrastructure Protection Plan, 2009.

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Chapter 4

Infrastructure and Service Delivery

Urban Service Provision

The City of Portland is the primary provider of infrastructure facilities and services, including transportation, water, sanitary sewer, stormwater, civic facilities, and parks and recreation, within the Portland urban services boundary (USB). The urban service area largely corresponds to areas within the city limits of Portland, but also includes additional unincorporated areas (see Figure 4.1 and the City's Comprehensive Plan Map).

The City of Portland partners with a variety of agencies and organizations to provide infrastructure services within the Portland urban service boundary, see below. While not explicitly discussed in this report, the capacity of these partner agencies to provide necessary services affects the City of Portland's service capabilities and demands. As part of the Comprehensive Plan Update, the City of Portland has or should establish intergovernmental service agreements with agency partners that provide urban services within the Portland Urban Service Boundary, in accordance with Oregon Revised Statute 195 and 197. These service partners are noted with an asterisk (*) below.

In some cases, the City of Portland provides infrastructure services to areas outside of the City of Portland urban services boundary, through service contracts with neighboring jurisdictions.

Service Responsibilities

The City of Portland provides the following public facilities and services within Portland:

Transportation

The City of Portland manages and/or regulates public rights-of-way and manages and maintains a variety of transportation facilities. Transportation facilities and services are also provided by a variety of other public agencies:

- Multnomah County* manages and maintains six Willamette River bridges.
- The Oregon State Department of Transportation* manages the State highway system, including the Marquam, Fremont, Interstate and Glenn Jackson bridges.
- TriMet* provides and operates the regional transit system, including the Tilikum Crossing bridge, with the exception of the Portland Streetcar which is owned by the City of Portland, operated with assistance from Portland Streetcar Inc, and funded in partnership with TriMet; and the Portland Aerial Tram, which is owned by the City and operated in partnership with the Oregon Health Sciences University (OHSU).
- The Port of Portland*, a regional agency, operates several marine terminals and the Portland International Airport.

- The BNSF Railway, Union Pacific Railroad, Portland and Western Railroad, Portland Terminal Railroad, Peninsula Terminal Railroad, and Amtrak move goods and people by rail.

Sanitary sewer, stormwater, and flood management

The City of Portland is the primary provider of sanitary sewers, wastewater treatment, stormwater management and conveyance, and flood management except as follows:

- Washington County's Clean Water Services*, the Port of Portland, and the Oregon Department of Transportation provide stormwater management and conveyance to some areas of Portland.
- Gresham, Milwaukie, Clackamas County Service District #1, and Clean Water Services provide conveyance and treatment of sewage in some areas of Portland.
- The Multnomah County Drainage District No 1*, Peninsula Drainage District No 1*, and Peninsula Drainage District No 2* provide stormwater management and conveyance services and flood mitigation and control in much of the Columbia Corridor. New agreements are in negotiations.
- Management of stormwater on private property has an impact on the amount and quality of stormwater entering public stormwater systems.
- The East and West Multnomah Soil and Water Conservation Districts, governmental agencies, provide technical, financial and educational assistance to support efforts to conserve and restore natural resources within their districts.
- Non-governmental associations, such as Watershed Councils and Friends groups, steward and support the protection, restoration and enhancement of the city's watersheds.

Water supply and distribution

The City of Portland is the primary provider of water supply and distribution, except in areas where service is provided under agreement with water districts, see below. Except as noted below, these water districts are wholesale customers of the Portland Water Bureau and therefore rely, to some degree, on the water supply, transmission, and storage infrastructure of the City of Portland.

- The Rockwood People's Utility District* provides water infrastructure and services to some areas of east Portland.
- The Burlington*, Tualatin Valley*, Valley View*, West Slope*, Palatine Hill*, and Alto Park* Water Districts and the Lorna Water Company provide water service to primarily unincorporated areas within the Portland urban service boundary to the west, southwest, and northwest of Portland.
- The Clackamas River Water District* and Sunrise Water Authority* provide water services to unincorporated areas within Portland's urban service boundary to the south of Portland. These water districts operate in partnership with each other through a cooperative agreement and use the Clackamas River as their main water supply source.

Parks and recreation

The City of Portland is the primary provider of public parks, recreational facilities, and natural areas. The City also manages Portland's urban forest, including regulation of street trees, public trees, and some

private trees, and development and implementation of strategies, education programs, and best management practices. Partners include:

- Oregon State Parks owns and operates Tryon Creek State Natural Area.
- Metro, the regional government, manages regional parks and natural areas, a number of spectator facilities, and the Oregon Zoo.
- Other non-governmental providers, such as the Audubon Society, own and maintain natural areas and public open spaces in Portland.
- Non-profit associations, “friends” groups, councils, and volunteer organizations help steward and support the City’s parks, natural areas, trails, facilities, and arts and recreation programs.

Green infrastructure

The City of Portland protects, restores, constructs and manages a variety of green infrastructure assets, such as trees, natural areas, ecoroofs, green street facilities, wetlands, and natural waterways. Other governmental agencies, nonprofit organizations and private entities also play a large role in the protection and stewardship of these resources.

Within the City government, responsibility for green infrastructure assets is divided among various City bureaus, including the Bureau of Environmental Services, Portland Parks & Recreation, the Bureau of Transportation, Portland Water Bureau, and Office of Management and Finance. Bureaus make capital and programmatic investments, and maintain diverse partnerships, to support management of the city’s green infrastructure. In addition, because green infrastructure provides multiple infrastructure services and functions, planning, acquisition, development, restoration, and long-term management of green infrastructure assets may be provided by individual bureaus or through cross-bureau partnerships.

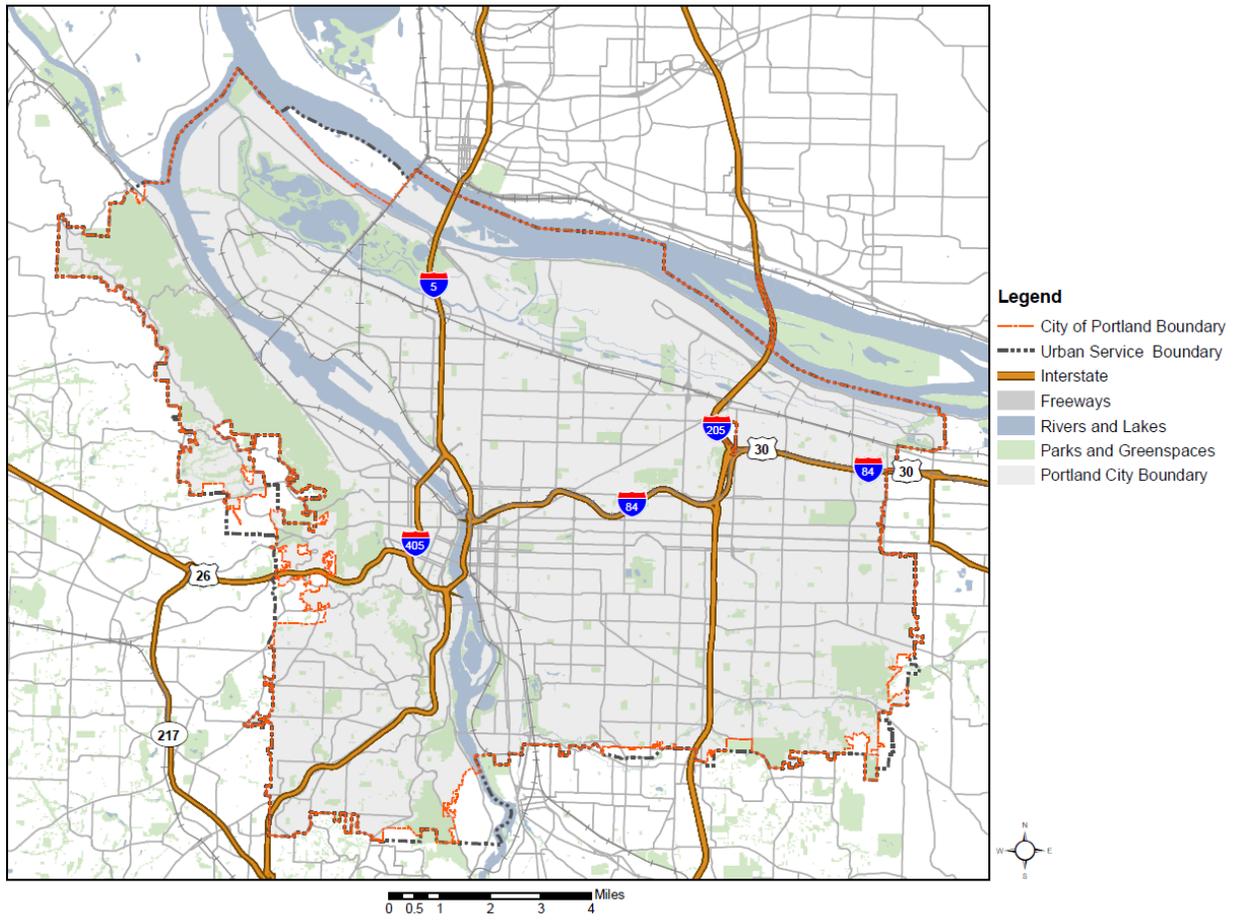
Public safety

Public safety and emergency services, including police, fire, and emergency management, are provided primarily by the City of Portland. Portland Fire & Rescue and the Portland Police Bureau participate in mutual aid agreements with all fire agencies bordering the City of Portland. The goal of mutual aid is to lend or receive fire protection and emergency medical services assistance across jurisdictional boundaries. The City also operates the regional 9-1-1 center and related systems. In addition, the Port of Portland provides police, fire, and rescue services for the Portland International Airport.

Solid waste, composting and recycling

The City of Portland regulates the collection and hauling of solid waste, compost, and recycling. Metro is the regional solid waste authority, charged with ensuring that the region’s solid waste is managed in a manner that protects public health and safety and safeguards the environment. Metro regulates facilities and operates transfer stations; private companies collect, transfer, process, and dispose of solid waste, compost, and recycling. The City partners with Metro and supports Metro’s work to ensure sound landfill management.

Figure 4.1. Portland's Urban Service Boundary and City Limits



Citywide inventory

The City of Portland provides and maintains infrastructure systems that supply water, sewer, transportation, parks and civic services. These infrastructure systems represent a significant investment and have a current replacement value of more than \$31 billion.¹⁴ Tables 4.1 and 4.2 summarize of the City’s infrastructure inventory, including the status, value, and condition of assets. These tables only include assets owned and/or managed by the City of Portland and do not reflect assets owned by partner agencies or by private property owners (e.g. private trees). Assets owned by partner agencies and private entities contribute to the overall provision of public services in the City of Portland but are not a component of this Plan.

Table 4.1 Summary of the City of Portland’s Infrastructure Systems (2013)

Transportation		<ul style="list-style-type: none"> 4,842 lane miles of roads 160 bridges 1,072 traffic signals 8.8 million square yards of sidewalks 37,813 improved corners 55,389 street lights 		
Environmental Services		<ul style="list-style-type: none"> 1,454 miles of separated storm and sanitary sewer pipes 885 miles of combined sewer pipes 97 pumping stations 2 wastewater treatment plants 47,779 storm and sanitary sewer access structures 1,900 green stormwater facilities (green streets, ponds, and swales) 885,312 feet of culverts and ditches 8,587 underground injection control facilities (UICs) and sedimentation manholes 		
Water		<table border="0"> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> Bull Run watershed Columbia South Shore wellfield 238 million gallons finished storage 75 miles of conduits 49 miles of transmission mains 2,200 miles of pipes 1,600 culverts 2 dams </td> <td style="vertical-align: top; padding-left: 20px;"> <ul style="list-style-type: none"> 33 wells 184,000 service lines 44,000 valves 184,800 meters 14,200 hydrants 38 pump stations 70 storage tanks </td> </tr> </table>	<ul style="list-style-type: none"> Bull Run watershed Columbia South Shore wellfield 238 million gallons finished storage 75 miles of conduits 49 miles of transmission mains 2,200 miles of pipes 1,600 culverts 2 dams 	<ul style="list-style-type: none"> 33 wells 184,000 service lines 44,000 valves 184,800 meters 14,200 hydrants 38 pump stations 70 storage tanks
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Parks & recreation		<table border="0"> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> 11,546 acres of parkland and natural areas 5 golf courses 8 botanical / public gardens 1 motorsports raceway 4 stadiums 13 pools 14 community and arts centers </td> <td style="vertical-align: top; padding-left: 20px;"> <ul style="list-style-type: none"> 155 miles of regional trails 129 playgrounds 232 sports fields 48 community gardens 124 tennis courts 5 skate parks 33 dog off leash areas </td> </tr> </table>	<ul style="list-style-type: none"> 11,546 acres of parkland and natural areas 5 golf courses 8 botanical / public gardens 1 motorsports raceway 4 stadiums 13 pools 14 community and arts centers 	<ul style="list-style-type: none"> 155 miles of regional trails 129 playgrounds 232 sports fields 48 community gardens 124 tennis courts 5 skate parks 33 dog off leash areas
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Other facilities & systems		<table border="0"> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> Facilities: 8 Police precincts and facilities 8 office, PDC facilities, and other buildings 5 spectator and performing arts facilities 32 fire stations and facilities </td> <td style="vertical-align: top; padding-left: 20px;"> <ul style="list-style-type: none"> Technology: Communications networks Production Services Strategic technology Electronic equipment and software </td> </tr> </table>	<ul style="list-style-type: none"> Facilities: 8 Police precincts and facilities 8 office, PDC facilities, and other buildings 5 spectator and performing arts facilities 32 fire stations and facilities 	<ul style="list-style-type: none"> Technology: Communications networks Production Services Strategic technology Electronic equipment and software
<ul style="list-style-type: none"> Facilities: 8 Police precincts and facilities 8 office, PDC facilities, and other buildings 5 spectator and performing arts facilities 32 fire stations and facilities 	<ul style="list-style-type: none"> Technology: Communications networks Production Services Strategic technology Electronic equipment and software 			

¹⁴ City of Portland, “2013 City Assets Report”.

Table 4.2 City of Portland’s Infrastructure: Inventory, Value, and Condition (2013)

Capital Asset Class	Description	Replacement Value		Current Condition (in %)						Confidence
		\$ million	Confidence	Very Good	Good	Fair	Poor	Very Poor	TBD	
Transportation		\$8,066.8								
Arterial & collector streets	1,871 lane miles	\$2,451.0	Moderate	18	21	21	32	8	0	High
Local streets	2,971 lane miles	\$2,304.8	Moderate	12	19	22	36	11	0	High
Sidewalk system										
sidewalks	8,833,812 sq. yds	\$1,113.1	High	10	25	30	25	10	0	Moderate
curbs	3,260 centerline miles	\$533.6	Moderate	12	50	16	12	10	0	Moderate
corners	37,813 corners	\$158.5	High	10	18	17	28	27	0	High
Structures (bridges only)	160 bridges	\$378.5	Optimal	6	42	33	18	1	0	Optimal
Traffic signals (hardware only)	1,072 traffic signals	\$275.3	Moderate	15	16	23	23	23	0	Moderate
Street lights	55,389 street lights	\$194.3	Low	4	12	39	30	15	0	Low
Support facilities	various buildings	\$6.9	None to Low	condition ranges from poor to very good						None to Moderate
Other transportation assets	Streetcar, aerial tram, signal controllers, traffic calming devices, street signs, pavement markings, meters, retaining walls, stairways, guardrails, harbor wall.	\$650.8	Low to Optimal	condition range from poor to very good or tbd						Low to Optimal
Environmental Services		\$12,517.1								
Combined sewers	885 mi. of pipe & access	\$5,018.8	High	52	18	12	12	6	0	High
Sanitary sewers	1000 mi. of pipe & access	\$4,104.4	High	72	20	6	2	0	0	High
Stormwater system	454 mi. of pipe; 1900 green stormwater facilities	\$1,946.7	Moderate	27	29	15	22	7	0	High
Wastewater treatment	2 treatment plants & 97 pump stations	\$2,168.0	Moderate	20	20	30	20	10	0	Low

Recommended Plan

Citywide Systems Plan

Capital Asset Class	Description	Replacement Value		Current Condition (in %)						
		\$ million	Confidence	Very Good	Good	Fair	Poor	Very Poor	TBD	Confidence
Water		\$5,472.0								
Supply	126 miles of roads, 1609 culverts, 12 bridges, 1 200-ft high concrete dam, 1 110-ft high earth dam, ASR wells, 33 well sites with drilled wells, pumps and motors, monitoring wells, 1 groundwater pump station, treatment facility, tank, and collection mains to bring water from wells to pump station	\$826.1	Moderate	4	54	39	3	0	0	Moderate
Transmission	75 miles of large diameter conduits, with various supports, 9 conduit trestles 7 river crossings, 49 miles of large diameter transmission mains	\$1,202.4	Moderate	6	43	44	8	0	0	Moderate
Terminal storage	238 million gallons finished water storage, interconnecting piping, post-storage treatment facilities, and microhydro facility.	\$786.9	Moderate	0	2	24	74	0	0	High
Distribution	2200 miles of distribution pipes, 184,000 service lines, 44,000 system valves, 6800 large meters, 178,000 small meters, 14,200 hydrants, 24,000 backflow devices, 38 pump stations, 70 storage tanks	\$4,176.3	High	14	47	31	6	2	0	High
Support facilities	13 support buildings, SCADA, vehicles, construction equipment, lab equipment, computers, and infrastructure components in inventory	\$105.0	High	24	17	10	16	32	0	Moderate

Recommended Plan

Citywide Systems Plan

Capital Asset Class	Description	Replacement Value		Current Condition (in %)						Confidence
		\$ million	Confidence	Very Good	Good	Fair	Poor	Very Poor	TBD	
Parks and Recreation		\$984.3								
amenities				--	--	--	--	--	--	--
furnishings in developed parks	decorative elements and furnishings: memorials, plaques, display fountains, benches, tables, drinking fountains in developed parks and natural areas	\$17.60	Low	10	38	37	9	2	4	Moderate
furnishings in natural areas				0	0	0	0	0	100	TBD
decorative elements				0	0	0	0	0	100	TBD
buildings and pools	community and arts centers, pools indoors and outdoors, restrooms, maintenance and utility buildings	\$268.50	High	--	--	--	--	--	--	--
major buildings				61	9	26	0	4	0	High
minor buildings				42	19	29	6	3	0	High
recreation features				--	--	--	--	--	--	--
gathering places				0	0	0	0	0	100	TBD
marine	gathering places, play areas, sports fields and courts, water play areas, docks and boat ramps	\$228.60	Low	71	0	6	23	0	0	High
off-leash areas				0	0	0	0	0	100	TBD
play areas				3	38	52	5	2	0	High
sports courts and fields				39	24	15	19	3	0	Low
water play				0	0	0	0	0	100	TBD
built infrastructure				--	--	--	--	--	--	--
circulation	circulation systems such as trails, walks, roads and parking lots; utilities	\$63.80	Low	0	41	40	18	0	0	Moderate
utilities				0	0	0	0	0	100	TBD
green infrastructure				--	--	--	--	--	--	--
natural areas	natural areas, gardens, turf, flower and shrub beds, trees	\$405.8	Low	50	31	6	12	1	0	Moderate
developed areas				10	34	45	7	4	0	Low

Recommended Plan

Citywide Systems Plan

Capital Asset Class	Description	Replacement Value			Current Condition (in %)					
		\$ million	Confidence	Very Good	Good	Fair	Poor	Very Poor	TBD	Confidence
Civic		\$1,318.5								
Facilities (buildings, structures)										
Office buildings	Portland Building, 1900 Building, City Hall Archives and Records Center, Kerby Garage, and Portland Communications Center	\$172.3	High	0	38	62	0	0	0	High
Other buildings	Train station and related buildings and Centennial Mills	\$48.7	Moderate	0	0	80	20	0	0	High
PDC facilities	Memorial Coliseum, Rose Quarter parking garages, and Providence Park	\$529.6	Moderate	0	37		63	0	0	High
Spectator facilities	Five stages in three buildings (Arlene Schnitzer Concert Hall, Keller Auditorium, and Antoinette Hatfield Hall)	\$111.2	Moderate	tbd	tbd	tbd	tbd	tbd	0	TBD
Performing Arts facilities *	30 stations, administration building and support facility	\$96.8	High	0	98	0	2	0	0	High
Fire facilities	Four precincts, Justice Center, property warehouse, equestrian division, and vehicle storage lot	\$108.8	High	0	100	0	0	0	0	High
Police facilities	Technology Services									
BTS Communications	Data networks, WiFi network, 800 MHz radio system	\$70.8	Moderate	0	97	3	0	0	0	High
BTS Production Services	Storage area network, core servers, email system	\$2.8	Moderate	0	77	23	0	0	0	High
BTS Strategic technology	Large corporate applications owned and managed by BTS such as GIS	\$6.2	Moderate	0	84	16	0	0	0	High
Electronic equipment and software-other bureaus	Video systems, electronic equipment, Office Suite software, bureaus' PC's and laptops	\$8.2	Moderate	0	100	0	0	0	0	High
Strategic technology-other bureaus	Large corporate applications such as TRACS, CAD, PPDS, CIS, and EBS	\$93.8	Moderate	0	88	12	0	0	0	High

* OMF is beginning to work with Metro/MERC on the status of performing arts facilities.

Infrastructure Coordination

Providing effective and efficient public facilities and services requires coordination across various City bureaus and offices. This coordination ranges from planning and asset management to long-range financing, annual budgeting, construction, and development review.

Coordinated Facilities and Services

In support of the City's overall mission, individual bureaus maintain distinct, but often complementary, missions and partner in multi-purpose facilities. A few examples include:

- The Bureau of Environmental Services and Portland Parks & Recreation share an interest in the protection, restoration, and enhancement of the city's green infrastructure, including the urban forest – as it provides stormwater, recreation, and natural resource value and services.
- Portland Parks & Recreation and the Bureau of Transportation cooperatively plan for and manage the City's trail systems and play a role in the provision of an interconnected, multi-modal transportation and recreation system.
- The Bureau of Environmental Services and Bureau of Transportation partner on right-of-way and street improvements to manage stormwater, including green streets.
- The Portland Water Bureau and Portland Parks & Recreation operate co-located facilities at places like Powell Butte Park, home to the City's largest water reservoir, and at the City's hydroparks.
- The Portland Police Bureau, Portland Fire & Rescue (PF&R), and the Office of Management and Finance, including the Bureau of Internal Business Services (BIBS) and the Bureau of Technology Services (BTS), provide buildings, facilities, technology, vehicles and apparatus that directly support the work of the Bureau of Environmental Services, Portland Water Bureau, Portland Bureau of Transportation and Portland Parks & Recreation.

Asset management

The City of Portland has asset management programs in the five major infrastructure bureaus – the Bureau of Transportation, Bureau of Environmental Services, Portland Water Bureau, Portland Parks & Recreation, and the Office of Management and Finance. While each bureau's asset management activities differ based on the needs of their unique systems, they coordinate with each other on a one-on-one basis and through the City Asset Managers Group (CAMG). The CAMG is a cross-bureau effort to establish best practices and continually improve performance-based information available to the public, bureaus, and city leaders. This information guides choices in the types and levels of service desired. The CAMG produces an annual City Assets Report that provides information on the value, condition, and funding needs for the City's assets. The information contained in this report helps decision-makers make more informed decisions in the annual budget process. More information on asset management can be found in Chapter 2.

Annual City Budget¹⁵

Every year, City bureaus participate in the annual budget process, which sets appropriation levels for operations and capital projects for the following fiscal year. The budget process is governed by Oregon's Local Budget Law, Chapter 294 of the Oregon Revised Statutes, which provides standard procedures for preparing, presenting, and administering local budgets, and ensures citizen involvement in budget preparation.

Budgeting in Oregon is an effort shared by citizens and elected and appointed officials. Citizens involved in the budget process work to ensure the services they require and want are adequately funded. City officials are responsible for building a budget that reflects the public interest and is structurally correct.

Budget Process

There are four primary steps in the creation of each year's budget – preparation of a proposed budget, approval, adoption, and amendment.

- **Preparing the Proposed Budget:** Acting as the Budget Officer, the Budget Director is responsible for overseeing the preparation of the Mayor's Proposed Budget for presentation to the City Council, sitting as the Budget Committee. The Proposed Budget is the culmination of an extensive process of budget development, analysis, and revision. Bureaus prepare Requested Budgets in accordance with direction given by the Mayor. These are submitted to the City Budget Office, which then analyzes the requests.
- **Approving the Budget:** In accordance with Local Budget Law, the City Council convenes to consider the Proposed Budget. The public is encouraged to attend and provide testimony on the Proposed Budget. The City Budget Office then summarizes the changes from the Mayor's Proposed Budget to the Approved Budget. This information and copies of the Proposed Budget are sent to the Tax Supervising & Conservation Commission for review, analysis, and certification.
- **Adopting the Budget:** City Council votes to officially adopt the budget before the start of the new fiscal year. Changes between the time the budget is approved and final adoption are limited to technical adjustments and other amendments defined by Local Budget Law.
- **Amending the Budget:** Changes after budget adoption are completed through the budget monitoring process (BMP), which also includes a supplemental budget. During the BMP, bureaus can request to transfer appropriation. In supplemental budgets, bureaus may ask to increase appropriation. The BMP and supplemental budgets provide Council the opportunity to change the budget three times a year.

¹⁵ This section was adapted from the 2013-2014 City of Portland Annual Budget. The full description of the budget process can be found in Volume 1: Citywide Summaries and Bureau Budgets, pages 34-37.

Public Involvement Process

The City engages in a proactive public outreach effort as part of the budget process through:

Bureau Budget Advisory Committees: Bureau-specific Budget Advisory Committees, made up of City staff, community members, and technical experts, review the specific bureau's draft budget request, weigh in on the program and service rankings, and provide input on proposed reductions.

Community Budget Advisors: Five appointed community volunteers convene with City Council for work sessions to review decision packages.

Community Hearings: In advance of the Adopted Budget, the City holds community hearings where Portlanders provide input. The feedback Portlanders provide helps Council prioritize services.

Portland Utility Board (PUB): The PUB is an appointed body of nine community members who provide independent and representative review of water, sewer, stormwater, and solid waste financial plans, budgets, and rates. The PUB serves as the Budget Advisory Committee for both the Water Bureau and Bureau of Environmental Services, meets year-round, and oversees financial plans, capital improvements, annual budget development, and rate setting of the City's water, sewer, and stormwater services. They report directly to City Council.

Citizens' Utility Board: The Citizens' Utility Board of Oregon is a nonprofit organization that provides outside independent review of the Portland Water Bureau and the Bureau of Environmental Services on behalf of residential ratepayers.

Direct Public Testimony: Community members may directly contact the Mayor and Commissioners with input for the budget. In addition to participating in the budget advisory committees, PURB, and community budget forums described above, community members can also personally testify on bureau budget requests at annual budget hearings, at the Tax Supervising and Conservation Commission hearing, and at the adopted budget hearing.

Development review

Building permits are reviewed by multiple City bureaus, including the infrastructure bureaus discussed in this report. The bureaus consider potential impacts of proposed development on infrastructure levels of service, and may require improvements to infrastructure before a land use permit is issued. Bureaus also review requests for most land use adjustments, such as conditional uses and land divisions. In these instances, they may require improvements – such as building streets, sidewalks, sewer and water lines or planting trees – as a condition of approval. In some instances, system development charges (SDCs) are assessed instead of or in addition to requiring improvements to infrastructure. The SDCs are assessed based on the potential impact of the proposed development.

Annexation¹⁶

The City of Portland is the primary infrastructure provider within the City of Portland's limits of incorporation. Annexation is the process of changing municipal boundaries to bring in adjacent unincorporated areas into an existing city, typically to provide urban services not presently available. Either a city or property owner may initiate annexation.

The City of Portland has adopted an urban service boundary (USB) that establishes the area for which it intends to provide urban services at some point in the future. Portland's urban service boundary was adopted in cooperation with surrounding jurisdictions. Property owners within Portland's urban services boundary may apply to the City of Portland to annex in order to receive urban level services, such as connection to City sewer and water systems. In these areas, the City plans for eventual service provision to urban service standards upon annexation of these properties into the City of Portland.

The cities of Portland and Gresham annexed virtually all adjacent unincorporated areas of Multnomah County in the late 1980s and early 1990s to provide sewers and other urban services to this developing area. The City is not currently pursuing any large-scale annexations of nearby unincorporated areas; property owners initiate most small-scale annexations.

Utility Coordination

When utilities need to access pipes and other facilities below roadways for maintenance or replacement work, they must cut through and then patch the pavement. This can cause travel delays and community impacts during construction and can affect the quality, integrity and appearance of the pavement surface. The City of Portland aims to manage the pavement degradation and travel and community impacts of pavement cuts for utility work by coordinating capital projects and through a 5-year moratorium on new pavement surfaces. The moratorium limits new cuts on new pavement surfaces, including overlays, inlays, reconstruction, and new construction of at least a half street or greater.

Levels of Service

Levels of service establish a framework for characterizing system deficiencies, developing and evaluating alternative solutions, and selecting recommended improvements.

Water System

The Portland Water Bureau has established the following levels of service for the water system:

- 100% compliance with state and federal water quality regulations.
- No more than 5% of customers out of water for more than 8 hours a year.
- No customer out of water more than 3 times per year.
- At least one working hydrant within 500 feet of service connection.

¹⁶ Adapted from City of Portland, "Annexation", accessed on July 15, 2013 at <http://www.portlandoregon.gov/bps/article/363163>.

- Maintain minimum pressure of 20 pounds per square inch (psi) during normal demands.

The Portland Water Bureau also maintains a variety of other customer service, financial health, infrastructure management, workforce, and sustainability service levels.

- Wastewater Collection System
- The Bureau of Environmental Services has established the following levels of service for the wastewater collection system:
 - Provide sewage service to support development consistent with the Comprehensive Plan where feasible.
 - Customers properly connect and maintain sewer connections per City standards.
 - In the combined sewer area, convey combined sewage to prevent releases to buildings or streets up to a 25-year storm frequency (a storm with a 4% chance of happening in any year).
 - Prevent combined sewer overflows to frequencies established by the NPDES permit.
 - Public sanitary/combined conveyance facilities are maintained in accordance with standards.
 - In the separated sewer area, sewage releases to surface waters (SSOs) are prevented for storm events up to a 5-year frequency (a storm with a 20% chance of happening in any year).

Wastewater Treatment System

- The Bureau of Environmental Services has established the following levels of service for the wastewater treatment system:
 - Treatment plants are in compliance with NPDES effluent limits.
 - 100% of biosolids are beneficially re-used.
 - 90% of methane is beneficially re-used.

Stormwater System

The Bureau of Environmental Services is in the process of developing a comprehensive system plan for stormwater, including levels of service. In the interim, the Bureau has established the following service categories and related performance indicators for the stormwater system:

- Protect public health and safety and property:
 - In the separated area, sewage releases to surface water are prevented for storm events up to a 5-year frequency. In the combined sewer area, prevent releases to buildings or streets up to a 25-year storm frequency.
 - Limit risk claims due to City stormwater.
 - Design and manage infrastructure to limit nuisance flood events.
 - In the UIC area, facilities are managed to effectively reduce pollution to the groundwater.
- Protect biological communities and improve ecological function:
 - Address water quality and quantity consistent with requirements of the Endangered Species Act.

- Mitigate contamination of surface water and sediments through use of pollution reduction facilities.
- Minimize disruption to the hydrologic cycle by managing impervious area and through flow attenuation.
- Support community needs:
 - Address deficiencies that impede community improvements. Increased impervious surface area – whether public or private – requires an approvable discharge point for stormwater conveyance.

Parks & Recreation System

- Provide a developed park or natural area within ½ mile from every household
- Provide a full-service community center within 3 miles of every household

Per Vision 2020, PP&R also seeks to build out the recreational trail system. More asset-specific service goals are outlined in Technical Papers, and as Bureau Performance Measures, identified in the Portland Parks & Recreation Strategic Plan. As Portland Parks & Recreation continues development of its new System Plan, it will continue refinement of recreational feature levels of service.

Citywide Investment Strategy Summary

The Citywide Systems Plan contains a capital Investment Strategy, including over \$5.1 billion in projects, for the Bureau of Environmental Services, Portland Water Bureau, and Bureau of Transportation. For full information, see Chapters 6 through 8 and Appendix A. The projects and programs included in the Investment Strategy are intended to maintain existing assets, comply with regulatory mandates, and provide key levels of service to existing and future residents and businesses. The Investment Strategy is the basis for the Comprehensive Plan’s List of Significant Projects, which identifies new facilities necessary to accommodate the residential and employment uses anticipated in the Comprehensive Plan.

Investment in the City’s capital assets may utilize existing financial resources or may include issuance of long-term debt. A decision to issue debt as part of a capital investment strategy will include analysis of available resources to support full repayment of the debt, including whether repayment revenues are program-specific or City general funds. Recommendations regarding use of debt are centralized via the City’s Debt Management program in the Office of Management and Finance, Public Finance & Treasury Division. Debt issuance must be authorized by City Council, and is conducted in conformance with the City’s Debt Policy (FIN-2.12) and nationally recognized best practices.

Table 4.3 Investment Strategy Summary

Bureau	Estimated Investment Strategy Total* (2013-2033)
Environmental Services	\$1,731,749,000
Water	\$1,567,070,000
Transportation	\$1,857,036,516
TOTAL	\$5,155,955,516

* Includes financially-constrained total

Though not required by State public facility planning statutes and rules, the Citywide Systems Plan also includes discussions of long-term investment and financial considerations for parks and recreation facilities (see Chapter 9) and other essential facilities and systems (see Chapter 10). The Plan does not provide detailed investment strategies for these systems.

System Summaries

Bureau of Environmental Services

The Bureau of Environmental Services focuses efforts on comprehensive, multi-purpose solutions across four program areas of the Investment Strategy – wastewater treatment, collection system maintenance and reliability, system development, and surface water (stormwater and watershed) management. These investments are driven by regulatory mandates, system risk (condition and capacity), and system plans including watershed planning and monitoring. The bureau anticipates nearly \$2 billion in investment in these programs over the next 20 years – see Table 4.4, Chapter 6 and Appendix A for more information on anticipated investments. Additional investment in ongoing operations and maintenance, green infrastructure programs, and other non-capital investments to meet stormwater, sewer, and watershed health system needs are not included here.

Table 4.4 Environmental Services Investment Strategy Summary

Program	FY 2013-2018	FY 2018-33
Wastewater Treatment	\$109,671,000	\$305,964,000
Collection System	\$328,896,000	\$702,800,000
System Development	\$23,462,000	\$60,000,000
Surface Water Management	\$73,441,000	\$127,515,000
TOTAL	\$535,470,000	\$1,196,279,000

Portland Water Bureau

The Portland Water Bureau's Investment Strategy for the Citywide System Plan is divided into seven (7) primary programs: supply, transmission and terminal storage, distribution, treatment, regulatory compliance, customer service, and support. The Water Bureau anticipates over \$1.5 billion in new investment in these programs over the next 20 years – see Table 4.5, Chapter 7 and Appendix A. The Bureau's Investment Strategy provides greater detail on anticipated water projects and investments.

Table 4.5 Portland Water Bureau Investment Strategy Summary

Program	FY 2013-2018	FY 2018-33
Supply	\$14,291,000	\$88,500,000
Transmission and Terminal Storage	\$191,170,000	\$242,000,000
Distribution	\$244,197,288	\$461,650,000
Treatment	\$2,500,000	\$150,000,000
Regulatory Compliance	\$25,504,000	\$30,000,000
Customer Service	\$3,057,000	\$53,700,000
Support	\$10,000,000	\$50,500,000
TOTAL	\$490,719,288	\$1,076,350,000

Bureau of Transportation

The Transportation System Plan (TSP) identifies projects and programs necessary to meet the mobility and access needs of Portland over the next twenty years. The Transportation System Plan is being updated to reflect the Comprehensive Plan Update and the update of the Regional Transportation Plan. The TSP serves as the transportation component of the Citywide Systems Plan. For reference, the TSP's project list is included in Appendix A.

Portland Parks & Recreation

Portland Parks & Recreation has identified many infrastructure needs over the next 20 years to meet the level of service goals outlined in the Parks 2020 Vision, including:

- Acquisition for developed parks, natural areas, trails, recreation, and maintenance facilities.
- Maintenance of existing parks, natural areas, trails, and facilities
- Development of new community centers
- Development of new parks
- Improvements at existing developed parks
- New trails/improvements to existing trails
- Natural area parks

Portland Parks & Recreation maintains a 20-year capital improvement plan (CIP) list, which includes known growth and maintenance related projects that have been identified at this time. The CIP list does not yet include projects for locations where Portland Parks & Recreation has not yet acquired property or developed a master plan for a site, or projects for tree maintenance and canopy expansion investments. Further information about the Portland Parks & Recreation CIP list, including currently identified projects, can be found on the City of Portland's website at: <https://www.portlandoregon.gov/parks/63265>.

The Citywide Systems Plan does not include a detailed 20-year project list for Portland Parks & Recreation. A comprehensive system plan that reflects asset management needs and community priorities and includes a list of needed investments, costs, and funding sources, will be developed over the next few years. In addition, this information is not required as part of this Plan under Statewide Planning Goal 11: Public Facilities and related statutes and administrative rules.

Other Essential Facilities and Systems

The Citywide Systems Plan does not include a detailed 20-year project list for public safety, technology, and other essential facilities and services because comprehensive system plans, including lists of needed investments, costs and funding sources, are not available at this time. In addition, this information is not required as part of this Plan under Statewide Planning Goal 11: Public Facilities and related statutes and administrative rules.

Chapter 5

Goals and Policies

All chapters of the Comprehensive Plan Goals & Policies contain goals and policies that may be relevant to the provision of public facilities and services. Chapter 8: Public Facilities and Services and Chapter 9: Transportation contain goals and policies for service delivery and system management for public rights of way, sanitary and stormwater systems, water, parks and recreation, transportation, and other City facilities and services. These chapters are included here for reference, but may be updated by future Comprehensive Plan post-acknowledgement amendments. The Comprehensive Plan Goals & Policies document contains the official versions of these policies.

Chapter 8: Public Facilities and Services

*Please see the **Recommended Goals & Policies** to review recommended goals and policies. A copy of the final Public Facilities Goals & Policies will be inserted here for the final Adopted Plan.*

Chapter 9: Transportation

*Please see the **Recommended Goals & Policies** to review recommended goals and policies. A copy of the final Transportation Goals & Policies will be inserted here for the final Adopted Plan.*

Chapter 6

Bureau of Environmental Services

Overview

Portland's sewer and stormwater systems serve nearly all of the city's 588,000 residents, numerous commercial and industrial properties, as well as some customers from neighboring jurisdictions. The network of pipes, pump stations, stormwater facilities, and two wastewater treatment plants, with an estimated replacement value of \$13.2 billion, is designed to protect public health, water quality, and the environment. In 2011, the city completed the largest public works investment in its history, the 20-year program to control combined sewer overflows (CSOs) to the Willamette River and Columbia Slough, adding significant new infrastructure (including the "Big Pipes") to the sewer system. Previously, as little as one-tenth inch of rain caused a CSO event. Now, the system can handle more than an inch without overflowing to the river. As a result, instead of sewage discharging in the Willamette 50 times a year, now it is unlikely to happen more than a few times in the winter and every few summers. Repayment of the "mortgage" on this \$1.4 billion investment will continue to impact sewer utility rates for years to come. Rates will also be affected by the need for maintenance and improvement of systems, especially aging collection system infrastructure.

Managing Portland's 37 inches of average annual rainfall, much of it falling on pavement, rooftops, or other impervious surfaces, is an ongoing challenge that involves built and natural infrastructure to be managed in partnership with businesses, residents, and community organizations. Portland has become an international leader in innovative stormwater management and other sustainable practices. These sustainable practices support a high quality of life for residents and strengthen the local economy by attracting visitors and businesses.



Mission and Values

BES's mission is to serve the Portland community by protecting public health, water quality and the environment. The Bureau provides sewage and stormwater collection and treatment services to accommodate Portland's current and future needs. The Bureau protects the quality of surface and ground waters and conducts activities that promote healthy ecosystems in our watersheds.

The Bureau's motto is "*Working for Clean Rivers*" and the organizational vision is to be recognized as a trusted service provider and innovative environmental leader through a demonstrated commitment to clean rivers, healthy watersheds and our community.

In the 2011 Strategic Plan, the Bureau identified five priorities for the next five years:

- Responsibly manage ratepayer funds to provide services that address community needs now and in the future.
- Invest in natural and built systems to protect public health and improve watershed health.
- Protect, rehabilitate, and maintain our existing infrastructure for long-term reliability.
- Build and expand partnerships to better meet our Mission and Vision.
- Cultivate leadership and excellence in our workforce.

Purpose of this Chapter

This chapter describes the public facilities and services provided by the Portland Bureau of Environmental Services that are necessary to carry out its mission. It identifies desired levels of service, inventory and condition information for existing public facilities, and future facilities that will be necessary to support the land uses designated in the Comprehensive Plan, as required by Oregon Planning Goal 11: Public Facilities and Oregon Revised Statute 197. Carrying out the Bureau's mission and other City and community goals may also require programs, investments and practices that are not related to public facilities. This chapter may acknowledge--but does not comprehensively address--these measures.

System Services

BES provides sewage and stormwater management services in its service area through a complex set of infrastructure systems that are closely intertwined with the natural systems of Portland's watersheds and the historical development of the city. BES is the responsible bureau for compliance with several state and federal regulatory requirements for groundwater and surface water resources (streams and rivers), as well as the Endangered Species Act. (More information about these requirements is provided later in this chapter.) BES is the lead bureau for planning, implementing, monitoring, and reporting on watershed health improvement projects and programs. BES also administers the City's brownfield remediation program which provides financial and technical assistance to facilitate brownfield clean-up as a redevelopment tool for human and environmental health, environmental justice, water quality, job creation, and neighborhood revitalization.

The Bureau provides wastewater collection and treatment services within the city limits and to areas outside the city limits within the City's established urban services boundary (USB). BES provides sewer service to specific areas outside the USB via contract agreements with neighboring jurisdictions where sanitary sewers from outside the USB flow to a BES sewer or treatment facility (Clean Water Services and Lake Oswego in the southwest, Water Environment Services of Clackamas County in the southeast, and city of Gresham in the east). Similarly, some neighboring jurisdictions treat sewage from the BES system.

The Bureau operates and maintains the stormwater collection system and has an oversight and regulatory role for stormwater management within the City's USB. The City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Discharge Permit covers stormwater from approximately 15,500 acres within Portland's USB that drain to the City's MS4 system, which discharges to local streams, the Willamette River, and the Columbia Slough. The City also manages stormwater with sumps or drywells primarily on the east side of the city, under the Water Pollution Control Facilities (WPCF) for Class V Stormwater Underground Injection Controls (UICs) permit.

Due to the close connection between built infrastructure that manages stormwater (pipes, ditches, pump stations, etc.) and the natural system of streams, wetlands, floodplains and forests that convey, filter, infiltrate and reduce stormwater runoff, the city has adopted a watershed approach to managing stormwater and addressing related regulations, guided by the 2005 *Portland Watershed Management Plan*. The Bureau is the city's lead agency for watershed protection and restoration for Portland's five watersheds (Johnson Creek, Fanno Creek, Tryon Creek, Columbia Slough, and the Willamette River) within the USB. All of the watersheds extend beyond the city limits, requiring extensive collaboration with other local, regional, state, and federal agencies, and non-governmental organizations. Improving watershed health is critical to providing stormwater service, meeting regulations, and supporting the resiliency of Portland's built and natural systems.

Service Agreements

The City of Portland has service agreements with other jurisdictions that allow for treatment of each other's wastewater flows:

- Lake Oswego, for cost sharing of the Tryon Creek Wastewater Treatment Plant.
- Gresham, Milwaukie, Clackamas County Service District #1, and Clean Water Services, for treatment of sewer flows.
- Dunthorpe-Riverdale Service District, for which Portland provides operations and maintenance, engineering, permitting, and treatment services.
- The City also maintains agreements with the Port of Portland and other private entities for maintenance of private pump stations.

The City is negotiating and expects to have in place for Fiscal Year 2013-14 an agreement with Multnomah County Drainage District #1 covering District provision of stormwater management services.

Inventory Summary

The Bureau of Environmental Services is responsible for facilities associated with sanitary sewage and stormwater service. The sanitary and combined sewage systems include both collection and treatment facilities. Two municipal wastewater treatment plants serve the city: the Columbia Boulevard Wastewater Treatment Plant (CBWTP) and the Tryon Creek Wastewater Treatment Plant (TCWTP). Separated stormwater system assets include collection, conveyance, and management facilities. While the bureau

owns and maintains an extensive stormwater system, BES also relies on stormwater management infrastructure (particularly green infrastructure¹) that it does not own or control as formal assets.

In 2013, the city’s wastewater and stormwater systems combined had an estimated replacement value of \$13.2 billion. In addition, the Bureau invests in and relies upon the city’s green infrastructure and natural systems (such as natural areas, tree canopy, wetlands, and streams) for managing rainfall and stormwater runoff. The value of these natural systems is not included in the \$13.2 billion.

Table 6.1 Estimated Replacement Value

System	Inventory	Estimated Replacement Value
Combined Sewers	885 miles of pipe & access structures	\$5.0 billion
Sanitary Sewers	1,000 miles of pipe & access structures	\$4.1 billion
Stormwater system*	1,900 water quality facilities & 454 miles of pipe	\$1.9 billion
Wastewater Treatment	2 plants & 97 pump stations	\$2.2 billion
Total		\$13.2 billion

* Estimated replacement value does not include the value of the nearly 9,000 Underground Injection Controls (UICs).

The city’s combined sewer system provides sanitary and stormwater service to approximately one-third of the city’s area, and the majority of its population, through over 885 miles of pipes. Separate sanitary and storm sewer and drainage systems serve the remaining two-thirds (by area) of the city, primarily in the western and outer eastern areas. The separated sanitary sewer system includes a network of 1,000 miles of sanitary lines and associated access structures.

In addition to gravity sewer pipes and service connections, the wastewater system includes more than ninety pump stations and 57 miles of force main which move wastewater uphill as needed to two wastewater treatment plants, where a series of processes clean wastewater through removal of solids and organic materials and disinfects the effluent before discharging to the Columbia or the Willamette River.

The separated stormwater sewer and drainage system collects and conveys stormwater for discharge to local receiving waters (streams and rivers) and includes pipes, culverts, ponds, sumps, detention facilities, ditches, and drainageways, some of which are neither owned nor maintained by the city.

Condition and Capacity Summary

The Bureau has recent condition inspections for all but a small percentage of the sanitary sewer collection system. Comprehensive condition data is not available for the stormwater system.

Based on recent inspections or condition assessment, over 80% of the combined and sanitary only pipes are in good or very good condition. Although the completion of the CSO program allows capital resources to shift to rehabilitation and system improvements, projected investments are not keeping pace with the rapidly aging collection system. While age is a good predictor of pipe failure, materials must also be

¹ Green infrastructure: Public or private assets—either natural resources or engineered green facilities—that protect, support, or mimic natural systems to provide stormwater management, water quality, public health and safety, open space, and other complementary ecosystem services. Examples include trees, natural areas, ecoroofs, green street facilities, wetlands, and natural waterways.

considered. Unfortunately, a significant percentage of the pipe system is concrete pipe that was installed in the early 1940s. Because much of the concrete in that era was poor quality, these pipes are failing more rapidly than might be expected from age alone.

Based on recent inspection data, most (69%) combined sewer system pipes are in good to very good condition, but approximately 10% of pipes are at high risk of failure and in need of repair or upgrading. The sanitary sewer pipes are generally much newer than the combined system pipes and over 90% are in good to very good condition. An estimated \$225 million is needed to address the highest risk pipe segments. Projects to address this backlog are included in the proposed Investment Strategy, see Appendix A.

BES has established levels of service consistent with our regulatory permits for both the combined and separated sanitary sewer systems. In the combined system, one benchmark is to convey the 25-year storm at full land use build-out (i.e., consistent with the zoning and the Comprehensive Plan) without risk of system overload, as evidenced by basement sewer backups or surcharging of trunk sewers. In the separated sanitary system, the benchmark is to convey the 5-year storm.

Some areas in the combined system are affected by localized hydraulic capacity limitations that increase the risk of basement sewer backups and/or street flooding. These areas are concentrated close in on the east side with scattered areas in other parts of the system. A number of projects to address this hydraulic deficiency are included in the proposed Investment Strategy.

In the separated sanitary system, hydraulic capacity is impacted by stormwater and groundwater entering the sanitary system. Because the source of stormwater inflow and infiltration can be difficult to identify, engineering solutions are challenging to design. Funds are included in the Investment Strategy to address this issue in the basins most impacted. These basins are concentrated in southwest Portland.

The pumping and treatment systems require regular and more frequent capital investment. While pipes have an estimated 100-year useful life, mechanical and electrical components have a useful life that ranges from 20 to 50 years. In general, all of the pump stations and Columbia Boulevard Wastewater Treatment Plant have sufficient capacity. However, Tryon Creek Wastewater Treatment Plant requires capacity upgrades to serve future growth projections and meet expected regulatory requirements. Projects to address both condition and capacity are included in the proposed Investment Strategy, see Appendix A.

Capacity issues for stormwater outside the combined sewer system vary by watershed. Unique challenges exist in the west hills, in the outer east buttes, and along the Columbia Slough. All of these locations have underserved areas, due to deficiencies in the built stormwater system (e.g., undeveloped right-of-way), or natural conditions that limit infiltration and on-site stormwater management, or make building new piped systems very costly or technically infeasible. All of Portland's major waterways, which are part of the stormwater conveyance network, are water quality limited due to temperature and/or contaminants and the habitat, hydrology and native fish and wildlife species are impacted by stormwater runoff. A number of projects to address stormwater conveyance and/or water quality are included in the proposed Investment Strategy.

Key Issues and Concerns

Serving Existing Residents: Wastewater

Both Portland's combined sewer system and its sanitary sewer system have hydraulic and condition deficiencies that impact the ability of these systems to serve existing properties at designated service levels. These deficiencies can result in higher risks for sewer backups, surcharging, and/or overflows. The greatest concentration of combined sewer pipe segments with capacity problems is located in the older central neighborhoods. The majority of the sanitary sewer system pipes have adequate capacity, however there are deficiencies, concentrated in the southwest (Fanno and Burlingame basins) where the system is impacted by stormwater entering the sanitary sewers.

Pipe segments that are in poor structural condition are widely distributed throughout the service area with the exception of outer east Portland where the collection system is relatively new.

Small geographic areas within the urban services boundary continue to treat sanitary sewage using some type of onsite system such as a cesspool or septic tank and drainfield. Development of new onsite systems is discouraged by the state and the county (the permitting authority) because of the high risk of bacterial contamination to surface and ground water. A program to extend sewers to some of the unsewered areas is included in the proposed Investment Strategy. However, it is important to note that it may not be technically or financially feasible to provide sewer service to all properties within the USB.

Serving Existing Residents: Stormwater

In areas not served by the combined sewer system, most stormwater is conveyed through pipes, ditches, or drainageways to streams and rivers. In parts of both the combined and separated sewer basins stormwater from the right-of-way or city property is filtered into the ground through sumps (UICs). See Figure 6.1. In some cases, stormwater is managed in detention facilities, other vegetated facilities, or allowed to infiltrate in natural areas. Safe conveyance of stormwater is an issue in some areas, particularly in the hilly areas of west Portland and some parts of outer southeast which lack comprehensive conveyance systems and where infiltration is limited by geology or high groundwater. In some cases, solutions may not be technically or financially feasible.

Flooding continues to be an issue, particularly in the Johnson Creek area. The City is working with partners to restore more natural stream and floodplain conditions to manage 10-year storm events along Johnson Creek.

Maintenance of Existing Infrastructure

For 2013, sanitary and stormwater systems have an estimated annual capital maintenance funding gap of \$12.4 million, including \$2.4 million in combined sewers and \$10 million for stormwater. The long-term financial forecast anticipates significant increases in the capital maintenance budget as the system continues to age. BES is applying new technologies and collecting improved data on its assets allowing for enhanced analysis, planning, and targeted implementation of corrective action.

The bureau's operating resources for operational maintenance needs are strained across all asset types. As of July 2012, the city's stormwater system included more than 1,900 water quality facilities including green streets, vegetated swales, constructed wetlands, and ponds. In addition, the City owns nearly 9,000 UICs and thousands of storm inlets, trash racks and sedimentation manholes. Although green infrastructure such as green streets and swales can have lower overall life cycle costs (capital and operating combined) than a piped solution, these facilities require more regular maintenance to be effective. As the Bureau's portfolio of stormwater infrastructure assets increases, additional operating resources are needed for maintenance. Increases to the operating budget have not been supported in recent years.

Meeting Regulatory Requirements

Bureau projects and programs address a wide range of regulations that focus on protecting human and environmental health. Major mandates stem from five federal acts: the Federal Clean Water Act, Safe Drinking Water Act, Water Resources Development Act, the Endangered Species Act, and Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Whenever possible, the Bureau's approach to addressing regulatory requirements is to take a comprehensive "watershed approach" to achieve broader environmental health and other city goals. Projects to address known regulatory requirements are included in the proposed Investment Strategy. Looking ahead, potential changes in regulatory mandates or permit conditions could present additional financial challenges for the Bureau. More information on regulatory requirements and the watershed approach can be found later in this chapter.

In December 2000, Portland Harbor was listed as a Superfund site by the federal government because there is contaminated sediment in the river. The City is one of more than 100 parties that have begun a voluntary settlement process for allocating costs of investigating and cleaning up Portland Harbor. The Portland City Council designated the Bureau of Environmental Services as the lead agency for the City regarding City concerns in the Portland Harbor cleanup. If it is determined that the City's activities contributed contamination to the sediments, the city may need to participate in and pay for some of the cleanup work in the harbor. Because cleanup actions have not yet been determined, cleanup costs are not known at this stage. Therefore, no projects are included in the proposed Investment Strategy.

Accommodating Growth

The Bureau of Environmental Services plans for its facilities based on build-out densities allowed within the comprehensive plan land use densities. The Bureau expects to be able to maintain and improve the sewer systems to accommodate growth as long as sewer and stormwater rates are sufficient to meet capital investment needs.

The geographic distribution of new growth is potentially a concern for all BES services – sanitary sewer, stormwater management, and protection and improvement of watershed health. In parts of the city, it is difficult to provide traditional constructed sanitary and/or stormwater systems, both from a cost and engineering perspective. Coordinating growth and density in centers and corridors in areas with good infiltration or where constructed stormwater management is technically and economically feasible will help

address these concerns. Development of some currently underdeveloped areas may be limited by options for sanitary sewer service and/or stormwater management.

Climate Change

Climate change is expected to influence local hydrology, habitat, and water quality. Preliminary analysis regarding anticipated local impacts suggests that changing weather patterns and temperatures may affect local stormwater management, wastewater treatment, and watershed health. It is not possible to accurately predict the degree of change in climate variables; therefore an adaptive management approach is necessary. The climate variable with the most potential to cause problems for the stormwater system is changes to winter rainfall patterns.

Most of the stormwater pipes and sumps (UICs) in Portland have been in place for decades and were sized with assumptions about climate and land use that were appropriate at the time they were built. Some of these systems are already experiencing problems with the increased runoff caused by increased impervious area. Changing rainfall patterns during the winter months could exacerbate this problem. It could also cause increased erosion and sediment in stormwater runoff. Sediment can clog pipes, make greenstreet facilities less effective, and deteriorate water quality of receiving streams.

The combined sewers could also be impacted by changing rainfall patterns with the added concern of the potential for more frequent combined sewer overflows (CSOs). During very heavy rain storms, runoff from buildings, streets, and other impervious surfaces impacts combined sewer capacity potentially causing overflows.

Climate change predictions include higher summer air temperatures and resultant increases in water temperatures. When wastewater temperatures increase, the dissolved oxygen content decreases and the biological activity of wastewater treatment processes tend to increase. Higher temperatures could result in increased odor production in the collection system and increased oxygen requirements for some biological treatment processes.

Increased temperatures and shifts in the timing and amounts of precipitation could also affect the region's natural systems. These changes are likely to stress and change vegetation, including vegetated facilities (such as green streets, ecoroofs, and rain gardens), and natural areas, particularly wetlands and streams, that we depend on to manage stormwater naturally. Risk of wildfires, floods, and invasive plants and animals are expected to increase. These changes may make it more difficult to meet water quality standards, lead to increasing or more restrictive regulations especially as more fish and wildlife species are listed as threatened or endangered due to changes in habitat, and may lead to higher operations and maintenance costs for infrastructure.

Sanitary Sewer and Stormwater Rates

Construction of the recently completed \$1.4 billion combined sewer overflow control (CSO) facilities has increased sewer and stormwater rates significantly over the past two decade. The CSO program and other capital projects are financed through bond sales. Bond repayment terms vary from 20 to 30 years. Approximately one-third of the bureau's annual budget is allocated to debt payments. Portland's rates are

high by regional and national standards; however, this is expected to change as other cities begin to undertake combined sewer overflow control capital projects. Planned operations and maintenance of, and capital improvements to, the sewer and stormwater systems will depend on continued predictable increases in sewer and stormwater rates. Continued public acceptance of rate increases is essential to meeting level of service standards and will require open and clear dialog with the public and decision makers.

Investment Strategy Summary

The work of the Bureau is focused on strategic and comprehensive project and program delivery to protect public health and restore the environment. The Bureau anticipates an annual average capital improvement program of \$100 million or approximately \$2 billion in capital investment over the next twenty years. Using a risk-based asset management approach, the Bureau budgets to maintain infrastructure and protect or enhance natural systems to meet regulatory requirements and enhance the health of watersheds. Asset management is a tool that addresses life-cycle costs, trade-offs between capital and operating expenditures, and prioritization of projects based on consequence and likelihood of failure, to achieve long-term system sustainability and acceptable levels of service. This approach is reflected in the Bureau's operating budget as well.

Regulatory Compliance

Environmental Services' projects and programs are largely guided by, or in response to, several federal regulatory mandates related to wastewater, stormwater, and natural resources. These regulations are focused on protecting human health and the environment, in line with the bureau's mission. Integrated planning efforts, including a comprehensive view of watershed health, guide the Bureau's response to many of these regulatory mandates. The watershed approach outlined in the 2005 *Portland Watershed Management Plan* provides a framework to coordinate and integrate regulatory response to achieve efficiencies and address the larger goals of clean and healthy rivers, while addressing issues and regulatory drivers such as flooding, contaminated sediments, or water quality in streams. Key regulatory mandates are described below. Except where otherwise indicated, projects and programs to address known mandates are included in the proposed Investment Strategy. While not recognized in the Investment Strategy in this document, the bureau also invests in programs such as outreach and education which have been determined to be cost-effective elements for effective service delivery.

Clean Water Act

The Clean Water Act (CWA), first adopted in 1978, establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating the water quality of surface waters. Several aspects of the CWA apply to the work of the bureau.

National Pollutant Discharge Elimination System Permits

The National Pollutant Discharge Elimination System (NPDES) permitting program was developed to control the discharge of point and certain non-point sources of pollution to the nation's waters. The NPDES program is administered in Oregon by the Department of Environmental Quality (DEQ). Several different types of NPDES permits apply to BES:

- **Wastewater Program**

Portland has NPDES Waste Discharge permits for treated municipal wastewater discharges from the Columbia Boulevard Wastewater Treatment Plant (CBWTP) and the Tryon Creek Wastewater Treatment Plant (TCWTP). The permits include water quality-based effluent limits and requirements for programs for pre-treatment, 'Fats, Oils, and Grease,' and illicit discharge response. In addition to the treatment plants, both sanitary sewer overflows (SSOs) and combined sewer overflows (CSOs) are regulated under this permit.

- **Stormwater Program**

Portland has a Phase I NPDES permit for stormwater discharges from the municipal separate storm sewer system (MS4). The regulations do not prescribe specific pollutant discharge limits, rather they allow for the implementation of Best Management Practices to improve water quality to the "maximum extent practicable" based on location conditions, resources, and priorities. The City's compliance approach is outlined in the Stormwater Management Plan (2011) which includes the following elements: development standards; industrial and commercial controls; illicit discharge detection and elimination; structural controls; operations and maintenance; preservation and restoration of natural areas; and public involvement.

- **Industrial Stormwater Program**

Portland is the agent for DEQ for administration of 1200-Z and 1200-COLS industrial stormwater permits within its jurisdiction. Some types of construction stormwater permits, such as 1200-C permits for large construction sites, are administered directly by DEQ.

Capacity, Management, Operations, and Maintenance (CMOM) Regulations

CMOM is a requirement of the CBWTP permit. It requires the bureau to improve the performance and reliability of the sanitary and combined sewer systems. Consistent with the 2011 NPDES Permit for CBWTP, BES submitted a Draft CMOM Program Report to DEQ in June 2013. The CMOM program is intended to reduce the likelihood of sewer releases by improving the overall reliability of the sanitary and combined sewer collection system. The strategies and activities defined align with the asset management approach to managing, operating, and maintaining the wastewater collection system. The approach uses risk-based strategies for the development, reinvestment, operations, and maintenance of the system.

Water Quality Standards and Total Maximum Daily Load Programs

Section 303 of the Clean Water Act established programs to develop and implement water quality standards and limits for pollutants received by water bodies. DEQ is responsible for developing water quality standards and total maximum daily loads (TMDLs) in Oregon. TMDLs specify the maximum amounts of certain pollutants (including heat) that a particular body of water is allowed to receive without exceeding water quality standards. The goal is to protect beneficial uses such as recreation, cold water fisheries (such as salmon), and municipal and industrial water supplies.

The City is responsible for addressing Environmental Protection Agency (EPA)-approved TMDLs in the Lower Willamette mainstem and its tributaries, as well as in Tryon, Fanno, and Johnson Creeks; and the Columbia Slough.

Amended Stipulated Final Order (CSO Program)

In 1991, BES entered into a legal agreement with DEQ concerning the city of Portland's CSO-abatement program, because overflows from the combined sewer system violated water quality standards for the Willamette River and the Columbia Slough. Completion of the CSO controls program in 2011 was a major milestone. Of relevance to this CSP, the agreement requires Portland to continue to further reduce CSO discharges using cost-effective methods that achieve other mission-based objectives such as watershed health, stormwater management, and wastewater operations and treatment. The Post-2011 CSO Facilities Plan was submitted on September 2010 and approved by DEQ in February 2011.

Safe Drinking Water Act

The Safe Drinking Water Act mandates a variety of programs to protect drinking water supplies. While the Portland Water Bureau is the primary entity regulated by this Act, Environmental Services does have to comply with a sub-set of the regulations through its UIC Program.

Underground Injection Control (UIC) Program

The National UIC Program was enacted in 1974 under the Safe Drinking Water Act. In Oregon, the program is administered by DEQ. In 2005, DEQ issued the City a Water Pollution Control Facility (WPCF) permit for stormwater discharges to approximately 9,000 city-owned UICs. The ten-year WPCF permit regulates the construction, operation, and maintenance of all City-owned UICs. The permit required the development and implementation of a UIC Management Plan, describing the measures the City will implement to control pollutants prior to discharge to a UIC to protect groundwater as a drinking water resource. The UIC Management Plan (2008, revised 2012) includes the following elements:

- Systemwide inventory, assessment and evaluation to determine compliance, prioritization and response actions.
- System management to prevent, minimize and control stormwater prior to discharge, including operations and maintenance, spill prevention and pollution control.
- Stormwater Discharge Monitoring Plan (2006, revised 2012) for data collection and evaluation to demonstrate public UICs are operated in a manner that protects groundwater as a drinking water resource.
- Corrective Action Plan (2006) to evaluate, select, and implement actions to address UICs that do not meet permit conditions.

The City has completed a significant amount of work to ensure compliance with the permit.

Endangered Species Act (ESA)

The Endangered Species Act (ESA) regulates the conservation of threatened and endangered plants and animals and the habitats in which they are found. All eight species of salmon and five species of steelhead that spawn, rear and migrate through waterways in the Portland area are listed as threatened or endangered under the ESA. In addition, ESA-protected Pacific Eulachon (smelt), Bull Trout and Green Sturgeon are present in the Columbia and Willamette Rivers and some local tributaries. Streaked Horned Lark (a bird found primarily in the Columbia Slough) was formally listed as a threatened species in 2013. Pacific lamprey is an ESA candidate species as well.

The basic requirements of the ESA are to avoid harming or harassing the listed species or adversely modifying their critical habitat, and to work to recover these species through the development and implementation of recovery plans. Critical habitat is federally identified and mapped. Portland's waterways are designated as protected critical habitat, which triggers specific requirements for any projects including City infrastructure projects, that involves federal actions such as funding or permitting.

The National Oceanic and Atmospheric Administration Fisheries, the federal agency with jurisdiction over salmon and steelhead, adopted a federal recovery plan for salmon and steelhead in the Lower Columbia River, including Portland, in 2013. BES recently signed a conservation agreement with the USFWS and 15 other state and federal partners regarding lamprey.

The City has a multi-pronged approach to comply with the ESA and advance the recovery plan. BES leads the City's ESA program and a streamlining team for city projects requiring ESA permits. Plans and

projects that help achieve other City objectives, such as culvert replacement, stream bank restoration and riparian protections, erosion control and revegetation, watershed monitoring, zoning, and climate change planning are part of the City's ESA response and critical to species recovery. Several city bureaus have programs and projects related to species recovery; BES implements those projects that are related to its sewer and stormwater mission.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA – Superfund) and Portland Harbor Cleanup

The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA, also known as Superfund) was enacted in the wake of the discovery of toxic waste dumps in the US, such as Love Canal and Times Beach in the 1970s. It allows the U.S. Environmental Protection Agency (EPA) to clean up such sites and to compel responsible parties to perform cleanups or reimburse the government for EPA-led cleanups.

In December 2000, the EPA listed a portion of the Lower Willamette River, known as Portland Harbor, as a Superfund site under the federal National Priorities Listing process. The Portland Harbor Superfund investigation is currently focused on a stretch of the Willamette River from River Mile 2 to River Mile 11.8, roughly the area from the Broadway Bridge to just short of the confluence with the Columbia River. The City operates stormwater and combined sewer overflow outfalls within the Portland Harbor area. The outfalls drain City-owned rights-of-way, industrial, commercial, residential, and vacant lands.

Under an intergovernmental agreement, the City and Oregon DEQ are working to identify sources that discharge significant contamination to the municipal conveyance system and to control these sources to reduce contaminant loads. The City is working closely with DEQ and EPA to develop a comprehensive plan to address future stormwater discharges under state and municipal programs to prevent recontamination of the harbor after clean up. If it is determined that the City's activities contributed contamination to the sediments in Portland Harbor, the city may need to participate in and pay for some of the cleanup work in the harbor. Because cleanup actions have not yet been determined, cleanup costs are not known at this stage. Therefore, no projects are included in the proposed Investment Strategy.

Goals & Policies

Draft Goals and Policies related to Sanitary and Stormwater Facilities and services can be found in Chapter 5. Key Infrastructure Policies.

Wastewater and Stormwater Systems

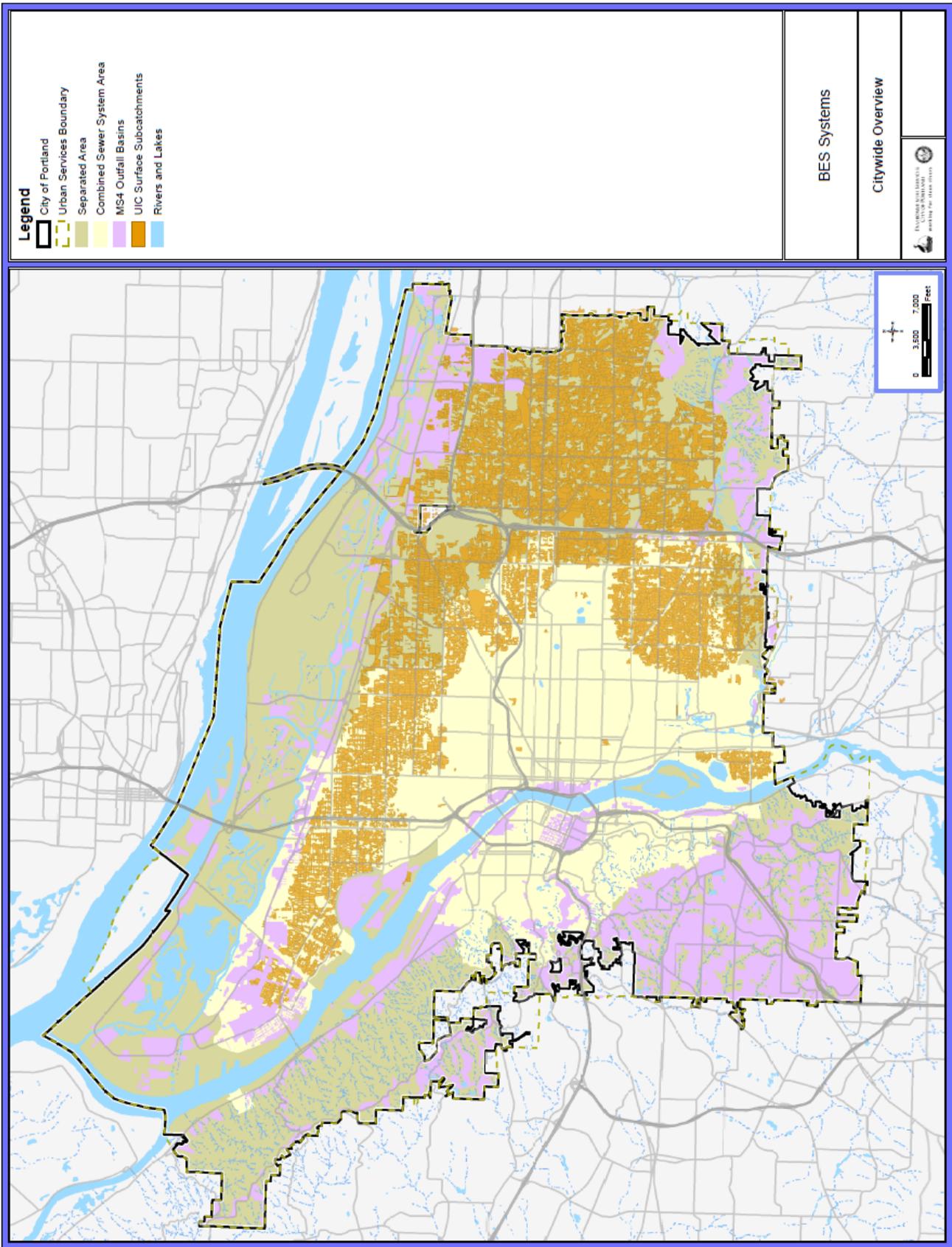
Systems Overview

Environmental Services provides sanitary sewage and stormwater collection through a complex set of infrastructure systems that are closely intertwined with the natural systems of Portland's watersheds and the historical development of the city. Wastewater and stormwater are conveyed through either combined pipes (wastewater and stormwater in a single pipe) or separated pipes (sanitary only or stormwater only). The combined and sanitary sewage pipes convey flow to one of the city's two wastewater treatment plants. In the separated area, stormwater is conveyed via pipes, ditches, swales, and natural drainageways, or simply flows overland to surface water (streams or rivers) or underground sumps (UICs). In portions of the combined sewer area, stormwater is also collected from the right-of-way or city property and discharged to UICs. See Figure 6.1, System Overview.

BES uses both "gray" (primarily pipes and pumps) and "green" infrastructure. Green infrastructure is a part of stormwater management in both the combined and separated stormwater areas. Green infrastructure solutions (such as trees, ecoroofs, natural areas, and green streets) capture and filter precipitation and urban runoff that may otherwise drain into the sewer system or directly into rivers and streams without benefit of pollution or velocity reduction. Green infrastructure can sometimes be the most cost-effective solution to protecting the piped infrastructure system. It can also contribute to other goals, such as climate change adaptation and mitigation. While the bureau owns and maintains an extensive stormwater management system, BES also relies on stormwater management infrastructure (particularly green infrastructure) that it does not own or control as formal assets. Portland's stormwater system depends on management and expansion of the city's tree canopy and natural areas that intercept rainfall, keeping it out of pipes and filtering it naturally. Natural streams and drainageways, although not owned by the bureau, are a critical part of the water conveyance network. Green infrastructure components of the stormwater system may be owned or managed by private property owners, other bureaus (most often, Portland Parks & Recreation), and other institutions and agencies (such as schools, the Oregon Department of Transportation (ODOT), and others).

BES conducts system planning to identify, characterize, and analyze (model) its systems. System plans recommend projects and programs to address condition, capacity, meet regulatory requirements, and growth goals. System planning is driven by an asset management approach (described below) and increasingly integrated with watershed planning. BES has current system plans for the combined and sanitary sewer system, the two wastewater treatment plants, but not for its pump stations or pressurized force mains. Stormwater system planning is underway.

Figure 6.1 Systems Overview



Portland's Watersheds

BES's sewer and stormwater systems are managed to protect or enhance human and environmental health and Portland's watersheds, see Figure 6.2. Each watershed has distinct characteristics and conditions, described below, which are relevant to existing and future infrastructure system planning and investments. All of Portland's watersheds include waterways that are TMDL-listed for water quality and have critical habitat for ESA-listed salmonids.

In 2006, Portland City Council adopted the *Portland Watershed Management Plan (PWMP)* in order to focus the City's efforts to protect and restore Portland's natural systems. The PWMP lays out an integrated set of strategies to improve watershed health, and provides a framework to coordinate and integrate responses to some of the City's regulatory requirements. A healthy urban watershed has the hydrologic, habitat, and water quality conditions suitable to protect human health and viable ecological functions and processes, including self-sustaining populations of native fish and wildlife species whose natural ranges include the Portland area." The City's and BES's goals under the PWMP are to achieve improvements in hydrology, water and sediment quality, habitat, and biological communities. Both the *Portland Plan* and the updated *PWMP Implementation Plan (2012)* reinforce the importance of improving watershed health through repair and maintenance of existing infrastructure, investment in built and natural stormwater infrastructure, environmentally-friendly development and the protection, enhancement and restoration of natural resources. While BES is the lead bureau for watershed health, implementation of the PWMP depends on the efforts of several city bureaus and coordination with other agencies and non-governmental entities. Watershed projects related to BES's mission are included in the Investment Strategy.

To inform future investments, the Bureau conducts comprehensive watershed monitoring to track changes in watershed health over time—including water quality trends. Now in the fourth year of monitoring, the Portland Area Watershed Monitoring and Assessment Program (PAWMAP) is establishing consistent citywide data through an efficient sampling approach modeled after EPA protocols. Every year BES samples a subset of the 298 inventoried miles of streams in Portland. Of the stream reaches sampled and analyzed so far, none meet the city's water quality benchmarks, in large part because of mercury and total suspended solids. Targets for in-water large wood, an indicator of in-stream habitat function and complexity, have been achieved in only 13% of the sampled reaches, and only 2.5% of sampled stream reaches meet the standard for a healthy macro-invertebrate population. (Macro-invertebrates include all species with exterior skeletons, including insects, which are a critical part of the food chain and an indicator of overall environmental health.) In sum, Portland's streams generally are not considered functional for water quality, habitat, and biological communities. Impervious area (roads, parking lots, and rooftops) covers between 22% and 40% of Portland's watersheds, generating large quantities of stormwater runoff and disrupting the natural water cycle. Due to implementation of public



and private stormwater management approaches, including surface water quality facilities like green streets and rain gardens, some of this impervious area is managed. However, effective impervious area—the runoff that remains unmanaged—ranges from 12% in the Johnson Creek watershed to 28% for the mainstem Willamette watershed.

Portland's six primary watersheds are described in more detail below. Specific stormwater system descriptions and challenges for each watershed are in the Stormwater System section.

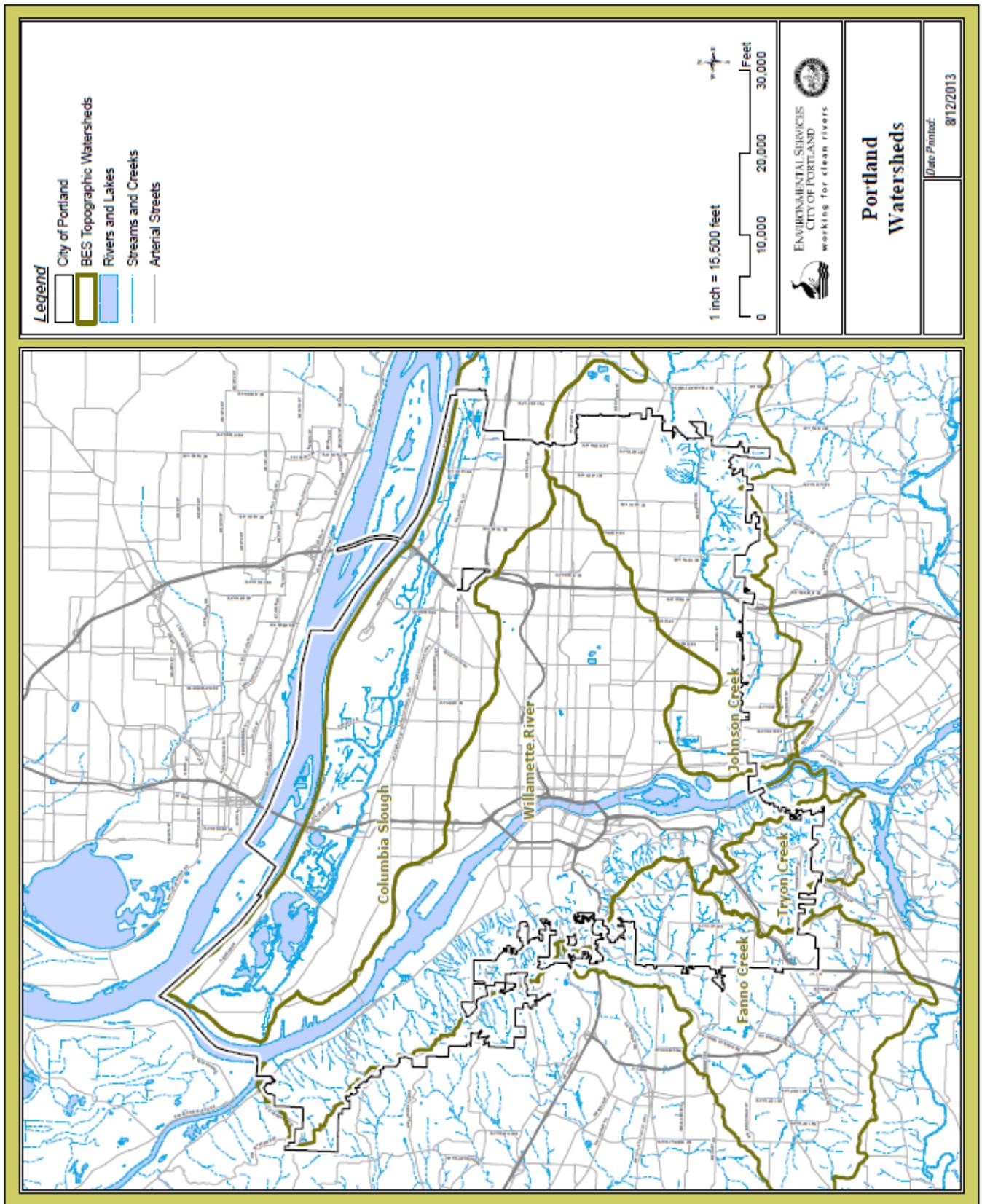
Portland Willamette River Watershed

The Willamette River Watershed in Portland is only 0.5 percent of the Willamette River's total drainage basin, which covers more than 11,000 square miles in western Oregon. Within the City of Portland, the watershed encompasses 69 square miles of land. Other city watersheds—Johnson Creek, Fanno Creek and Tryon Creek—drain to the Willamette River. The river flows north through the downtown core to the Columbia River and serves industrial, residential, commercial, and recreational uses. The highly altered stretch of the river through Portland is the gateway to the entire Willamette Basin for salmon, steelhead, lamprey, and other native fish and wildlife. Despite heavy urbanization, valuable habitat for feeding refuge, rearing, and mating still exists in this portion of the watershed. The river is also a significant place for people to encounter nature through active or passive recreation, and the working harbor is a major economic driver for the region.

The watershed includes the central city and much of inner southeast and northeast Portland, which is highly developed and covered by impervious surface, although relatively flat and with generally good infiltration. The watershed also contains Forest Park and several other large parks and open space areas, and includes smaller tributary streams on the west side of the river that are not part of the Fanno or Tryon Creek basins.

The Willamette River has water quality limitations, including established TMDLs for temperature, bacteria, and mercury. Completion of the Combined Sewer Overflow (CSO) Program in 2011 significantly reduced CSO discharge events to the Willamette River, which improved one aspect of river health, but more work remains to address water quality and habitat in the main stem river. Nine miles of the main stem Willamette River in Portland are designated as a federal Superfund site. In the west side tributaries, water quality challenges and stormwater-related high flows in natural channels lead to degradation of the physical and biological characteristics of these tributary systems. Protection and restoration of remaining natural areas on the Willamette escarpment and in the west hills are important to connecting existing high-quality habitat, preserving the natural hydrologic function of steeply sloped areas, and preventing further water quality impacts in the main stem river.

Figure 6.2 Portland Watersheds



Columbia Slough and Columbia River Watersheds

The Columbia Slough Watershed extends along the Columbia River shoreline and through north and northeast Portland to Alameda Ridge. The watershed drains approximately 51 square miles of land and is defined by the 19-mile long main channel (the slough) as well as approximately 30 miles of secondary waterways. The Upper Columbia Slough is a highly managed system, with piped stormwater, dikes and levees, and a system of pumps that provide area drainage and flood control. The lower nine miles of the slough—from NE 18th Avenue to Kelley Point Park—are tidal and directly connected to the Willamette River. The lower slough provides valuable habitat for migrating juvenile Columbia River and Willamette Basin salmon. The slough provides recreation and access to nature for the metro region, particularly underserved neighborhoods in north and northeast Portland. The Columbia South Shore Well Field, part of Portland's drinking water supply, is located in this watershed.

The watershed is an important economic and transportation hub, the location of thousands of jobs as well as 170,000 residents. Much of the northern section of the watershed has industrial land uses on large parcels. More information on the slough's unique stormwater management considerations is in the stormwater system section. Completion of the CSO program greatly reduced sewage overflows to the Columbia Slough, which has improved water quality.

However, the slough remains water quality limited, with established TMDLs for temperature, bacteria, nutrients, and toxics. Low levels of contamination in the sediment are also widespread. In 1994, the City of Portland established a Consent Order with DEQ related to sediment. The City entered the Voluntary Clean Up Program in 2006. The City and DEQ have adopted an approach that includes reducing pollutant sources, cleaning up specific sites, and long-term monitoring to track how the slough is responding to watershed management actions. BES has completed a predesign that identifies priority city-owned stormwater outfalls that need pollutant reduction facilities.

Protection of valuable natural resources like Smith and Bybee Wetlands and Big Four Corners Natural Area, ongoing work to revegetate the banks of the slough, construction of green street facilities, and stormwater pollution controls by businesses along the slough are improving conditions in the Columbia Slough watershed, but significant challenges remain.

The Columbia River watershed in Portland is a fraction of the river's overall drainage basin in North America and covers just over one square mile of the City of Portland along the river's south shoreline and Hayden Island. The City provides stormwater and sewer services to the residents and businesses in this area, and the Columbia Boulevard Wastewater Treatment Plant discharges Portland's wastewater effluent to the Columbia River. While development on Hayden Island is concentrated on the eastern side, the western portion is outside the City's service area and remains undeveloped. The island provides rare shallow water habitat and riverine woodlands. The Columbia River south shoreline is leveed for approximately 11 miles and the drainage districts are responsible for flood control in this area.

Johnson Creek Watershed

The Johnson Creek Watershed encompasses approximately 54 square miles of land, over half of which lies outside the City of Portland. Johnson Creek originates in Clackamas County east of Boring, Oregon,

and flows west approximately 25 miles to its confluence with the Willamette River. The watershed has a mix of land uses: agricultural, commercial, light industrial, and residential. Salmon, steelhead, and other native fish are found in significant portions of the watershed. Johnson Creek provides some of the city's best opportunities for native species recovery.

Fifteen miles of the creek channel is lined with concrete and rock from Works Progress Administration (WPA) attempts to control flooding in the 1930s, which has exacerbated storm-related flooding, particularly in the Lents neighborhood. In addition, development in the East Buttes area has disturbed natural drainageways, seeps, and springs that are an important part of the hydrologic cycle, and the entire creek has low flows during the summer.

Agricultural runoff, particularly in the headwaters (outside City limits), and legacy pollutants such as DDT are a significant challenge to stream health. Remediation efforts require collaboration among multiple jurisdictions. The creek has established TMDLs for bacteria, temperature, and toxics.

Through the implementation of the Johnson Creek Restoration Plan (JCRP), the City and partners have purchased more than 260 acres of frequently flooded property and are removing WPA alterations and restoring the natural stream channel. The goal of the JCRP is to curb impacts from nuisance flooding while improving water quality and habitat, reversing the damage from earlier attempts to control flooding that altered the natural channel of the creek. Several floodplain restoration projects completed in the past ten years are making cumulative improvements in the natural resource functions of the watershed, and additional priority projects are planned.

Fanno Creek and Tryon Creek Watersheds

The Fanno Creek Watershed covers approximately seven square miles of land in southwest Portland. The balance of the watershed's 32 square miles is mainly in Washington County. Several of the tributaries to Fanno Creek provide cool water and habitat for native fish, and Fanno Creek itself is a tributary to the Tualatin River.

Stormwater flows into stream channels and into Fanno Creek or is managed by the storm sewer system and surface water facilities. Impervious area from development, combined with local geology and steep slopes, results in highly variable flows that impact streams. Fanno Creek has water quality challenges, including established TMDLs for temperature, bacteria, and nutrients.

The Tryon Creek Watershed covers approximately six square miles of southwest Portland. About 21 percent of the watershed is outside the City of Portland's boundary in the jurisdictions of Multnomah County, Clackamas County, and the City of Lake Oswego. Most of the development is concentrated in the upper part of the watershed where impervious surfaces cover significant area. Tryon Creek State Natural Area and other parks and natural areas provide valuable, but fragmented, habitat. Native resident fish are found in the creek, but salmon and other migratory fish are largely excluded by the culvert under Highway 43 near the mouth of the creek.

Stormwater in this watershed flows quickly across soils that are slow to infiltrate and down steep slopes into stream channels that flow into Tryon Creek. Runoff from major transportation corridors including I-5

and Barbur Boulevard discharges to Tryon Creek or its tributaries. The creek has water quality challenges, including established TMDLs for temperature and bacteria. Stream bank erosion, channel incision and simplification, and fine sediment deposition are issues in both the Tryon and Fanno Creek watersheds. The Fanno/Tryon Watershed Management Plan calls for a dual approach in Tryon Creek of managing stormwater runoff, to reduce impacts to streams, especially in the upper watershed, while restoring and protecting existing natural areas to preserve the natural functions of the water cycle. In Fanno Creek Watershed, the primary focus is on managing stormwater runoff from commercial corridors and high-traffic streets.

Asset Management Approach

Although BES began incorporating asset management into its business practices more than 20 years ago, in 2010 the Bureau launched an Asset Management Improvement Program to better define asset management principles and practices as they should be applied to BES assets, identify opportunities for improvement, and establish a framework for implementing improvements. This helps the bureau prioritize investments within and across the different systems (sewage conveyance, treatment, and stormwater management). Asset management is a dynamic process, and the bureau's implementation of asset management varies by system and asset types.

The focus of the asset management approach is assessment and mitigation of business risk. Business risk is calculated as the product of consequences of failure to meet levels of service and likelihood of failure. In determining the consequences of failure to meet levels of service, the following triple bottom line risk factors were used:

- economic, including impacts on operations, maintenance, and/or replacement and emergency costs,
- environmental, including impacts on physical habitat, biological communities, and/or compliance with regulations, and
- social, including impacts on public inconvenience and perception and/or public health and safety.

Starting with these triple-bottom-line asset management factors, staff identified specific risks and associated dollar values for individual consequences of capacity and structural failures. The potential consequences of pipe failure include sewage backing up into private property, sewage overflows to the surface, and/or sinkholes opening to the surface.

Likelihood of failure is the probability an asset will fail. For structural deficiency risk, likelihood of failure was determined from condition assessment data and literature curves that relate pipe condition grades to remaining useful life for different pipe materials. For capacity deficiency risk, likelihood of failure was estimated by computer model simulation of flows for storms with different frequencies and under existing and future development conditions.

Sewer pipe segments were evaluated using a geographical information system (GIS) database tool to prioritize and map potential spot repairs and whole pipe rehabilitation/replacement. The database includes information from pipe inspection regarding condition, grade, and defects of the pipe as well as data concerning consequence of failure, likelihood of failure, estimated cost, and prioritization. This pipe

rehabilitation tool was utilized to identify rehabilitation/ replacement needs for the sanitary and combined sewer collection systems.

Pipe assets were evaluated to determine the current and potential future capacity risk. Alternatives were developed to address capacity and structural risks and were evaluated for cost-effectiveness in addressing level of service goals including reducing sewage backups into basements in the combined system. In the sanitary system, rainfall derived infiltration and inflow (RDII) is the biggest cause of capacity deficiencies. The effects of RDII were evaluated for the pipelines and pump stations using flow monitoring data and/or modeling assumptions based on pipes of similar age and location.

Wastewater Collection System

Wastewater is collected and conveyed via either combined sewers or separated sanitary sewers. Sewage is collected and transported through a combination of gravity pipes, pump stations, and pressurized force mains to major interceptors that convey the sewage to one of two wastewater treatment plants.

Wastewater Collection System Inventory

The collection system consists of a network of approximately 1,900 miles of collection system piping (1,000 miles of sanitary sewer, 885 miles of combined sewer, and 13 miles of sewers Portland maintains by agreements with other agencies), ranging from six inches to 22 feet in diameter. The system includes 39,760 access structures, 57 miles of force mains, and 25 outfalls. The City is responsible for operation and maintenance of 97 pump stations (80 that are owned by the City; six owned by other public agencies and 11 privately-owned septic tank effluent pumping (STEP) systems). The total wastewater service area is approximately 92,500 acres.

The combined sewer system collects and transports sewage and stormwater flow in a single pipe network to the CBWTP for treatment. It is divided into 41 basins², which are grouped into four major CSO service areas: West Side Willamette, East Side Willamette, North Willamette, and the Columbia Slough, see Figure 6.3. This area is approximately 31,700 acres in size and is bounded on the north by the Columbia Slough, on the south by Johnson Creek, on the west by the Portland West Hills, and on the east by 82nd Avenue (approximately). It includes most of downtown Portland and many older residential areas.

In the combined system, raw sewage is collected from local properties and stormwater runoff is collected from the public right-of-way, rooftops, parking areas, and other impervious surfaces. The system includes publicly-owned stormwater control facilities (such as green streets and sumps) that divert stormwater from the pipe system and 14 pumps stations. The city also relies on privately-owned vegetated stormwater facilities such as rain gardens, to reduce stormwater volume entering the combined system. Combined sewage is conveyed through a series of collector sewers and trunk sewers to diversion structures located at the downstream ends of the basins. The diversion structures route the combined sewage from the basins into the interceptor system that conveys the flow to the CBWTP. When capacity is not available in the interceptors, the diversion structures overflow to the CSO control facilities (storage tunnels and pumping systems) to deliver captured CSOs to the CBWTP for treatment. During large, infrequent storms when the tunnels fill, the excess combined sewage spills over the control dams in the tunnel shafts and discharges to the Willamette River or the Columbia Slough.

The sanitary sewer system includes the network of pipelines and pump stations that collect and convey wastewater only. The area served by sanitary sewers is divided into 29 basins, totaling 60,800 acres, and covering most of outer east and southwest Portland, see Figure 6.3. The basins are defined by the network of sanitary sewers that collect wastewater and convey it to either a major sanitary trunk sewer or a combined interceptor sewer. Seventy-four of the City's pump stations pump separated sanitary flow of

² BES has defined multiple basins for the combined sewer, sanitary sewer, and stormwater systems. Basin boundaries are based on the routing of flows to downstream discharge locations. The basins are delineated separately for each type of sewer – combined, sanitary, and stormwater. Within one watershed, there may be combined sewer basins, sanitary sewer basins, stormwater basins, or a combination of each.

which 55 are located in the Columbia Slough Service Area. The sanitary flow from the Tryon Creek Service Area (Tryon Creek and Dunthorpe-Riverdale basins) is treated at the Tryon Creek Wastewater Treatment Plant.

Flow from the Durham Service Area (Skyline and Clean Water Service South basins) flows to the Durham Advanced Wastewater Treatment Facility, owned and operated by Clean Water Services of Washington County. Aside from the few customers served by Gresham, the remaining flow is treated at CBWTP.

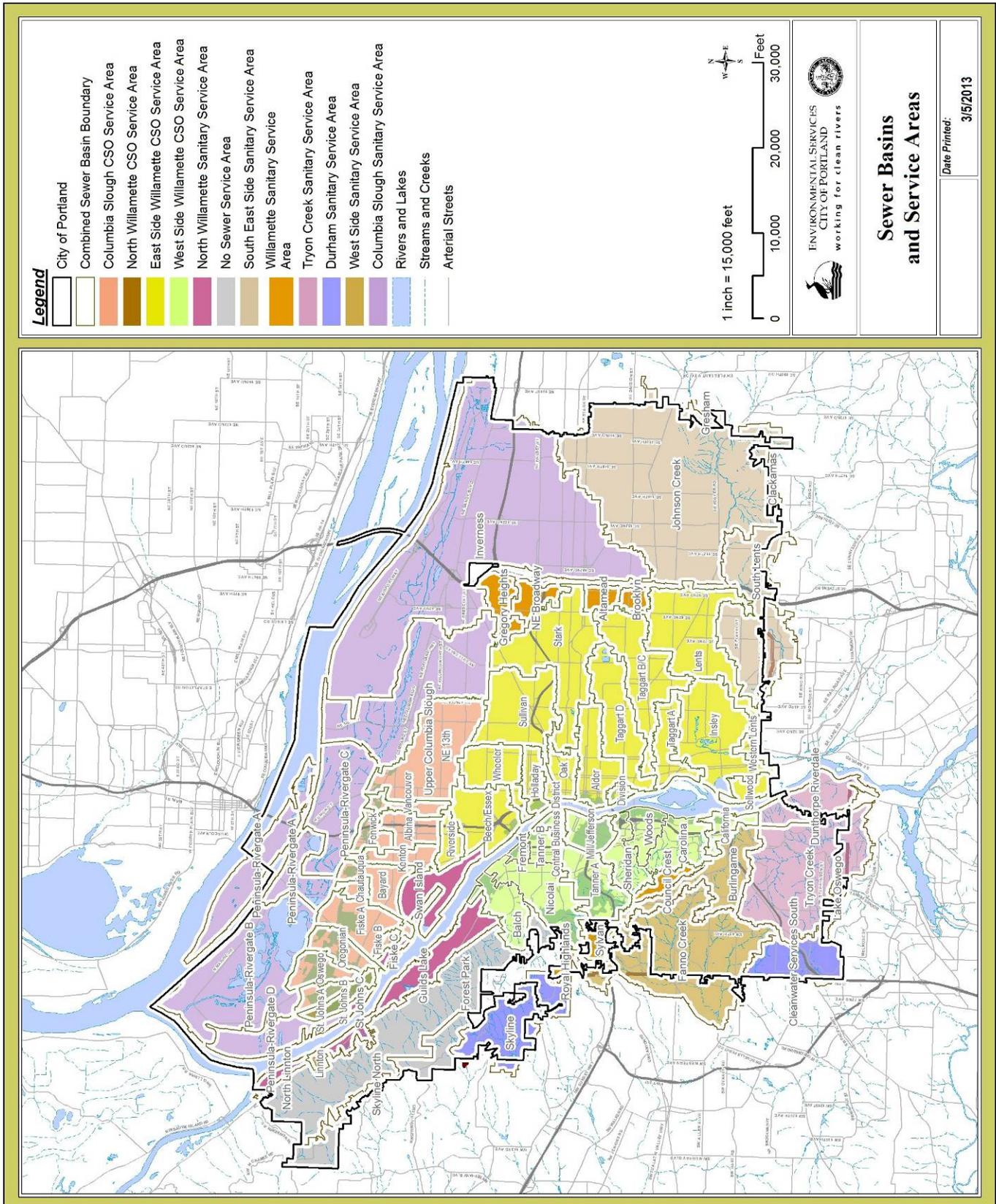
Wastewater Collection System Levels of Service

Levels of service for the wastewater sewer system establish a framework for characterizing system deficiencies, developing and evaluating alternative solutions, and selecting recommended improvements. The following levels of service are specific to the collection system:

- Provide sewage service to support development consistent with the Comprehensive Plan where feasible.
- Customers properly connect and maintain sewer connections per City standards.
- In the combined sewer area, convey combined sewage to prevent releases to buildings or streets up to a 25-year storm frequency (a storm with a 4% chance of happening in any year).
- Prevent combined sewer overflows to frequencies established by the NPDES permit.
- Public sanitary/combined conveyance facilities are maintained in accordance with standards.
- In the separated sewer area, sewage releases to surface waters (SSOs) are prevented for storm events up to a 5-year frequency (a storm with a 20% chance of happening in any year).

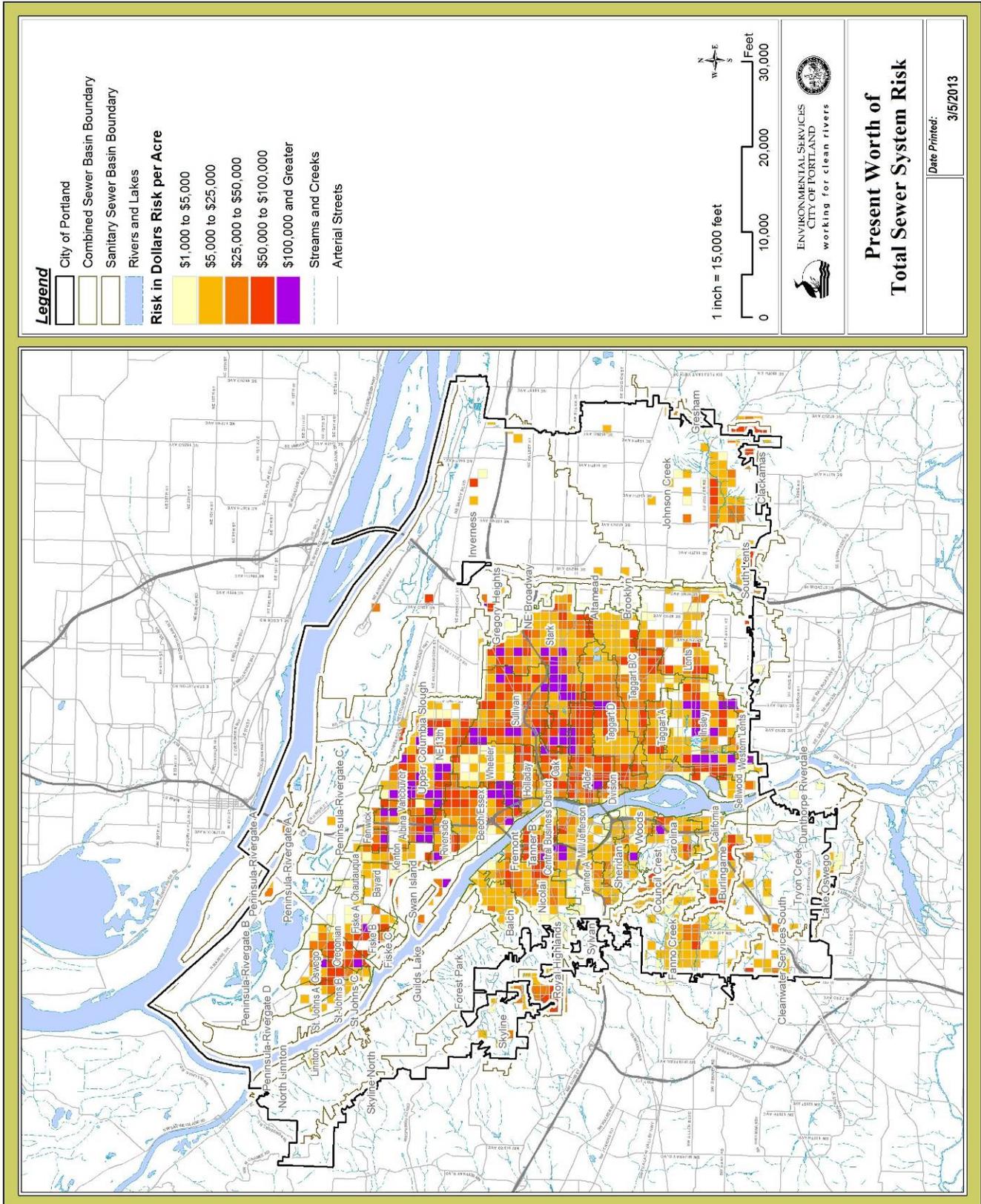
The Bureau has evaluated the sanitary and combined sewer pipe systems for structural integrity and the capacity to convey design flows. Pump station capacities have been evaluated to determine whether they could adequately pump the collection system design flows. Characterization of these systems is presented in terms of the risk of not meeting the technical levels of service. The estimated total sewer system capacity and structural deficiency risk is shown in Figure 6.4. In this figure, risk is expressed in dollars per acre and summarized in 25-acre grid cells color coded to signify a risk range. This figure illustrates the areas of the system where total sewer risk is currently highest. The Bureau has included a number of projects in its Investment Strategy to reduce this risk.

Figure 6.3 Sanitary and Combined Sewer Basins and Service Areas



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Figure 6.4 Sanitary and Combined Sewer System Risk



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Wastewater Collection System Current and Projected Condition

Sewer pipes are inspected to determine both structural and operational condition. Over the past 40 years, most of the collection system has been inspected. Approximately three-quarters of the pipe segments have been inspected over the last ten years. Of the remainder, approximately 65% were constructed within the past 20 years and are therefore assumed to be in excellent condition.

Table 6.2 Pipe Condition

Combined Sewer System	Miles	Very Good	Good	Fair	Poor	Very Poor	TBD
Pipes Total	878	51%	18%	11%	12%	6%	0.57%
Pipes 8" or less	321	45%	22%	8%	16%	8%	0.93%
> 8 and < 24"	401	54%	18%	14%	10%	4%	0.25%
>= 24 and < 36"	68	66%	13%	7%	9%	4%	0.03%
36" and larger	88	65%	8%	8%	15%	3%	1.14%
Sanitary Sewer System	Miles	Very Good	Good	Fair	Poor	Very Poor	TBD
Pipes Total	1,012	71%	20%	5%	2%	0%	0.40%
Pipes 8" or less	770	78%	18%	2%	2%	1%	0.13%
> 8 and < 24"	142	54%	31%	12%	2%	0%	1.41%
>= 24 and < 36"	50	46%	32%	16%	4%	0%	2.00%
36" and larger	50	52%	16%	26%	6%	0%	0.00%

As inspections are conducted, structural defects are noted and scored. The condition scoring method for sewer mains uses five grade ranges as shown below:

Table 6.3 Structural Condition Rating System

Grade	Condition	Description	Structural Score Range
1	Excellent	No defects or few minor defects	0 - 9
2	Good	Minor defects or few moderate defects	10 - 99
3	Fair	Moderate defects that will continue to deteriorate	100 - 999
4	Poor	Moderately severe defects that will become Grade 5 defects in the foreseeable future	1,000 - 9,999
5	Very poor/ immediate attention required	Defects requiring immediate attention. (Failed or failure imminent.)	10,000+



All pipes are at risk of structural failure at some point in time. Pipes in poor condition are at risk to fail sooner than pipes in good condition. In accordance with the asset management approach, the business risk of a structural failure for any given pipe is estimated by calculating the potential cost of consequence of failure, estimating the likelihood of failure, and developing a risk distribution as a function of time. To assess structural deficiency risk for the entire sewer system, this process was applied to every pipe in the city's inventory for the service area. Figure 6.5 shows the 100-year present worth value of structural deficiency risk for all condition Grade 4 and 5 pipes summed by 25-acre grid cells. Only Grade 4 and 5 pipes are shown in this figure because they represent pipe rehabilitation needs within the 20-year planning horizon. The Bureau is in the fourth year of a multi-year \$123 million rehabilitation program to address the highest risk pipes. Assuming adequate funding, the Bureau anticipates reducing its highest risk. Unfortunately, the collection system is degrading more rapidly than investment projections.

A significant percentage of the pipe system is concrete pipe installed in the early 1940s. Much of that era's concrete was of poor quality, so pipes are failing more rapidly than expected from age alone.

Pump stations, components and force mains require more frequent renewal than the gravity pipe system. The Pump Station Improvement Program was established to keep pump stations in good working order to maintain reliability and efficiency within the conveyance system. The program addresses capacity, mortality, reliability, and code compliance. Funding for this program is proposed to increase in future years to allow for timely capital renewal at each of the 97 pump stations. In general, pump stations are assumed to have a 50-year useful life; however, major components require renewal after about 25 years.

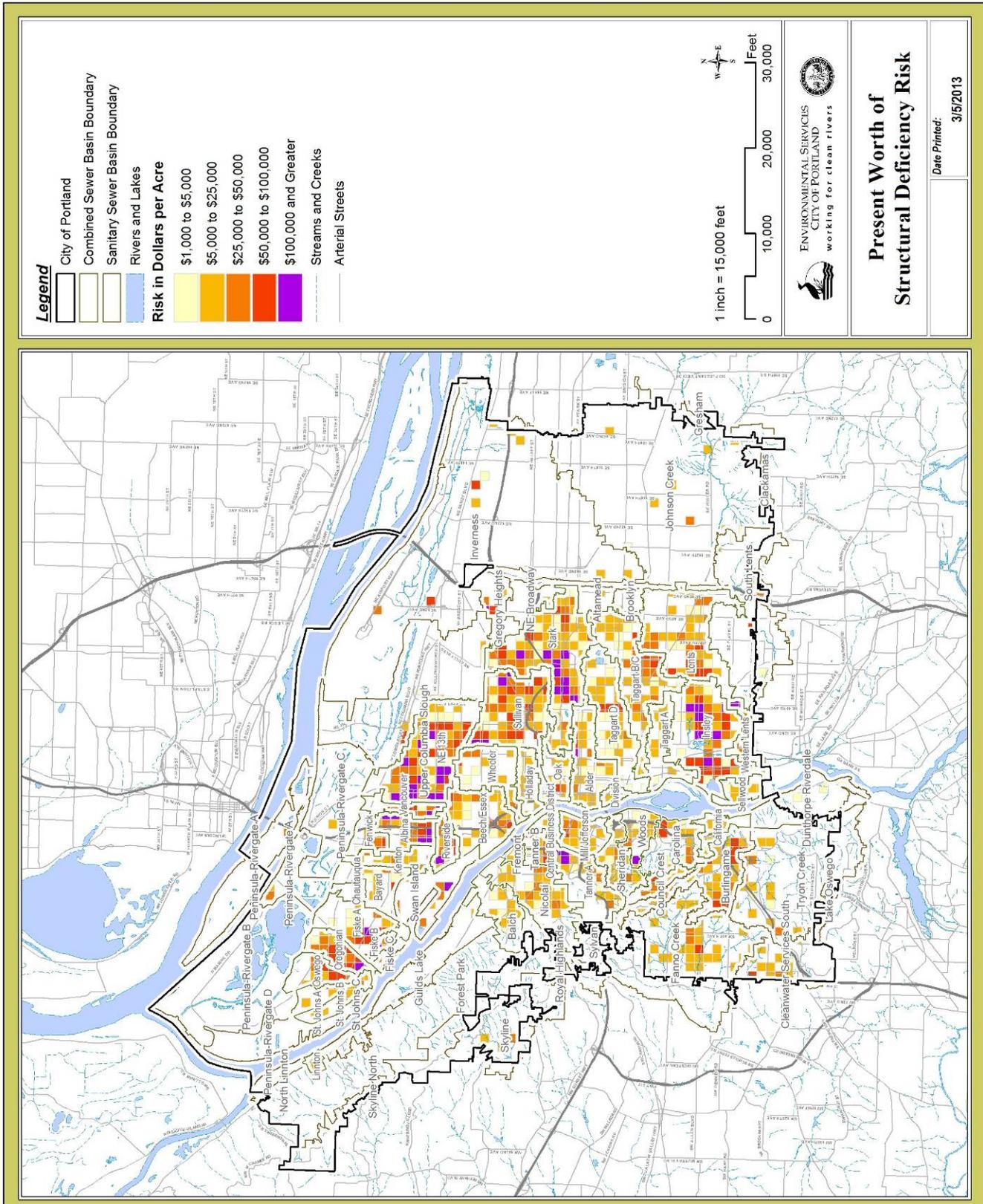
Vegetated stormwater facilities (green streets, etc.) in the combined sewer system are not included in this condition assessment, as most of them are relatively new. However, it is important to recognize the fact that these facilities, which reduce stormwater pollutants in the separated system and reduce the capacity demand in the combined sewer system, require regular maintenance to be effective. Budget requests for increased funding to maintain these facilities have not been supported. Lack of maintenance could lead to system failure.

Wastewater Collection System Current and Projected Capacity

To support the capacity and performance analyses of the sewer system, BES developed a highly detailed simulation technique called explicit modeling. The technique is explicit in that it models public and private facilities (manholes, pipes, green streets, onsite vegetated facilities, etc.) and impervious surfaces at the property level. Explicit modeling enables BES to more clearly define the sources of basement sewer backup risk and capacity problems throughout the basins, to efficiently calibrate flow monitoring data with more certainty than traditional models, and to evaluate the cumulative benefits of green infrastructure stormwater controls for streets, parking areas, and roofs.

The models are specific to each sewer basin and three of the interceptors. The basin model calibrations were performed by comparing basin model results against flows measured by temporary flow monitors installed within the basins. For the interceptors, flow data is available from more permanent monitors. The good correlation between the model predictions and the physical measurements at the monitors gives BES confidence in the model's ability to predict hydrologic and hydraulic response from rainfall events.

Figure 6.5 Structural Deficiency Risk (Sanitary and Combined Sewer Pipes)



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The hydraulic capacity characteristics of the combined sewer system are evaluated for five different design storm scenarios: three storms (2-year, 5-year, and 25-year) for existing conditions, one storm (25-year) for future conditions (build out of the Comprehensive Plan), and the 3-year summer storm (Regulatory criteria). Each of the existing-condition design storms represents a different level of risk. The combined sewer system performance measures focus on providing sufficient capacity to eliminate or significantly reduce street flooding risk and basement sewer backup risk for the 25-year design storm under future (2050) conditions. An additional regulatory requirement is to eliminate untreated CSO discharges to the Willamette River from May 1 to October 31 of each year except during storms greater than or equal to a summer storm with a 3-year return frequency under future conditions. Typically, this requirement impacts only the stormwater control facilities and the CSO tunnels and not the balance of the collection system capacity.

The greatest concentration of pipe segments with capacity problems is located in the older central neighborhoods. These capacity problems lead to the risk of the combined sewer backing up into basements during intense storm events. The highest risk of basement sewer backups on the east side of the Willamette River are in an area roughly bounded by NE Prescott Street to the north, SE Holgate Blvd to the south and SE 45th Avenue to the east. On the west side of the river, the highest predicted risk of basement sewer backups is in NW Portland in an area roughly bounded by NW Yeon Avenue to the north, West Burnside Street to the south and NW 23rd Avenue to the west.

The performance measure for identifying locations of potential capacity deficiency is basement sewer backup. Individual tax lots are determined to be at risk for basement sewer backups when the maximum water surface elevation in the sewer pipe is within eight feet of the estimated main floor elevation of the property. The estimated main floor elevation is three feet above the estimated ground elevation. The accuracy of the basement sewer backup risk is limited by the estimated main floor and ground level elevations which were determined with a digital terrain model. In the absence of reliable and systematic data, it was assumed that each tax lot has a basement. In addition to basement sewer backup risk, there is the risk of SSOs, CSOs, and the risk of surcharging of trunk sewers to degradation of pipe material.

The capacity-related sanitary sewer system technical levels of service are for storm events up to a 5-year frequency to convey sewage to prevent releases to buildings or streets and to prevent releases to surface waters. The performance measures for these are the same as for the combined system for basement backups, street flooding, surcharging in pipe constructed of brick, and pipe surcharge for a duration greater than 30 minutes. There is an additional performance measure related to pump stations: Separated sanitary pump stations should have adequate firm capacity to pump the peak hourly and peak instantaneous flows associated with the 5-year, 24-hour storm intensity of its tributary area, without overflows. Firm capacity is defined as the capacity of the pump station with the largest pump out of service.

Most of the sanitary sewer basins meet the service levels for conveyance. Exceptions are the Fanno Creek and Burlingame basins where street flooding and basement sewer backups may occur during storms smaller than the service level design storms. During rain events, stormwater enters the sanitary pipes either through inappropriate connections or through cracks in the pipe material. This Rainfall

Derived Inflow and Infiltration (RDII) is impacting the capacity of the sanitary pipe system. During intense storms, the Fanno Basin Pump Station is unable to keep up with the additional flow. A capital improvement project is underway to address this issue. The capacity of the Tryon Creek Wastewater Treatment Plant is also impacted by RDII. Capacity upgrades to the plant are discussed below. Note that in this same geographic area, there are other stormwater management issues such as incomplete conveyance systems. These are discussed below as part of the stormwater system.

Figure 6.6 illustrates the present worth of pipe capacity deficiency risk associated with the piped system.

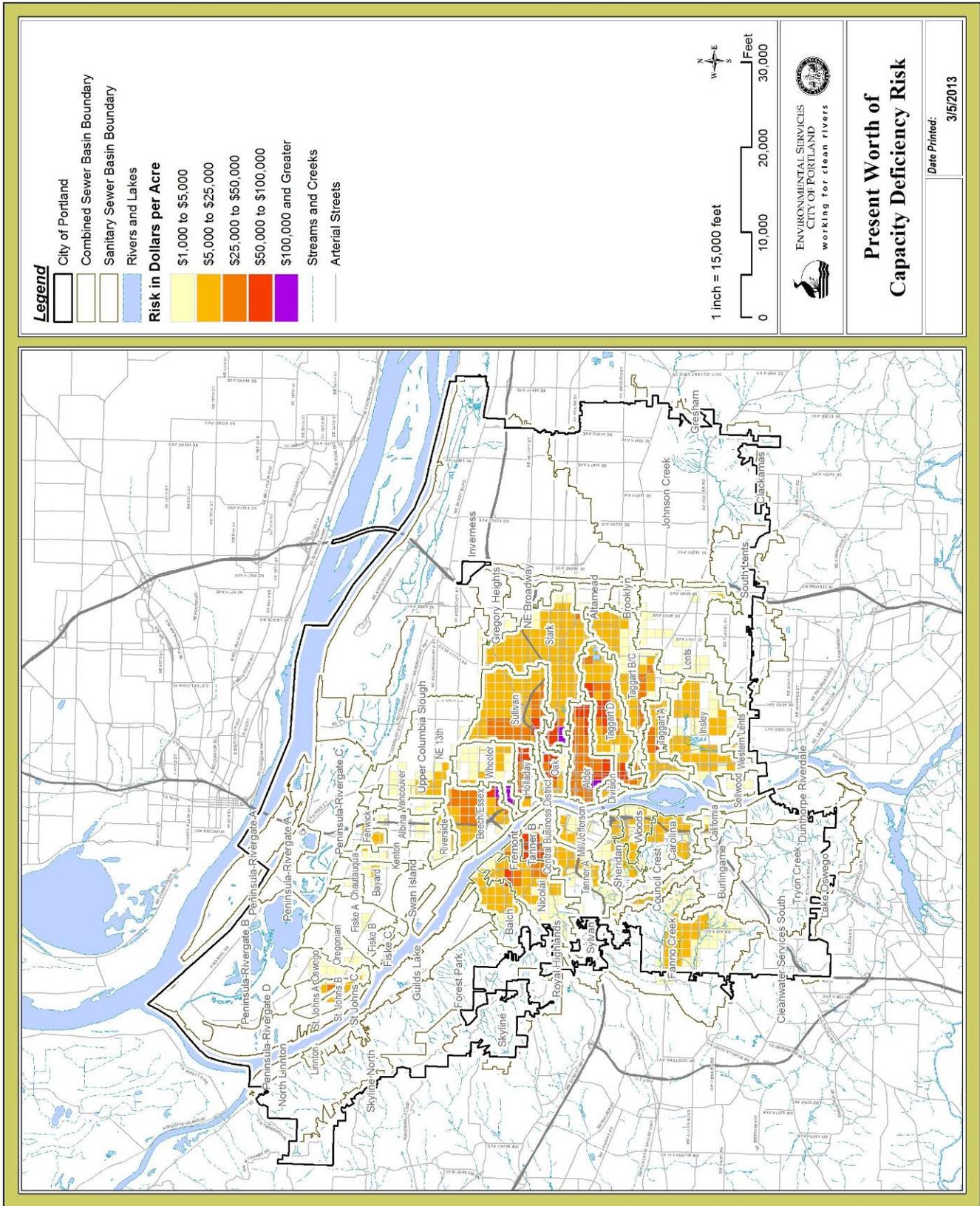
The capacity assessments of city pump stations were performed using basin-wide hydrologic and hydraulic models that estimate the base and peak design storm flows coming to the pump stations from the sanitary and combined sewer systems. The models are based on EPA-SWMM, which simulates the upstream hydrologic inputs including direct storm runoff and hydraulic routing of both the sanitary and wet weather flow components. For the separated sewer areas, the modeling system relies on a site-specific set of regression equations to create generate the RDII flows. The regression equations were developed using the city's HYDRA rain gauge system data and actual flow monitoring data to define the hydrologic response of the collection system to the rainfall inputs. A calibration assessment was performed to evaluate the quality of the monitoring flow data and the "goodness of fit" for models

Using this integrated method of EPA-SWMM and regression equations, the full wet weather flow rates from the collection system to each pump station were developed for the appropriate design storm. The estimated flows were then routed in the model through each pump station to determine whether or not the installed station capacity was able to fully convey the design storm. This capacity assessment was performed for both the existing collection system conditions as well as the future (2040-2050) system conditions.

- **No Capacity Deficiencies:** Pump station "Firm Capacity" is able to safely convey the peak design storm flows, which means the station is able to keep one pump in reserve for emergency conditions
- **Insufficient Firm Capacity:** Pump station must use "Full Capacity" (all available pumps) in order to safely convey the peak design storm flows.
- **Insufficient Full Capacity:** Pump station is not able to fully convey the peak design storms even using all available pumps.

The 14 pump stations in the combined area have sufficient capacity to convey flows. Three pump stations in the separate area have insufficient firm capacity and two have insufficient full capacity. Projects to address these capacity issues are included in the proposed Investment Strategy.

Figure 6.6 Capacity Deficiency Risk (Sanitary and Combined Sewer Pipes)



Providing Sanitary Sewer Service to Unserved Areas

The City’s level of service for wastewater collection is to provide sewage service to support development consistent with the Comprehensive Plan where feasible. In order to identify system needs and serve unconnected areas, properties that are currently not connected to the sanitary sewer system were reviewed to determine whether tax lots met the conditions required for sewer service connection:

- No gravity sewer exists close enough to allow for a lateral to connect to the sewer.
- It must be feasible to provide service to the lot. Pump stations are not considered feasible for fewer than five properties.

There are significant areas currently unserved by sanitary sewers within the USB, primarily in the Johnson Creek and Skyline basins. It is estimated that 1,500 developed properties have some type of on-site sewage system and are not connected to the piped sewer system. Some of these properties are zoned for development; others are already developed with on-site systems such as cesspools and/or drainfields. In some cases, with current technology, it may not be technically or financially feasible to connect these properties to the sewer system. Estimates to serve individual properties range as high as over \$1 million. Lack of sanitary sewer service may cause existing developed properties to become uninhabitable and may deem some vacant lots to be undevelopable.

Recommended Wastewater Collection System Improvements

BES developed and evaluated alternatives to address the structural and capacity pipe deficiencies identified during the characterization of the system and to meet the levels of service summarized above.

For pipes with structural deficiencies, the alternatives include whole pipe replacement (which may include lining) or a spot repair. Ongoing monitoring is recommended when the defects do not warrant rehabilitation at this time. The preferred alternative is illustrated in Figure 6.7. Given the age of the collection system, pipe rehabilitation is expected to be an ongoing need.

There are two primary alternatives for providing capacity in the combined system – conveyance or stormwater control. The conveyance alternative is a traditional pipe upsizing approach (replacing existing pipes with larger pipes). The stormwater control alternative uses green infrastructure to detain and/or infiltrate stormwater through vegetated facilities. In the sanitary system, the capacity alternatives include pipe upsizing, pump station expansion, RDII (rainfall derived infiltration and inflow) removal (usually pipe repair or replacement, and wastewater treatment plant expansion. In areas currently unserved by any sanitary sewer system, alternatives have been developed and evaluated to provide new sanitary sewer service where technically and financially feasible. The preferred alternative is illustrated in Figure 6.8.



The recommended plan for the combined sewer system includes projects that reduce basement sewer backup risk, replace structurally deficient pipes, reduce surcharging in major trunk lines, and contribute to CSO reduction through the incorporation of stormwater control facilities. The primary focus of these projects is to provide adequate capacity in the combined sewer system to convey the design flow and resolve basement sewer backup risk. For the most part, this is completed by either increasing pipe capacity through upsizing of pipe diameter or by routing stormwater runoff to stormwater control facilities to reduce the runoff that enters the system. In a few basins the resolution of basement sewer backup risk is achieved through stormwater separation, redirection of flow, or underground pipe storage facilities.

Based on asset management principles, only cost-beneficial projects – projects for which the cost of doing them now is less than the amount of risk from failure as expressed in dollars - (either as stand-alone projects or when combined with hydraulically dependent projects) are recommended as they will cost-beneficially reduce the risk within the combined sewer system. Of the estimated \$930 million in capacity-related risk in the combined sewer system, only \$200 million in projects were recommended to move forward in the March 2012 plan. One key assumption in the recommendation is development of some private stormwater management facilities to address the some of the capacity issues.

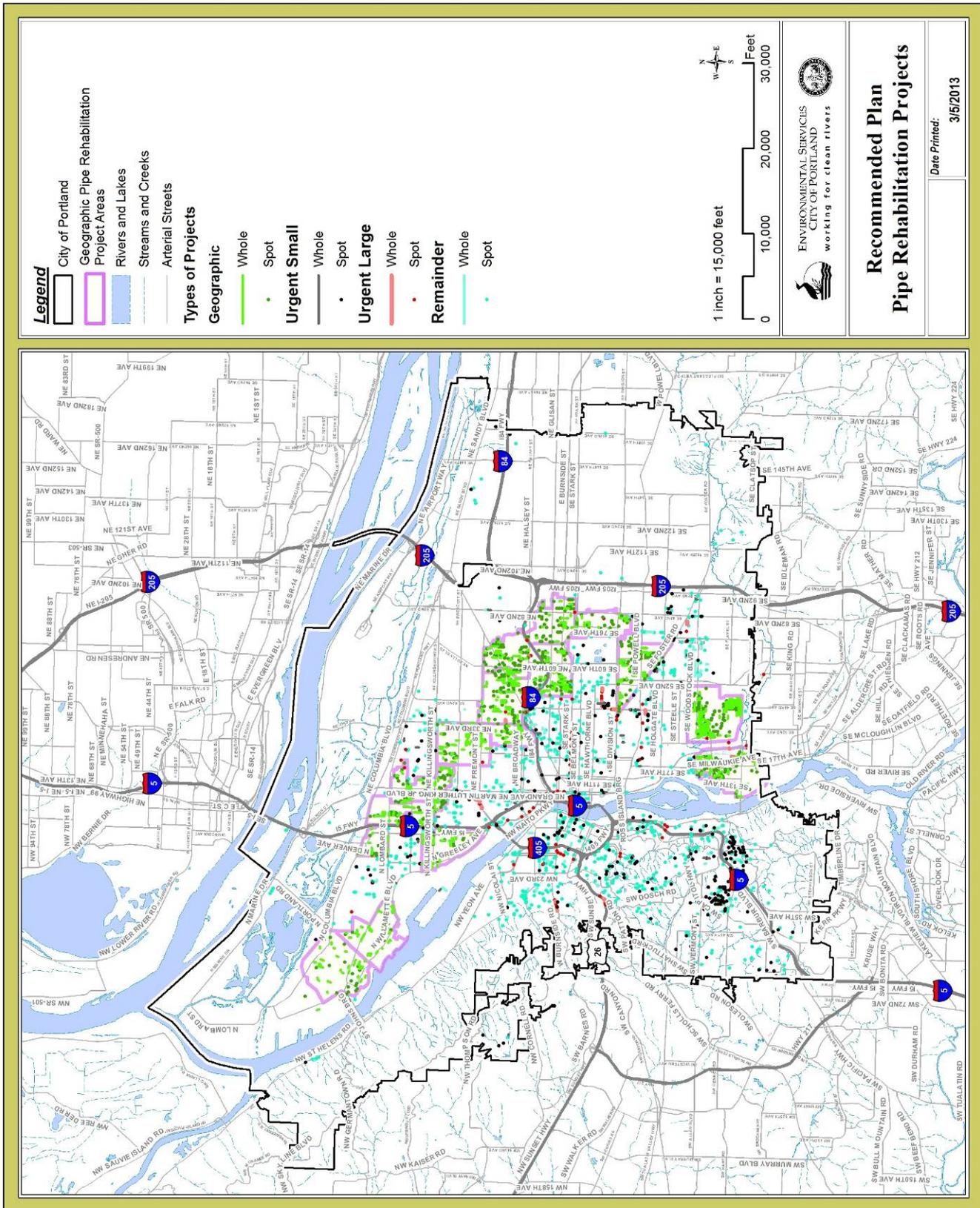
In the long-term, capacity improvement projects will be drawn from the list of projects that are currently not considered cost-beneficial. It is expected that some will become cost-beneficial in the future due to one or more of the following factors:

- The sewer system is aging so pipe segments proposed for upsizing will have a higher risk of having a structural failure. Because the risk is greater, the project will resolve more risk.
- The dollar value of basement sewer backup risk might increase to be more than the current estimate of \$5,000 per basement sewer backup.
- Other risk reduction (such as operations and maintenance efficiencies) may be quantified and included in the risk calculation.
- More stormwater control facilities might be implemented on private property through a stormwater retrofit program and reduce the maintenance costs assumed in the system plan because maintaining the facilities will be the responsibility of the property owners.
- Changes to the zoning might alter the future base assumptions changing the number of properties predicted to be at risk of basement sewer backups.

In the sanitary sewer system, the most critical capacity issues are the deficiencies in the Fanno Creek and Burlingame Basins. Significant wet weather flow and capacity problems in this area require a system-based solution that combines capacity upgrades with RDII reduction. Major elements of the recommended plan include increasing the capacity of Fanno Basin Pump Station, constructing a surge tank facility to protect recently completed force mains, near-term RDII reduction and pipe upsizing to resolve local capacity issues, long-term RDII reduction to reduce the risk of flows exceeding the capacity of the Fanno Creek Interceptor and the Fanno Basin Pump Station, and increasing the capacity of a short section of the Southwest Parallel Interceptor.

The recommended plan for the sanitary sewer system includes projects to extend sewer service to unserved areas that are both technically and financial feasible.

Figure 6.7 Recommended Sanitary and Combined Pipe Rehabilitation Projects



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Collection System Investment Strategy

The Investment Strategy (Appendix A) includes the following projects and programs for the collection system:

- **Pump Station Improvement Program:** Program to refurbish or upgrade pump stations not in compliance with current codes, not operating reliably, need improvements because of growth in the receiving sewage basin, and/or are over 20 years old with out-of-date equipment. The Pump Station Improvement Plan guides the selection of projects. This program was developed to ensure the 97 pump stations are maintained in accordance with a scheduled plan to increase pump station reliability.
- **Sewage Pipe Rehabilitation Program:** Based on regular inspection, this program rehabilitates the highest risk pipes.
- **Capacity Upgrades:** Based on the Systems Plan, these programs add capacity by upsizing pipes and/or adding surface infiltration facilities. Projects are prioritized based on risk and benefit/cost. Work also includes cost-effective pipe rehabilitation, if located within the project area. Capacity upgrade projects are anticipated in the following basins: Holladay/Stark/ Sullivan, Beech/Essex, Oak, Taggart/Insley, Wheeler, Alder, NE 13th Ave, Northwest Neighborhoods, and North Portland.
- **Sanitary Sewer Collection System Capacity:** A series of projects is proposed to address infiltration and inflow (RDII) in the sanitary sewer system in SW Portland. Projects typically involve rehabilitation of main lines and laterals and disconnecting storm inlets from the sanitary sewer.
- **Sewer Extension Program:** Where technically and financially feasible, sewer extensions are proposed to relieve septic systems at risk of failure, to correct party sewer situations, and to provide service where development will be occurring soon and service is currently not available.

Wastewater Treatment System

Wastewater Treatment System Inventory

The City of Portland owns and operates two municipal wastewater treatment plants, where wastewater is processed through removal of solids and organic materials and the addition of disinfection. The Columbia Boulevard Wastewater Treatment Plant (CBWTP), located in north Portland, serves as the city's main sewage treatment facility, cleaning and discharging most of Portland's wastewater. The plant provides service to nearly all of Portland's 583,000 residents. The service area for the wastewater collection and treatment system totals 94,000 acres, including 9,000 acres outside the city limits. The Tryon Creek Wastewater Treatment Plant (TCWTP), located south of Portland in the city of Lake Oswego, serves Lake Oswego and a small portion of southwest Portland, see Figure 6.9.

The CBWTP campus is generally bound by N. Columbia Boulevard on the south, N. Portland Road on the west, the Columbia Slough on the north, and Union Pacific rail lines on the east and southeast. Two other parcels are part of the 147-acre campus: a 36-acre site known as Triangle Lake is located just north of the slough and a 24-acre future expansion site is located west of N. Portland Road on the south bank of the slough. Site zoning is Heavy Industrial (IH) and General Industrial (IG). A narrow strip along the Columbia Slough has environmental overlays for conservation (c) and protection (p). The northern tip of the site has an aircraft landing overlay (h). The entire campus is designated as a conditional use.

As currently configured, the CBWTP includes nearly 350,000 square feet of buildings and over 700,000 square feet of tanks, pumps, and other structures. In October 2011, an updated Master Plan was approved for the campus, see Figure 6.10. The Master Plan allows for development of an additional 122,000 square feet within the campus boundaries without conditional use review, as long as Master Plan standards are met. As part of the land use approval, mitigation activities are proposed to protect the community in the areas of transportation, facilities design, landscaping and screening, open space, neighborhood livability, safety, physical services such as waste disposal and water supply, protection of designated resources, and enhancement of environmental and recreational resources. Odor monitoring and control systems include retrofits to existing facilities and installation of odor controls in all new facilities. The odor monitoring and control systems were developed in collaboration with the CBWTP Citizen Advisory Committee and treatment plant neighbors and are intended to assure compliance with City Council Resolution 35453.



Columbia Boulevard Wastewater Treatment Plant

In addition to process facilities, maintenance facilities, storage, and office areas, the campus also provides space for Multnomah County Vector and Nuisance Control (four buildings totaling 10,500 square feet) and is one of five fueling stations for publicly-owned vehicles. The site is also designated as one of the City's incident command centers to handle emergencies such as floods or earthquakes.

The TCWTP is a 13.5-acre plant located in the City of Lake Oswego with a rated treatment capacity of 8.3 million gallons per day. It is bounded by the Willamette River to the east, Tryon Creek to the north, and privately owned Industrial zoned properties to the west and south. Development on the plant site includes 80,000 square feet of tanks and 13,000 square feet of building structures. The plant's service area includes part of southwest Portland, unincorporated Multnomah County, and the City of Lake Oswego.

Wastewater Treatment System Levels of Service

The following bureau levels of service are specific to the wastewater treatment plants:

- Treatment plants are in compliance with NPDES effluent limits.
- 100% of biosolids are beneficially re-used.
- 90% of methane is beneficially re-used.

Wastewater Treatment System Current and Projected Condition and Capacity

Columbia Boulevard Wastewater Treatment Plant

The Columbia Boulevard Wastewater Treatment Plant is an activated-sludge, secondary treatment plant with a designed capacity (average dry weather flow (ADWF)) of 100 million gallons per day (mgd) for secondary treatment. The headworks and the primary treatment process have a design capacity of 450 mgd. The plant receives an ADWF of approximately 63 mgd. The major processes at the plant are liquids handling (pretreatment, primary treatment, secondary treatment, disinfection, and discharge), solids handling, methane utilization, and water re-use.

Liquid processes include:

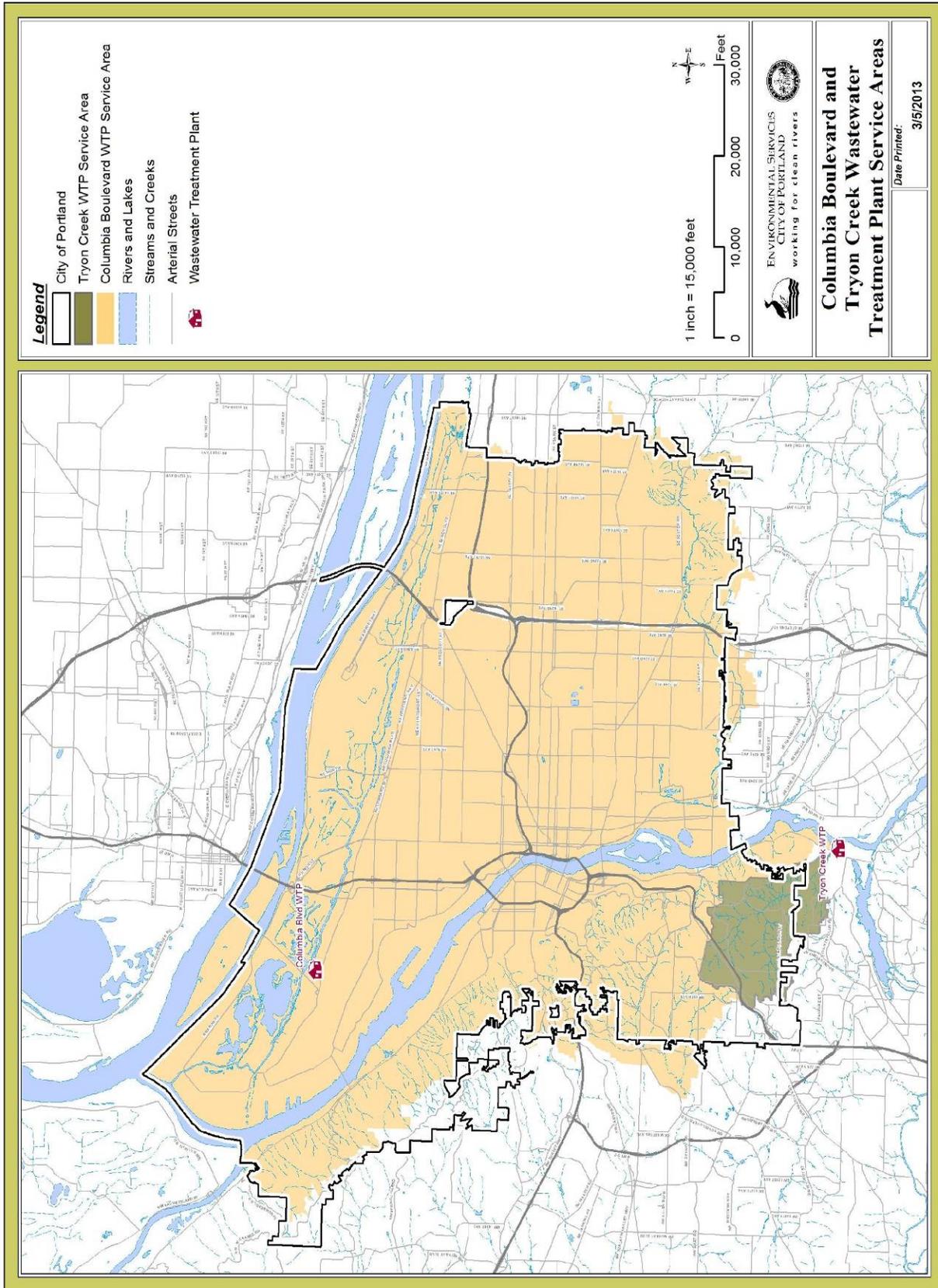
- Influent pumping;
- Preliminary treatment: bar screens with screen presses, grit basins with grit washer-separators and grit disposal facilities, septage receiving and testing station, and an emergency bypass to the primary clarifiers;
- Flow monitoring and controls;
- Dry weather primary treatment: standard physical clarification for 120 MGD minimum;
- Wet weather primary treatment: fine screening, chemically enhanced primary treatment (CEPT), standard clarifiers and bypass to route excess flows to disinfection and outfalls;
- Secondary treatment: aeration basins, secondary clarifiers, and sludge collectors;
- Chlorine disinfection with dechlorination;
- Effluent pumping: to a 72-inch line that carries flows to the dechlorination facility at Hayden Island, then to an alternative dry weather outfall/diffuser in the Columbia River, and to a 102-inch diameter pipeline that carries treated effluent to the dechlorination facility, then to an alternative wet weather discharge outfall and diffuser in the Columbia River.

Solids handling includes:

- Degritting;
- Transport, storage, handling, processing grit and sewer cleanings;
- Gravity thickening of primary sludge;
- Gravity belt thickening of the waste activated sludge;
- Two-stage anaerobic digestion of primary and secondary sludge;
- Gas collection, storage, and energy generation;
- Seasonal lagoon storage for secondary sludge; and
- Belt press dewatering of anaerobically digested biosolids.

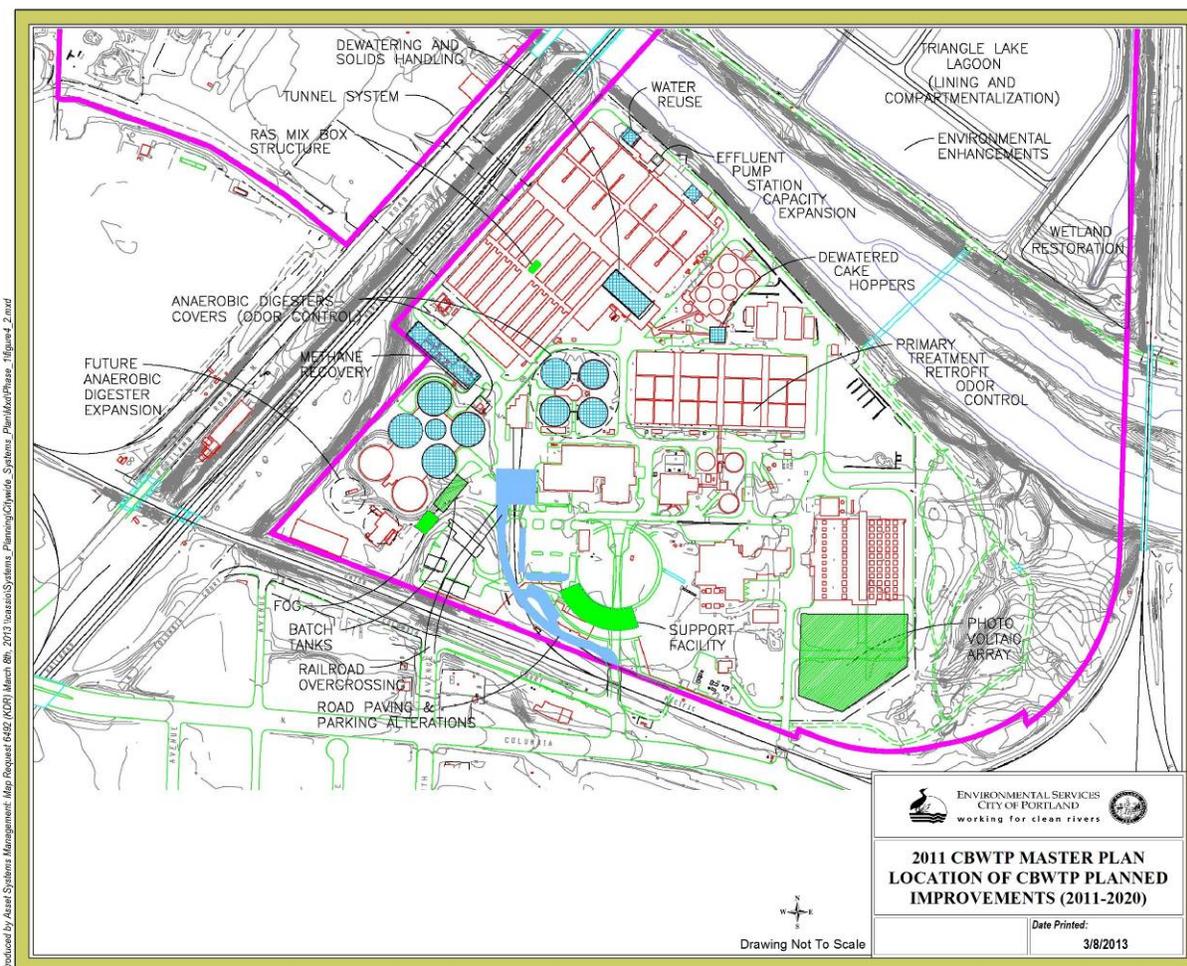
The plant generates approximately 13,000 dry tons of biosolids annually. The solids, in the form of dewatered cake, are transported in trucks to farms in central and eastern Oregon for direct land application, providing for beneficial reuse.

Figure 6.9 Columbia Boulevard and Tryon Creek Wastewater Treatment Plants Service Areas



Produced by Asset Systems Management Map Request 6482 (OCA) March 5th, 2013 \masso\systems\Planning\Citywide Systems Plan\Phase 1\TP ServiceAreas.mxd

Figure 6.10 Columbia Boulevard Wastewater Treatment Plant Master Plan



As the anaerobic digesters at CBWTP stabilize wastewater solids, they produce a gas that contains methane. Methane is a primary constituent of natural gas. The CBWTP currently collects and uses a portion of its digester gas to fuel boilers, for heating the digesters, and for space heating. The plant also produces electricity by using digester gas to fuel two 850 KW generators. The on-site generated electricity offsets demand for 40 – 50% of previously purchased power. Some gas is sold to a nearby industrial customer. Excess gas is burned in flares on site. A study is looking at alternative uses for the excess gas including expanded electrical generation or conversion to vehicle fuel.

The current hydraulic capacity of the Columbia Boulevard Wastewater Treatment Plant is sufficient to accommodate future twenty-year growth. However, many of the existing process facilities are aging and in need of rehabilitation to ensure maximum efficiency. Projects to address capital maintenance are proposed in the 20-year planning horizon. In addition, changing regulatory requirements impact operations. A number of projects are proposed to maintain the plant and to continue to address regulatory requirements. This is likely to require new process facilities to be located on the west side of Portland Road.

Tryon Creek Wastewater Treatment Plant

The Tryon Creek Wastewater Treatment Plant is located in north Lake Oswego and receives sanitary flow from sanitary basins in southwest Portland and the city of Lake Oswego. It has an ADWF design capacity of 8.3 mgd and a peak wet weather flow capacity of 37.5 mgd. The plant currently has an ADWF of 4-6 mgd, with Lake Oswego contributing 65% of the flow volume. Treated wastewater is discharged to the Willamette River via an outfall system. Solids are trucked to CBWTP for processing.

The draft update to the Tryon Creek Wastewater Treatment Plant Facilities Plan recommends significant improvements to address projected increases in peak flows to 50 mgd, anticipated new permit requirements, and functional obsolescence of existing facilities. The Plan recommends acquisition of additional property to increase peak flow hydraulic capacity and allow for gravity flow through the treatment process. Solids will continue to be trucked to CBWTP. Figure 6.11 illustrates the recommended 30-year site plan for the Tryon Creek Wastewater Treatment Plant.

Required improvements can be divided by process needs. Improvements to the liquid treatment processes include:

- improvements to the influent collection systems – both the Lake Oswego Foothills Interceptor and the BES Tryon Creek Interceptor, and the Tryon Creek Pump Station;
- demolition of the existing headworks and construction of a new headworks and dry weather clarifiers to be located on property to be acquired which is currently occupied by a self-storage facility;
- construction of an influent pump station to flow from Portland's Tryon Creek Interceptor;
- enhancements to the existing aeration basins and secondary clarifiers;
- enhancements to the disinfection processes including conversion of former primary clarifiers to chlorine contact basins; and
- construction of an additional outfall for effluent disposal when plant flow and Willamette River levels are both high.

Improvements to the solids treatment processes include:

- Construction of a new solids thickening facility and
- Conversion of the existing digesters to blended storage facilities.
- Thickened, blended raw solids will be hauled to CBWTP for processing. A new enclosed loading facility will be constructed for odor control.

Other site improvements will address the non-potable water system; odor control; site design, security, and circulation; architecture, landscape architecture, and site aesthetics; support buildings; and electrical and instrumentation and controls.

Recommended Wastewater Treatment System Improvements and Investment Strategy

Significant improvements have been made at CBWTP to accommodate the increased wet weather flows resulting from the completion of the CSO controls. A limited number of future improvements to accommodate growth and anticipated regulatory requirements are recommended in the March 2010 Facilities Plan Update:

- Completion of the phased reconstruction of the lagoon
- Secondary Process Improvements (anticipated to meet changing permit requirements) – requires expansion to the west side of Portland Road
- On-site disinfection
- Solids dewatering
- 2 additional digesters
- Thermophillic equipment, blend and batch tanks (for Class A biosolids)
- 2 potential waste re-use projects: expansion of co-generation or alternative uses for methane gas such as conversion to vehicle fuel and improvements to the solids handling processes to create Class A biosolids which have a higher commercial value for fertilizer and could also result in savings in transportation costs.

In addition to the above projects from the Facilities Plan, a series of capital maintenance projects are planned in the 20-year planning horizon. The Investment Strategy includes three investment categories related to wastewater treatment:

- **Columbia Boulevard Wastewater Treatment Plant (CBWTP) Improvements:** This program includes a number of mid-size improvements at the Columbia Boulevard Wastewater Treatment Plant including Seismic Improvements, Outfall Diffuser Extension, Access / Egress Improvements, Bio-Solids Dryer, Dewatered Sludge Hopper, TWAS Piping Upgrade, Centrifuge. Also included is an expansion to Secondary Treatment, if required, to be located on the west side of Portland Road. All are consistent with the Facilities Plan and the Conditional Use Master Plan.
- **Tryon Creek Wastewater Treatment Plant (TCWTP) Improvements:** This program includes improvements identified in TCWTP draft Facilities Plan. Projects include construction of new headworks and dry weather clarifiers, a new influent pump station, odor control facilities, electrical upgrades, and site enhancements. The acquisition of an adjacent parcel will facilitate gravity flow (resulting in potential operational savings from reduced pumping) through the updated processing facilities.
- **Rehabilitation, Repair, and Modification Program:** This program provides for annual reinvestment in the treatment facilities to protect capital investment and enhance system reliability. It provides best management practice to prevent probable violations of the NPDES permit. The aging Columbia Boulevard and Tryon Creek plants require regular investment. Projects include equipment replacement, minor capacity upgrades, restoration of a facility to its original condition and renewal of useful life for more than 10 years, and regulatory mandates.

Figure 6.11. Tryon Creek Wastewater Treatment Plant Recommended Site Plan



Figure 7-2 RECOMMENDED SITE PLAN - 30 YEAR
 Tryon Creek Wastewater Treatment Plant Facilities Plan Dec. 11, 2013

Stormwater System

Sanitary sewage and stormwater are managed very differently. In the sanitary system, sewage is collected and conveyed to wastewater treatment plants and finally discharged to the Columbia or Willamette River. Conversely, the City's goal for stormwater is first on-site management for pollution reduction and flow control, as regulated by the *Stormwater Management Manual (discussed in more detail)*. Any flow not managed on site is then routed to the nearest conveyance system, which includes pipes and natural drainages. BES distinguishes two primary stormwater management systems in the USB: the combined sewer system and the "separated" stormwater area.

In the combined sewer area, stormwater is managed to reduce peak flows to avoid combined sewer overflows to the Willamette River and Columbia Slough and/or releases to streets or private properties (including basement sewer backups). Surface stormwater facilities – including green street facilities, rain gardens, ecoroofs, trees and other vegetation – detain stormwater, reducing peak flow to the combined sewer and allowing the system time to accommodate the increased flow from rain events. UICs are also used in parts of the combined sewer areas to collect stormwater from the right-of-way and city-owned property and allow that water to infiltrate into the ground. Once stormwater enters the combined sewer, it becomes part of the wastewater flow and is treated at the treatment plant. The pipes and other facilities managing this stormwater are discussed above in Wastewater Collection System.

Within the separated sewer areas of the city, stormwater is not conveyed to the wastewater treatment plants. Instead, stormwater management and conveyance depends on a combination of built and natural infrastructure systems. Approximately two-thirds of the city's land area drains to the city's MS4 system and UICs, both of which are managed under regulatory permits. Flow enters the system from overland runoff and impervious surfaces, including roadways, parking lots, and rooftops. Stormwater in these areas is conveyed through swales, drainage ditches, pipes, and stormwater inlets/catchbasins and discharged to receiving waters (streams and rivers) or to UICs for subsurface infiltration. In some areas, the stormwater system includes facilities that detain peak stormwater runoff and control flow release, and treatment facilities that remove or reduce pollutants.

As development occurs, impervious surfaces reduce the ability of stormwater to soak into the ground and increase the amount of stormwater runoff, disrupting the natural water cycle. Without appropriate stormwater management, these conditions erode stream channels, increase the risk of landslides, contribute to street and stream flooding, and prevent groundwater recharge. Parking lots, roadways, rooftops, and other impervious surfaces increase the pollution levels and temperature in streams, rivers, and groundwater resources.

The city's stormwater management requirements for all areas are defined in the Stormwater Management Manual (SWMM). The SWMM applies to all development and redevelopment projects within the City of Portland on both private and public property.

The City of Portland's approach to stormwater management emphasizes the use of vegetated surface facilities to manage and infiltrate stormwater on the property where the stormwater runoff is created. Infiltrating stormwater onsite with vegetated surface facilities provides a number of benefits, including but

not limited to pollution reduction, volume and peak flow reduction, and groundwater recharge. These benefits play a critical role in protecting stormwater infrastructure and protecting Portland's water bodies, including about 300 miles of streams and rivers that ultimately receive and convey stormwater. This in turn benefits human health, fish and wildlife habitat, recreational resources, and drinking water. The SWMM complements and supports the Portland Watershed Management Plan and other City standards and practices. Protecting and restoring existing natural resources, open spaces and tree canopy is also a component of the City's stormwater management strategy. BES relies on, and collaborates with, other bureaus (particularly Portland Parks & Recreation and the Bureau of Planning and Sustainability) in the protection, management and restoration of resources that reduce impacts on the built stormwater system and help address clean water regulations.

Not all stormwater is managed by the City's systems. Some of it simply flows over land via private property and/or public right-of-way directly to a receiving water body. Some stormwater management in Portland is the responsibility of other agencies and jurisdictions, including the drainage districts and entities like Oregon Department of Transportation. Stormwater management is further complicated by ownership. In the sanitary system, once sewage enters the system, it is the responsibility of BES. The stormwater system is not a closed system. Stormwater from public property may flow across private property and the reverse, which blurs lines of responsibility. Management and conveyance relies on public-private partnership and innovative solutions that recognize site-specific conditions.

In parts of Portland that lack constructed storm sewers or public drainage facilities, surface water flows over land through private properties. Often this water collects in some kind of open conveyance, or drainageway, which carries it across private property. These drainageways may be naturally formed (such as streams or creeks) or constructed (such as ditches or man-made channels). Drainageways often receive stormwater runoff from multiple sources, accumulating impacts from upstream development on downstream properties. Preserving the natural functions of drainageways protects properties by reducing the impacts of ponding, flooding, erosion, and other effects of excess flows. Especially in areas not specifically protected by zoning, drainageway protections help limit site and off-site impacts of stormwater discharges and flows, mitigate runoff, prevent erosion, and protect the privately owned elements of the watershed drainage network. The City administers drainageway protections, or drainage reserves, during review of private property development proposals. The Stormwater Management Manual allows stormwater to be conveyed from private property to stormwater systems, including drainageways, if onsite stormwater disposal is not feasible.

Stormwater System Inventory

The City's separated storm sewer and drainage system consists of a 458 miles of stormwater pipe and approximately 144 miles of drainage channels that discharge to streams and rivers. In addition, approximately 9,000 stormwater infiltration sumps (UICs) discharge stormwater underground. The storm sewer and drainage system service area is shown in Figure 6.11. Citywide (in both the combined and separated sewer basins), the Bureau owns and/or maintains approximately 1,900 surface water quality facilities, including detention ponds, swales, constructed wetlands and green street facilities, and approximately 8,000 sedimentation manholes (located upstream of a UIC) that provide some level of detention and pollution reduction.

The City's MS4 area includes stormwater conveyance infrastructure such as pipes, ditches, roads, catch basins, curbs, gutters, and manmade channels that discharge to waters of the State. Portland's MS4 area is approximately 15,500 acres. The City's MS4 permit does not cover:

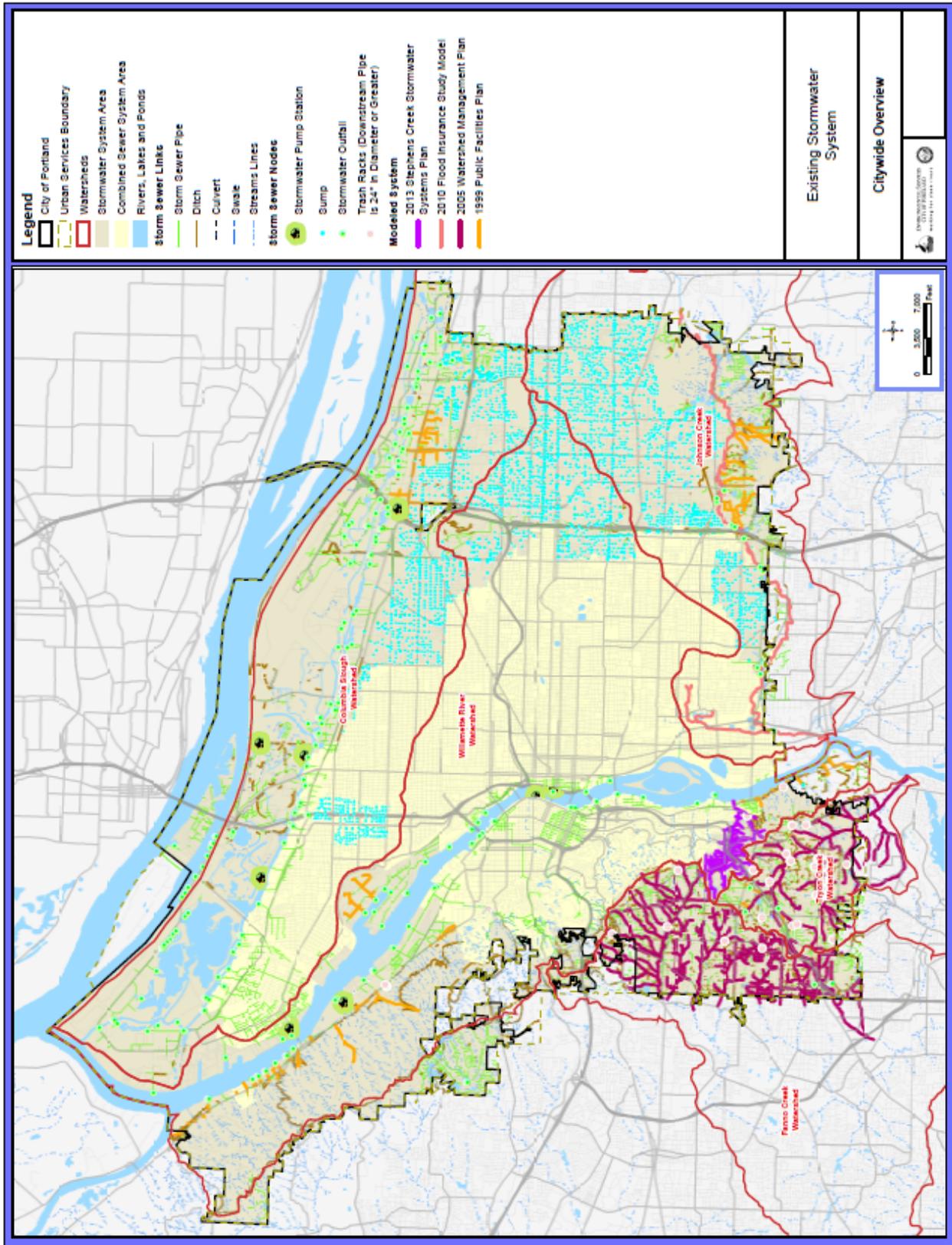
- Stormwater that flows to UICs (WPCF permit applies)
- Stormwater that flows to the combined sewer system
- Natural drainageways and stream systems
- Direct stormwater discharges from private property to natural stream systems (without entering the MS4)
- Areas with no public stormwater infrastructure
- Areas with individual, general, or industrial stormwater permits

The NPDES stormwater regulations do not prescribe specific pollutant discharge limits. Instead, they allow for the implementation of Best Management Practices (BMPs) to improve water quality to the "maximum extent practicable" based on local conditions, resources, and priorities. The City developed, updates and implements a Stormwater Management Plan (SWMP) that describes measures the City will implement throughout the five-year (2011-2016) permit term to reduce pollutant discharges in the MS4 storm sewer system. Best Management Practices include both programs and capital projects in the following categories: development standards; industrial and commercial controls; illicit discharge detection and elimination; structural controls; operations and maintenance; preservation and restoration of natural areas; and public involvement. These BMPs are reflected in the bureau's Investment Strategy.

The City's stormwater system includes approximately 9,000 UICs that collect stormwater from the public right-of-way and City-owned properties and discharge it to the subsurface. Approximately 90 percent of the UICs include a sedimentation manhole prior to the sump. UICs are most prevalent east of the Willamette River where soils better support infiltration. The City's WPCF permit regulates the construction, operation, and maintenance of all City-owned and operated UICs. Unlike the MS4 permit, the WPCF permit includes numerical standards, based on national drinking water standards, for stormwater discharges to a UIC. The permit also establishes the requirements the City must implement throughout the ten-year (2005-2015) permit term to control pollutants prior to discharge to a UIC to protect groundwater as a drinking water resource. These requirements are included in the bureau's Investment Strategy.

As discussed earlier in this plan, the city's stormwater management approach also relies on assets not owned or controlled as part of the BES system. This includes nearly 300 miles of surface streams and rivers, numerous acres of natural area and open space that convey, absorb, and filter rainfall and stormwater, and the tree canopy that intercepts rain and reduces stormwater volumes citywide. To help protect water quality and reduce stormwater runoff, BES and other bureaus invest in protecting and restoring natural areas and expanding the urban tree canopy on public and private property. For more information about Portland's natural and green infrastructure see the City's Natural Resource Inventory, urban canopy studies, and the Portland Parks & Recreation chapter in this document.

Figure 6.11 Existing Stormwater System



Stormwater System Levels of Service

Recently, the Bureau has intensified its stormwater planning activities, especially outside of the combined sewer system. Efforts are underway to update the *Stormwater Management Manual (SWMM)* and develop a comprehensive system plan for stormwater. The proposed stormwater system plan will focus first on identifying risk associated with failing to meet defined levels of service and then performing a targeted alternatives analysis with the goal of identifying and addressing the greatest sources of stormwater-related risk. The Bureau established service categories and related performance indicators to help frame the characterization of system deficiencies, development and evaluation of alternatives, and selection of recommended improvements. These categories include:

- Protect public health and safety and property:
 - Sanitary sewage releases: In the separated area, sewage releases to surface water are prevented for storm events up to a 5-year frequency. In the combined sewer area, prevent releases to buildings or streets up to a 25-year storm frequency.
 - Erosion and landslide hazards: Limit risk claims due to City stormwater.
 - Localized/nuisance flooding: Design and manage infrastructure to limit nuisance flood events.
 - Groundwater contamination: In the UIC area, facilities are managed to effectively reduce pollution to the groundwater.
- Protect biological communities and improve ecological function:
 - Loss of habitat: Address water quality and quantity consistent with requirements of the Endangered Species Act.
 - Mitigate contamination of surface water and sediments through use of pollution reduction facilities.
 - Minimize disruption to the hydrologic cycle by managing impervious area and through flow attenuation.
- Support community needs:
 - Address deficiencies that impede community improvements. Increased impervious surface area – whether public or private – requires an approvable discharge point for stormwater conveyance.

Since 1999, the Stormwater Management Manual (SWMM) has provided policy and design requirements for stormwater management throughout the City of Portland. The requirements apply to all development, redevelopment, and improvement projects within the City of Portland on private and public property and in the public right-of-way. Portland's approach to stormwater management emphasizes the use of vegetated surface facilities to treat and infiltrate stormwater on the property where the stormwater runoff is created. Infiltrating stormwater onsite with vegetated surface facilities is a multi-objective strategy that provides a number of benefits, including but not limited to pollution reduction, volume and peak flow reduction, and groundwater recharge. These benefits play a critical role in protecting stormwater infrastructure and improving watershed health. Revisions to the SWMM will incorporate a systems-based approach, which will focus on the needs of the system to which stormwater is being conveyed. For example, the risks and

requirements for protection of groundwater when stormwater is infiltrating into the ground are different than the risks and requirements for protecting the capacity and treatment needs of the combined sewer system. The SWMM will continue to emphasize a management hierarchy, requiring onsite stormwater management prior to conveyance offsite. As stormwater system and facility planning evolves, the SWMM will focus regulatory and design approaches by local stormwater systems, including storm-only sewers, drainageways and waterbodies, and combined sewer systems.

Stormwater System Current and Projected Condition and Capacity

Comprehensive condition data is not available for the stormwater system in the separated stormwater areas. Of particular concern for stormwater management are the many miles of public right-of-way that are undeveloped or otherwise lack adequate stormwater infrastructure, see Figure 6.12

While comprehensive stormwater system planning is underway, existing plans and modeling information reveal some of the condition and capacity issues related to the stormwater system in each watershed. These are summarized below.

Portland Willamette River Watershed

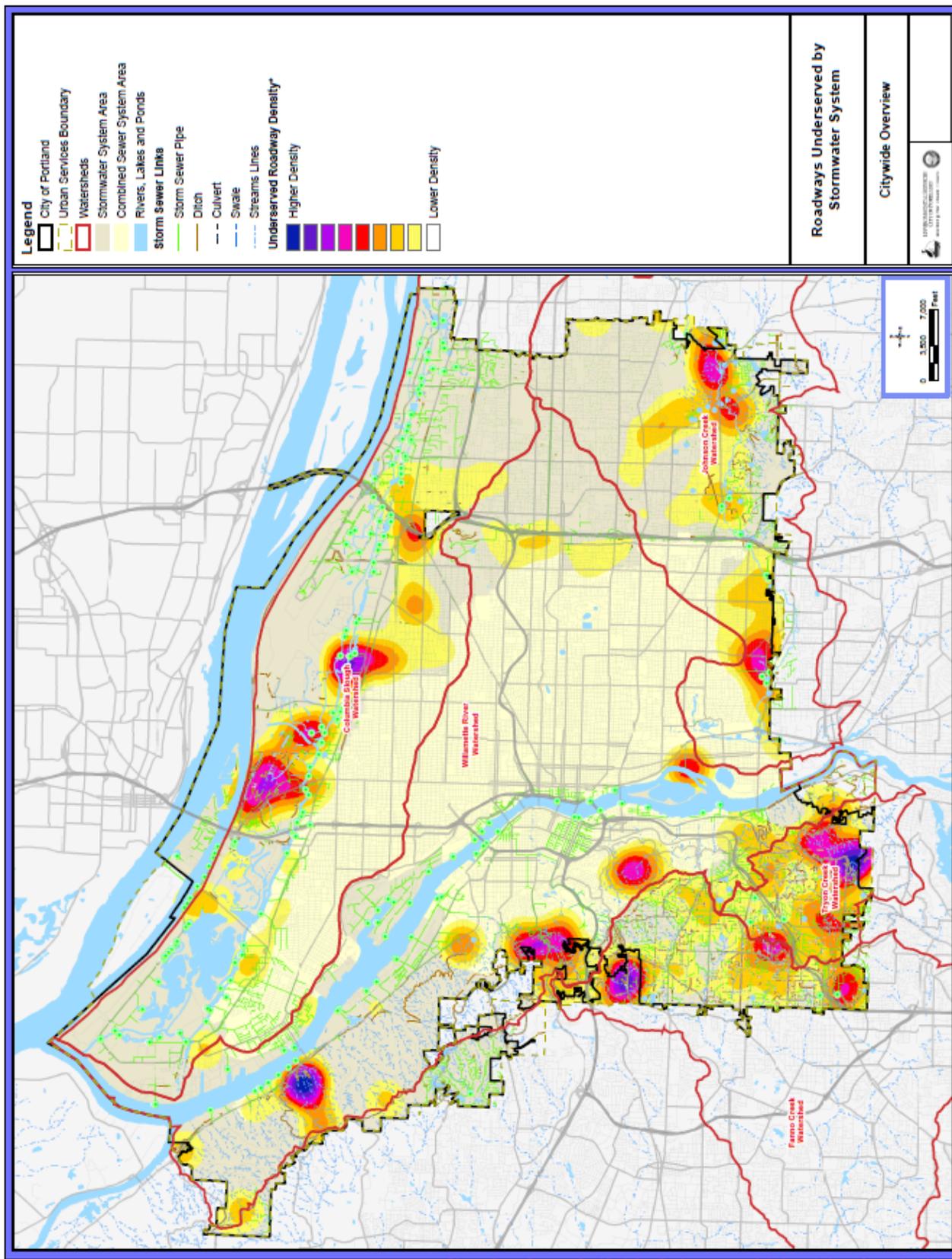
The Willamette Watershed's developed areas are largely served by the combined sewer system, but portions of the area are also served by UICs and the City, Port of Portland, and ODOT MS4 systems and private systems. The areas within the watershed that have been analyzed with modeling are shown in Figure 6.11.

Studies such as the Westside Streams Water Quality and Trend Analysis Status Report (2010) and the Tanner Creek Water Quality Characterization (2011) identify sources of water quality deficiencies in the watershed and guide the development of pollution reduction projects.

Primary deficiencies in the Willamette watershed are water quality and high flows in the natural channels of the west hills that lead to degradation of the streams. Similar to the Fanno Creek and Tryon Creek watersheds, steep slopes and low infiltration capacity of soils presents challenges for on-site stormwater management in some areas, and makes innovative solutions and protection of the existing natural resources that manage water important.

The Stephens Creek subwatershed of the Willamette has had the most complete and recent stormwater evaluation (2013). It was the first watershed analysis that evaluated not only conveyance system capacity and water quality, but also the hydrologic indicators of stream health. In this area, approximately 22% of taxlots do not have an approvable stormwater discharge point and approximately 25% of the city-managed rights-of-way in the subwatershed do not have an approved stormwater conveyance system.

Figure 6.12 Roads Underserved by Stormwater System



Columbia Slough and Columbia River Watersheds

The existing stormwater systems in the Columbia Slough watershed and on Hayden Island are shown in Figure 6.11. The Columbia Slough watershed is flat, primarily sandy alluvium with good infiltration, but a high water table, which limits the use of sumps and surface infiltration facilities in some areas.

Several entities are responsible for conveying and treating stormwater runoff in the Columbia Slough watershed, which creates unique management challenges. The City of Portland is only responsible for systems that convey stormwater from public right-of-way to the slough. The City manages stormwater in the southeast portions of the watershed using approximately 3,500 UICs. In the Columbia South Shore Well Field, wellhead protection area regulations limit infiltration of stormwater. Private and public UICs in this area are required to protect the groundwater through measures to control and treat spills that could pollute runoff.

Three public drainage districts, operating separately from the City of Portland, are responsible for flood control within their respective district boundaries. Flood control responsibilities include preventing Columbia River water and local stormwater from flooding property by operating pump stations to convey flow into the Columbia Slough and Columbia River. There are over 600 privately-owned stormwater conveyance systems that discharge runoff from private properties into the slough. The Portland International Airport and the Oregon Department of Transportation (ODOT) own and operate stormwater systems that discharge to the slough at 15 different outfall locations. The Port of Portland operates several more private stormwater systems that discharge stormwater from their properties into the slough.

The City is currently using hydrologic and hydraulic modeling to assess stormwater system capacity deficiencies for much of the service area through a cooperative project with Multnomah County Drainage District #1 (MCDD) to recertify the district's levee system with the Corps of Engineers. In addition, stormwater system deficiencies related to sediment quality in the slough are being evaluated as part of a DEQ Consent Order. BES has identified 52 priority city-owned stormwater outfalls that need pollution control. The investment strategy includes an estimate for these projects.

Johnson Creek Watershed

The existing stormwater systems in the Johnson Creek watershed are shown in Figure 6.11. Stormwater sumps, or UICs, are the primary stormwater management system within the watershed. Currently, the watershed has about 2,400 active sumps.

Flooding along Johnson Creek is a significant stormwater-related issue. Under the Johnson Creek Restoration Plan (2001), the City is working to reduce "nuisance floods" (floods that have about a 10% chance of occurrence in any given year, or an average of once every 10 years), while also improving water quality and habitat. Until recently, Johnson Creek flooded Foster Road in the Lents area about every other year. With the completion of the Foster Floodplain Natural Area restoration project in 2012, flooding is expected to be reduced to a six to eight year recurrence, and further implementation of projects from the restoration plan will continue to improve conditions. In addition, a multi-bureau team is studying the feasibility of managing larger floods (those that have about a 1% change of occurrence in any given year, or occur on average once every 100 years).

Resources have recently shifted to study and understand the stormwater flows from East Buttes, Johnson Creek tributaries and other upland areas into Johnson Creek. Stormwater system planning is expected to comprehensively identify system deficiencies. Based on hydraulic modeling and field observations, stormwater system capacity deficiencies are expected to be identified in the steep, natural channels south of Johnson Creek and east of Interstate 205. Soils in this area have limited capacity to infiltrate stormwater. Natural drainage and local seeps and springs make on-site stormwater management difficult. Disruption of these resources has caused problems for development. Steep slopes present potential landslide risks and many streets lack stormwater management infrastructure. The relatively recent development in some neighborhoods east of I-205 and south of Powell Boulevard has increased the amount of impervious area and decreased vegetation, contributing to the flashiness (rapid rise and fall) of Johnson Creek and its tributaries and exacerbating stormwater problems downstream.

Fanno and Tryon Creeks Watersheds

The existing stormwater systems that contribute flow to Fanno Creek, other Tualatin River tributaries, and Tryon Creek are shown in Figure 6.11. This figure also shows the portions of the stormwater system that have been assessed using hydrologic and hydraulic models.

Water quality is a primary challenge related to stormwater in these watersheds. As a part of the Fanno and Tryon Creeks Watershed Management Plan (2005), pollutant loading from different land uses was modeled. These results were used to estimate the source of water quality deficiencies in these watersheds and serve as a guide for the development of pollution reduction projects. High traffic commercial corridors are a significant source of pollutants. Some existing stormwater detention ponds contribute to temperature problem.

The 2005 Fanno/Tryon Watershed Management Plan also identified numerous stormwater capacity deficiencies at culvert crossings and within piped systems. In addition, most of Portland's properties and streets that lack adequate stormwater systems are located in the Fanno and Tryon watersheds. These areas tend to have soils with low infiltration capacity that do not allow for on-site stormwater discharge; steep slopes that have potential landslide hazards; and streets that lacking drainage infrastructure for off-site stormwater discharge.

Recommended Stormwater System Improvements

Recommended improvements can be divided into two categories: retrofits to address stormwater issues that impact existing development and proactive options that can reduce the need to expand the stormwater management system. These vary somewhat by watershed and by stormwater basin.

In the combined sewer basins, priority will continue to be on managing stormwater as close to the source as the possible (i.e., keep water out of the sewer), as called for in the City's NPDES permit. This strategy will be implemented through projects such as private property retrofits (eco-roofs, rain gardens, parking lot retrofits) and public stormwater infiltration facilities in the rights-of-way. The investment strategy includes these multi-objective green infrastructure projects, which also address basement sewer backups. Within in the combined sewer basins, there also may be opportunities to separate stormwater from the sanitary sewer system. This approach is currently under review in the Lloyd District area.



In the separated stormwater areas, the Bureau has identified a variety of projects and programs to address stormwater system needs. In addition to the types of projects identified for the combined area, there are also projects to address flood management, pollution reduction, and overall watershed health. However, it is important to note that the Bureau anticipates that there will be areas where it is neither technically nor financially feasible to provide stormwater management services. It may be desirable to encourage increased density in areas that are already highly impervious. Allowing for higher density may make neighborhood stormwater management system improvements more cost effective by increasing the number of properties served in proportion to the public investment.

Citywide, the bureau continues to invest in programmatic approaches that protect the existing stormwater system and natural resources, and help avoid the need for future costly capital projects to treat stormwater. These programmatic approaches include capital programs included in the investment strategy, such as land acquisition for protecting high-quality natural resources that are part of the water cycle, and green street projects. Non-capital programs, such as community education and outreach, tree planting, revegetation and control of invasive species are also critical parts of the bureau's strategy to protect water quality and address other regulatory drivers.

While citywide stormwater system planning is not yet complete for all areas, existing watershed and stormwater plans recommend the following investments. Additional stormwater system improvements to address system risk will be recommended in the coming years.

In the **Columbia Slough** Watershed, projects will focus on water quality with a primary goal of improving the quality of the sediments in the Slough. Specific water quality projects are being identified as part of the Columbia Slough Sediment Order. Flood control is also an issue in the slough, both keeping Columbia River water from flooding property within the drainage districts' boundaries and keeping stormwater generated from within the drainage districts from flooding properties. A study will determine whether or not a new stormwater pump station is required. The bureau continues to invest in protection, restoration, and enhancement of natural resources as well as built infrastructure improvements.

In the **Johnson Creek** Watershed, projects will continue to focus on floodplain restoration and management through restoration in target areas along the main stem of the creek. These projects are multi-objective: providing flood mitigation, improving water quality, and enhancing fish and wildlife habitat. The CIP identifies larger flood mitigation projects in West Lents and in East Lents. Restoration is underway on Crystal Spring Creek, a tributary stream that is a source of clean, cold, and constant flows. Projects are also underway to protect and restore natural resources in the uplands and tributaries. Future work will begin to address upland stormwater system conveyance and capacity.

In the **Fanno/Tryon** Watershed, projects will focus on stormwater system improvements including flow control and treatment to improve water quality, protect streams, and ensure storm system reliability. Stormwater retrofits will focus on managing stormwater from existing impervious area in major transportation corridors such as Beaverton-Hillsdale Highway and SW Barbur Boulevard. Projects to increase culvert capacity and improve fish passage in the streams and their tributaries are underway or planned. Additional projects include stream daylighting, sewer infrastructure protection, stream enhancement, and roadside drainage and shoulder improvements. The bureau and partners continue to focus on protecting, restoring, and enhancing natural resources that support water quality, hydrology, and habitat.

In the **Willamette River** Watershed, the Bureau will continue to implement stormwater projects to address capacity in the combined sewer system to limit sewer overflows and improve watershed health. In the separated sewer system projects will address other stormwater-related impacts to the river, tributaries and their watersheds. Projects will focus primarily on controlling the flow of stormwater and improving water quality through projects to retrofit existing impervious area with stormwater facilities along public right-of-way and on private property. Construction of new neighborhood-scale water-quality facilities could be a cost-effective solution in some areas. As in the Fanno/Tryon Watershed, projects often require partnering with other public agencies (such as ODOT) or private property owners. Restoration and enhancement of remnant habitat areas along the main stem Willamette River to create habitat “stepping stones” through the industrial harbor and downtown core is important for ESA-listed species migrating to upstream habitats.

Investment Strategy

Process

Each year, the Bureau prepares capital and operating budgets for the upcoming fiscal year and for the five-year planning horizon. The work of the Bureau is focused on strategic and comprehensive program delivery protecting public health and restoring the environment within a prescribed, but negotiated, regulatory framework. Using asset management principles including reducing risk and the likelihood of failure, the Bureau develops budgets to maintain infrastructure and natural systems to meet regulatory requirements and enhance the health of watersheds. Asset management addresses life-cycle costs, trade-offs between capital and operating expenditures, and prioritization of projects based on risk and consequence of failure, to achieve long-term system sustainability and acceptable levels of service. The Bureau uses an integrated approach, rather than one that addresses only single subject regulatory requirements, whenever possible. Taking an integrated approach is often more cost-effective and results in better watershed health outcomes – hydrology, water quality, habitat, and biological communities – while also addressing other urban environmental problems.

In order to be best stewards of ratepayer dollars, the bureau delivers its services through a wide array of operating programs that complement the capital investments. Public education has proven to be a particularly cost-effective approach to reducing the volume and pollutant load entering the sewers. Investing in public engagement and community stewardship has yielded a number of stormwater management benefits such as extensive tree planting, clearing of invasive species in parks and other

natural areas, and construction and maintenance of stormwater facilities by private entities (such as eco-roofs and rain gardens). The bureau works closely with a number of non-governmental organizations including watershed councils, environmental groups, and neighborhood groups, which often leverages volunteer contributions and other sources of funding to meet multiple community benefits.

The Bureau has been implementing an asset management approach to guide investment for several years. To date, extensive work has focused on the Combined and Sanitary Collection System where an updated Systems Plan has evaluated projects using a risk-based asset management framework. This approach will be expanded to the Bureau's other systems and asset types as resources are available to do the required analysis. Watershed monitoring data, regulatory requirements and watershed planning (such as the Johnson Creek Restoration Plan) guide prioritization of stormwater and watershed investments. Applying asset management approaches to the natural systems and green infrastructure is an emerging effort for the Bureau.

The Capital Improvement Plan (CIP) is developed utilizing a multi-step process to identify, develop, review, score, and rank projects to determine funding and scheduling priorities and ensure that the core sanitary sewer and stormwater systems are met to serve the community. A bureau-wide stakeholder review team investigates, scores, and ranks all CIP projects in accordance with identified CIP criteria. CIP weighted criteria, scoring, instructions, scheduling guidelines, estimating procedures, and project request forms are used to ensure each project is developed, reviewed, and scored based on detailed and consistent information. A CIP development strategy guides project selection and scheduling. Projects are reviewed by managers in finance, program areas, operations, and engineering to ensure financial resources are expended effectively and appropriately. The bureau director reviews the final CIP plan and submits it to City Council during the annual City budget process.

The public is involved in the budget development process through the Bureau's Budget Advisory Committee and the Public Utilities Review Board. All CIP projects that affect the public include public involvement and outreach plans.

Projects and Programs

The major components of the sewer system define the program categories within the capital budgeting process: Sewage Treatment, Maintenance and Reliability, Surface Water Management (i.e., stormwater and watershed health), and Systems Development.

The Bureau focuses efforts on comprehensive, multi-purpose solutions in the highest priority areas for work in all four program areas of the CIP, guided by both regulatory requirements and the Bureau's mission and Strategic Plan. The Bureau anticipates nearly \$2 billion in capital investment in these programs over the next twenty years. Capital projects and programs are drawn from the recommended system improvements discussed in earlier sections. It is important to note that the proposed Investment Strategy represents a conservative financial approach to addressing system needs. The Bureau's 20-year Investment Strategy (included in Appendix A) is summarized in Table 6.4.

Table 6.4 Investment Strategy Summary

Program	FY 2013-2018	FY 2018-33
Wastewater Treatment and Pumping	\$109,671,000	\$305,964,000
Maintenance & Reliability	\$328,896,000	\$702,800,000
System Development	\$23,462,000	\$60,000,000
Surface Water Management	\$73,441,000	\$127,515,000
TOTAL	\$535,470,000	\$1,196,279,000

Specific objectives for the program areas are described below.

Sewage Pumping and Treatment Systems

Regulations, primarily through the NPDES Waste Discharge permits, require investment in the ten year planning horizon with a focus on process improvements at Columbia Boulevard Wastewater Treatment Plant (CBWTP), including secondary process improvements and upgrades to the mixing systems in the digesters. Other investments in this program area will focus on ongoing maintenance at the CBWTP and the Tryon Creek Wastewater Treatment Plant through the Repair, Rehabilitation and Modification program and the Pump Station Improvement program. An updated Facilities Plan for CBWTP was completed in March 2010; no new projects were identified for the near term. The draft TCWTP Facilities Plan identifies extensive investments to be made at this site including acquisition of property for a new headworks facility which will allow for gravity flow through the plant and upgrades to nearly all the existing facilities on site.

Collection System Maintenance and Reliability

This program area is focused on improving and maintaining the existing sanitary and combined sewer collection system to provide accepted levels of service. The March 2012 Systems Plan (for sanitary and combined sewers) recommends grey and green infrastructure projects that have a favorable benefit/cost ratio and reduce system risk. The plan identified approximately \$175 million in pipe rehabilitation for near-term investment. Additional projects are planned to address the highest risk of basement sewer backup. In response to system failure in the Fanno Basin, an extensive improvement program is underway through fiscal year 2016, including a new pump station to augment the existing pump station. A small amount of work remains to meet ongoing requirements for the Combined Sewer Overflow Program to provide increased efficiency of system operations.

Surface Water Management

This program area focuses on systematically protecting and restoring surface water assets (such as drainageways, streams and wetlands) and improving overall watershed health to protect public health and safety and comply with state and federal regulations. Projects often involve collaboration with other public agencies, nonprofits and community partners. The Bureau prioritizes projects that protect the most critical existing watershed functions and/or preserve those locations at the greatest risk of damage. This is accomplished by implementing the Watershed Management Plan recommendations for restoring important natural functions and/or using green infrastructure to reduce or avoid stormwater impacts. A stormwater system plan for the Stephens Creek subwatershed was completed in 2012 which identified

investment needs for that area. A citywide stormwater system planning process is now underway to identify projects to improve stormwater conveyance, capacity and water quality. Other near-term priorities for this program area include continuing restoration of Johnson Creek and its floodplains; stormwater retrofit projects in Fanno/Tryon and the Columbia Slough; and restoration and enhancement projects along the main stem Willamette River and its tributaries, and the Columbia Slough.

Systems Development

In support of Metro's 2040 Growth Concept, this program area funds projects that cost effectively and incrementally expand the sewer collection system to serve planned development. Work is underway to identify clusters of properties that are currently served by on-site sewage systems, such as septic or cesspools, and to plan for alternatives prior to failure of on-site systems. This program also funds sewer improvements in association with public works projects by others, primarily transportation projects – both road and transit. In response to City Council action, the Bureau has developed a program to address non-conforming sewer connections. Most of the work to date has been in response to either a service failure or a property sale. Some work has been accomplished in conjunction with planned pipe rehabilitation projects.

Financial Strategy

The Bureau annually prepares a five-year financial plan. Periodically, the Bureau forecasts on 10-year and 20-year horizons to gain additional understanding and insight into long-term financing needs and rate implications. The five-year financial plan has three key elements. Initially, operating and capital expenditure requirements for the Bureau are developed through separate operating and capital planning processes and then they are brought together. Overall revenue requirements and a corresponding five-year funding program are developed taking into account the impact of capital construction on future operations and maintenance requirements.

The financial planning process lays the groundwork for setting utility rates, which are formally adopted each year by the City Council. Rates are set on a cost of service basis, meaning that rates are designed to charge customers for their proportional cost of collecting, transporting, and treating discharges. Debt obligations (“mortgage payments”) have a significant impact on the bureau's financial plan and its rates. In fiscal year 2013-14, approximately one-third of the budget was allocated to debt payments.

Existing Financial Strategies

Environmental Services receives revenue for capital investment from sewer fees, charges and permits; line and branch and system development charges; cash transfers from the Sewer System Operating Fund; and Bond proceeds, the latter are the primary funding source of the Bureau's capital expenditures.

System Funds

The Bureau's financial reporting system is organized into five separate funds:

- The Sewer System Operating Fund provides for the day-to-day operation, maintenance and management of Bureau programs.

- The Sewer System Construction Fund holds equity contributions and net bond proceeds for transfer to the Sewer System Operating Fund to reimburse capital-related expenditures.
- The Sewer System Debt Redemption Fund provides for payment of debt incurred for capital construction.
- The Sewer System Rate Stabilization Fund functions as a reserve that enables the Bureau to level its projected annual revenue requirements to reduce significant changes in sewer and stormwater rates from year to year.
- The Environmental Remediation Fund was created to provide funding to remediate former solid waste disposal sites. The Environmental Remediation fund now also provides funding of the City's share of the Portland Harbor Superfund program remedial investigation and feasibility study costs and the City's source investigation program

Debt Service Coverage

The Bureau's current financial planning standard is to set rates adequate to provide Net Revenues (gross revenues less operating expenses) including transfers from the Rate Stabilization Fund equal to or greater than 1.50 times the annual debt service requirement on first lien debt, and 1.30 times the annual debt service requirement on all (first and second lien) debt. These targets exceed the requirements specified in the existing debt covenants. This approach helps the bureau maintain a high bond rating, which reduces the cost of borrowing money to pay for capital projects.

Ending Fund Balances

The Bureau's current policy is to maintain combined ending fund balances within the Operating Fund and the Rate Stabilization Funds equal to or greater than 10 percent of each year's operating expenses.

The Construction Fund ending fund balance is targeted at 35 percent of the next year's CIP, or \$500,000, whichever is greater, for planning purposes. Actual ending fund balance will differ depending on the rate of expenditures and the timing of CIP borrowings.

Projected revenues and expenditures

Table 6.5 depicts forecast resources and requirements for the Operating Fund. While the Bureau annually prepares a five-year financial plan, Table 6.5 includes an FY2019 – FY2033 summary column to provide a 20-year extended outlook.

Table 6.5 Sewer system operating fund forecast sources and use of funds (\$1,000)

Item	2014	2015	2016	2017	2018	FY2019 – FY2033
Resources						
Service Charges & Fees	\$275,404	\$294,507	\$315,179	\$335,524	\$353,283	\$6,733,906
Connection Fees	9,910	9,364	9,909	10,494	10,773	266,070
Wholesale Contracts	3,445	3,555	3,669	3,787	3,909	77,778
Other Service Charges & Misc.	7,907	6,335	6,475	6,681	6,872	140,826
Cash Transfers In -						
Rate Stabilization Fund	10,400	-	-	-	-	32,250
Sewer Construction Fund	86,400	112,100	110,345	108,732	112,424	2,080,868
Capitalized Overhead	8,255	8,413	8,574	8,738	8,905	155,960
Other Funds	697	181	186	192	199	3,951
Interest Income	81	36	54	53	48	652
Beginning Fund Balance	52,999	58,176	62,214	66,539	70,786	74,404
Total Resources	\$469,226	\$491,052	\$515,200	\$544,623	\$567,356	\$9,566,665
Requirements						
Personal Services	45,637	47,014	50,498	51,878	54,149	1,072,772
Materials & Services	36,893	38,470	40,657	43,172	44,897	820,078
Internal Services	33,153	34,689	36,233	37,722	38,986	759,166
Capital Outlay (1)	113,121	111,623	111,548	117,357	112,837	2,156,169
Int. Accruals/Lease Purchase	71	46	67	79	73	277
Cash Transfers -						
General Fund Overhead	6,965	7,348	7,753	7,966	8,186	156,865
Construction Fund	18,759	20,096	20,916	22,963	29,153	1,660,573
Rate Stabilization Fund	1,550	5,550	5,825	4,750	-	28,875
Debt Redemption Fund	151,949	160,579	171,426	183,984	200,474	2,741,297
Other Cash Transfers	2,977	3,401	3,727	3,972	4,205	59,763
Ending Fund Balance	58,176	62,214	66,539	70,786	74,404	110,830
Total Requirements	\$469,226	\$491,052	\$515,200	\$544,623	\$567,356	\$9,566,665

(1) Includes capitalized personal services, materials & services, internal services, land, equipment and capital improvements

Revenues from service charges and fees, and transfers from the Sewer Construction Fund are the largest resources for the Operating Fund. Projections for expected new customers, average water use per account, increases in impervious area, and planned rate increases are used to forecast revenues over the forecast period.

Operating expenses include personal services, materials and services, internal services, transfers for general fund overhead, and transfers to the Rate Stabilization, Construction, Environmental Remediation, and Debt Redemption Funds. The operating expense forecast reflects the Bureau's existing operating budget, assumed cost escalation factors and service additions associated with CIP and other programs.

Factors Influencing the Forecast

The following are considered risks to the forecast as their potential effects were not explicitly included in the investment strategy or financial forecast. Potential costs are not known in all cases.

- **Portland Harbor**

The Portland Harbor Superfund Site investigation is currently focused on a stretch of the Willamette River from River Mile 2 to River Mile 12. The City is one of the potentially responsible parties actively engaged in assessment and evaluation of cleanup alternatives in this section of the river. The total cost associated with the cleanup and restoration activities and the City's ultimate share of those costs are unknown at this time.

- **Willamette Basin TMDLs**

The DEQ intends to finalize a mercury TMDL within the next few years and an update of the temperature TMDL is also pending. Changes may affect operations at the Tryon Creek Wastewater Treatment Plant and some projects and programs, but specific implications and the ultimate costs are unknown at this time.

- **MS4 Permit**

The City's MS4 permit includes requirements to evaluate program effectiveness at reducing applicable TMDL parameters. As new TMDLs are developed and approved, technical work and associated budgets will likely increase.

- **Sanitary Sewer Overflows (SSOs)**

State and federal regulators continue to study the operations and maintenance of municipal sewer systems and potential guidelines regarding SSOs. Should SSO rules similar to those proposed in 2001 eventually become effective, the Bureau's sewer system would be affected. Such rules could have significant financial impacts to both capital (via upsizing of facilities) and operating (increased system oversight) budgets.

- **Sanitary and Stormwater Service to Residents**

As discussed in earlier sections, there are challenges to providing sanitary sewer service to all properties within the USB. These include properties with onsite disposal, undeveloped properties, and properties serviced by under capacity sewer lines. While some of the solutions are included in the financial forecast, the full extent of the need is not fully known. Similarly, the Bureau recognizes the need to make improvements to the stormwater system, however, the extent of these improvements is not fully known at this time.

- **Sanitary Sewer and Stormwater Rates**

The bureau's capital and operating budget forecasts are influenced by annual sewer and stormwater rates approved by the City Council. Planned operations and maintenance of, and capital improvements to, the sewer and stormwater systems will depend on continued predictable increases in rates. Annual rate increases determine the bureau's ability to address the key issues and concerns listed in the Overview section. Lower rate increases than planned would require either reduced operation and maintenance expenditures or delays in maintenance of existing infrastructure and new capital system improvements, which may increase future costs.

In addition, the financial forecast makes assumptions about factors internal to the Bureau and the City, such as program levels, and external factors, such as inflation and borrowing costs. Changes to these factors may change the financial forecast. This is particularly true of an extended forecast such as the 20-year forecast shown in Table 6.5. The following describes some of the factors and risks involved in unanticipated changes:

- The financial forecast is based on a 1.5% decrease in average use per single-family residential customer (based on winter water consumption), and a 0.75% decrease in average use per multi-family, commercial and industrial customer, roughly consistent with recent history. The forecast also assumes an account growth rate of 0.5% per year. Should consumption or account growth be lower than anticipated, revenues would be adversely affected.
- Changes in interest rates will affect the cost of new debt. Any significant increase in interest rates over the forecast interval will increase revenue requirements for interest on new debt. Conversely, lower-than-anticipated interest rates would reduce borrowing costs and therefore revenue requirements.
- The forecast rate increases are based on best estimates of inflation over the forecast interval. An increase in the actual rate of inflation above the forecast inflation rate will lead to correspondingly higher revenue requirements.
- The current economic recession has resulted in a drastic drop in all construction related fees and permits, most notably System Development Charges, which are a material revenue source. The financial plan assumes construction activities will rebound. If construction activity does not rebound as assumed, revenues would be adversely affected.

Chapter 7

Portland Water Bureau

Overview

The Portland Water Bureau has supplied domestic water to residents of the Portland area for more than 100 years and is the largest supplier of domestic water in Oregon. The Portland water system serves drinking water to about 940,000 Oregonians, almost one-quarter of the state's population. In 2012-13, the Portland Water Bureau directly served a retail population of over 570,600 people in 163,000 residential households (both single and multi-family residences) and about 20,000 commercial and industrial customers. Portland's wholesale customers served an estimated population of approximately 450,000 in 2012-13.

Vision, Mission & Values

The mission of the Portland Water Bureau is to provide reliable water service to customers in the quantities they desire and at a quality level that meets or exceeds both customer and regulatory standards; to provide the highest value to customers through excellent business, management, and operational practices, and appropriate application of innovation and technology; to be responsible stewards of the public's water infrastructure, fiscal and natural resources; and to provide the citizens and City Council with a water system that supports their community objectives and overall vision for the City of Portland.

Purpose of this Chapter

This chapter describes the public facilities and services provided by the Portland Water Bureau that are necessary to carry out its mission. It identifies desired levels of service, inventory and condition information for existing public facilities, and future facilities that will be necessary to support the land uses designated in the Comprehensive Plan, as required by Oregon Planning Goal 11: Public Facilities and Oregon Revised Statute 197. Carrying out the Bureau's mission and other City and community goals may also require programs, investments and practices that are not related to public facilities. This chapter may acknowledge – but does not comprehensively address – these measures.

System Services

Service Area

Approximately 940,000 people living within a 225-square-mile service area around Portland are served by the Water Bureau's retail and wholesale water sales, see Figures 7.1 and 7.2. The Water Bureau delivered 33 billion gallons (BG) to customers during fiscal year (FY) 2012-13. The 20 wholesale water customers are located in Multnomah, Clackamas and Washington counties.

Services Provided

The Water Bureau provides reliable water service to customers in the quantities they desire. Water from two sources, the Bull Run watershed and the Columbia South Shore Well Field, is of consistently high quality and meets all regulatory standards.

Service Agreements & Partnerships

The Portland Water Bureau currently has wholesale water sales agreements with 20 water providers in Portland's metropolitan area -- including cities, water districts, and private water companies. Eight of these water providers have service areas within the Urban Services Boundary of the City of Portland. These include: Burlington Water District, Lorna Water Company, Palatine Hills Water District, Raleigh Water District, Rockwood PUD, Tualatin Valley Water District, Valley View Water District, and West Slope Water District. Some wholesale providers also provide service to small groups of Portland citizens through "wheeling" agreements. These agreements are used where it is difficult or overly expensive to provide water directly from Water Bureau facilities.

The Clackamas River Water District and Sunrise Water Authority provide water services to unincorporated areas within Portland's urban service boundary to the south of Portland. These water districts operate in partnership with each other through a cooperative agreement and use the Clackamas River as their main water supply source.

The Portland Water Bureau is a member of the Regional Water Providers Consortium. Members include more than 20 municipalities (including the City of Portland), water districts and Metro. (Metro is the regional growth management agency serving Clackamas, Multnomah, and Washington counties.) The Consortium serves as a collaborative and coordinating organization to improve the planning and management of regional municipal water supplies, including regional water conservation implementation and emergency preparedness coordination. The Consortium and its members endorse the Regional Water Supply Plan as the region's water supply strategy for the future. Water providers belonging to the Consortium retain full authority to operate and upgrade their systems and infrastructure.

The Portland Water Bureau maintains partnerships and agreements with other city bureaus and regional and state transportation agencies, providing services such as relocating water mains as directed by City Council. The bureau also has agreements with the U.S. Forest Service for activities within the Bull Run watershed, which is located in the Mt. Hood National Forest.

The City of Portland also maintains partnerships with the cities of Gresham and Fairview regarding participation in the Columbia South Shore Well Field Wellhead Protection Program.

Figure 7.1 Drinking Water Supply System Retail and Wholesale Service Areas

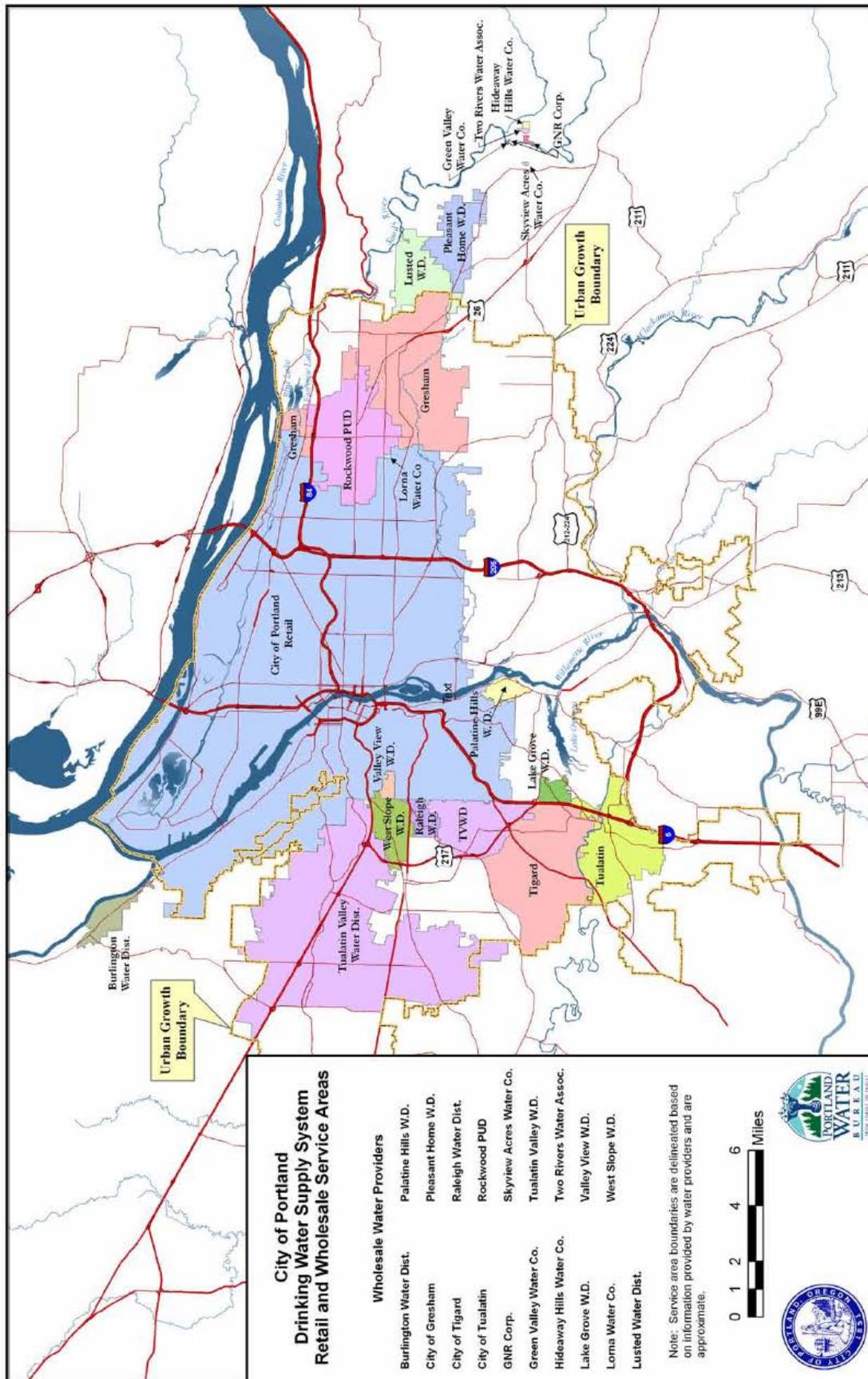
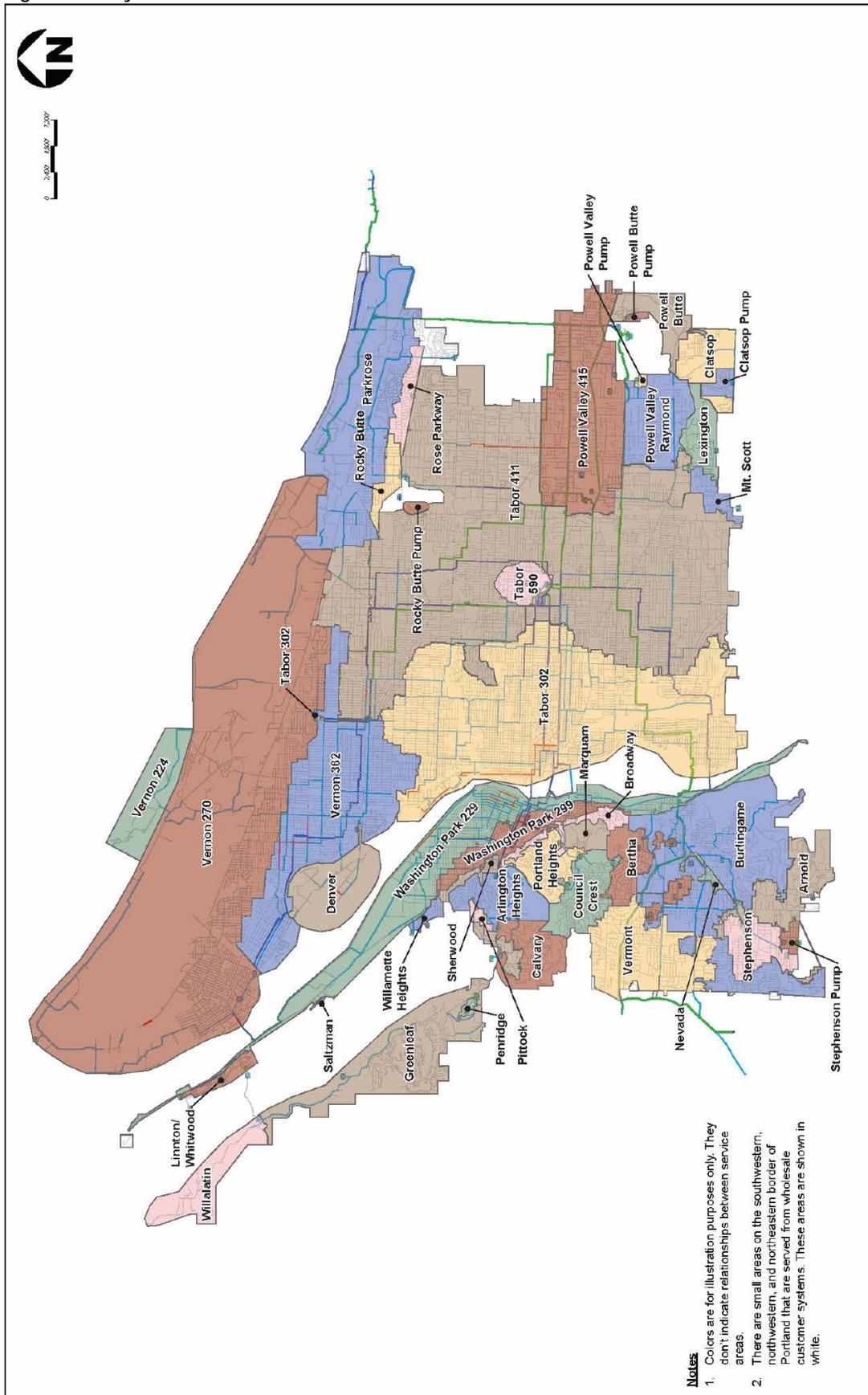


Figure 7.2 City of Portland Retail Service Areas



Inventory Summary

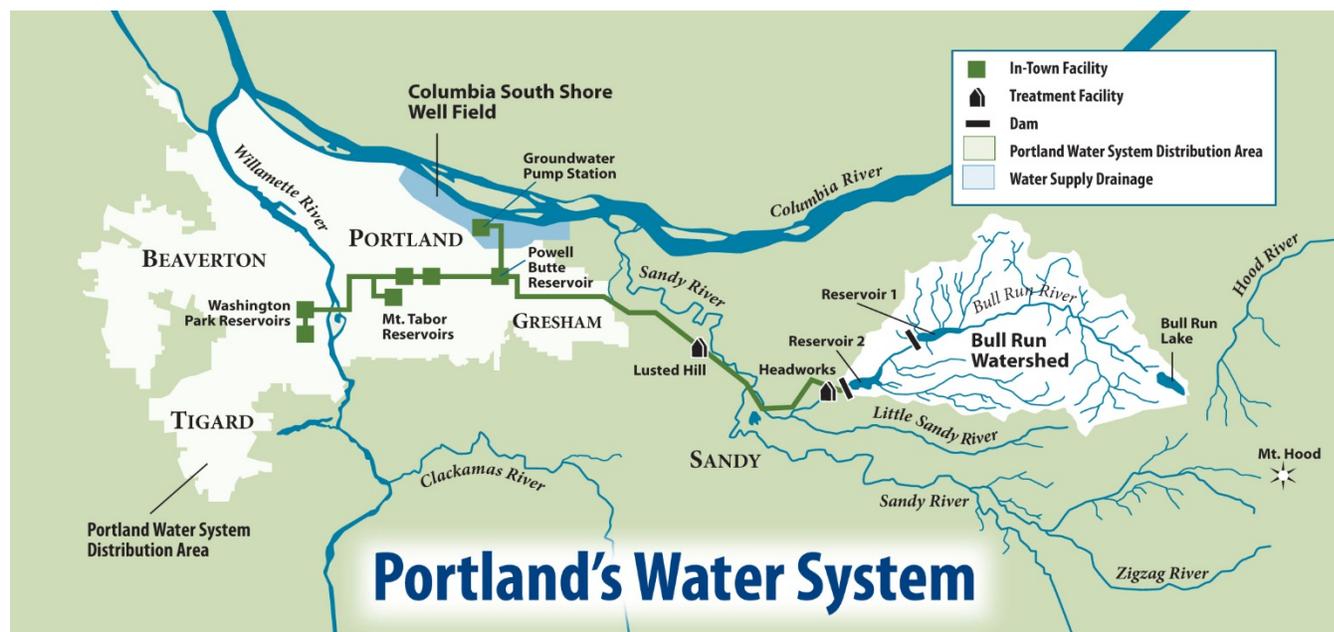
Water is supplied from the Bull Run watershed, located between the city and Mt. Hood, and the Columbia South Shore Well Field, located along the Columbia River, through approximately 2,250 miles of pipes within the City’s boundaries. In 2013, the water system was valued at about \$7.6 billion.

The City’s water system includes five integrated sub-systems:

- a supply system, which collects water from the Bull Run watershed and Columbia South Shore Well Field;
- a transmission system of conduits, which moves water to a number of reservoirs;
- a terminal storage system of reservoirs;
- a distribution system of mains, service lines, pumps and tanks, which distribute water to residences and businesses; and
- support facilities to assist in the operation and maintenance of the water system.

Figure 7.3 illustrates the main components of Portland’s water system. The components are described in more detail in Tables 7.1 and 7.2.

Figure 7.3 Portland’s Water System



Condition Summary

The most recent Inventory and Condition Report prepared by the Water Bureau is summarized in Tables 7.1 and 7.2. The replacement value of the water system is estimated at \$7.6 billion in 2013 dollars. About 63% of the value of the water system is in the distribution system. The supply system constitutes about 13% of the value of the water system, transmission accounts for 16%, terminal storage is 6%, and support facilities account for 2% of the Bureau’s asset value.

Roughly 47% of the water system is estimated to be in good condition with 22% being considered very good. Approximately 23% of the water system is considered to be in fair condition, 6% is poor and 2% is considered to be very poor. Table 7.2 provides additional detail on asset value and condition.

Table 7.1 Portland Water Bureau Summary of Value and Condition of Assets, 2013

Asset Group	Value (\$ million)					Total Value
	Very Good	Good	Fair	Poor	Very Poor	
Supply	\$131.8	\$457.2	\$276.0	\$82.3	\$18.2	\$967.0
Transmission	\$64.9	\$513.2	\$518.7	\$109.7	\$0.2	\$1,207.0
Terminal Storage	\$218.9	\$133.8	\$18.1	\$84.7	\$0.0	\$455.7
Distribution	\$1,182.1	\$2,434.1	\$912.0	\$190.1	\$65.7	\$4,785.4
Support Facilities	\$40.8	\$29.2	\$18.0	\$16.7	\$59.3	\$163.7
Total	\$1,638.5	\$3,567.6	\$1,742.7	\$483.6	\$143.4	\$7,578.8

Table 7.2 Portland Water System Inventory and Condition, 2013

Asset Group	Value (\$ million)					Total Value
	Very Good	Good	Fair	Poor	Very Poor	
Supply	\$131.8	\$457.2	\$276.0	\$82.3	\$18.2	\$967.0
Bull Run Roads	16.6	60.8	95.4	57.4	18.2	249.9
Bull Run Lake Facilities	0	17.2	.14	1.8	0	20.4
Dam 1 Facilities	0	119.9	102.1	0	0	222.0
Dam 2 Facilities	30.0	1161.3	34.9	13.8	0	240.0
Headworks & Lusted Hill Facilities	0	33.3	11.4	4.8	0	49.5
Groundwater Well Sites	0	36.5	26.6	2.9	0	66.0
Groundwater Pump Station and Treatment	27.7	27.1	4.2	1.6	0	60.6
Groundwater Collection System	57.5	1.1	0	0	0	58.7
Transmission	\$64.9	\$513.2	\$518.7	\$109.7	\$0.2	\$1,207.0
Bull Run Transmission	46.2	204.6	305.1	76.1	0.2	619.8
Transmission Mains	18.8	308.6	213.6	33.7	0	574.8
Terminal Storage	\$218.9	\$133.8	\$18.1	\$84.7	\$0.0	\$455.7
Distribution	\$1,182.1	\$2,434.1	\$912.0	\$190.1	\$65.7	\$4,785.4
Distribution & Transport Mains	721.3	1,549.3	254.0	47.7	9.0	2,582.5
Services	112.6	323.2	381.1	65.3	17.1	899.4
Valves	211.9	287.7	72.2	19.9	12.1	603.8
Meters	23.9	24.0	19.4	15.0	5.3	87.9
Hydrants	5.1	81.6	59.2	17.5	20.6	183.7
Regulators	0.0	7.9	7.9	8.1	0	24.0
Fountains	1.9	7.0	7.0	2.8	0.9	19.4
Pump Stations	40.6	54.3	19.9	2.9	0.8	118.5
Tanks	64.8	99.0	91.4	10.9	0.0	118.5
Support Facilities	\$40.8	\$29.2	\$18.0	\$16.7	\$59.3	\$163.7
Interstate Facility	16.0	5.7	0.8	1.5	49.6	73.5
Other Facilities	24.8	23.5	17.1	15.2	9.7	90.2
TOTAL	\$1,638.5	\$3,567.6	\$1,742.7	\$483.6	\$143.4	\$7,578.8

Capacity Summary

Population Growth and Water Use

The population in the Portland metropolitan area is expected to continue to increase. Although the physical boundaries of the retail service area are not expected to be redefined beyond the limits of the urban growth boundary (UGB), vacant land and redevelopment lots within the retail service area are increasingly being developed with higher-density housing and more mixed-use development than in the past. In addition, several of the bureau's 20 wholesale customers have identified growth in existing service areas as well as some small additions to the UGB in 2004.

Historical water use, both retail-only and combined retail and wholesale demand, has not kept pace with the increase in the service area population. Since 1992, the number of gallons per capita per day for the entire retail and wholesale area has declined while the population has grown.

Demand Forecast

Although the growth in demand does not increase at the same rate as the growth in population, analysis of future demand and population shows that demand will increase over time. Using a single-equation econometric model, the Water Bureau estimated the mathematical relationship between the overall demand for water and a series of explanatory variables including population change, weather factors such as precipitation and temperature, the average price of water, weekend use, climate change, and others. The result is a weather-normalized demand forecast for annual demand. The forecast also estimates demand under weather conditions that generated the highest average daily demand during the peak season (1967) and the highest single peak-day water demand (1981). Forecasts for Portland's retail and wholesale annual average daily demand (ADD) have been developed to 2030 for both weather-normalized and 1967 weather conditions for the entire year and for the peak season, respectively.

Population estimates generated as a part of the population and allocation forecasts prepared for the Regional Transportation Plan were provided by METRO. Estimates were made based on approximate service territories of Portland and each wholesale customer. No estimate for future growth outside the existing service territories was included, although some growth outside the existing service territory is likely for some providers as the UGB is expanded to accommodate the required 20-year land supply.

According to the Water Management and Conservation Plan (2010), the average annual daily retail demand for 2030 is predicted to be around 70 million gallons a day (MGD). The average annual daily retail plus wholesale demand for 2030 is predicted to be around 135 million gallons a day (MGD). Both numbers would be a substantial increase from current demands. An update of the Water Management and Conservation Plan is scheduled for 2020.

Key Issues & Concerns

Regulatory Compliance

Many large system projects are moving forward to achieve compliance with the Long Term 2 Enhanced Surface Water Treatment Rule (LT2 rule) of 2006. The rule requires that water systems with uncovered

finished water reservoirs, like those at Mount Tabor and Washington Park, either cover the reservoirs or provide treatment at the outlets of the reservoirs to remove or inactivate *Cryptosporidium*, *Giardia* and viruses. All of the compliance projects are in the Terminal Storage Program. These projects include design and construction for an additional enclosed water storage reservoir at Powell Butte, a replacement storage reservoir at Kelly Butte as well as design work for adjustments necessary to disconnect the uncovered reservoirs at Mt. Tabor and Washington Park from the drinking water system. Additional work to replace storage at Washington Park is also necessary. It is expected to cost between \$330 million and \$400 million to fulfill these requirements.

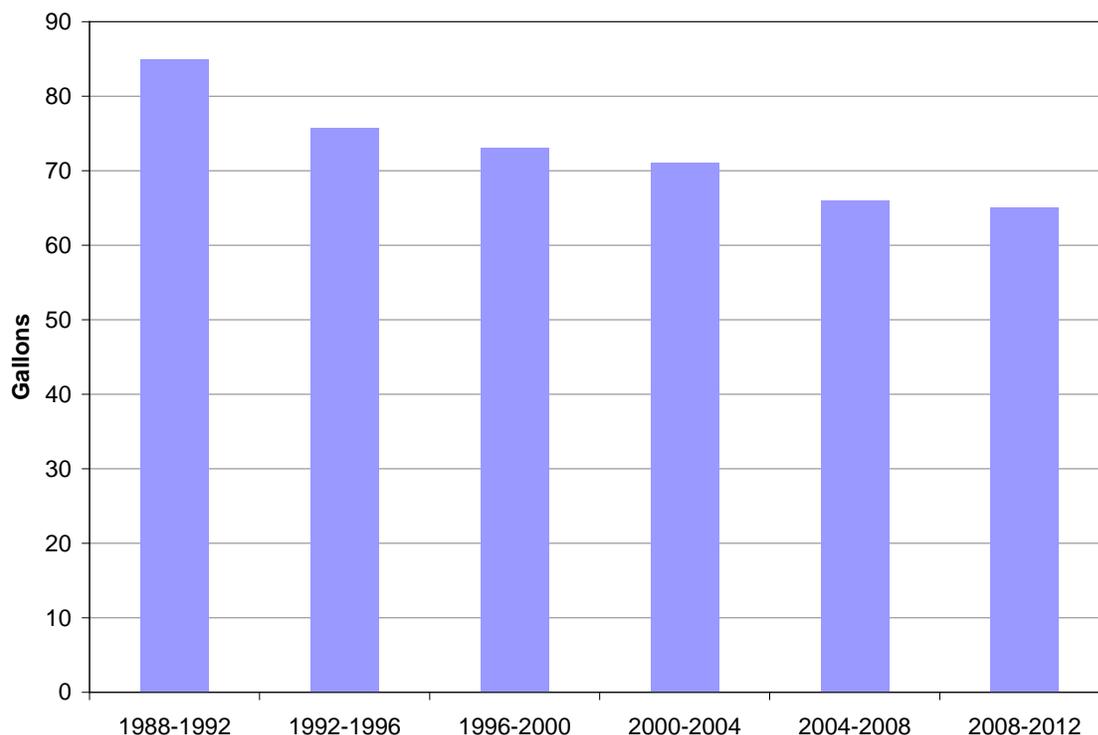
In addition, the bureau has capital projects in and around the Bull Run watershed to achieve compliance with regulations of the Clean Water Act and the Endangered Species Act. These projects are described in the bureau's Bull Run Water Supply Habitat Conservation Plan.

Declining Water Demand

As discussed previously, total water demand for the Portland system has fallen over the last few years, as retail and wholesale customers use less water. Per capita water use for retail single-family residential customers has gone down significantly since 1992. The average consumption for retail single-family customers between 1987 and 1992 was 87 gallons per capita per day (GPC), is now down to about 66 GPC, and has been as low as 62 GPC. Variables such as the water shortage of 1992, updated state and national plumbing codes, the change from flat rates to consumption-based rates for wastewater (in 1994), and behavioral changes resulting from conservation education have helped to reduce each household's overall consumption. Figure 7.4 shows the average annual GPC from 1988–2007.

Water demand forecasts developed by the Water Bureau anticipate that while per capita water demands will continue to decline somewhat over time, the overall demands on the Portland water system will increase due to population growth. The status of continued wholesale water sales is not known at this time, but the bureau anticipates continuing to sell water to wholesale customers.

Figure 7.4 Average Residential Per Capita Daily Water Use¹



Accommodating Growth

The City of Portland provides water to retail customers within the city limits, as well as a significant number of large wholesale customers. Average daily demand for retail customers in 2012 was 62 million gallons per day (MGD). This is expected to grow to approximately 70 MGD by 2030. While this is not a huge growth rate within the City, it is something that needs to be addressed in the planning of infrastructure.

A larger issue is the impact of regional growth, as the total population in areas served through wholesale water sales agreements is expected to increase significantly. However, as wholesale customers make decisions on future supply sources which may or may not include supply from the City of Portland, it is unknown how this growth will impact the Water Bureau.

Maintaining Existing Infrastructure

The replacement value of water system assets was estimated at \$7.6 billion in 2013. Many water system facilities are nearing the end of their useful lives. Half of distribution mains are older than 50 years. The uncovered reservoirs are all over 100 years old. Transmission conduits are 60 to 100 years old. Dams and reservoirs are 50 to 80 years old. The Water Bureau faces new costs to maintain and replace aging

¹ Each bar is an average of the gallons-per capita for the four-year period.

infrastructure, respond to security and vulnerability issues, and comply with regulatory requirements. In the meantime, there is pressure to hold down rate increases.

For 2013, the Water Bureau estimates a \$15.5 million annual funding gap, primarily in the replacement of assets in poor condition, including distribution system components, transmission conduits, and the seismic upgrades of tanks and other facilities. Over the next 5 years, the Water Bureau expects to invest over \$490 million on water-related capital improvements, primarily on the Distribution Program, which will help reduce the funding gap.

Vulnerability and Security

The City of Portland Water Bureau is dedicated to protecting public health and safety by ensuring that key components of the water system will withstand most human-caused or natural disasters. The Water Bureau has completed a number of studies on vulnerabilities within the system. Significant funding will be required to increase protection of more than 80 critical facilities, including dams, reservoirs, water supply pipelines, pump stations, and operations facilities.

Climate Change

The Water Bureau studies the issue of climate change and is establishing both preparation and mitigation strategies. The ability of Portland's two water systems to meet future demands, as well as the need for conservation and efficiency programs, will be important considerations as climate change impacts become more evident..

The City of Portland has kept detailed climate records for the past 70 years and continues to research and model climate patterns and their effects in the Bull Run watershed. The City also monitors current global and regional climate change information. Information available to date indicates that average winter season precipitation could increase. The average length of summer season, when the water system is drawing more water out of reservoir storage than is being refilled, could also increase. This period is referred to as "reservoir drawdown". In simpler terms, it is approximately the period from when spring rains stop and when fall rains begin. Storage in the Bull Run system is still expected to refill each year, because total flows in the watershed over the winter season are much greater than the amount needed to refill the storage reservoirs.

The City is preparing for climate change through research and monitoring, revising long-term planning models, working with other large drinking water utilities on preparation and mitigation strategies, developing its rights in the Columbia South Shore Well Field to provide summer supply and emergency backup capacity, and supporting efficient water use practices.

Regulatory Compliance

Federal Mandates

The City of Portland must comply with a variety of federal mandates, including the Clean Water Act, the Safe Drinking Water Act, the Lead and Copper Rule, and several mandates related to the protection and

management of the Bull Run watershed. Programs and projects to maintain compliance are included in the Bureau's investment strategy.

Safe Drinking Water Act (SDWA)²

Under the Safe Drinking Water Act, which is implemented through Oregon Revised Statutes and Administrative Rules, the Portland Water Bureau is required to conduct water quality sampling and submit results to Oregon Health Authority, in order to demonstrate compliance with maximum contaminant levels. The bureau also participates in on-site inspections (sanitary surveys) of treatment and distribution facilities by State Drinking Water Program personnel every three years, and participate in annual inspections. The Portland Water Bureau is also required to submit a Water System Master Plan every 20 years, submit a list of completed projects annually, produce and distribute annual Consumer Confidence Reports, meet operator certification requirements, and submit annual cross-connection reports.

Unregulated Contaminant Monitoring Rule (UCMR)⁵

The UCMR is administered under direct authority of the U.S. EPA and requires monitoring for 25 unregulated contaminants using five analytical methods during 2008-2010. The U.S. EPA uses the data generated by the UCMR to evaluate and prioritize contaminants on the Drinking Water Contaminants Candidate List, a list of contaminants EPA is considering for possible new drinking water standards.

Stage 2 Disinfection Byproducts Rule³

The Stage 2 Disinfection Rule is administered under direct authority of the U.S. EPA and requires the Portland Water Bureau to submit a sample plan and conduct sampling for disinfection byproducts.

Long Term 2 Enhanced Surface Water Treatment Rule, LT2⁴

The Long Term 2 Enhanced Surface Water Treatment Rule (LT2) was promulgated in January 2006. This federal rule applies to surface water or groundwater under direct influence of surface water (GWUDI) systems, and increases regulations regarding *Cryptosporidium* in the water supply. LT2 also addresses the regulation of *Cryptosporidium*, *Giardia* and viruses in uncovered finished drinking water reservoirs.

Compliance with LT2 has impacts on two separate parts of Portland's water system. First, the rule requires the city to provide additional treatment to its Bull Run supply to either remove or inactivate *Cryptosporidium*. Portland developed a comprehensive treatment variance request based on the results of a one-year water-quality sampling program and study of Bull Run water. A variance to this part of the rule was granted to the Water Bureau by the Oregon Health Authority on March 14, 2012.

² of 1974, 1986, 1996 as administered under the U.S. EPA Primacy Agreement by the Oregon Department of Human Services (ODHS) under Oregon Revised Statutes (ORS) 448 and Oregon Administrative Rules (OAR) 333-061

³ U.S. EPA Safe Drinking Water Act of 1974, 1986, 1996 - 40 CFR Parts 9, 141, and 142 - Federal Register: January 4, 2006 (Volume 71, Number 2), Rules and Regulations Page 387-493.

⁴ U.S. EPA Safe Drinking Water Act of 1974, 1986, 1996 - 40 CFR Parts 9, 141, and 142 - Federal Register: January 5, 2006 (Volume 71, Number 3) - Rules and Regulations Page 703-752

In 2002, new treatment facilities were estimated to cost between \$55 and \$204 million to construct and millions more to operate on an annual basis. If OHA's variance is revoked, the Water Bureau would likely be required to construct these new treatment facilities.⁵

Second, the rule requires changes to how uncovered finished drinking water reservoirs are managed and operated. The rule requires that water systems with uncovered finished water reservoirs, like those at Mount Tabor and Washington Parks, either cover the reservoirs or provide treatment at the outlets of the reservoirs to inactivate *Cryptosporidium* and viruses. A regulatory schedule for this work has been approved by to the Oregon Health Authority. The bureau is required to eliminate the use of uncovered reservoirs at Mt. Tabor by December 31, 2015 and those in Washington Park by December 31, 2020.

In its 2009 LT2 Storage Recommendation, the Water Bureau estimated that it will cost approximately \$400 million to come into compliance with the uncovered reservoir requirements of the rule.

Lead and Copper Rule

Lead and copper enter drinking water primarily through plumbing materials. Exposure to lead and copper may cause health problems ranging from stomach distress to brain damage. On June 7, 1991, EPA published a regulation to control lead and copper in drinking water. This regulation is known as the Lead and Copper Rule (also referred to as the LCR or 1991 Rule).

In January 1997, the Portland Water Bureau began corrosion treatment, raising the pH of the water to make it less acidic and less likely to leach metals. Corrosion treatment has reduced lead levels at the tap by more than 50% since the City began this treatment in 1997.

Americans with Disabilities Act⁶

The Americans with Disabilities Act of 1990 (ADA) prohibits discrimination and ensures equal opportunity for persons with disabilities in employment, State and local government services, public accommodations, commercial facilities, and transportation. ADA requires some new Portland Water Bureau facilities, and in some instances existing facilities, to be brought up to specified accessibility standards.

Bull Run-Related Legislative and Administrative Protections

A variety of federal legislation, regulatory requirements, administrative actions and agreements affects protection, management, and use of the Bull Run watershed that in turn enables the Water Bureau to provide a reliable water supply to the City of Portland. These include federal statutes specific to Bull Run, federal requirements applicable to national forest land, requirements of other federal agencies applicable to Bull Run, and agreements between the City and the Mt. Hood National Forest. Primary examples include the following:

⁵ The Water Bureau has plans for an ultraviolet light (UV) treatment facility (completed in early 2012) to address treatment requirements, should the variance be revoked. The UV treatment option was selected by the Portland City Council as the preferred treatment option in 2009 (Resolution 36720).

⁶ 1990, administered through Oregon Structural Specialty Code Oregon Administrative Rules 918-460

Federal Statutes and Regulations Specific to Bull Run

- Bull Run Watershed Management Act, P.L. 95-200, (1977) directs the Forest Service to consult and coordinate with the City of Portland to ensure management programs, practices, and standards on watershed lands are protective of drinking water quality
- 2012 Mt. Hood National Forest Closure Order for the Bull Run Watershed Management Unit— Closure Order MH-2012-05 closes forest service lands within the BRWMU to the public
- Oregon Resource Conservation Act (ORCA), P.L. 104-208 (1996), prohibits timber cutting within the hydrographic boundary of the Bull Run River drainage, except as necessary to protect or enhance water quality or for the construction, expansion, protection, or maintenance of water supply, energy transmission, or approved hydroelectric facilities
- Little Sandy Protection Act, P.L. 107-30 (2001), extends the boundaries of the Bull Run Management Unit and applies the land management protections of the 1996 ORCA to the entire management unit

Federal Requirements Implementing Policy Applicable to National Forest Land

- 1990 Mt. Hood National Forest Land and Resource Management Plan provides guidance for natural resource management.
- 1994 Northwest Forest Plan set management direction for the lands within the range of the northern spotted owl.

Requirements of Other Federal Agencies

- 1995 Bureau of Land Management (BLM), Salem District, Record of Decision and Resource Management Plan provides guidance for the management of non-native species
- BLM Permanent Closure Order for the Bull Run Watershed Management Unit (2011) closes BLM lands within the BRWMU to public access
- Bull Run Water Supply Habitat Conservation Plan (2009) defines the actions the City will take to address impacts of the Bull Run water supply system on native fish species in the Bull Run River, as regulated by the federal Endangered Species and Clean Water Acts and administered by the National Marine Fisheries Service and the Oregon Department of Environmental Quality

Agreement with the Mt. Hood National Forest

- The Bull Run Watershed Management Unit Agreement was established in 2007. Under this agreement, the city participates in collaborative efforts to maintain and manage various aspects of the watershed.

State Mandates

In addition to federal mandates, the City of Portland must also comply with state and regional mandates set through Oregon Revised Statutes and Administrative Rules. Projects to maintain compliance are included in the Bureau's investment strategy.

Statewide Planning Goals and Guidelines⁷

Statewide Planning Goals and guidelines require the City to maintain policies, service agreements, public facilities plans, and project lists for water service, through the City's Comprehensive Plan and public facilities plan. These plans must be submitted to the Oregon Department of Land Conservation and Development (DLCD) for acknowledgment as consistent with statewide goals.

Water Rights⁸

To maintain water rights granted by the state, the Portland Water Bureau developed a Water Management and Conservation Plan. This plan was approved by the state in 2010, and reports annual water use. Portland has state statutory right to full flow of the Bull Run and Little Sandy Rivers. The state also granted full extensions for the four primary CSSWF groundwater rights in 2009. The bureau is required to provide plan updates every five years.

Oregon Structural (OSSC), Mechanical (OMSC) and Electrical (OESC) Specialty Codes⁹

Requires new facilities and in some instances existing facilities to be brought up to new building code standards.

House Bill 3543 (2007)

The Oregon Legislative Assembly declared that it is the policy of the state of Oregon for state and local governments, businesses, nonprofit organizations, and individual residents to prepare for the effects of global warming and, by doing so, prevent and reduce the social, economic and environmental effects of global warming. House Bill (HB) 3543 (2007) sets greenhouse gas emissions targets for the state of Oregon with goals for progressively lower greenhouse gas emissions every decade until 2050.¹⁰ The City of Portland and Multnomah County have adopted a Climate Action Plan (2009) with a goal of reducing carbon emissions by 80 percent by the year 2050.¹¹ The City also adopted Resolution No. 36749 directing its bureaus to implement policies and programs related to the Climate Action Plan.¹²

Regional Plans

Regional Water Supply Plan

The Regional Water Supply Plan (RWSP) (2004) was adopted by most of the region's individual water providers and is coordinated by the Regional Water Providers Consortium. The RWSP provides a

⁷ SB 100, Statewide Planning Goals and Guidelines (OAR 660-011), Compliance procedures (ORS 197, and) Goal 11-Public Facilities and Services

⁸ ORS 436 and 437 and OAR 690-086, 690-410, and 690-315 Water Rights - Oregon Water Resources Department (OWRD) Oregon Revised Statutes 436, 537 Oregon Administrative Rules 690-086, 690-410, 690-315

⁹ 2007 OSSC – OAR 918-460, 2007 OMSC – OAR 918-440, 2005 OESC – OAR 918-305

¹⁰ Oregon Legislative Assembly. 2007. House Bill 3543. An Act relating to climate change; appropriating money; and declaring an emergency. Salem, Oregon.

¹¹ City of Portland and Multnomah County. 2009. Climate Action Plan. Portland, Oregon. Available at <http://www.portlandoregon.gov/bps/index.cfm?c=49989&a=268612>. Accessed November 11, 2009.

¹² City of Portland. 2009. Portland City Council Resolution No. 36749. Adopt the joint City of Portland and Multnomah County Climate Action Plan to reduce local greenhouse gas emissions by 80 percent from 1990 levels by 2050.

comprehensive, integrated framework of technical information, resource strategies and implementing actions to meet the water supply needs of the Portland Metropolitan Area to the year 2050.

Metro Regional Framework Plan (2005) - METRO

In 1992, the region's voters adopted a Metro charter for Metro which gave Metro jurisdiction over matters of metropolitan concern and required the adoption of a Regional Framework Plan. The Regional Framework Plan unites all of Metro's adopted land use planning policies and requirements. The charter directs Metro to address the water sources and storage in the plan. The Regional Framework Plan, originally adopted in 1997, was amended in 2005, 2010 and 2011 and contains regional policies contained in the Regional Urban Growth Goals and Objectives (RUGGO), 2040 Growth Concept, Metropolitan Greenspaces Master Plan and Regional Transportation Plan to create a coordinated, integrated Regional Framework Plan.

The Metro 2040 Growth Concept provides a structure for the preferred form of regional growth and development in the Portland metropolitan region. The Water Bureau will need to provide the water infrastructure to meet demands associated with projected population densities.

Section 4.1 of the Regional Framework Plan acknowledges the Regional Water Supply Plan developed and adopted by the Regional Water Providers Consortium. It is the policy of Metro to:

- Promote and achieve regional water conservation and demand management goals as defined in the Regional Water Supply Plan;
- Promote the coordination between regional growth management programs and water supply planning;
- Promote the coordination between land use planning and achieving goals of the Regional Water Supply Plan and;
- Set benchmarks and evaluate achievement of the targets and goals established in the Regional Water Supply Plan in coordination with the region's water providers.

Urban Growth Management Functional Plan - Title 6 (Metro Code Sections 3.07.610 - 3.07.650) - Centers, Corridors, Station Communities and Main Streets - METRO

The Urban Growth Management Functional Plan was adopted by the Metro Council and codified in Section 3.07 of the Metro Code. The purpose of this functional plan is to implement regional goals and objectives contained in the Regional Framework Plan.

The Regional Framework Plan identifies Centers, Corridors, Main Streets and Station Communities throughout the region and recognizes them as the principal centers of urban life in the region. Title 6 calls for actions and investments by cities and counties, complemented by regional investments, to enhance this role. The Portland Water Bureau is expected to complete infrastructure improvements as needed in order to support activities related to development of these urban environments.

Portland Watershed Management Plan

The Portland Watershed Management Plan (PWMP) is intended to guide City decisions and projects by providing a comprehensive approach to restoring watershed health. The Water Bureau collaborates with other City bureaus on projects like green streets, land acquisition, floodplain restoration and fish and wildlife habitat protection.

Goals & Policies

Draft Goals and Policies related to Water Facilities and services can be found in Chapter 5. Key Infrastructure Policies.

Water System Levels of Service

Levels of service establish a framework for characterizing system deficiencies, developing and evaluating alternative solutions, and selecting recommended improvements. The Portland Water Bureau's Strategic Plan includes the following service levels for water infrastructure:

- 100% compliance with state and federal water quality regulations.
- No more than 5% of customers out of water for more than 8 hours a year.
- No customer out of water more than 3 times per year.
- At least one working hydrant within 500 feet of service connection.
- Maintain minimum pressure of 20 pounds per square inch (psi) during normal demands.

The Bureau also maintains a variety of other customer service, financial health, infrastructure management, workforce, and sustainability service levels.

Investment Strategy

The Portland Water Bureau's Investment Strategy for the Citywide System Plan is divided into seven (7) primary programs: Supply, Transmission and Terminal Storage, Distribution, Treatment, Regulatory Compliance, Customer Service, and Administration & Support. The Water Bureau anticipates over \$1.5 billion in new investment in these programs over the next twenty years, see Table 7.3. This chapter and Appendix A. Investment Strategy provides greater detail on anticipated water projects and investments.

Table 7.3 Investment Strategy Summary

Program	FY 2013-2018	FY 2018-33
Supply	\$14,291,000	\$88,500,000
Transmission and Terminal Storage	\$191,170,000	\$242,000,000
Distribution	\$244,197,288	\$461,650,000
Treatment	\$2,500,000	\$150,000,000
Regulatory Compliance	\$25,504,000	\$30,000,000
Customer Service	\$3,057,000	\$53,700,000
Support	\$10,000,000	\$50,500,000
TOTAL	\$490,719,288	\$1,076,350,000

Supply System¹³

The primary drinking water source for Portland is the Bull Run watershed, supplemented by a groundwater supply from the Columbia South Shore Well Field (CSSWF) and the wells in the former Powell Valley Road Water District. The Bull Run watershed is located east of Portland and just north of the western foothills of Mt. Hood; the CSSWF is south of the Columbia River and east of the Portland International Airport, see Figure 7.5. The former Powell Valley Road Water District is located in southeast Portland, near Powell Butte.

Since 1895, Portland has relied on the Bull Run watershed as its principal source of supply. Rainfall runoff and snowmelt from within the watershed are captured in the Bull Run storage system, which includes Bull Run Lake, and Reservoirs 1 and 2, all located on the Bull Run River. At Reservoir 2, water enters the Headworks, the origination point of the three conduits that convey water from the Bull Run system to Powell Butte Reservoir. Until 2015 and 2020 respectively, water from Powell Butte will be supplied to Mt. Tabor and Washington Park reservoirs. These reservoirs have served as terminal storage for the water supply transmission system, and as central points for distributing water into the retail water system. As these facilities are decommissioned, water from Powell Butte will follow one of three paths: to Kelly Butte, an enclosed underground storage facility; to other terminal storage-system reservoirs; or through large transmission mains to the distribution system and/or wholesale customers.

The federal Safe Drinking Water Act, which regulates public drinking water supplies, typically requires surface water supplies to be filtered to meet federal drinking water standards. Because the Bull Run source water quality is very high and Portland implements source water protection measures, Portland is currently exempt from filtration requirements. Portland's water supply is disinfected using chloramines. Water is chlorinated at the Headworks at Reservoir 2. Ammonia and caustic soda are added at a second treatment facility, Lusted Hill.

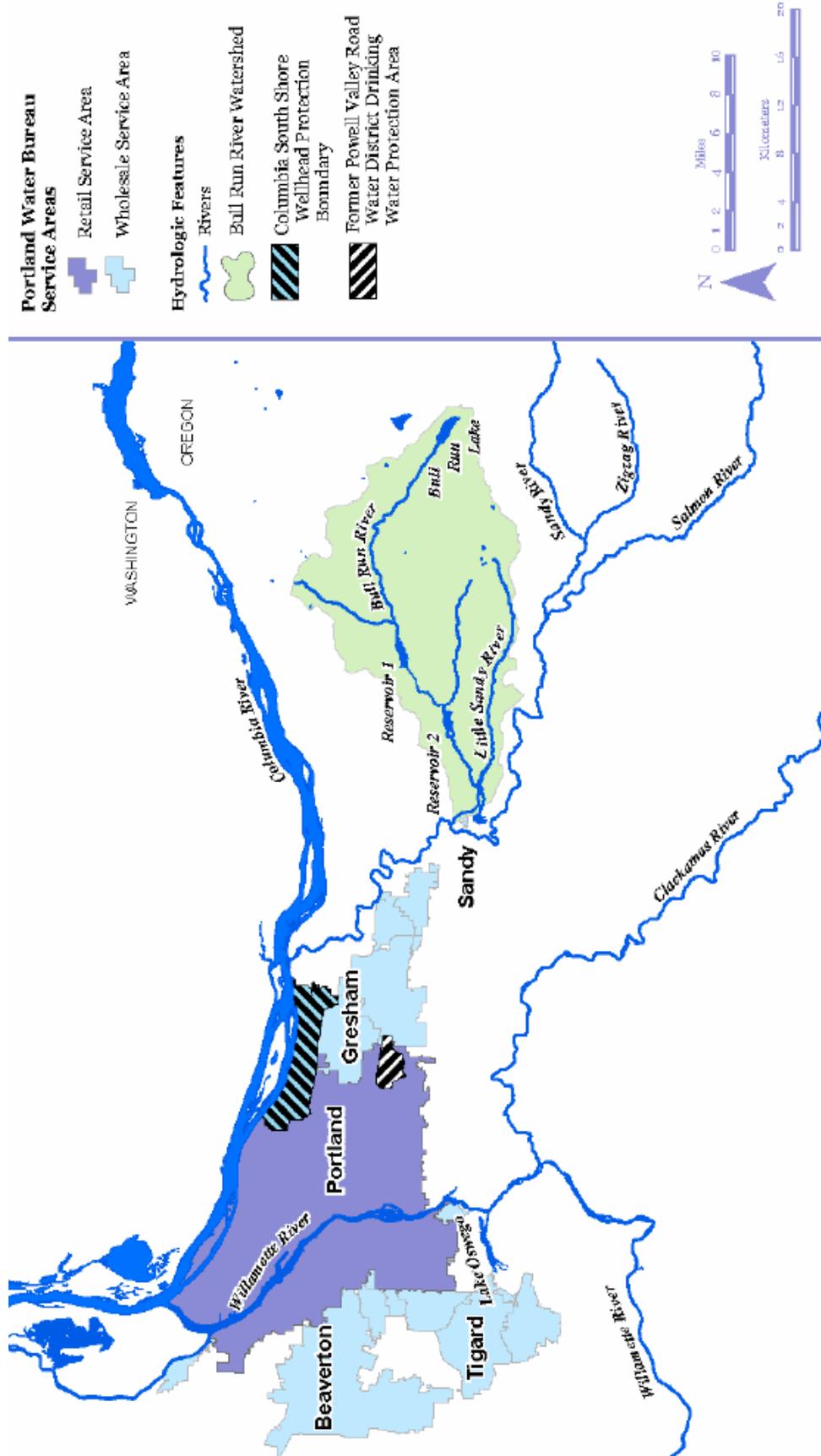
Since 1985, Portland has used groundwater from the Columbia River South Shore Well Field as an emergency seasonal supply and as a backup supply when winter storms cause high turbidity in the Bull Run watershed. The groundwater supply comes from three aquifers along the south shore of the Columbia River. The system includes 27 wells, one storage tank, a groundwater booster pump station, and a treatment facility. Portland also has access to wells previously owned by the Powell Valley Road Water District.

Wholesale Customers

The Water Bureau supplies water to its wholesale customers; the City of Portland does not typically receive water from any sources owned or operated by its wholesale customers. The City's water supply system is interconnected with other water suppliers including the City of Lake Oswego, the City of Milwaukie, and Clackamas River Water. Portland is able to receive water from these other sources on a limited basis in an emergency.

¹³ Portland Water Bureau, Distribution System Master Plan and Portland Water Bureau, Water Management and Conservation Plan

Figure 7.5 Drinking Water Supply System Water Sources



Bull Run Watershed

Inventory

The water of the Bull Run River is primarily impounded in two reservoirs: Reservoir 1, completed in 1929, and Reservoir 2, completed in 1962. Periodically, the Water Bureau relies on storage capacity in Bull Run Lake, a natural lake that is upstream of the headwaters of the Bull Run River, to enhance the supply of the two reservoirs.

At the Headworks facility below Dam 2, the raw water is disinfected. The water then flows to the Lusted Hill facility for further treatment, and is fed by gravity to the terminal storage, transmission, and distribution systems. The Bull Run water system includes facilities for generating hydropower. The Portland Hydroelectric Project's hydropower facilities at Dams 1 and 2 generate electricity that the city sells to Portland General Electric (PGE).

The Water Bureau's facilities in the Bull Run Supply system are served by a network of 123 miles of roads and 11 bridges. In total, infrastructure assets in the Bull Run supply system have a 2013 replacement value of \$782 million.

Current Condition

The vast majority of assets in the Bull Run watershed are in fair to good condition, see Table 7.2. Eight percent of assets are in poor condition; two percent are in very poor condition.

Adequacy and Reliability of Supply

The Bull Run watershed is the city's primary water source. The approximate median annual water yield from the Bull Run watershed (measured at Headworks) is 180 billion gallons. The median annual diversion for water supply is approximately 20 percent of the total median yield. The reservoirs in the Bull Run are recharged during the fall, winter, and spring when rainfall is abundant. During the dry summer months (starting in June or July), the reservoirs are drawn down. This drawdown period typically lasts until early October but can sometimes last until November or December. During this period, the water flowing out of the reservoirs exceeds the water flowing into the reservoirs from rainfall and tributary flow.

Water demand varies annually, driven primarily by weather. In warm, dry summers when demand is high, the yield from the Bull Run watershed is at its lowest. In cool wet summers, water demand is often lower and yield from the Bull Run tends to be higher.

The duration of the dry season is also important because it determines the time period during which the city will rely on the limited storage in the watershed's reservoirs. Long dry seasons increase the proportion of groundwater that the city uses to meet demand before fall rains return.

The two Bull Run reservoirs are relatively small in comparison to the amount of precipitation and stream discharge in the basin. The reservoirs are not large enough to provide a multi-year water supply. Refill each winter is necessary to ensure supply for the following summer.

Over the last 20 years, the city has examined a number of options for increasing water storage in the Bull Run system. In the future if necessary, the city will continue to explore these and other options, such as water efficiency and conservation, to meet long-term water supply needs.

Columbia South Shore Well Field

The Columbia South Shore Well Field (CSSWF) is the second-largest developed water source in the state (after the Bull Run Supply), and the largest developed groundwater source in the state. Located on the floodplain of the Columbia River northeast of downtown Portland, this 11-square-mile area spans the boundaries of three cities: Portland, Fairview, and Gresham. The wells in the well field provide water when the Bull Run supply is shut down due to emergency conditions such as turbidity events, landslides, fires, or other natural or human-caused disruptions. The groundwater system is also a supplemental supply to meet demands during the summer peak season as needed.

Inventory

As of 2013, there are 27 wells in the CSSWF.¹⁴ These wells draw on three aquifers: the Sand and Gravel Aquifer (SGA); the Troutdale Sandstone Aquifer (TSA), and the Blue Lake Aquifer (BLA). The sum of the nominal instantaneous pumping capacity for all of these wells is approximately 103 to 118 million gallons a day (MGD), based on the maximum pumping rates of the individual wells. In use, the well field has an empirically determined initial 30-day operating capacity of approximately 90 MGD. A large pump station moves water to the city's Powell Butte Reservoir, where it is mixed with Bull Run water (unless the Bull Run supply is off-line).

Current Condition

The wells in the CSSWF are primarily in good or fair condition (53% and 41%, respectively). Collection mains are primarily in good to very good condition (85% and 13%, respectively). The treatment facility is in good condition and the pump station is in fair to good condition. Additional condition information can be found in Table 7.2.

Supplemental and Emergency Use of the CSSWF

According to the Seasonal Water Supply Augmentation and Contingency Plan—also referred to as the Summer Supply Plan (SSP), the CSSWF is used for supplemental and emergency supply under the following conditions:

- Supply Augmentation: Groundwater may be used to augment the Bull Run supply to meet demand during seasonal warm dry periods when the Bull Run water supply is not sufficient to meet the needs of the bureau's retail and wholesale customers; to maintain in-stream flows for fish habitat; or if water demand exceeds the conduit capacity long enough to deplete in-town storage below safe levels.¹⁵

¹⁴ A map of the Columbia South Shore Well Field can be found in Figure 2-3 of the *Water Management and Conservation Plan*, 2010.

¹⁵ Conduit capacity may be exceeded if demand is exceptionally high or if one or more of the conduits is out of service.

- Turbidity Event Augmentation: Groundwater may be needed to augment or replace the Bull Run surface supply to avoid violating state and federal drinking water standards for turbidity. Turbidity in the surface water supply is typically caused by storm events in the Bull Run watershed.
- Emergency Use: Groundwater may be needed during catastrophic events (in addition to turbidity events) that would cause a loss of part or all of the Bull Run surface water supply. Catastrophic events include, but are not limited to, severe or extended drought, fire in the watershed, flood, landslides, volcanic activity, earthquakes, and acts of vandalism or terrorism. Any of these events could cause significant water quality problems or result in damage to, or shutdown of, the conduits or other critical infrastructure used to transfer Bull Run water to the Bureau's in-town reservoirs. An example of a catastrophic event in the watershed was a landslide in 1995 that damaged two conduits. Groundwater was used for 27 days and provided an average of 25.4 MGD to the distribution system.¹⁶

Contamination and Remediation

The City of Portland has an extensive network of monitoring wells. The bureau tracks groundwater quality and changes in groundwater levels over time in multiple aquifers within the CSSWF. Data from city groundwater quality monitoring indicate that the deep confined aquifers Portland uses for drinking water are free of contamination within the capture zones of active wells.

Anthropogenic, or human-related, contamination was first discovered in shallow groundwater aquifers near the well field in the 1980s. Since the early 1990s, the city has worked closely with the Oregon Department of Environmental Quality (ODEQ) to expedite the discovery, assessment, and remediation of contaminant sources and plumes, and to keep the well field operational. Remediation technologies used to remove contaminants from soil and groundwater include pump-and-treat, soil vapor extraction, electro-resistive heating, air sparging, and chemical and biological treatment. Remediation in the CSSWF is nearly complete.

High concentrations of naturally-occurring manganese in two wells have limited the ability of the Water Bureau to utilize these wells. Manganese can cause water discoloration which can affect laundry businesses served by the Water Bureau. The Water Bureau avoids using the high-manganese wells unless no Bull Run supplies are available and the full capacity of the well field is needed.

Groundwater Protection Program

The Groundwater Protection Program, adopted in 2003 and updated in 2010, replaced existing programs in Portland and Fairview and initiated a program in Gresham. The Groundwater Protection Program requires businesses that use, store, or transport hazardous material above a certain threshold amount to implement best management practices to prevent chemical spills.

Regulated businesses in Portland are inspected every two years as part of their regular fire inspection to ensure the business is in compliance with the program requirements. In Gresham and Fairview,

¹⁶ Although the average is 25.4 MGD, the actual amounts per day varied widely.

inspections are conducted by Gresham watershed management staff. The Water Bureau and its partners provide free technical assistance to businesses on compliance issues.

The Columbia South Shore Well Head Protection Area delineation was certified by the Oregon Health Authority Drinking Water Program in 2003. A certified wellhead protection area is considered a significant groundwater resource under Statewide Planning Goal 5 if the public water system served by the wellhead area has a service population greater than 10,000 and relies on groundwater as the primary or secondary source of drinking water. Local governments are required to develop a program to reduce the risk of groundwater contamination in such areas. In June 2008, the Department of Environmental Quality certified the Columbia South Shore Well Field Protection Program, which addresses Goal 5 requirements for protecting these groundwater resources.

Adequacy and Reliability of Supply

The Portland Water Bureau has not experienced any major supply deficiencies in the last 10 years. Supply capacity and reliability were both enhanced in the mid-1980s by the development of a high-quality secondary source of drinking water in the Columbia South Shore Well Field (CSSWF). The CSSWF can be used in the event of a supply shortage in the Bull Run watershed. In the past ten years, water from the CSSWF has been used to augment Bull Run supply due to turbidity, for summer supply augmentation, and for maintenance runs. As of December 31, 2012, the CSSWF has been used a total of 29 times—10 times for turbidity events in Bull Run, once for a landslide that took two of the three conduits out of service, 13 times for summer supply augmentation, and five times for maintenance reasons.

Current well field capacity is sufficient to meet short-term (less than 30-day) emergency needs during the non-peak-season. The current capacity of the well field system is not sufficient to meet demand during a full shutdown of the Bull Run system due to emergencies or catastrophic events for periods longer than 30 days. Groundwater availability may also be limited in the future due to increased withdrawal from the aquifer by full-time and growing municipal users in Oregon and Clark County, Washington.

The city has evaluated several options for maintaining and improving the adequacy and reliability of supplies from the Bull Run watershed and the CSSWF... The results of these studies indicate that developing supplies in the CSSWF is the most cost-effective option.

The Water Conservation and Management Plan (2010) anticipates the potential development of 53 MGD in the CSSWF by 2028 to meet the annual average water demand of the current retail and wholesale service areas.

Former Powell Valley Road Water District Wells

On July 1, 2005, the City of Portland annexed areas served by the Powell Valley Road Water District (PVRWD) in southeast Portland, northwest of Powell Butte. Residents of this former water district are now served by the Portland Water Bureau's retail system. Under an intergovernmental agreement, Portland assumed control of all of the district's assets, including six active wells.¹⁷ The PVRWD assets included water rights and water infrastructure. The installed capacity of the Powell Valley wells can be as much as 8.6 MGD, however less than half of this capacity is currently available.¹⁸ Several capital improvement projects are planned to repair various facilities and fully integrate the wells into the Water Bureau system. These projects may be completed in three to ten years.

The former Powell Valley Road Water District wells are in good condition, are productive, and do not have significant water quality issues. In the future, the Water Bureau intends to upgrade these facilities to allow connection of these wells to the main system through Powell Butte. This integration would allow the bureau to increase capacity if needed and to blend well water with water from the Bull Run watershed and/or CSSWF before it enters the distribution system. The Powell Valley Road Water District's wells had a state certified delineation and approved wellhead protection plan (July 1998) at the time of annexation. This protection plan is non-regulatory and relies on best management practices. The Portland Water Bureau reassessed the delineation with an updated methodology and received certification from OHA in October 2010. The protection plan needs to be updated and submitted for re-approval.

The state-approved WMCP includes the potential use of 7.36 MGD of the developed supply to meet future demands.

Current & Projected Demands

Table 7.4 summarizes existing and 2030 retail demands for the distribution system by service area. The 2005 average daily demand was 61.5 mgd.¹⁹ The Distribution System Master Plan, finalized in 2007, estimated that the average daily retail distribution-system demand for 2030 is projected to increase to 70 mgd. Historically, per capita demand in the retail area has shown a steady downward trend since 1993. However, current demand forecasts project relatively steady total demand through 2015, with an upward trend thereafter based on population increase.

Regional population forecasts from Metro, the state-approved Water Management and Conservation Plan, finalized in 2010, estimate the average system-wide demand to be between 132 and 138 million gallons a day. According to the Water Management and Conservation Plan (2010) the average and peak demand for the total service area is anticipated to increase 21% between 2007 and 2030.

¹⁷ A map of the former Powell Valley Road Water District can be found in Figure 2-4 of the *Water Management and Conservation Plan*, 2010.

¹⁸ Additional information on these wells, including size, depth, and capacity can be found in Table 2-2 of the Portland Water Bureau's *Water Management and Conservation Plan*.

¹⁹ A 2005 demand of 64 mgd was used in capacity evaluations, projected from 2002 demand data at the outset of the study.

Table 7.4 Existing and Projected Retail Water Demands²⁰

Service Area	2005 - Daily Demand		2030 – Daily Demand		Service Area	2005 - Daily Demand		2030 – Daily Demand	
	Avg (mgd)	Peak (mgd)	Avg (mgd)	Peak (mgd)		Avg (mgd)	Peak (mgd)	Avg (mgd)	Peak (mgd)
Arlington Heights	0.7	1	0.9	1.3	Powell Butte Pump	0.02	0.03	0.03	0.05
Arnold	0.5	1	0.6	1.2	Powell Butte	0.2	0.4	0.4	0.7
Bertha	0.5	1.1	0.6	1.3	PV Pump	0.03	0.05	0.03	0.1
Broadway	0.2	0.4	0.3	0.5	PV Raymond	1	1.8	1.3	2.3
Burlingame	1.9	3.3	2.1	3.7	PV 415	2.9	5.1	3.6	6.5
Calvary	0.6	1	0.8	1.3	Rocky Butte Pump	0.02	0.03	0.02	0.04
Council Crest	0.3	0.8	0.4	1.1	Rocky Butte	0.2	0.3	0.2	0.4
Clatsop Pump	0.1	0.2	0.1	0.2	Rose Parkway	0.3	0.6	0.3	0.7
Clatsop	0.2	0.3	0.2	0.4	Saltzman	0.001	0.003	0.002	0.004
Denver	0.9	1.6	1	1.7	Sherwood Field	0.5	0.9	0.6	1.2
Greenleaf	1	1.6	2.1	3.5	Stephenson	0.4	0.7	0.4	0.7
Lexington	0.2	0.4	0.3	0.5	Stephenson Pump	0.1	0.1	0.1	2
Linnton/Whitwood	0.1	0.2	0.2	0.3	Tabor 302	10.6	15.6	12.7	18.7
Marquam	0.7	1.2	0.9	1.6	Tabor 4112	15.1	22.7	16.9	25.4
Mt Scott	0.2	0.4	0.3	0.5	Tabor 590	0.3	0.5	0.3	0.5
Nevada	0.1	0.2	0.1	0.2	Vermont	1.6	2.5	1.8	2.7
Parkrose	1.9	3.6	2	3.9	Vernon3	10	15.2	12.1	18.2
Penridge	0.04	0.1	0.1	0.2	Willalatin	0.1	0.3	0.3	0.8
Pittock	0.04	0.1	0.1	0.1	Washington Park 229	6.2	9.8	8.9	14
Portland Heights	0.6	1	0.8	1.3	Washington Park 299	3.7	5.8	5.2	8.2
Totals⁴	64.2	102.6	79.2	126.6					

1 Willamette Heights service area demands are included in Sherwood service area total.

2 The demands for Tabor 411 include Tabor 338.

3 The demands for Vernon include Vernon 224, Vernon 270 and Vernon 362.

4 The area served via Rockwood WD is not included in the total. The average daily demand for this area is estimated to be 0.3 mgd with a peak demand of 0.5 mgd. In the future the average daily demand will remain the same and the peak demand will rise to 0.6 mgd.

Wholesale Water Agreements

The Portland Water Bureau has wholesale water sales agreements with 20 water purveyors in the Portland, Oregon metropolitan area, including cities, water districts, and private water companies.

Portland can potentially sell water to a wholesale population of 450,000 and routinely provides wholesale service to over 375,000 people. Annual wholesale water sales account for 12 percent of annual water sales and about 40 percent of annual water demand. These agreements require the Portland Water Bureau to meet specific levels of service.

²⁰ Portland Water Bureau, Distribution System Master Plan, June 2007 (Table 2-4)

Table 7.5 Portland Water Bureau Wholesale Agreements²¹

5-Year Agreement	10-Year Agreement	20-Year Agreement
GNR Water Company	Pleasant Home Water District	Burlington Water District
Green Valley Water Company	Lake Grove Water District	City of Gresham
Hideaway Hills Water Company	City of Tigard	City of Sandy
Lorna Water Company	City of Tualatin	Lusted Water District
Skyview Acres Water Company	Tualatin Valley Water District	Palatine Hill Water District
Two Rivers Water Association		Raleigh Water District
		Rockwood Water PUD
		Valley View
		West Slope Water District

Needs & Approach

Bull Run Supply

Although the demand needs are not critical at this juncture, the City will, if it becomes necessary, explore options for increasing water storage in the Bull Run system in order to meet long-term water supply needs.

Groundwater Supply

Current well field capacity is sufficient to meet short-term (less than 30 days) emergency needs during the non-peak-season. The current capacity of the well field system is not sufficient to meet demand during a full shutdown of the Bull Run system due to emergencies or catastrophic events for periods longer than 30 days. Groundwater availability may also be limited in the future due to increased withdrawal from the aquifer by full-time and growing municipal users in Oregon and Clark County, Washington.

Asset Management Plans

Asset management plans are being developed for the Bull Run Supply and Groundwater Supply. These plans will help identify maintenance, repair and replacement strategies necessary to maintain and improve the water system.

Recommended Supply System Improvements

Bull Run Watershed

The function of this program is to allocate funds for the capital projects necessary to maintain, improve, and protect the watershed facilities that are not directly related to the water supply system facilities. This includes Bull Run watershed road reconstruction to ensure continuous, reliable, and safe access to all facilities, as well as maintenance of other city-owned infrastructure within the watershed.

The Dam 2 Tower Improvements Project provides for modification of the north tower inlet to allow selective-depth withdrawal from Bull Run Reservoir 2. The intent is to help regulate temperatures for flows

²¹ Portland Water Bureau, 2014.

released to the lower Bull Run River to comply with Clean Water Act requirements and to improve water quality by providing flexibility during turbidity events. The anticipated completion date is 2014.

Dams and Headworks Repair and Rehabilitation

This program provides for assessment of the condition and rehabilitation of dams and facilities at Headworks. As many of these facilities are between 50 and 70 years old, their safe and reliable operation requires ongoing investment. The program includes preliminary engineering and design of needed repairs, rehabilitation of these facilities, and actual repair work.

Columbia South Shore Well Field

The Columbia South Shore Well Field (CSSWF) is Portland's alternative supply of water should the Bull Run watershed supply be interrupted for any reason. Projects funded in this program improve the maintenance of this aging infrastructure, including repairs, selective replacements and upgrades.

Groundwater Collection Main Hardening

Much of the piping connecting the wells to the Groundwater Pump Station is located in liquefiable soils which are vulnerable during a seismic event. This project would design and install measures to "harden" the piping and reduce this vulnerability.

Groundwater Electrical Improvements

This project designs and constructs a new 115kV/4160V transformer and other components to complete a double-ended electrical substation at the Groundwater Pump Station. It will also design and construct a 5kV main breaker replacement and purchase selected spare components.

Groundwater Pump Station (GWPS) Expansion

As water demand increases, the bureau will need to increase the available flows from the groundwater system. The system expansion will include upgrade of the Groundwater Pump Station to provide additional capacity.

Groundwater Well Field Expansion

As water demand increases, the bureau will need to increase the available flows from the groundwater system. The system expansion will include additional well development and collection mains in the Columbia South Shore area.

Groundwater Well Field Reliability Enhancements

The bureau is attempting to increase its flexibility and preparedness to meet the future challenge of an interruption of Bull Run water. The bureau is improving its emergency preparedness by evaluating electrical vulnerability for the pumping system, reviewing the flood inundation vulnerability of the site, and developing a groundwater intertie that would reduce transmission system vulnerability. The inundation review may be partially completed through a partnership with Multnomah County Drainage District.

Powell Valley Well Improvements

The project includes upgrade of the facilities in the previous Powell Valley Road Water District area and connection and integration of these facilities to the Portland Water Bureau's water system.

Transmission and Terminal Storage System

Inventory

Three large-diameter conduits carry the water from the Bull Run watershed to the Water Bureau's in-town storage and distribution system. The conduits have interconnections in three places to ensure reliability, should one or two conduits fail. The water flows downhill from an elevation of 735 feet above mean sea level (MSL) then through the Lusted Treatment facility to Portland's easternmost storage reservoir on Powell Butte, at 530 feet above MSL. Alternatively, groundwater can be pumped to Powell Butte from the Columbia South Shore Well Field through the Groundwater Pump Main when the Bull Run Supply is not available or limited. When water is supplied from both Bull Run and the Columbia South Shore Well Field, the water is blended at Powell Butte. See Figure 7.6 for a schematic diagram of the City's water system.

The Water Bureau maintains water storage, or reservoirs, to provide for daily fluctuation of water use, to fight fires, and to provide time to connect to emergency sources of supply when primary sources are unavailable. In 2012, the terminal storage in Portland's water system consists primarily of Powell Butte Reservoir 1, Mount Tabor Reservoirs 1, 5 and 6, and Washington Park Reservoirs 3 and 4. It also includes storage at Kelly Butte, Sam Jackson and Mayfair. After 2012, the terminal storage system will undergo changes in response to regulations. The system will be reconfigured so that water from Powell Butte will be directed along multiple paths: to Kelly Butte, an enclosed underground storage facility; to the terminal storage-system reservoirs, or through large transmission mains to the distribution system and/or wholesale customers.

Current Condition

The transmission system's 75 miles of conduits is primarily in fair to good condition, although an estimated 12% is in poor or very poor condition. More detailed condition assessments of the conduits are needed. The Washington County Supply Line and Groundwater Pump Main are primarily in good condition (91%), while the Mt. Tabor to Washington Park transmission mains are in fair to good condition.

Terminal storage located at Mount Tabor and Washington Park are classified as uncovered reservoirs, and therefore must be decommissioned or covered as part of the federal LT2 regulations. The Mount Tabor and Washington Park reservoirs are ranked in the condition assessment as poor. As a result of the LT2 regulations, plans are currently underway to build additional terminal storage at Powell Butte (Reservoir #2) and replacement storage at Kelly Butte to replace the function of the Mount Tabor Reservoirs. Design work to replace the uncovered reservoirs at Washington Park is under way.

Terminal storage at Sam Jackson and Mayfair is considered to be in fair condition.

Current Capacity

The conduits have a combined maximum capacity of approximately 212 MGD. The current average annual demand (retail plus wholesale) is approximately 100 MGD. Peak-day demand is approximately 170 MGD. At this time, transmission capacity is available to meet demands when all facilities are in operation. However, transmission system outages and vulnerability remains a concern.

Total storage capacity of the terminal storage reservoirs is currently approximately 195 million gallons (MG). This will be reduced to 148 MG through the elimination of the uncovered reservoirs and construction of new covered storage.

Projected Capacity

At the point in time that peak-day demands are projected to exceed the capacity of the three conduits, Conduit 5 will likely be required. Peak-day demands are not expected to exceed the capacity until near the end of the time period covered by this plan, or later.

Terminal storage capacity will be 148 MG for the time period covered in this plan.

Needs & Approach

The conduits are a critical part of the supply system and represent a significant financial investment for the Water Bureau. Gaining better information on the condition of the conduits and providing the necessary maintenance is therefore of great importance to the Bureau. This work has begun with the completion of a Conduits Asset Management Plan. Over the next few years, the City will need to invest to help improve knowledge of the condition of the conduits. The recently constructed Sandy River crossing reduced vulnerability and replaced conduit sections that were considered in poor condition. A new seismically hardened Willamette River crossing is also planned and included in the capital improvement plan.

Replacement of terminal storage reservoirs is expensive—significant funding is needed to complete the new storage within the time frames required by EPA.²² Additional transmission main improvements will also be required as part of the reservoir replacement work. An asset management plan for terminal storage is currently being developed. This plan will help identify projects and replacement strategies necessary to maintain and improve the system.

An overall seismic evaluation of the Transmission and Terminal Storage system is recommended.

Recommended Transmission and Terminal Storage System Improvements

Conduits and Transmission Mains

The conduits that bring water to Portland from the Bull Run watershed are large pipes - 56 to 72 inches in diameter. This program funds repairs, replacements and upgrades to the conduits. In future years, the

²² See the bureau's website on Uncovered Reservoirs, <http://www.portlandoregon.gov/water/article/330807>, for the most up-to-date information.

Portland Water Bureau plans to upgrade 4-5 miles of conduits each year at an estimated cost of \$4-\$5 million per mile.

Conduit 5

This project would include installation of sections of a new Conduit 5 as growth occurs and the condition of the existing conduits worsens.

Kelly Butte Reservoir

This project would increase storage capacity from 10MG to 25MG by replacing the existing tank with a buried reservoir. The project includes site access, construction access and easements, staging areas, and on-site storage areas. This project establishes Kelly Butte as a key facility that will be used for system pressure equalization and in-town terminal storage in lieu of the Mt. Tabor uncovered reservoirs.

New Conduit Intertie

This project would address concerns about the capability of the conduit system to withstand hazards and deliver an uninterrupted supply to the City. The project will connect the conduits through additional piping and valving to improve reliability of flow during emergency conditions and for maintenance by providing additional isolation and interconnectivity.

Powell Butte Reservoir 2

This LT2-related project is being constructed in two phases – Phase 1 is complete. The project is currently in Phase 2, the construction of a 50-million-gallon buried reservoir at Powell Butte. It includes a short section of Conduit 5, construction of a maintenance and storage facility, replacing the caretaker's house, construction of an interpretive center and restrooms, reservoir overflow facilities, park improvements and mitigation requirements (required in the 2003 Land Use Review Type III Conditional Use Master Plan).

Powell Butte Reservoir 3

This project constructs a third reservoir at Powell Butte and possible bypass piping around the Butte for additional system reliability.

Sandy River Conduit Relocation, Phase II

The bureau is committed to increasing the flexibility and preparedness to meet the future challenge of a natural disaster. Conduits 2, 3, and 4 were identified in the system vulnerability study as vulnerable to seismic, volcanic, flood, and other natural and human-caused hazards. This project will relocate the Sandy River crossings of Conduit 3. The replacement of crossings of Conduit 2 and 4 have already been completed.

Sandy Wholesale Connection

The project consists of the design and construction of a wholesale meter connection for the City of Sandy to the Portland Water Bureau's supply and is anticipated to be completed early 2014.

Tabor Reservoir Adjustments

This project includes adjustments to piping, structures and other features at Mt. Tabor in order to move storage elsewhere and physically disconnect the uncovered reservoirs from the public water system for compliance with LT2. The project does not include disposition of the reservoirs after they have been disconnected from the public water system.

Washington Park Reservoir 3

The project will plan, design and construct a new buried reservoir to replace uncovered Reservoir 3. This project is one solution toward compliance with LT2 replacement of the uncovered reservoirs. It is assumed that Reservoir 4 will be used as the overflow detention structure. The covered Reservoir 3 will likely retain its visual characteristics and historical features.

West Side Transmission Main Improvements

These mains include the Sam Jackson to Downtown Pipeline and the Jefferson Street Supply mains. These new large transmission mains will strengthen the supply to terminal storage located on the west side of the Willamette River.

Wholesale Connections

This project provides for facilities serving wholesale customers including repairs, replacements, and upgrades of pump stations and meters.

Distribution System

The retail distribution system within the City of Portland comprises approximately 2,200 miles of mains connected to 67 active storage tanks and reservoirs and 39 pump stations, located in 42 service areas. The distribution system configuration has evolved over the past 100+ years in response to changing requirements and regulation. Many parts of the system originated as small, independent water districts that have been incorporated into the Portland Water Bureau's system over the years. Table 7.6 lists the retail distribution service areas and the number of service connections (according to Water Bureau maps as of August 2006). The distribution systems for wholesale water customers are owned and managed by other water service providers and are not included in this report.

Table 7.6 Service Connections by Service Area

Service Area	# of Connections	Service Area	# of Connections
Arlington Heights	825	Powell Butte Pump	50
Arnold	1,548	Powell Valley Road 415	3,782
Bertha	1,730	Powell Valley Road Pump	15
Broadway	604	Powell Valley Road Raymond	2,000
Burlingame	7,816	Rocky Butte	892
Calvary	643	Rocky Butte Pump	46
Clatsop	438	Rose Parkway	766
Clatsop Pump	277	Saltzman	8
Council Crest	1,334	Sherwood	679
Denver	225	Stephenson	1,383
Greenleaf	2,414	Stephenson Pump	379
Lexington	526	Tabor 302	32,362
Linnton/Whitwood	192	Tabor 411	59,070
Marquam	170	Tabor 590	888
Mt Scott	699	Vermont	3,650
Nevada	144	Vernon 224 & 270	15,932
Parkrose	4,167	Vernon 362	18,545
Penridge	37	Washington Park 229	5,223
Pittock	78	Washington Park 299	4,297
Portland Heights	1,323	Willalatin	213
Powell Butte	431	Willamette Heights	292
Total Service Connections	176,093		

Figure 7.2 presents a map showing the locations of service areas. Figure 7.6 is a schematic of the City’s system, showing key Bull Run and CSSWF supply and transmission facilities, and key distribution system pipelines, pump stations and storage tanks.

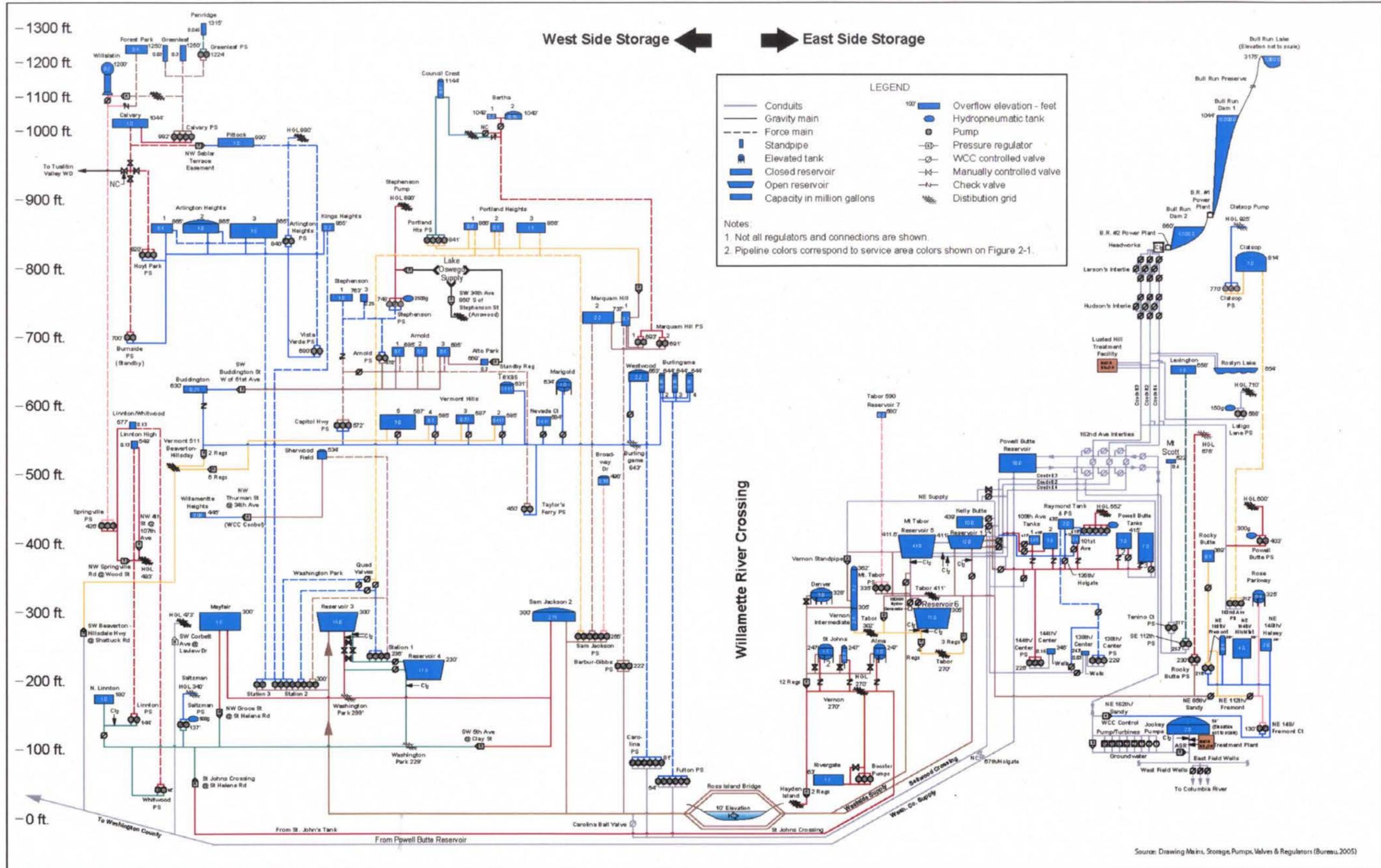
Service areas east of the Willamette River are shown on the right side of Figure 7.6. Most of the areas east of the Willamette are supplied by gravity (without pumping) from Powell Butte and the Mount Tabor Reservoirs, which are fed from the supply and transmission system. Exceptions are small areas in southeast Portland, in and around Powell Butte, the Tabor 590 Service Area, which is located on Mount Tabor, and some areas of northeast Portland, shown on the far right-hand side of the schematic.

Service areas west of the Willamette River are shown schematically on the left side of Figure 7.6. Higher elevation service areas west of the Willamette are served from several key pump stations (Carolina, Fulton, Sam Jackson, and Washington Park) that draw from major transmission lines that currently run from the Mt. Tabor Reservoir complex to the Washington Park Reservoirs.

Inventory

Portland’s retail water distribution system is composed of vast networks of distribution mains, service lines, pump stations, and tanks, as well as hydrants, meters, valves, and fountains.

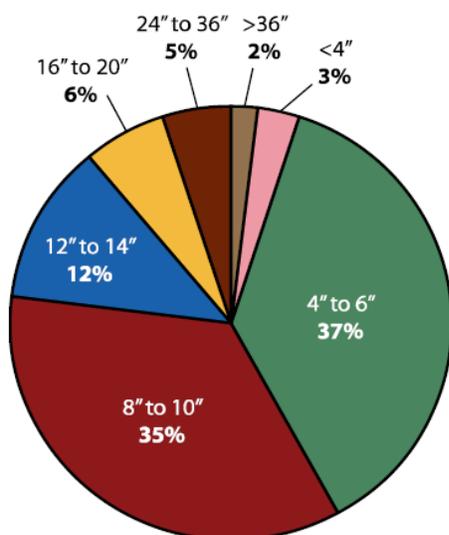
Figure 7.6 City of Portland Water Supply Schematic²³



Mains

Portland’s retail distribution system comprises approximately 2,100 miles of pipeline. Figure 7.7 summarizes pipeline diameters in the distribution system. Distribution piping includes a number of materials, including unlined and lined cast iron (65%), ductile iron (29%), steel (2%), and a small percentage of other materials. The City’s distribution mains have a combined replacement value of over \$2.2 billion.

Figure 7.7 Pipeline Diameters in the Distribution System²⁴



Service Lines

The retail distribution system also includes over 183,000 service lines. The vast majority of these lines (94%) are smaller than 2” in diameter, although larger lines do exist in some areas. The network of service lines has a replacement value of \$899 million.

Tanks

The retail water system is served by 67 active storage tanks with a total storage capacity of approximately 270 million gallons. Table 7.7 lists the tank, its service area, capacity information, and whether the condition of the tank was assessed in 2006 as a part of the Distribution System Master Plan. Portland’s storage tanks have a replacement value of \$266 million.

Pump Stations

The distribution system includes 35 pump stations, valued at \$118 million. Table 7.7 lists the capacity of each pump station, and whether a condition assessment was performed in 2006 as a part of the Distribution System Master Plan.

²⁴ Portland Water Bureau, Distribution System Master Plan, 2007

Meters

The Portland Water Bureau has nearly 180,000 meters worth approximately \$88 million. Small meters are replaced every 30 years while large meters are tested and replaced based on condition and criticality.

Valves

The water distribution system contains approximately 43,800 system valves, with a replacement value of \$604 million.

Hydrants

The distribution system includes about 14,400 hydrants, with a combined replacement value of \$184 million.

Table 7.7 Distribution System Service Areas, Storage Reservoirs and Pump Stations²⁵

Service Area and # of Connections	Reservoirs/ Tanks	Capacity (mg)	Pump Stations	Capacity (mg)
Arlington Heights	Arlington 1	0.5	Arlington Heights	NA
	Arlington 2	1	Sam Jackson	1700
	Arlington 3	3	Wash. Park 1	3200
	Kings Heights	0.2	Wash. Park 2	7500
			Wash. Park 3	1300
Arnold	Alto Park	0.2	Capitol Hwy	2500
	Arnold 1	0.5	Taylor's Ferry	2000
	Arnold 2	0.5		
	Arnold 3	0.6		
Bertha	Bertha 1	0.2	Marquam Hill 1 & 2	2410
	Bertha 2	0.9		
Broadway	Broadway Drive	0.4	Sam Jackson	800
Burlingame	Buddington	0.3	Carolina	10800
	Burlingame 2	1.6	Fulton	6400
	Burlingame 3	0.4		
	Burlingame 4	0.9		
	Marigold	1		
	Texas	0.7		
	Westwood	1		
Calvary	Calvary	1	Burnside	470
			Hoyt Park	2800
Clatsop	Clatsop	3	162nd Avenue	880
Clatsop Pump			Clatsop	775
Council Crest	Council Crest	0.5	Portland Heights	4300
Denver	Denver	3		
Greenleaf	Forest Park	0.5		
	Greenleaf 1	0.03	Calvary	1900
	Greenleaf 2	0.3		
Lexington	Lexington	1	112th Avenue	1100
Linwit	Whitwood	0.1	Linnton	130
			Whitwood	640
Marquam	Marquam Hill 1	0.3	Barbur Gibbs	1300
	Marquam Hill 2	2.3	Sam Jackson	2100
Mt. Scott	Mt. Scott	0.4	Tenino Ct.	320
Nevada	Nevada Ct	0.6		
Parkrose	104th/Klickitat	4		
	148th/Halsey	2		
Penridge	Penridge	0.1	Greenleaf	130
Pittock	Pittock	1	Verde Vista	1000
Portland Heights	Portland Heights 1	0.6		
	Portland Heights 2	0.5		
	Portland Heights 3	1.9		
Powell Butte	Powell Butte N/S	50	1st & Kane	N.A.

²⁵ Portland Water Bureau, Water Management and Conservation Plan, 2010 (Tables 2-21 and 2-22)

PB Pump	50			PB Heights	1480
		101st Ave	0.5		
		109th Ave 1	3		
Powell Valley Road 415	3,782	109th Ave 2	0.7		
		160th Ave 1	7		
		160th Ave 2	3		
		PV 144th/Center	0.2		
PV Rd Pump	15			PV Raymond St	440
PV Road Raymond	2,000	PV 138th/Center Raymond	0 2	PV 138th / Center	1100
Rocky Butte	892	Rocky Butte	0.5		
RB Pump	46			Rocky Butte	200
Rose Pkwy	766	Rose Parkway	0.5		
Saltzman	8			Saltzman	75
Sherwood	679	Sherwood	0.4	Washington Park 2	1400
Stephenson	1,383	Stephenson 1	1.3	Arnold	1000
		Stephenson 3	0.3		
Steph. Pump	379			Stephenson	500
Tabor 302	32,362	Mt. Tabor 6	37.8		
		Vernon 2	2.5		
Tabor 4113	59,070	Kelly Butte	10		
		Mt. Tabor 1	12		
		Mt. Tabor 5	49		
Tabor 590	888	Mt. Tabor 7	0.2	Mt. Tabor	1200
		Vermont Hills 2	0.6		
		Vermont Hills 3	0.9		
Vermont	3,650	Vermont Hills 4	0.5		
		Vermont Hills 5	2.8		
Vernon 224 & 270	15,932	Alma	1		
		St Johns 2	1.5		
Vernon 362	18,545	Vernon 3	3.2		
Washington Park 229	5,223	North Linnton	1		
		Washington Park 3	16		
		Washington Park 4	17.6		
Washington Park 299	4,297	Sam Jackson 2	2.8		
		Mayfair	5.6		
Willalatin	213	Willalatin	0.2	Springville	630
Willamette Heights	292	Willamette Heights	0.1		

Current Condition

In general, the majority of the Water Bureau’s distribution system asset groups are in fair to very good condition. However, almost half of the bureau’s galvanized steel distribution mains (45%) are in poor to very poor condition, as are over one-fifth of the meters (23%), and hydrants (20%), by value. Half of the 2,200 miles of distribution mains are older than 50 years. More information on the condition of major asset groups can be found in Table 7.2. The Water Bureau evaluates asset condition as one factor in asset management decisions.

Service Area Assessment

In 2007, the Portland Water Bureau completed a series of hydraulic evaluations of the “backbone” distribution system, or the essential distribution-system components. The purpose of the evaluation was to assess the ability of the system to meet demands under both existing (i.e., 2005) peak-day conditions and 2030 peak-day conditions.²⁶ The evaluation found that the system that will reliably deliver water through 2030. Of the 42 service areas evaluated representing the retail system, 20 service areas, accounting for 86 percent of the 2030 peak-day demand, have no deficiencies.

Table 7.8 summarizes the results of the preliminary screening. Of the remaining 22 service areas, accounting for 14% of 2030 peak day demand:

- Six service areas (Clatsop Pump, Powell Butte Pump, PV Raymond Pump, Rocky Butte Pump, Saltzman Pump, Stephenson Pump) are direct-pump service areas with no storage. Deficiencies are based on providing sufficient capacity to meet fire flows. In some instances, pump stations were designed for lower fire-flow requirements, in place at the time of pump station design. In other instances, the Bureau has designed pumps to meet fire-flow requirements with all units in service. If all units are used in the screening, three (3) service areas show no deficiencies (Powell Butte Pump, PV Raymond Pump, Stephenson Pump).
- Eight service areas have recognized deficiencies and are being evaluated by the Bureau in other studies. These are: Calvary, Council Crest, Greenleaf, Linnton/Whitwood, Penridge, PV Raymond, Willalatin, and Willamette Heights.
- Five service areas were flagged for further assessment in the hydraulic evaluation. These are: Broadway; Mt Scott; Sherwood; Stephenson; and, Tabor 590. Although the preliminary screening did not identify deficiencies in the Burlingame service area for the planning scenarios evaluated, the Bureau has recently completed a Master Plan for the service area that includes several capital projects to remedy previously identified deficiencies.
- The remaining three service areas have mitigating circumstances that relieve some of their identified deficiencies. The Lexington service area was deemed deficient in the outage screening, but the Bureau has purchased a generator to supply the service area in a power outage situation. However, the generator would not address a service outage of the pump main, so the service area was still deemed deficient. The second, Bertha, was deficient for both storage and outage. However, the service area has additional regulated supply from other service areas. The third, the Vernon 362 service area, has a large number of regulators that supply the zone, which addresses the storage deficiencies.

²⁶ More information can be found in the Portland Water Bureau's Distribution System Master Plan, 2007. Options to integrate the former Powell Valley Road 415 service area with the Tabor 411 service area, and supply capacity through Washington Park were also assessed in this plan.

Table 7.8 Results of 2007 Preliminary Screening of Service Areas²⁷**Service Areas that Passed Preliminary Screening for Pumping, Fire, Storage and Outage Service Goals; or Are Being Addressed in Other Studies***

Arlington/Portland Heights **	Arnold	Burlingame
Clatsop	Denver	Marquam Hill
Nevada	Parkrose	Pittock
Powell Butte	PVRWD 415	Rocky Butte Tank
Rose Parkway	Tabor 302	Tabor 411
Vermont	Vernon 270	Washington Park 229
Washington Park 299		

Service Areas that were Deficient for One of More Screening Service Goals

Service Area	Pumping	Fire	Storage	Outage	Notes
Bertha	✓	✓	X	X	Additional regulated supply available
Broadway	X	X	X	X	Additional regulated supply available
Calvary	X	X	X	N/A	Being evaluated in NW Hills study
Clatsop Pump	X	X	N/A	X	
Council Crest	✓	✓	X	X	Being evaluated by Bureau
Greenleaf	✓	✓	X	X	Being evaluated in NW Hills study
Lexington	✓	✓	✓	X	The Bureau has purchased a generator with an automatic transfer switch for 112th St Pump Station. The generator would not address outages due to a pump main break
Linnton / Whitwood	X	X	X	X	In Upper Linnton Tank Analysis
Mt. Scott	X	X	X	X	Additional regulated supply available
Penridge	X	X	X	✓	Being evaluated in NW Hills study
Powell Butte Pump	X	X	N/A	✓	Not deficient if all pumps used
PV Raymond Pump	X	X	N/A	✓	Not deficient if all pumps used
PV Raymond	X	X	X	X	Being evaluated by Bureau
Rocky Butte Pump	X	X	N/A	✓	
Saltzman	X	X	N/A	✓	
Sherwood	X	X	X	X	Additional regulated supply available
Stephenson	X	X	X	✓	
Stephenson Pump	X	X	N/A	✓	Not deficient if all pumps used
Tabor 590	✓	X	X	X	
Vernon 362	N/A	X	X	N/A	Large regulated supplies available
Willalatin	X	X	X	X	Being evaluated in NW Hills study
Willamette Heights	N/A	X	X	X	Being evaluated in Willamette Heights Tank study

* Passed all screening criteria (Arnold, Clatsop, Denver, Marquam Hill, Nevada, Rocky Butte Tank, Vermont), were only deficient in storage screening (Parkrose, Rose Parkway), or passed pumping, storage, and fire screening goals, but were not screened for outages, since these are being addressed by other studies, or are large service areas with adequate redundancy (Arlington/Portland Heights, Burlingame, Powell Butte, PVRWD 415, Tabor 302, Tabor 411, Washington Park 229, Washington Park 299).

** Arlington Heights and Portland Heights service areas are hydraulically interconnected and were evaluated together.

N/A = Not applicable, or not evaluated in DSMP ✓ = Passed screening X = Failed screening

²⁷ Portland Water Bureau, *Distribution System Master Plan, 2007*

Backbone Hydraulic Evaluation

The backbone evaluation assessed system operation, taking into account system hydraulics, to find further deficiencies not evident in the preliminary screening. The model simulated a 24-hour period on the peak-demand day for 2005 and 2030 demand conditions. Results of the hydraulic evaluation were consistent with the preliminary screening. No additional deficiencies were identified.

Three service areas, however, that had deficiencies in the screening evaluation showed no deficiencies in the hydraulic evaluation. All three (Broadway, Sherwood Field, and Stephenson) have adequate pumping capacity to meet normal demand, but insufficient capacity to meet peak-day demand plus re-fill of storage following a fire within the service area.

Assessment of Pump Stations and Tanks²⁸

Condition assessments have been conducted for 35 pump stations and 66 tanks in the distribution system. The pump station assessment found that, in general, the pump stations originally constructed by the Bureau were in good condition. With the exception of the recently acquired Powell Valley system pump stations, pump stations acquired from other formerly independent water systems had more deficiencies.

- 15 pump stations are in good condition with only minor corrective maintenance needed;
- 20 pump stations are operationally and functionally sound, but exhibiting some signs of wear, with some need for corrective action;
- Deficiencies were identified in the Fulton, Linnton, Portland Heights, Sam Jackson, and Taylors Ferry service areas.
- Of the 66 tanks assessed, 4 tanks are in conditions that substantially diminish performance; 55 tanks are operationally and functionally sound, but exhibiting some signs of wear, with some need for corrective action; and 7 tanks are in good condition with only minor corrective maintenance needed.

The tank assessments found that coating and painting for tanks has not been performed routinely in recent years. A strategic coating and painting program was recommended. The analysis also found seven tanks that require further evaluation to address extensive cracks observed during inspections. Fifty-two tanks also had minor repair or maintenance recommendations, and several tanks require anchoring and/or flexible piping connections to reinforce tanks to withstand an earthquake. All work will be performed as part of ongoing capital and maintenance programs.

Seismic Assessment

As part of the Distribution System Master Plan (2007) a qualitative seismic assessment was provided for 32 tanks to identify conceptual-level seismic improvements. The analysis used condition information collected in the tank inspections, along with probabilistic ground-motion data from U.S. Geological Survey, to assess which tanks would be most vulnerable in a large-scale earthquake in the Portland area

²⁸ Portland Water Bureau, *Distribution System Master Plan*, 2007

(100- year to 500-year frequency). For tanks identified to be the highest risk, conceptual-level improvements were identified to reinforce the tanks.

Needs & Approach

Backbone Hydraulic Evaluation

In selecting improvements, service areas were reviewed to identify water supply issues including service pressures, fire flow requirements, water quality goals and sizing for new facilities.

For direct-pumped service areas, the improvements were developed based on a criterion of meeting peak-hour demands plus fire flow with one pumping unit out of service, rather than peak-day plus fire flow, since direct-pumped areas have no storage and pumps and must be able to meet both normal and fire demands. In some instances, the bureau has designed pump stations to meet fire flows with all units in service. In the Powell Butte Pump, Powell Valley Road Water District Pump and Stephenson Pump service areas, pump stations can provide adequate fire flow if all units are used. The bureau will need to determine whether these pump stations - built to then-current standards - should be upgraded based on the Distribution System Master Plan criteria of meeting peak-hour demands plus fire flows with one unit out of service.

Condition Assessment of Pump Stations and Tanks²⁹

All of the pump station projects generated from the pump station condition assessment will be constructed as part of ongoing capital and maintenance programs, or as part of larger planned pump station rehabilitation projects.

Asset Management Plans

Asset management plans are being developed for all assets within the distribution system. These plans will help identify additional projects and replacement strategies necessary to maintain and improve the system. These plans may identify additional projects to be included in the 20-year Project List.

Recommended Distribution System Improvements

Burnside Pump Station Replacement

This project will decommission the old undersized pump station and modify the nearby Verde Vista pump station to serve the Burnside pumping needs for the next 50 years. The project will also acquire property for the future Burnside pump station to be built 50 years from now.

Carolina Pump Main Extension

This project will connect the existing Carolina Pump Main (Westwood Tanks) and the Fulton Pump Main (Burlingame Tanks) together. This will be a pump main from the intersection of SW Capital Hwy and SW Terwilliger Blvd to the Burlingame Tank site. Phase 1 is replacing the existing 16" Fulton pump main with

²⁹ Portland Water Bureau, *Distribution System Master Plan*, 2007

a 24" pump main from Burlingame Tank site to SW Chestnut and SW Burlingame as well as improvements at the Burlingame Tank site. Phase 2 is the new construction of a 24" pump main from SW Chestnut and SW Burlingame Ave to tie into the existing Carolina Pump main at Capitol Hwy and Terwilliger Boulevard.

Control Center SCADA Server Replacement

This project replaces the aging supervisory control and data acquisition (SCADA) system at the Water Control Center with a secure, Windows based system. The bureau will add, as part of the upgrade, a disaster recovery SCADA system to our Lusted Treatment site. The new system will have better system functionality, improved integration tools, management tools and security and will provide the Water Bureau with critical water supply monitoring and control for 10 years plus. The system includes hot standby real-time and historical servers, client workstations at various facilities, a decision-support server, and a terminal server for remote access.

Distribution Mains

This program includes rehabilitation and replacement of mains with high leakage or break rates, substandard mains (2-inch galvanized steel), expansion due to applications from private developers, increasing supply for fire protection, improving water quality and water system upgrades due to local improvement districts (LIDs), and street improvements. Water main replacements also include appurtenances such as fire hydrants, valves, pressure regulators, service branches, and other facilities.

Field Support

This project funds vehicles and major equipment purchases, including heavy construction equipment such as dump trucks and backhoes, and Bureau-owned computer software with a unit cost greater than \$5000.

Forest Park Low Tank

This project will plan, design and construct a single 1.3 million gallon tank at NW Cornell and NW Skyline Drive for the Greenleaf 1034 pressure zone. This storage is to augment regular system capacity and increase fire flow to a large area of Northwest Portland.

Fulton Pump Station Improvements

This project will replace the Fulton Pump Station with a new pump station located in Willamette Park.

Greenleaf Pump Station

This project will plan, design and construct a replacement Greenleaf pump station at the existing site. Flow upgrades will remove the Penridge tank from the system. The new pump station will pump directly to the distribution system.

Hydrants

The bureau maintains about 16,000 fire hydrants. These hydrants allow Portland the flexibility and preparedness to respond to a fire emergency through coordination with the Fire Bureau. This project provides for the replacement of fire hydrants that are no longer repairable. Replacements may also occur as part of the bureau's ongoing efforts to standardize hydrant types for more efficient and effective management of maintenance and repair activities.

Meters

This project funds the purchase and installation of water meters. The Bureau's objective is increase accuracy based on replacing high usage meters. High usage meters typically wear out faster than others.

Portland Heights Pump Main

This project will replace the portion of the 12" pump main in SW Montgomery Drive between the southern end of the 16" pump main from Washington Park and the Portland Heights Tank site with approximately 3,500 feet of 16" main in Montgomery Drive and Greenway Avenue. The new main will replace a poor condition main and provide additional supply capacity to the area.

Portland Heights Pump Station Electrical Improvements

The project will design and construct a new prefabricated building at the Portland Heights Pump Station to house electrical and control equipment, and also install in the existing pump vault a new 100hp pump and vault improvements.

Portland to Milwaukie Light Rail

This project consists of relocation of over 5,000 feet of main impacted by TriMet's SE Corridor Light Rail project.

Pump Stations and Tanks

This project includes a large variety of infrastructure consisting of water storage tanks, pumps, and pump and control facilities. The bureau uses a reliability centered maintenance (RCM) approach to manage its assets. A key focus of the next twenty years will be to replace the remote telemetry units at over 140 remote sites. The existing units are over 15 years old, and are becoming obsolete. The servers are at the end of their service cycle, and must also be replaced.

Sam Jackson Pump Station and Mains

This project will make multiple capital improvements to the Sam Jackson Pump Station, including seismic improvements, replacement of RTU and motor controllers, installation of pump control and check valves, extension of the crane rail, a concrete pad, and installation of a security fence and gate.

Services

This project constructs replacement and customer requested water services. A water service is the connection between the water main and any given customer's service meter. Service connections are always performed by Water Bureau crews directed by a certified Water Service Mechanic. An ongoing budget of approximately \$5 million per fiscal year provides for installation of about 1,000 water service connections annually and other upgrades to existing water services.

Willamette River Crossings

The project replaces major pipelines to strengthen the transmission link between Powell Butte and the service areas west of the Willamette River, including downtown and the storage reservoirs at Washington Park. It includes construction of a new seismically strengthened river crossing to replace the first one of potentially two Willamette River crossings, and new transmission piping on both sides of the Willamette.

Treatment System

Inventory

The Federal Safe Drinking Water Act, which regulates public drinking water supplies, typically requires surface water supplies to be filtered to meet federal drinking water standards. Because the Bull Run source water quality is very high and Portland implements source water protection measures, Portland is currently exempted from filtration requirements. Portland's water supply is disinfected using chloramines. Water is chlorinated at the Headworks at Reservoir 2. Ammonia and sodium hydroxide are added at a second treatment facility, Lusted Hill.

Ammonia ensures that disinfection remains adequate throughout the distribution system. Sodium hydroxide increases the pH of the water helping to control lead and copper levels at customers' taps should these metals be present in the customers' home plumbing.

Future federal regulations may require additional treatment processes in the future.

Treatment is also required for the groundwater supply.

Facilities used to provide water treatment include a chlorination building and equipment, and flow metering at Headworks; treatment facilities and equipment at Lusted Hill; and treatment facilities and equipment at the Groundwater Pump Station.

Current and Projected Condition

Headworks treatment facilities are rated as good to fair. The flow meters are rated as poor.

The Lusted Treatment Facility was constructed in 1992. Condition is assessed at good to fair. However, buildings at this site were built as temporary structures and do not reflect the full cost of replacing the facility with permanent buildings. Future facility upgrades will include permanent structure replacements.

The treatment facilities at the Groundwater Pump Station were recently upgraded and are rated in very good to good condition.

Current and Projected Capacity

Due to changing regulations, the suitability of a treatment facility is a moving target. As federal and state rules are modified and as technology changes, treatment facilities must change as well.

With the State granting the Bureau a variance on the treatment provisions of the LT2 rule, many related facility improvements planned at Headworks were postponed as well. Among these improvements were replacement of the chlorination system and the operators' station. Both of these will need significant upgrades within the next 20 years.

Needs & Approach

Asset management plans are being developed for the Bull Run Supply and Groundwater. These plans should help identify needed improvements.

Recommended Treatment System Improvements

Headworks Flow Meters

This project would install new flow meters on the Primary Intake conduits; install new flow meters and flow control valves on Screen house #3 conduits; and address the sump pump drainage system in Bailey pressure-reducing valve vault.

Treatment Facilities Improvements

This project includes several related projects for treatment facilities for the Bull Run water supply, at both the Bull Run Headworks and the Lusted Hill Facility. Specific treatment improvements have not been determined at this time. Projects would likely be driven by state and federal regulations.

Support System

Inventory

The Support system includes miscellaneous facilities and equipment necessary to support the Water Bureau's mission. Support system assets are shown in Table 7.2. Chief among these assets are the Interstate Facility, and Sandy River Station.

Funding for Support system projects often resides in budget programs other than "Support". The Interstate Rehabilitation Project is currently funded through the Distribution program in the CIP.

Current and Projected Condition

The Interstate Maintenance Building is more than 85 years old. Studies have indicated that this building is highly vulnerable to collapse during an earthquake. This building fails to meet building codes in many

areas including structural, mechanical and electrical requirements. Renovations required to bring the building up to code are extensive. A major rehabilitation plan has been developed that will result in the demolition and reconstruction of this building, anticipated to be completed in 2016.

Other buildings include Sandy River Station which is primarily in good to fair condition.

Current and Projected Capacity

Needs & Approach

Buildings classified as part of the Support system will require maintenance and rehabilitation over the next 20 years. An asset management plan for facilities/buildings is being developed that should help identify work that is needed.

Recommended Support System Improvements

Building Maintenance

The bureau maintains hundreds of structures from the Bull Run watershed to downtown Portland. These structures range in size from small pump houses to the maintenance hub on Interstate Avenue. The necessary work involves structural repairs and maintenance.

Interstate Facility Rehabilitation

The project rebuilds the Portland Water Bureau's main maintenance facility. A four-year master planning effort from 2002 – 2006 developed the baseline requirements for both current and long-term needs. Recent updates to the master plan along with additional program summary work has created the basis for the design of the facility now underway. Two new buildings will replace the eighty-five year old Maintenance Building that currently serves as the main office and warehouse. Site improvements to the 11 acre campus improves vehicle and employee circulation. It also brings the property up to current code requirements for storm water management and landscaping.

Planning

This program consists of general planning studies for projects needed to improve the operation of the water system. These include pressure zone adjustments, facility modifications, and system element studies.

Sandy River Station Upgrades

This project consists of upgrades to the Sandy River Station facilities including an evaluation of a potential move to a different site.

West Side Maintenance Facility

A hub is needed on the west side of the Willamette River for maintenance and construction crews, vehicles, equipment and materials, and emergency operations. Property previously owned by the Federal

government (the Jerome Sears site) has been acquired by the City for this purpose. This project includes improvements to the facility over the next 20 years.

Regulatory Compliance

Inventory

The Regulatory Compliance program ensures that water throughout the system meets Federal and State of Oregon drinking water quality standards and environmental protection standards. Included in this program is implementation of the federally approved Habitat Conservation Plan (HCP) and the multiple easements and improvements required by this plan. Chief among these is the Bull Run Dam 2 tower intake structure which will allow the bureau to better control the release of water to enhance downstream conditions for anadromous fish species in compliance with the Endangered Species and Clean Water acts.

Regulatory Compliance system assets are included in Table 7.2.

Needs & Approach

The focus of this program is implementation of the federally approved Habitat Conservation Plan and the multiple easements and improvements required by this plan.

Recommended Regulatory Compliance System Improvements

Bull Run Dam 2 Tower

The Water Bureau is installing steel multi-level intake structures onto the North Dam 2 Tower located in the Bull Run watershed. Modifications are designed to allow selective water withdrawal, proper operation during flood conditions, and enable the tower to better withstand seismic events.

HCP Alder Creek Fish Passage

This project will design and install two fish passage facilities as planned in the Habitat Conservation Plan (HCP). The project is in Alder Creek, a tributary to the Sandy River. There will be a fish ladder at the waterfall and a fish ladder at a water diversion.

Regulatory Compliance

This project responds to requirements of the Endangered Species Act (ESA), including the implementation of the Habitat Conservation Plan (HCP) Consistent with HCP commitments, this project funds easements, purchases land, and also supports projects jointly conducted with other watershed partners.

Customer Service

Inventory

The Customer Services Program includes facilities that provide services for customers other than the direct supply of water. It includes customer billing, collection, and call center facilities and equipment, which is the largest part of the program. It also includes conservation, security, emergency management and grounds maintenance for Bureau-owned properties. Specific assets included in the Customer Services program are Dodge Park and the Security and Emergency Management facilities, including the new City Emergency Coordination Center.

Customer Service system assets are included in the Distribution section and the Support Facilities section in Table 7.2.

Current and Projected Condition

Dodge Park is considered to be in good condition. Upon completion of the new Emergency Coordination Center in 2014, the Security and Emergency Management facilities (including the Ranger Station and security gates) should be in very good condition.

Current and Projected Capacity

Needs & Approach

Automated meter reading would reduce operational costs and provide better customer service (i.e. access to more current consumption data).

Maintenance and upgrades of Water Bureau facilities including Dodge Park and Security and Maintenance facilities will be a continual need. An asset management plan for facilities/buildings has been developed that should help identify work that is needed.

Recommended Customer Service System Improvements

Automated Meter Reading (AMR) Implementation

This project provides for the replacement of customer meters throughout the City with automatic water meter reading equipment.

Emergency Coordination Center

This project designs and constructs the City's Emergency Coordination Center. The bureau will locate its emergency response and security staff at this location. The project location is adjacent to the City's 911 Call Center at SE 99th Ave and Powell Blvd. The total project cost is \$19.85 million and Portland Water Bureau is a contributing bureau.

Security and Emergency Management

The bureau is committed to increasing flexibility and preparedness to meet future security challenges, to enhance security throughout the water system and to modernize security practices and infrastructure. This program includes physical security improvements to major and minor facilities as well as improved security in the overall water distribution system and control/communications system.

Investment Strategy

Process

Annually, the Portland Water Bureau prepares capital budgets for the upcoming fiscal year and for the five-year planning horizon. The major components of the water system define the program categories within the capital budgeting process. These capital programs are: Supply, Transmission and Terminal Storage, Distribution, Treatment, Regulatory Compliance, and Customer Service. The Capital Improvement Plan (CIP) is an annual planning process which allows a review of capital projects and programs. The Portland Water Bureau engages the public in developing its budget and the CIP. All Water Bureau CIP projects that affect neighborhoods or that require city, state, and/or federal permit review processes include public involvement elements.

The Engineering Services Group (ESG) receives requests and ideas for CIP projects from a number of sources. Internal bureau stakeholders groups including Asset Management, Development Services, Design or Construction, Operations, Maintenance and Construction, and Resource Protection all may identify the need for a capital project. Other sources include projects generated from ESG CIP Planning Section listed in Master Plans or Public Facility plans, and recommendations from the Asset Management group that include business case studies. In addition, the Portland Water Bureau receives notifications from other agencies or bureaus planning or producing work that may impact the water system. External requests may also come from citizens, wholesale customers, the City Council, and developer requests for projects administered through ESG's Development Services Branch.

The Water Bureau performs economic analyses and/or business cases for new projects, and ensures that investment decisions are economically justified.

Contributing Plans

Asset Management

The Bureau's Asset Management Program is intended to guide the strategic management of physical assets to best support the delivery of identified services. It helps the Bureau to better manage existing assets, and plan for future needs. This process is guiding decisions as to the effective mix of maintenance, repair, renewal or replacement of the water system components, and has led the Bureau to focus on critical assets. A risk analysis methodology has been applied to assess the relative risks of asset failure; those assets with the highest risks are then identified for follow-up actions.

Asset condition assessments have been completed or are underway for many asset classes. Business case methodology is helping ensure that investment decisions deliver good value by comparing the cost of an investment to the benefits it provides. Benchmarking with best practices helps the Bureau better understand process improvement opportunities. Asset Management Plans have been prepared for almost all asset classes, capturing current information on service levels, inventory, condition, failure modes, risks of asset failure, and asset strategies.

System Plans

A number of plans are consulted in preparation of the CIP. These include the Infrastructure Master Plan (2000), the Distribution System Master Plan (2007), the Bull Run Water Supply Habitat Conservation Plan (2008), the Water Management & Conservation Plan (2010), and various master plans and project specific planning documents developed by the Portland Water Bureau.

Alternatives Analysis and Prioritization Process

The Portland Water Bureau's methodology and criteria for the selection and ranking of capital projects depends on the magnitude of the project and duration of the project's lifecycle. For major projects, an initial concept report is developed evaluating possible project alternatives and recommending potential capital projects. Senior management approves projects to continue with a larger planning effort to create a Basis of Design Report. To develop this report, the Water Bureau's Planning section uses industry practices in cost-benefit analysis and risk assessment to identify and weigh alternative solutions, and compare them with service standards. The Portland Water Bureau selects projects based on these quantitative analyses but also considers the logistics of rate impacts, sharing cost with interagency partners, creating revenue opportunities, and achieving compliance with regulatory requirements.

The criteria used to select projects for inclusion in the budget include fulfilling service levels (such as maintaining pressure and limiting customer outages), mitigating high risks of asset failure, operating assets at the most efficient and cost-effective levels, contributing to local and regional sustainability and energy-conservation goals, providing appropriate redundancy within the supply system, complying with all state and federal water-quality regulations, ensuring access to key water-supply facilities, and coordinating with other agency infrastructure projects.

Projects & Programs

The FY 2013-18 CIP provides balance between longer-term infrastructure replacement and maintenance needs and short-term water system infrastructure needs to ensure compliance with drinking water regulations. The CIP priorities for the bureau's budget and capital program include:

- Implement improvements necessary to assure compliance with current safe drinking water regulations, including the LT2 rule.
- Continue to expand the utilization of an asset management system plan and the computerized maintenance management system to support planning and implementation of system maintenance activities.
- Implement the Bull Run HCP, a comprehensive multi-decade Clean Water and Endangered

Species Act compliance agreement for the Bull Run watershed.

- Support other governmental agency capital improvement projects (e.g., light rail, Sellwood Bridge, Columbia River crossing) as directed by City Council.

The 5-year CIP is summarized within the following seven Bureau programs with key projects identified:

Customer Service

The Bureau's participation in the City Emergency Coordination Center is the primary project included within this program over the first five years. Bureau security staff will operate from this location with the Portland Bureau of Emergency Management. In the event of a major emergency, all City coordination staff will operate from this center.

Distribution

Over the first five years, approximately \$244 million of the CIP is for improvements to the distribution system. Of the total, about \$83 million is to be used for direct water line replacement projects, including work initiated by other bureaus and agencies, as well as replacement of the oldest or most deteriorated portions of the distribution system. About \$35 million is to continue rehabilitation of the Interstate maintenance building. There is \$57 million for the Willamette River Pipe Crossing Project. Almost \$16 million is for pump stations and tanks. Other improvements include services, meters, hydrants, fountains, and vehicle and equipment replacement.

Regulatory Compliance

Over the first five years, more than \$25 million has been planned for improvements to the water supply from the watershed, principally the Dam 2 Tower Improvements. Construction continues on the HCP Alder Creek project to enhance fish habitat.

Support

The Support Program includes funding for master system planning, focusing on identifying the need for, and timing of, improvements to or acquisitions for the water system. Master planning uses asset management methods to determine the most cost-effective investments. Individual asset studies help guide the selection of major capital projects for the short and long term. The Portland Water Bureau has included funds for some of the planned studies on vulnerable and aging infrastructure in upcoming fiscal years.

Supply

This program includes projects to improve existing facilities and roads in the Watershed and to improve the groundwater system. An example is the Groundwater Electrical Supply Improvements project that will reduce the risk of an extended electrical supply outage to the groundwater pump station.

Transmission and Terminal Storage

Over the first five years, the major projects in this program include \$35 million to continue construction of an additional 50-million-gallon water storage tank at Powell Butte and \$119 million for other enclosed storage including Kelly Butte reservoir and Washington Park reservoir. Also included is \$33 million for other conduit and transmission main projects.

Treatment

Headworks Flow Meters project, to accurately record treated water flow and regulate chemical additions to the system in compliance with drinking water regulations, is the only project in the first five years.

Financially Constrained Investment Strategy

The Bureau focuses its efforts on regulatory compliance elements, improving the condition of its aging infrastructure, and addressing operations and maintenance needs. The CIP addresses longer term infrastructure replacement and maintenance needs, while addressing short-term water system infrastructure needs to ensure compliance with drinking water regulations.

Recently, the primary focus of the bureau’s capital Investment Strategy has been responses to EPA’s LT2 rule (reservoir replacement projects), the HCP (Dam 2 towers project), and the Interstate Facility Improvement project. Upon completion of these projects, the focus will return to improving the maintenance and reliability of existing facilities. As facilities within the water system begin showing their age, major reconstruction and maintenance projects will need to be undertaken.

Planned CIP outlays (excluding capitalized overhead) total \$491 million over the five-year forecast period.

Table 7.9 Investment Strategy Summary

Program	FY 2013-2018	FY 2018-33
Customer Service	\$3,057,000	\$53,700,000
Distribution	\$244,197,288	\$461,650,000
Regulatory Compliance	\$25,504,000	\$30,000,000
Supply	\$14,291,000	\$88,500,000
Support	\$10,000,000	\$50,500,000
Transmission and Terminal Storage	\$191,170,000	\$242,000,000
Treatment	\$2,500,000	\$150,000,000
TOTAL	\$490,719,288	\$1,076,350,000

Financial Strategy

Existing Financing Strategies

As part of the Bureau’s overall mission and values, its financial objective is to “maintain fiscal integrity, undertake sound financing practices and ensure auditable results” which:

- Provides for sufficient annual funding of operating, maintenance, and capital programs approved

by City Council.

- Provides for rates and charges to customers that are equitable and based on generally accepted cost of service principles unless otherwise directed by City Council.
- Strives for a natural optimal balance between financial health, operational effectiveness, infrastructure condition, effective management, rate affordability, and a skilled and experienced workforce.
- Strives to optimize capital financing strategies, today and into the future.
- Ensures the maintenance of appropriate and adequate cash balances (operating fund, construction fund, sinking fund, and rate stabilization account) consistent with City policies, bond covenants, and industry standards

Rates and charges for water services are established annually based, in part, upon cost-of-service principles and methodologies recommended by the American Water Works Association (AWWA). The process used by the Bureau follows the Commodity Demand method set by the AWWA. Under this approach, developed for the Bureau by Raftelis Financial Consultants, Inc in 2006, water system costs are allocated to customers based on their average and peak water demand characteristics and use of the system. Retail rates are then established based on the residual financial requirements of the system.

The Bureau assesses both a volumetric usage charge and a fixed monthly base charge. A monthly base charge is imposed on water services connected directly to the water system. The base charge is in addition to the rates charged for water usage.

Financial Plan and Rate Setting Process

The Bureau annually prepares a requested budget and five-year financial plan. The Bureau's budget process includes a Budget Advisory Committee (BAC). The BAC meets between October and January to review and provide input on the requested budget including the five-year capital improvement plan and proposed retail rates. The financial plan includes operating and capital expenditure and expected rates for each year of the five-year forecast period. The requested budget and financial plan reflects the financial implications of the bureau's priorities, strategies, and service levels.

The financial planning process lays the groundwork for setting rates. Section 11-105 of the City Charter authorizes the City Council to fix fees and charges for connection to and use of the Water System. Water user fees and connection charges are formally reviewed every year by the Bureau. Rates required to support proposed activities for the next year are submitted by the Bureau Administrator to the City Council for review and approval.

Water Funds

The Bureau's financial system is organized into three separate funds:

- The Water Operating Fund serves as the operating fund of the Bureau and, with the exception of debt service; all expenditures made from this fund are for operation and maintenance of capital assets. Receipts from the sale of water are the primary source of revenue for the Water Operating Fund. The cash flow in this fund determines the need for rate increases. The Rate

Stabilization Account is within the Operating Fund.

- The Water Construction Fund is the recipient of proceeds from bond sales to provide for the funding of water system capital improvements. Other sources of revenue include reimbursements for capital expenditures, such as main extensions and service installations, system development charges and sale of assets. Also, a portion of the water sales revenues is transferred to this fund to finance routine system repair and replacement. The Water Construction Fund reimburses the Water Operating Fund for capital asset requirements including capitalized overhead, capitalized interest, and the cost of issuing bonds.
- The Water Bond Sinking Fund provides for the repayment of bonded debt and interest incurred in conjunction with construction of water system facilities. The revenue bond reserve accounts are also maintained in the Sinking Fund. The source of revenue for this fund is a transfer from the Water Operating Fund, reduced by interest earnings on fund balances and a transfer from the Water Construction Fund of interest earnings on bond proceeds.

These three funds enable the Bureau to segregate resources for specific uses and ensure that reserves are not used to supplement daily operating needs. Maintenance of the fiscal integrity of each fund is a key objective of the Bureau's financial planning and analysis efforts.

Anticipated Revenues

The bulk of the Bureau's CIP is financed by Water revenue bonds. Though not required by bond covenants, the Bureau's planning standard is to set rates such that Net Revenues provide at least 1.90 times debt service coverage on First Lien Bonds. Additionally, the Bureau maintains a planning standard that results in Stabilized Net Revenues providing at least 1.75 times coverage on the Combined Annual Debt Service (as defined in the Master Second Lien Water Revenue Bond Declaration) for both First and Second Lien Bonds. These standards exceed the debt service coverage required by bond covenants.

Additional revenues to support the capital plan include cash financed capital funding from rate revenues, system development charges, new services and main reimbursements, City interagency reimbursements on capital projects, and sales of assets.

Revenue and expenditure comparison

The Bureau plans for a minimum fiscal year-end operating cash reserve of \$15.0 million in the Operating Fund. This represents about 45 to 60 days of operating costs. This standard conforms to the generally accepted industry standard for such reserves, and has been approved by the Office of Management & Finance as a reasonable amount for this reserve.

The Bureau also has a Rate Stabilization Account (RSA) within the Water Operating Fund that is used to smooth rate increases over the financial planning period and beyond. This smoothing is one of the Bureau's key financial planning objectives and is aimed at maintaining financial stability and predictability.

Financial challenges, unmet needs and risks

The Bureau's financial projections include key assumptions underlying the revenue and expenditure forecast. Key assumptions in the revenue forecast include:

- Retail water demand
- Wholesale water sales
- User charges
- Issuance of additional First Lien Bonds or Second Lien Bonds to fund capital program requirements

Key assumptions in the expenditure forecast include:

- Annual inflation
- The bureau's cost related to the City's outstanding pension obligation bonds
- Pension system contribution rates
- All costs related to compliance with the LT2 rule including regular monitoring and capital projects
- Continuing to operate under the Bull Run Treatment Variance³⁰

³⁰ On March 14, 2012, OHA issued a Final Order granting the City a variance to the treatment requirements of the LT2 Rule. The variance went into effect on April 1, 2012, and will be in effect for ten years as long as the City is able to meet a set of important conditions designed to protect the health of Portland drinking water customers. These conditions require the Bureau to continue to monitor Bull Run source water for *Cryptosporidium*, maintain all legal protections in the Bull Run, and monitor and manage any potential sources for *Cryptosporidium* contamination in the watershed. In the event of a first detection of *Cryptosporidium*, the Bureau is required to increase its monitoring efforts, coordinate with health officials to determine what, if any, impacts the detection may have, and communicate this information to its customers. The communications requirement in the variance conditions requires, at minimum, a press release to Portland-metro media outlets and posting of the information on the Bureau website if *Cryptosporidium* is detected at the intake. If one or more detections occur during this one-year period of increased monitoring, it is likely that OHA will revoke the variance.

Chapter 8

Portland Bureau of Transportation

Portland's Transportation System

Portland's transportation system served nearly 584,000 residents in 2010, and tens of thousands of individuals who live, work, or spend time in the Portland Metro area. Transportation assets include facilities for pedestrians, bicyclists, transit users, all motorists, and emergency vehicles. Portland's transportation system, provided by the City and a variety of other jurisdictions and agencies, includes not only the networks of roads and highways but also right-of-way, sidewalks and paths, bikeways, bridges and other structures, transit (light rail, bus, streetcar, and tram), and thousands of supporting assets (lights, signals, signs, etc.).

The \$8.1 billion the public has invested in the City's transportation system enables individuals to get to work, school, recreation, and activities to sustain daily household needs. The transportation system is a fundamental component of regional access and mobility, serving residents, businesses, and travelers and providing connections to local, regional, interstate, national and international destinations. The City's transportation system also creates the foundation for a variety of activities essential to our lives: livable and safe neighborhoods, land uses and managing growth, commerce and job creation, environmental protection, freight mobility, and revitalization.

Transportation System Plan

The City of Portland's Transportation System Plan (TSP) serves as the transportation component of the Citywide Systems Plan.

The TSP is the long-range plan to guide transportation investments in Portland. It meets state and regional planning requirements and addresses local transportation needs for cost-effective street, transit, freight, bicycle, and pedestrian improvements. The TSP plans for transportation options for residents, employees, visitors, and firms doing business in Portland, making it more convenient to walk, bike, take transit -- and drive less -- while meeting their daily needs. The TSP provides a balanced transportation system to support neighborhood livability and economic development.

Chapter 9

Portland Parks & Recreation

Note: Parks and recreation facilities are not a required urban service under the Oregon public facility planning goals and statutes. The City of Portland considers parks, natural areas, trails and recreation facilities to be essential infrastructure systems and has included this chapter in the interest of comprehensive infrastructure planning. However, the City does not intend for this chapter to be reviewed for compliance with public facility planning rules, including Oregon Statewide Planning Goal 11: Public Facilities, Oregon Statute 197 or Oregon Administrative Rule 660.

Overview

Portland Parks & Recreation (PP&R) cares for over 11,000 acres of parks and natural areas, manages the urban canopy and the city's community gardens and offers thousands of programs for all ages at its community centers, swim pools, and other recreation facilities. In 2013, 86% of Portland residents rated the overall quality of parks as good or very good, making Parks the highest rated city service. Public investment in these important recreation facilities, natural areas, and gathering spaces supports a high level of use by Portland residents and visitors. In 2013, there were 4 million visits by Portlanders to community centers, pools, and recreation programs and 88% of Portlanders visited a city park at least once during the year. People from around the world and Portland's neighborhoods visit the Washington Park International Rose Test and Classical Chinese gardens. There are 155 miles of regional trails used for recreation and active transportation that keep Portlanders moving and healthy. Annually Portland community members volunteer over 475,324 hours to help maintain parks and assist others at our community centers.

Portland's treasured parks, trees, gardens, natural areas, and trails are infrastructure that beautify the city, provide important habitat, water quality, and environmental benefits, and add to the quality of life for both residents and visitors. Events and programs stimulate understanding and appreciation of the arts, celebrate diversity, encourage healthy lifestyles, benefit the local and state economy, and contribute to the public safety and stability of Portland neighborhoods. The continued investment in these important public spaces makes Portland a great place to live, work, and play.

Portland Parks & Recreation has adopted the following vision, mission, organizational values, equity statement and Parks 2020 goals to guide the Bureau's work.

Vision

"Portland's parks, public places, natural areas, urban forest, community gardens, and recreational opportunities give life and beauty to our city. These essential assets connect people to place, self, and others. Portland's residents treasure and care for this legacy, building on the past to provide for future generations."

Mission

“The mission of Portland Parks & Recreation is to help Portlanders play – providing the safe places, facilities, facilities, programs, and nature experiences which promote physical, mental, and social activity. We get people, especially kids, outside, active, and connected to the community. As we do this, there will be an increase in the wellness of our residents and the livability of our city. We accomplish this through:

- Establishing, safeguarding and restoring the parks, natural areas, public places, community gardens and urban forest of the city, ensuring that these are accessible to all;
- Developing and maintaining excellent facilities and places for public recreation and community building;
- Providing dynamic recreation programs and services that promote health and wellbeing for all;
- Partnering with the community we serve.

Organizational Values

Portland Parks & Recreation has the following organizational values:

- Quality, responsive service to our diverse customers and partners.
- Community participation in program and project planning.
- Innovation, creativity, and excellence in all we do.
- Openness, honesty, and respect in all relationships.
- A diverse and culturally competent workforce.
- Transparent, ethical, and accountable decision making.

Equity Statement

“We recognize, understand and encourage celebration of the differences that surround us. Diversity and equity are vital to Portland Parks & Recreation’s ideals and values.”

Parks 2020 Vision Goals

The Parks 2020 Vision outlines the following five goals for the park system:

- Ensure Portland’s park and recreation legacy for future generations;
- Provide a wide variety of high quality recreation services and opportunities for all residents;
- Preserve, protect, and restore Portland’s natural resources to provide ‘Nature in the City’;
- Create an interconnected regional and local system of paths and walks to make Portland ‘The Walking City of the West’; and
- Develop parks and recreation facilities and programs that promote ‘Community in the City’.



Purpose of this Chapter

This chapter describes the public facilities and services provided by Portland Parks & Recreation that are necessary to carry out its mission. It identifies desired levels of service, inventory and condition information for existing public facilities, and desired future facilities. Carrying out the Bureau's mission and other City and community goals may also require programs, investments and practices that are not related to public facilities. This chapter may acknowledge – but does not comprehensively address – these measures.

System Services

Service Area

Portland Parks & Recreation manages a system of developed parks, natural areas, the urban forest, community gardens, trails, community centers, and special recreation features that serve residents and visitors. See Figure 9.1 for a map of park facilities.

Core Services Provided

Portland Parks & Recreation's built and green infrastructure forms the base by which Portland Parks & Recreation provides a wide variety of programs and services for the public. The focus of this chapter is built infrastructure, but Portland Parks & Recreation has five service areas:

- Community Services (includes Community Engagement, Leadership & Advocacy, Marketing & Business Development, and Visitor Services)
- Infrastructure Services (includes Capital Development, Maintenance, and Property)
- Support Services (includes Business Services and Planning), and;
- Recreation Services (includes Aquatics, Arts, Community & Socialization, and Sports & Games).
- Natural Resources Services (includes Natural Areas, Community Gardens, and the Urban Forest).



Service Agreements & Partnerships

Partnerships are an important strategy for Portland Parks & Recreation. Healthy, robust partnerships increase the visibility of our programs and work, they can help inform our communities about our strengths and our challenges, they extend our services and bring different skills to help manage resources and they provide us with important information about our communities. Working with community partners is a skill and work ethic that permeates all levels of Portland Parks & Recreation.

Portland Parks & Recreation regularly partners with a variety of agencies and organizations that provide park and recreation services to Portland residents. Governmental agencies include Metro, Multnomah County, School Districts (there are five in Portland that PP&R works with), the State of Oregon and many other regulatory bodies that govern land use and environmental work. Additionally, PP&R has more than 100 formally recognized “Friends and Partner” groups that range in capacity from half a dozen episodic volunteers, to fully developed non-profit organizations that completely manage specific assets. Altogether, Friends, Partners and volunteers contribute more than 470,000 hours annually, comparable to more than 220 full-time staff.

To facilitate efficient and effective provision of services, Portland Parks & Recreation has a number of identified service and partnership agreements. For example, Portland Parks & Recreation has a joint facilities agreement with Portland Public Schools, and agreements for the Schools Uniting Neighborhoods (SUN) program, Hoyt Arboretum, Pittock Mansion, Leach Botanical Gardens, Japanese Gardens, and many other Friends groups who help manage and maintain the park system.

The Portland Parks Foundation, an independent, nonprofit organization, formed in 2001 to assist in bringing long-term stewardship to Portland’s parks and programs. The foundation works closely with Portland Parks & Recreation to raise awareness of the funding and stewardship needs of the park system. They cultivate donors to deliver private dollars in three aspects of urban parks: the land, the amenities and the people.

Inventory Summary

In 2013, the Portland Parks & Recreation system consisted of 11,546 total acres, and includes five main facility types:

- Developed Parks: 209 Parks on 3,455 Acres

- Natural Areas: 77 parks on 7,887 acres
- Undeveloped Properties: 214 acres
- Trails: 155 Miles of Regional Trails
- Community and Arts Centers: 14 Facilities

In addition to the capital infrastructure, Portland Parks & Recreation oversees the City's urban forestry program, which is responsible for managing the urban forest on City-owned or managed land, and certain private properties, and which coordinates implementation of the City's Urban Forest Management Plan. In 2010, the urban canopy covered 29.9% of the City.

Condition Summary

Portland Parks & Recreation has inspected most of its assets, and strives to re-inspect 20% of its assets each year so that condition information is never more than five years old for any given asset. In 2013, 37% of Portland Parks & Recreation inspected assets were in good or very good condition, 19% were in fair condition, and 13% were in poor condition. Another 32% of the assets have not yet been inspected and given a condition rating. Percentages are based on counts of individual assets, which range in value and complexity, e.g. from pools to playgrounds.

Capacity Summary

Portland Parks & Recreation strives to serve all Portlanders, and the park system needs to respond to population growth and recreational trends. In 2013, 4 million visits were recorded to a Portland Parks & Recreation recreational programs. Thirty-two percent of Portlanders participated in a city recreation activity, and 88% of Portlanders visited a city park at least once in 2013. While the park system needs to have the capacity to continue serving the large number of Portlanders using parks and recreation programs, Portland Parks & Recreation is also working to deliver equitable access to parks and recreation facilities geographically across the city. These level of service goals are outlined in the Portland Parks & Recreation Vision 2020, and include the goals to have:

- 100% of households within ½ mile walk of a park or natural area,
- 100% of households within 3 miles of a full service community center.

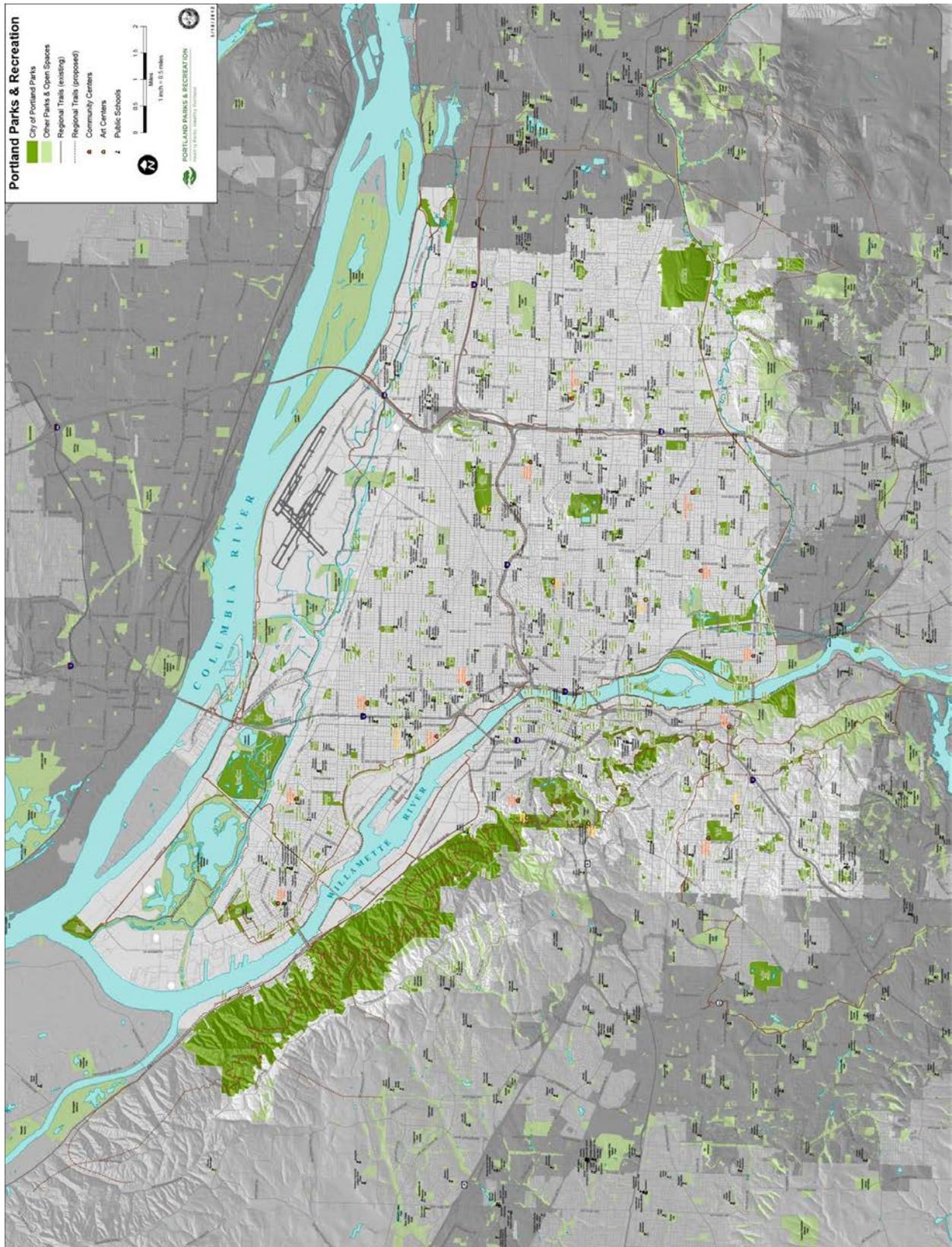
In 2013, 80% of households were within a ½ mile walk of a park or natural area, and 70% were within 3 miles of a full service community center. For service area maps, see Figure 9.3 and 9.4.

Key Issues & Concerns

Providing Services in Underserved Areas

Unfortunately, not everyone in Portland has equitable access to the benefits of parks and recreation. Virtually every district of the city has at least one parkland deficiency. In East, Northeast, and Southwest Portland, where there are fewer developed parks and often fewer trees and canopy cover, residents receive fewer benefits from the social and recreational opportunities parks provide. Since there are few remaining sites appropriate for larger developed parks available in the city, remedying park deficiencies

Figure 9.1 Portland Parks & Recreation Parks, Trails, Community Centers, and Natural Areas (2012)



presents a formidable challenge. See Figure 9.3, which shows the areas currently being served and unserved using the ½ mile from a park or natural area level of service.

Although community centers provide the recreational programs and community gathering places that give appeal to urban living, those benefits are unavailable to some residents. Certain areas of the city have no community centers, and others have centers that are housed in old, ill-adapted buildings that lack fundamental elements. Sellwood Community Center (SCC), for example, was built in 1909 as a rooming house. It does not have adequate security surveillance, ADA accessibility, or storage, and many rooms lack basic equipment for classes and programs. Yet, the neighborhood depends on SCC to fulfill its recreation needs. Since recreation programs and facilities are inextricably intertwined, the shortage of quality community centers limits the availability, breadth, and quality of recreation programs. See Figure 9.4, which shows the areas currently being served and unserved using the 3 miles from a full service community center level of service.

Portland's park system also lacks sufficient quantities of certain types of recreation facilities, like aquatic facilities and sports fields. Both are heavily used, highly programmed, and in short supply. Waiting lists also indicate that the Portland Parks & Recreation community garden program needs to keep expanding. While Portland Parks & Recreation currently has 48 community garden sites, only 7 gardens had plots available and there were almost 1400 individuals on the waiting list for garden plots in 2013.

As more people crowd into existing parks and facilities, user conflicts are increasing and the quality of park resources are declining. Portland Parks & Recreation works to balance the need for expansion of the existing system to address level of service gaps and address equity issues, with the need to adequately reinvest in existing infrastructure.



Improving Access to Parks and Facilities

Lack of access to parks and few connections between parks limits the benefits of the system. Highways, heavy traffic, large taxlots, and industrial properties prevent many Portland residents from accessing park and recreation opportunities. In some situations, if better access to parks were available, including completed sidewalk systems or public access easements acquired, some households not currently considered within ½ mile of an existing park or natural area due to existing street conditions would now be served. Fragmentation reduces optimal conditions and forfeits the immense benefits of a holistic

system, because it is more difficult for people to safely and conveniently access a variety of park and recreation facilities.

Within parks and natural areas, there are also numerous ADA barriers that impact users from fully accessing the park system. Through development of the citywide ADA Transition Plan, PP&R has determined that there are over 20,000 individual barriers to accessibility that need to be addressed. Missing handrails, inaccessible paths, outdated wheelchair lifts, and steep slopes are examples of barriers that prevent people with disabilities or mobility challenges from fully enjoying parks and natural areas. The Transition Plan, with public input, will prioritize the needs and devise a schedule for addressing and funding the improvements given available resources.

Maintaining Existing Infrastructure

In 2013, Portland's extensive park and recreation system had a current replacement value of over \$1.02 billion, not including the underlying land which also adds additional value to the system. The condition of the system directly influences its ability to provide users with quality recreation experiences.

Preserving and improving the condition of a park, facility or natural area requires regular maintenance, which in turn requires sufficient funding. However, Portland Parks & Recreation is currently only able to reinvest 1-2% of facilities current replacement value annually, half of the industry standard of 2-4% for built facilities such as pools and community centers. Reinvestment standards for parks and natural areas are in development.

While the Bureau has identified specific maintenance needs and is currently addressing the most serious needs, Portland Parks & Recreation continues to lack sufficient funds to maintain its assets properly. Improving the level of maintenance and repair of the existing system to sustainable levels would require nearly \$36.6 million more in resources each year (based on 2013 calculations, see Table 9.6).

Portland Parks & Recreation has instituted an asset management program to ensure the provision of high-quality facilities, provide for long-range capital planning, and develop best management practices.

However, the asset management program does not account for trees and other green infrastructure found in the Bureau's parks and natural areas. PP&R, BES, and the Water Bureau are investigating the possibility of modifying asset management and capitalization practices to include important green infrastructure assets, including trees.

Asset Management takes a full life-cycle approach, informing decisions from design through operations and maintenance to renewal and eventual replacement. The goal is to deliver expected levels of service with adequate funding at acceptable levels of risk. Asset Management shifts the operations and maintenance perspective from reactive maintenance and repair to a proactive approach of predictive maintenance and renewal, reducing costs and avoiding unplanned loss of service. Ideally, design and capital construction decisions are made in light of ongoing operations and maintenance costs to achieve the lowest total lifecycle costs. For the Bureau to have a full understanding of its assets, the asset management program will need to be expanded to incorporate green infrastructure, including trees.

Accommodating Growth

Parks and recreation facilities are an important contributor to quality of life in the City of Portland and essential public infrastructure. They provide places to recreate and find respite, and improve the environmental, social, and physical health of the community. Maintaining Portland's quality of life will require preserving access to high quality park and recreation experiences by acquiring and protecting park lands, maintaining and upgrading existing facilities, and providing additional recreation facilities and services. The actual number of parks and facilities necessary will vary based on where and how growth occurs, the ability of existing facilities to serve additional users, and opportunities to locate and build additional parks and facilities.

Growth and increasing density will provide other challenges as well, including:

- Making acquiring new parks more difficult, as development reduces the number of parcels available for parks and natural areas. It may also increase competition for a fixed amount of land, thereby driving up land prices.
- Heightening the need to retain tree canopy, while causing tree removal.
- Increasing the number of users of already heavily utilized facilities, such as pools, Greater use of trail systems could increase user conflicts on multi-modal pathways.
- Exacerbating needs in currently underserved areas. These pressures may be particularly acute in dense urban centers that currently lack sufficient park amenities, where both existing facilities and acquisition opportunities are scarce.

In planning for growth, PP&R will look for opportunities to acquire sufficient parkland to meet needs and will improve and maintain parks, trails, and other facilities to accommodate more users while preserving a quality user experience. The Bureau will also explore options to create separated bike and pedestrian pathways on anticipated heavily used regional trails. Finally, PP&R will continue to work to preserve and enhance the City's natural areas and urban tree canopy for its critical environmental and community functions.

Currently, the City assesses a Park Systems Development Charge (SDC) on new residential and commercial construction to partially offset the costs associated with providing park services to new development. SDC funds are restricted to land acquisition and capital improvements in areas of population growth and new development. SDC funds cannot be used to correct existing parkland deficiencies, nor can they be used to meet the equally vital operations or maintenance needs. At a rate that is 75% of the targeted recovery rate, the SDC assessment does not fully offset the true costs of park development in Portland.

Meeting Increasingly Diverse Community Needs

Portland's system of parks and recreational activities includes a wide variety of facilities and programs. Over time, the recreational needs of Portland have and will continue to grow and evolve. Pickle ball has been replaced with Footsal, the waitlist for community gardens is growing and wading pools are being replaced with splash pads. Senior recreation programs may have different amenity needs than youth programs.



Meeting the needs of a growing and diversifying population is a fundamental challenge for Portland Parks & Recreation. Open space is generally viewed as our most flexible and valuable asset. We are, however, asked to accommodate an increasing number of single use and specialized activities that require dedicated land. These facilities, including off-leash dog areas, community gardens, spray parks, skate parks, and disc golf courses provide valuable recreation opportunities to a wide variety of users but limit the acreage available for more general uses. As Portland's demographics continue to change, recreational facilities and programs need to be able to accommodate the needs of growing cultural and ethnic communities. PP&R needs to continue to reduce barriers that may be experienced due to race, socio-economic status, or geographic location to ensure that park service is being provided equitably. Currently, to address the needs of diverse communities, PP&R incorporates community feedback into the planning of new park facilities, and to the programming of facilities. Parks will need to further increase its investment in the diverse populations of the city by deepening its inclusion efforts in decision making to advance equity goals.

Different perspectives will provide a richer analysis to factors including current distribution, service areas, and capacity; current and projected demand; available locations; demographics; and resources when planning for and siting new facilities.

Protecting Portland's Natural Resources

Portland's natural areas and urban forest provide innumerable environmental, economic, and health related benefits to the city. Natural area settings in Portland include forests, meadows, wetlands, streams, and riverbanks. Portland Parks & Recreation currently protects more than 7,885 acres of natural areas. These natural areas are primarily forest and represent the range of forest types naturally occurring in the region including Douglas fir stands, ash and cottonwood riparian forests, and mixed deciduous and conifer forest. The system includes some open woodlands, often dominated by Oregon white oak, and less frequently shrublands and grasslands, including wetland marshes, which offer unique habitat features. Hybrid Parks are managed both as natural areas, and have portions that are developed.

Protecting natural resources is very important to residents who value access to nature, improving the quality of life and environment. As existing open space is developed, more people will seek and use park system resources — crowding into existing parks and facilities, escalating user conflicts, and degrading resource quality. Natural areas are also important for providing wildlife habitat, cleaning the air and water, and enhancing resiliency to the impacts of climate change.

Portland Parks & Recreation's approach to natural area acquisition, restoration, and management is described in The Natural Area Acquisition Strategy (2006) and Natural Areas Restoration Plan (2010). The plan integrates the goals and objectives established in the Salmon Safe Certification (2004), the Portland Watershed Management Plan (2005), and the Oregon Conservation Strategy (2006). When appropriate, PP&R and the Bureau of Environmental Services (BES) collaborate on the acquisition and/or restoration of natural areas, when the property meets the objectives of both Bureaus.

Portland Parks & Recreation used an Ecosystem Management framework to develop specific, science-based restoration actions for each natural area. The framework is based on six steps:

1. Vegetation Inventory
2. Desired Future Condition (25-year timeframe)
3. Assessment: gap analysis between the inventory and the desired future condition
4. Prescription: specific, localized actions necessary to reach the desired future condition
5. Intervention: on-the-ground work
6. Monitoring: observations and data collection to measure the success of the intervention and to modify the prescriptions.

This framework sets the trajectory for enhancing ecological health and building resiliency for natural area sites. Portland Parks & Recreation is the only park system certified Salmon Safe (2004, recertified in 2012). Certification standards constitute a set of best management practices that are applied across a variety of landscapes from natural areas to golf courses to sports fields. These best management practices – integrated pest management program, reduction in irrigation and runoff, riparian restoration, removal of invasive species, assist the City in meeting its obligations for the Clean Water and Endangered Species acts.

Portland Parks & Recreation faces ongoing funding challenges in its efforts to implement the Natural Areas Acquisition Strategy (2006) and Natural Areas Restoration Plan (2010). PP&R has not had available funding to acquire all the targeted natural areas identified in the Acquisition Strategy, and has not had sufficient levels of funding to fully implement the restoration and management actions called for in the Restoration Plan. Operation and maintenance funding for natural areas is scarce. For example when Forest Park was acquired in 1947, no operation and maintenance funds were allocated for its protection and enhancement, and to date there are still no dedicated funds. The current cost estimate for controlling invasive species in Forest Park – which represents only a portion of the park's operation and maintenance needs – is \$10 million.

Stewarding the City's Urban Forest

The urban forest, which includes all the trees and shrubs in the city, provides environmental, social and economic benefits to Portland's residents in the form of increased biodiversity, improved air quality, stormwater mitigation, improved neighborhoods and increased property values.. Regulation of this important resource is led by Portland Parks and Recreation although management is shared among many city bureaus that have an interest in its improvement and well-being, as well as private property owners. These bureaus have developed an action plan to realize the goals of the 2004 Urban Forest Management Plan. The action plan calls for diverse activities to meet Urban Forest Management Plan goals and outcomes; activities such as education and stewardship, research and monitoring, planting and maintenance, and policy and regulatory improvements. The 2009 estimated operation and maintenance needs for operation and maintenance needs of the City's street trees is \$13 million.

The city's urban forest faces a number of challenges that have implications for multiple City bureaus and goals. First, canopy cover is being lost to development, particularly in areas of southwest and outer east Portland. Traditional development patterns often involve significant losses of tree canopy cover and increases in impervious surfaces which limits areas for replanting, particularly large tree species. These changes can result in increased stormwater volumes and air temperatures, and heighten pressures placed on hillsides and streams. The urban forest is also threatened by invasive plants and insects. These invasive species can stress the ability of natural species to survive. Invasive pests and diseases can have sudden and devastating effects on the urban forest especially in areas that lack age and species diversity. Climate change will also impact the urban canopy and the tree species survival. The City will need to update the street tree list and plant drought resistance species to increase the resiliency of the urban forest.

Portland's street and park trees form a sustainable resource vital to the city's environmental, social, and economic health. Portland's street and park trees cost the city and private property owners just over \$6.5 million annually to maintain, yet provide nearly \$27 million worth of environmental and aesthetic benefits¹. For every dollar invested, \$3.80 worth of benefits is returned. Portland Parks & Recreation's approach to managing the urban forest is described in The Urban Forest Management Plan (2004) and The Urban Forest Action Plan (2007). Portland Parks & Recreation, Bureau of Environmental Services, Bureau of



¹ Portland's Urban Forest Canopy – Assessment and Public Tree Evaluation (2007)

Planning and Sustainability and Bureau of Development Services also recently partnered in an effort to update the tree code, which covers privately owned land and was adopted by City Council in April 2011 but has not been fully funded for implementation.

Managing Park, Recreation, and Natural Resources

Portland Parks & Recreation is developing a System Plan that will provide a holistic and comprehensive approach to park acquisition, management, programming, and resource protection. Portland Parks & Recreation is also developing master and management plans to guide development, management and funding decisions to optimize resources and meet needs.

Portland Parks & Recreation is developing accurate inventory and assessment information for all assets, both capital and non-capital. Without valid, reliable information on which to base management decisions, it is difficult to effectively anticipate and prepare for new park uses, or manage green infrastructure resources like the urban forest and natural areas. For example, the City does not have a complete inventory of private trees, but recognizes that more than half of the tree canopy of the urban forest is located on privately owned land. Basic information such as canopy cover, species diversity and distribution is needed for proactive management.

Preparing for Climate Change

Hotter, drier summers and warmer, wetter winters due to climate change will likely have impacts on park habitat areas, tree species, natural areas, waterways, and built infrastructure. For example, warmer, drier summers may result in increased demand for water-related recreation and air-conditioned indoor recreation spaces, or may require adjustments to management practices for the urban forest to ensure resilient tree canopy. Changes in rainfall could impact asset lifespan, increasing maintenance requirements for structures, trails, docks, trees and landscaping, and other facilities. Trails and other assets may be impacted by increased landslides.

To help prepare the city for the impacts of climate change, Portland Parks & Recreation will need to take into account trends in river levels, temperatures, and rainfall when locating and designing future park facilities. In addition, the bureau may need to design and maintain bridges, docks, or park features in flood areas differently, to adjust to changing flooding patterns and water levels. Adding tree and shrub cover where appropriate and selecting planting species that are resilient and water-efficient will help mitigate heat and air quality impacts. Portland Parks & Recreation will also need to continue to increase energy efficiency, water conservation, maintenance efficiency, and the use of resilient materials to help prepare for climate change related impacts.

Funding the City's Park, Recreation, and Natural Area System

In the fiscal year 2013/14 adopted budget, Portland Parks & Recreation will spend just under \$100 million to operate, maintain, and expand Portland's park system. Over 40% of Portland Parks & Recreation's financial support comes from the city's General Fund (i.e., discretionary resources that the Council allocates). In addition to the discretionary General Fund revenue, Portland Parks & Recreation receives revenue from system development charges, user fees, interagency agreements, and a variety of other

sources. A small (and unpredictable) fraction of Portland Parks & Recreation's budget comes from grants and donations. Portland Parks & Recreation also periodically raises fees to provide the variety and scope of programs that the public needs and wants. Scholarships are available to mitigate the effect this may have on those on fixed incomes or with lower incomes.

Portland Parks & Recreation operating expenses have risen steadily in recent years due to increasing use, utility costs and an aging park infrastructure, as well as construction of new facilities to accommodate a growing population and demand for different recreation activities. Unfortunately, over many decades, park system funding has not kept up with needs. Numerous parks need major renovation and many recreation facilities are in poor condition. Funding is not available for routine maintenance of park trees, and Portland Parks & Recreation's Urban Forestry program does not have a sustainable source of funding for tree replacement or canopy expansion.

Insufficient funding for public schools also has budget impacts on parks and recreation. As public schools cut youth programs, Portland Parks & Recreation's role as the state's second-largest provider of youth programs becomes even more vital. Portland Parks & Recreation now provides many of the arts, athletics and recreation programs that schools cannot.



Regulatory Compliance

Portland Parks & Recreation works to meet all regulatory requirements in the development and maintenance of its assets. Federal, State, Regional, and City legislation and mandates affect how Portland Parks & Recreation operates and manages its park system. Examples of legislation at all levels that affect Portland Parks & Recreation include:

Federal

- The **Federal Emergency Management Agency (FEMA)** requires communities to take into account floodplain hazards in all official actions related to land management and use. Relevant projects must be reviewed and permitted by the Bureau of Development Services to ensure no net rise in stream or river elevations that would harm downstream properties.
- The **Endangered Species Act** is intended to protect and recover endangered or threatened species, and the habitat and ecosystems upon which they depend. PP&R has been working towards recovery of salmon in the region to help the city meet Endangered Species Act compliance. This includes watershed and fish habitat restoration, removal of invasive plants, redesign of parks and their features, and careful review of management practices. Waterways in parks receive special consideration with specific actions such as invasive species removal, planting native species and working with BES to restore and protect their functions. The IPM Program contributes to the success of the endangered/threatened salmon and steelhead program. PP&R is committed to maintaining Salmon Safe Certification, which requires the use of best management practices throughout the park system to improve aquatic ecosystem and to ensure that any harmful impacts on water quality and fish habitat are minimized.
- The **Americans with Disabilities Act (ADA)** requires that public spaces and programs be accessible, or, where full accessibility cannot be provided in an integrated setting, jurisdictions are required to provide equivalent facilitation opportunities. All new development is required to meet ADA standards, and the City of Portland's ADA Transition Plan, currently under development, will provide an approach for addressing accessibility barriers in existing public spaces to ensure compliance.
- The **National Historic Preservation Act** is intended to preserve significant historical and archaeological sites. Portland Parks & Recreation's portfolio includes several facilities and sites that are listed on the National Historic Register.
- The **Clean Water Act** regulates discharges of pollutants into waters of the United States, and quality standards for surface waters. PP&R's Water Quality Testing Program helps the City achieve compliance by providing specific feedback on the effectiveness of the PP&R Integrated Pest Management (IPM) program at protecting water quality, and providing direct accountability for practices most likely to influence water quality such as fertilizer applications and pesticide use.
- The **Migratory Bird Treaty Act** protects migratory birds, and their habitat and ecosystems. PP&R sponsors the Festival of the Birds to educate the public about migratory birds. Additionally, work PP&R does to remove of invasive species and plant native species enhances native bird habitats throughout the city.

State

- The **Department of Environmental Quality (DEQ)** is a regulatory agency whose job is to protect the quality of Oregon's environment. Projects are required to comply with DEQ regulations impacting air quality, water quality, and general environmental health (including pollutants, hazardous materials, etc.)
- The **Statewide Comprehensive Outdoor Recreation Plan (SCORP)** looks at recreational trends and needs in the state of Oregon, and provides guidance for delivering quality outdoor recreational opportunities for Oregonians and visitors. The SCORP is also used to provide guidance for state administered grant programs.
- Many of **Oregon's Statewide Planning Goals** have impacts on Portland Parks & Recreation projects, including Goals 2, 4, 5, 7, 8, 9, 10, 11, and 15. Goals that most directly impact Portland Parks & Recreation work include:
 - Goal 5 (Open Space, Scenic and Historic Areas and Natural Resources), which requires inventory of these important resources, and policies that guide treatment of these resources;
 - Goal 8 (Recreation Needs), which requires jurisdictions to evaluate its recreation facilities and develop plans to ensure that recreation opportunities will meet projected recreation demand. The Parks Vision 2020 outlines the broad system goals to ensure that Portland Parks & Recreation will be able to address anticipated recreation demands; and
 - Goal 15 (Willamette Greenway), which sets forth procedures for administering the 300 miles of greenway that protects the Willamette River. PP&R's management of public spaces, trails, and access points along the Willamette River Greenway helps the city to be in compliance with Statewide Planning Goal 15.
- The **Oregon Recreation Trails System Act** designates a system of recreation trails statewide to provide outdoor recreation opportunities and access to scenic areas.

Regional

- The **Metropolitan Greenspaces Master Plan** details the vision, goals, and framework for a regional system of natural areas, trails, and greenways in the Metro region.
- The **Metro 2040 Growth Concept** a long-range plan guiding growth and development in the Portland Metro area, including open space, park, and regional trail goals.
- The **Regional Framework Plan** includes Metro's adopted land use planning policies and requirements, including requirements for parks, open spaces, and recreational facilities, and protection of lands for natural resources.

Local

- Portland Parks & Recreation projects must also comply with **City of Portland Zoning and Building Permit Code Requirements**, often including environmental review. All projects must also comply with the Portland Stormwater Management Manual.

Goals & Policies

Draft Goals and Policies related to Parks & Recreation facilities and services can be found in Chapter 5. Key Infrastructure Policies.

Desired Levels of Service

Portland Parks & Recreation has two defined level of service goals, from its adopted Parks Vision 2020:

- Provide a developed park or natural area within ½ mile from every household
- Provide a full-service community center within 3 miles of every household

Per Vision 2020, PP&R also seeks to build out the recreational trail system. More asset-specific service goals are outlined in Technical Papers, and as Bureau Performance Measures, identified in the Portland Parks & Recreation Strategic Plan. As Portland Parks & Recreation continues development of its new System Plan, it will continue refinement of recreational feature levels of service.

Capital Improvement Program (CIP) Strategy

Portland Parks & Recreation's Capital Planning Process is outlined in the Portland Parks & Recreation Capital Planning Manual (2009). The goals of the Capital Planning Process are to:

- Protect and maintain those existing assets that provide desired levels of service through maintenance, rehabilitation and renewal that extend the life of the asset.
- Provide new service and expand capacity that accommodates growth and provides equitable levels of service through the expansion of existing facilities and the construction of new parks and facilities. Improve efficiency, environmental quality and energy conservation wherever possible.

Portland Parks & Recreation updates its Capital Project List annually. The list identifies projects on a 1-5 year CIP timeframe, a 5-10 year CIP timeframe, and a 10-20 year timeframe. See the Investment Strategy section later in this chapter for more detail on the Portland Parks & Recreation Capital Planning process and project criteria.

Inventory

Built Infrastructure

Portland Parks & Recreation's built infrastructure system is currently valued at over \$1.02 billion, see Table 9.1. This is based on 5 main types of assets, with green infrastructure being the largest percentage of the overall replacement value, at \$419 million. PP&R defines its green infrastructure asset group as the urban forest, turf, shrub beds, and botanic gardens located on its properties. Buildings and pools are the next largest category, at \$280 million. This multitude of parklands, recreation facilities, support facilities, trees, and natural areas contribute to access to nature, recreational opportunity, environmental quality, and livability within the city.

Besides Portland Parks & Recreation, Metro is the largest park and natural area provider in the city. Metro’s inventory includes significant natural habitat areas, including the over 2,000 acre Smith & Bybee Wetlands, as well as Glendoveer Golf Course, the M. James Gleason Memorial Boat Ramp on the Columbia River, and fourteen pioneer cemeteries. Metro also owns and operates the Oregon Zoo, Oregon Convention Center, Portland Center for the Performing Arts, and Portland Metropolitan Exposition Center. State parks, public schools, cemeteries, and other open spaces also provide park and natural area opportunities.

Table 9.1 Parks & Recreation Asset Groups and Replacement Values, 2013

Capital Asset Class	Value (in millions)
Amenities	\$21.4
Buildings and pools	\$280.6
Recreation features	\$236.6
Built infrastructure	\$68.0
Green infrastructure	\$419.2
Total Parks	\$1,025.8

Table 9.2 Inventory of Portland Parks & Recreation Facilities by Type, 2013

Inventory by Facility Type	
Developed Parks	3,445 acres
Natural Areas	7,887 acres
Regional Trails	155 miles
Community and Arts Centers	14 facilities
Aquatic Facilities	13 pools
Tennis Facilities	124 courts
Athletic Fields	232 fields
Golf Courses	5 courses
Restroom Buildings	97 facilities
Basketball Hoops	229 hoops
Spray Features and Interactive Fountains	24 facilities
Skate parks	5 facilities
Community Gardens	48 gardens
Playgrounds	129 areas
Stadiums and Sports Complexes	4 facilities
Botanical/Public Gardens	8 gardens
Administrative Facilities	12 facilities
Maintenance Facilities	44 facilities
Off-Leash Dog Areas	33 areas
River Beaches	5 areas
Motorsports raceway	1 area
Reservable Picnic Areas	86 areas

Urban Forest

Portland’s public streets, parks, and natural areas host a diverse array of tree types. Nearly 1.5 million trees grow in these public spaces. The street tree population includes 171 different types, and over 41

tree types are found in developed parks and natural areas. Replacement of the city's urban forest is estimated at \$6 billion.



Table 9.3 Inventory of Portland’s Trees, 2007

Tree type	Number
street trees	236,000
developed park trees	39,000
natural area trees	1,200,000

Broadleaf deciduous trees dominate the landscape, accounting for 85% of street trees and 77% of park trees. Tree size designations (small, medium, and large) are determined by both the functional type and mature tree size of the tree. Parks contain more large-at-maturity trees (64%) and more conifers (23%) than do street rights-of-way. Streets host four times the diversity of tree types than parks, one-third of which are small when mature.

Current Condition

Portland Parks & Recreation is in the process of developing a more formal Asset Management program. Portland Parks & Recreation is working to develop an Asset Register to maintain collected inventory and condition information about its assets. The Bureau has developed an inspection program work plan, and has begun the process of adding routine inspection and condition assessment information into annual operations practices. In general, 20% of all Portland Parks & Recreation assets would be inspected each year, so that condition information on an asset would never be more than five years old.

Table 9.4 illustrates the condition of PP&R’s capital assets, as reported in 2013. Some assets have yet to be assessed, but of those that have been, the majority of assets were in fair or better condition. However, 43% of park furnishings were in poor or very poor condition, 4% of major buildings were in poor or very poor condition, 12% of minor buildings were in poor or very poor condition, 23% of marine facilities were in poor condition, 23% of play areas were in poor or very poor condition, 13% of sports courts and fields were in poor or very poor condition, 19% of community gardens were in poor or very poor condition, 19%

of circulation systems (roads and trails) were in poor or very poor condition, 13% of natural areas were in poor or very poor condition, and 11% of developed park landscapes were in poor or very poor condition.

Table 9.4 Current Condition: Parks and Recreation System, 2013

Capital asset type	Current Condition (in %)					To Be Determined
	Very Good	Good	Fair	Poor	Very Poor	
amenities						
furnishings in developed parks	12	14	31	41	2	0
furnishings in natural areas	0	0	0	0	0	100
decorative elements	28	31	19	21	1	0
buildings and pools						
Major buildings	61	9	26	0	4	0
Minor buildings	40	16	32	8	3	0
recreation features						
gathering places	0	0	0	0	0	100
marine	71	0	6	23	0	0
off-leash areas	0	0	0	0	0	100
play areas	17	35	25	18	5	0
sports courts and fields	33	22	21	9	4	11
water play	0	0	0	0	0	100
community gardens	19	17	45	15	4	0
built infrastructure						
circulation	0	41	40	19	0	0
utilities	0	0	0	0	0	100
green infrastructure						
natural areas	50	31	6	12	1	0
developed areas	10	34	45	7	4	0

Condition of Urban Forest

Tree condition is the health of the tree as manifest in the condition of its bark and leaves. The condition of urban trees reflects species hardiness, site conditions, and maintenance history. Trees that are well suited to Portland’s climate, that can adapt to the challenges of growing in an urban environment, and that have been maintained using proper arboricultural techniques are generally the most successful. Urban forest condition also includes the distribution of trees and make-up of the forest in terms of tree species; more even distribution of trees and a wide array of tree species comprise a healthier forest which is more resilient to pests, pathogens and catastrophic events such as storms or climate change

Table 9.5 Current Condition: Street and Park Trees, 2007²

Tree type	Current Condition (in %)			
	Good	Fair	Poor	Dead/Dying
Street trees	64	28	7	1
Park trees	88	7	5	1

Portland’s park trees are in generally better health than its street trees. While roughly the same proportion of park (94%) and street (91%) trees are in fair to good condition, 24% more park trees are classified in good condition. Compared with parks and natural spaces, the street environment – where growing space is limited, soils are generally poor, and automobile exhaust reduces local air quality – is far less hospitable to trees.

Projected Condition

Portland Parks & Recreation is in the process of developing a full Asset Management program, which will provide projected condition information for assets. At this time, Portland Parks & Recreation does not have projected condition information.

Current Capacity

Portland Parks & Recreation has not yet met its level of service goals to have every household within ½ mile of a park or natural area, and within 3 miles of a full service community center. In 2013, 80% of households were within ½ mile of a park or natural area, and 70% of households were within 3 miles of a full service community center.



Park Experience

PP&R's 2020 Vision includes a goal to "Provide a wide variety of high quality recreation services and opportunities for all residents." An objective of this goal, and a measure of our level of service, is to provide a park experience within a half mile (approximately 10 to 15 minute walk) of every Portland

² Portland Parks & Recreation, *Portland’s Urban Forest Canopy Assessment and Public Tree Evaluation*, October 2007

resident. The park experience includes developed parks (parks with, at a minimum, grass, trees, circulation, open play areas and seating), and accessible natural areas over 1/6 of an acre in size.

Figure 9.3 shows the areas of the city (in blue) that are within 1/2 mile walk of a park or natural area. The 1/2 mile distance is calculated using the walkable street and trail system, so parks in areas with poor transportation circulation systems have smaller service areas and serve fewer people. The calculation also takes into account walkability to actual park entry points.

Typically, the districts with lower levels of service are the more recently annexed parts of the city, where former county parks with fewer amenities were added to the system. PP&R is actively working to improve that level of service. For example, in 2015 PP&R will be constructing Beech Park and Gateway Park in East Portland using SDC funds. These parks represent a \$12.4 million investment in East Portland and will serve more than 1,790 new households. PP&R is presently working with Verde, a nonprofit group, and Let Us Build Cully Park! Coalition to build Cully Park in northeast. The funding for Cully Park is from grants and \$1.25 million in from SDC.

As PP&R works to meet the 1/2 mile goal, it faces the following challenges:

- Properties with the capacity and characteristics to provide a reasonable park experience are not always available in the areas of greatest need.
- Funds for acquisition of new park land often come with restrictions on how or where they can be used. For example, Service Development Charges (SDC) funds can only be used to address needs created by population growth, not to remedy deficiencies in levels of service. Funds that come from Urban Renewal Areas (URA) are restricted to parks within those geographic areas. These restrictions slow progress in meeting the goal.

The percentage of households within a 1/2 mile walk of a developed park or natural area does not include undeveloped properties or properties not owned or managed by PP&R.

Community Centers

PP&R's 2020 Vision includes a goal to "Provide a wide variety of high quality recreation services and opportunities for all residents." An objective of this goal, and a measure of the level of service, is to provide a full-service community center within 3 miles of every Portland resident. A full service community center includes a gymnasium, fitness and classrooms, and a pool.

The 3 mile distance is calculated using the walkable street and trail system, so community centers in areas with poor transportation circulation systems have smaller service areas and serve fewer people. The calculation also takes into account walkability to actual community center entry points.

PP&R is actively working to improve that level of service. In 2002, the percentage of households within 3 miles of a full-service community center was 36%; in 2013, it was 70%.

As PP&R works to meet the 3 mile goal, it faces the following challenges:

- Development of a new full-service community center is a major undertaking. Properties with the capacity and characteristics to support a full-service community center are not always available in

the areas of greatest need. Furthermore, experience shows that co-locating any community center with a park expands recreation programming options and enriches the participant experience.

- Funds for acquisition of new land and facilities often come with restrictions on how or where they can be used. For example, Parks Service Development Charges (SDC) funds can only be used to address needs created by population growth, not to remedy deficiencies in levels of service. Funds that come from Urban Renewal Areas (URA) are restricted to facilities within those geographic areas. These restrictions slow progress in meeting the goal.

The percentage of households within a 3 miles of a full-service community center does include smaller community centers or other facilities owned by PP&R and managed by partners. Figure 9.3 shows the areas of the city currently meeting the 3 mile to a full service community center level of service goal.



Trails

The Parks 2020 Vision also includes a goal to create an interconnected system of trails to serve both recreational and transportation needs. PP&R has been working to build out its trail system, as outlined in the Parks Recreational Trail Strategy (2006). The Recreational Trail Strategy calls for 220 miles of a connected trail system; however, only 155 miles are built, leaving 65 miles of future trails that need to be constructed. As PP&R works to build out the trail system, it faces the following challenges:

- Trail easements on private property are acquired when a property develops or redevelops, or through a willing seller program. Waiting for one of these conditions to occur before an easement can be acquired has resulted in a slow process for filling in trail gaps.
- As use, both recreational and transportation, continues to increase on trail systems, PP&R needs to continue to coordinate with other partner groups and agencies to ensure that the existing trail systems are able to handle growing capacity and respond to increased maintenance needs.

Figure 9.5 shows the PP&R trail system, existing and future, as shown in the Recreational Trail Strategy.

Figure 9.3. Portland Parks & Recreation ½ Mile to Park or Natural Area Service Area

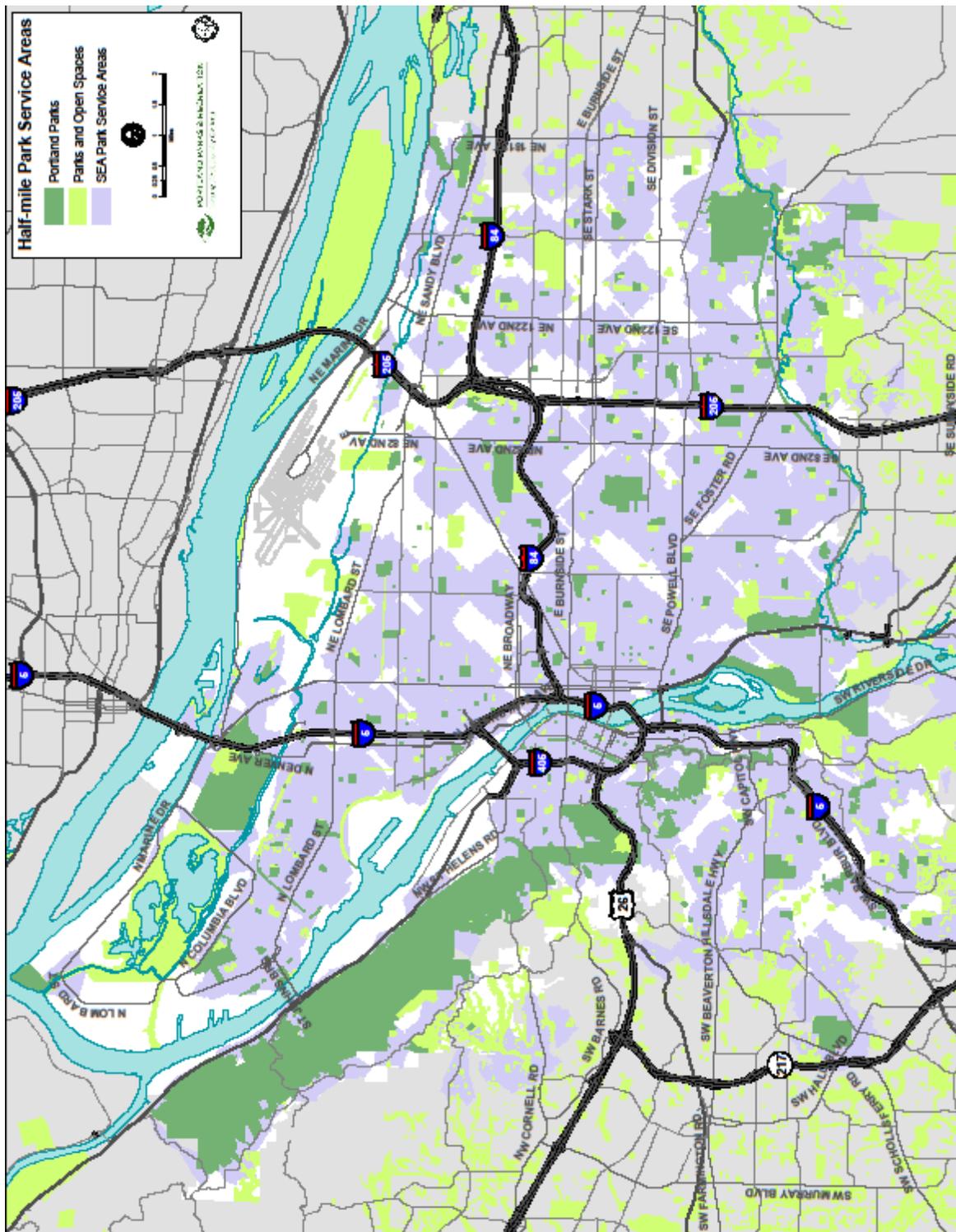


Figure 9.4. Portland Parks & Recreation 3 Mile Full Service Community Center Service Area

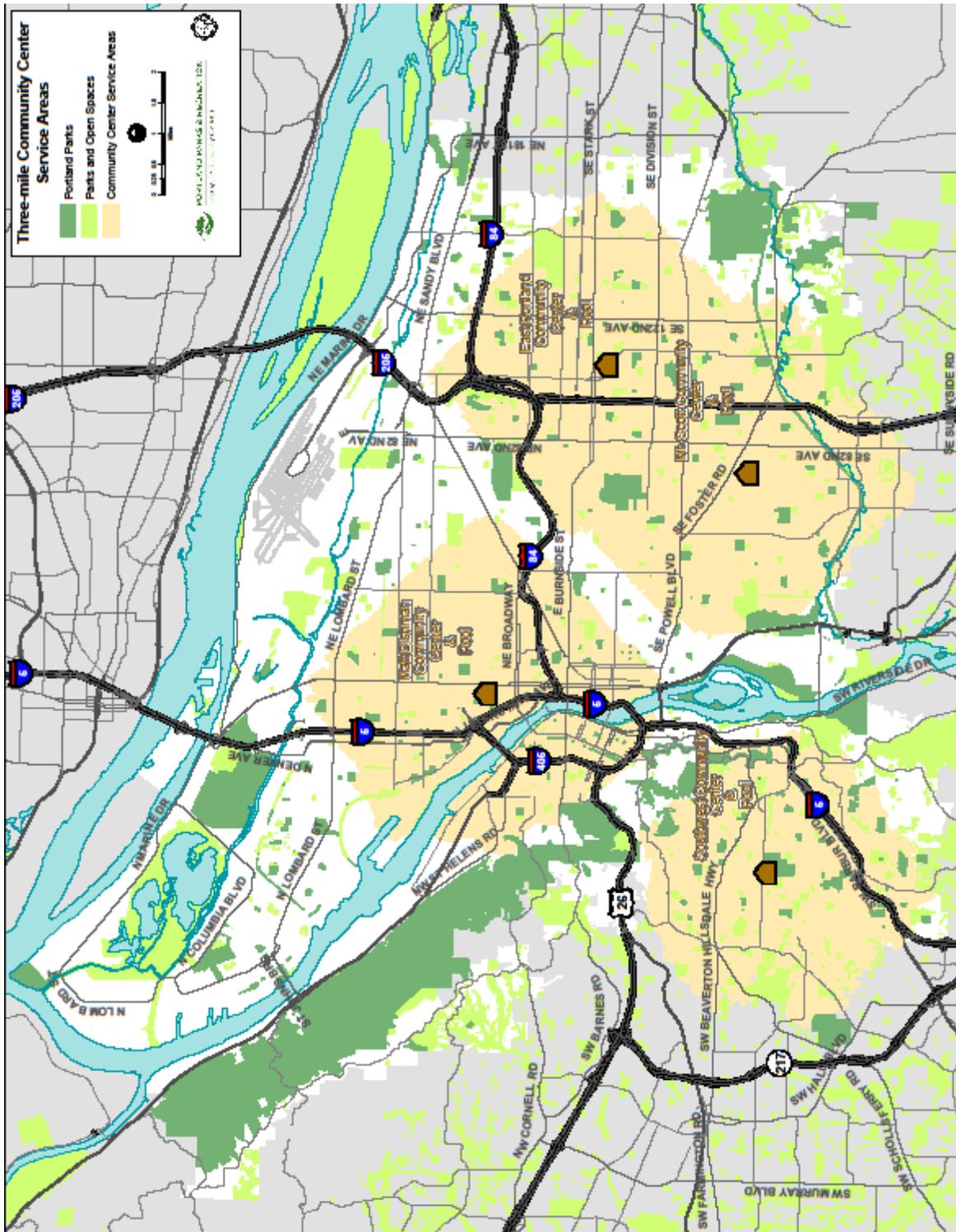
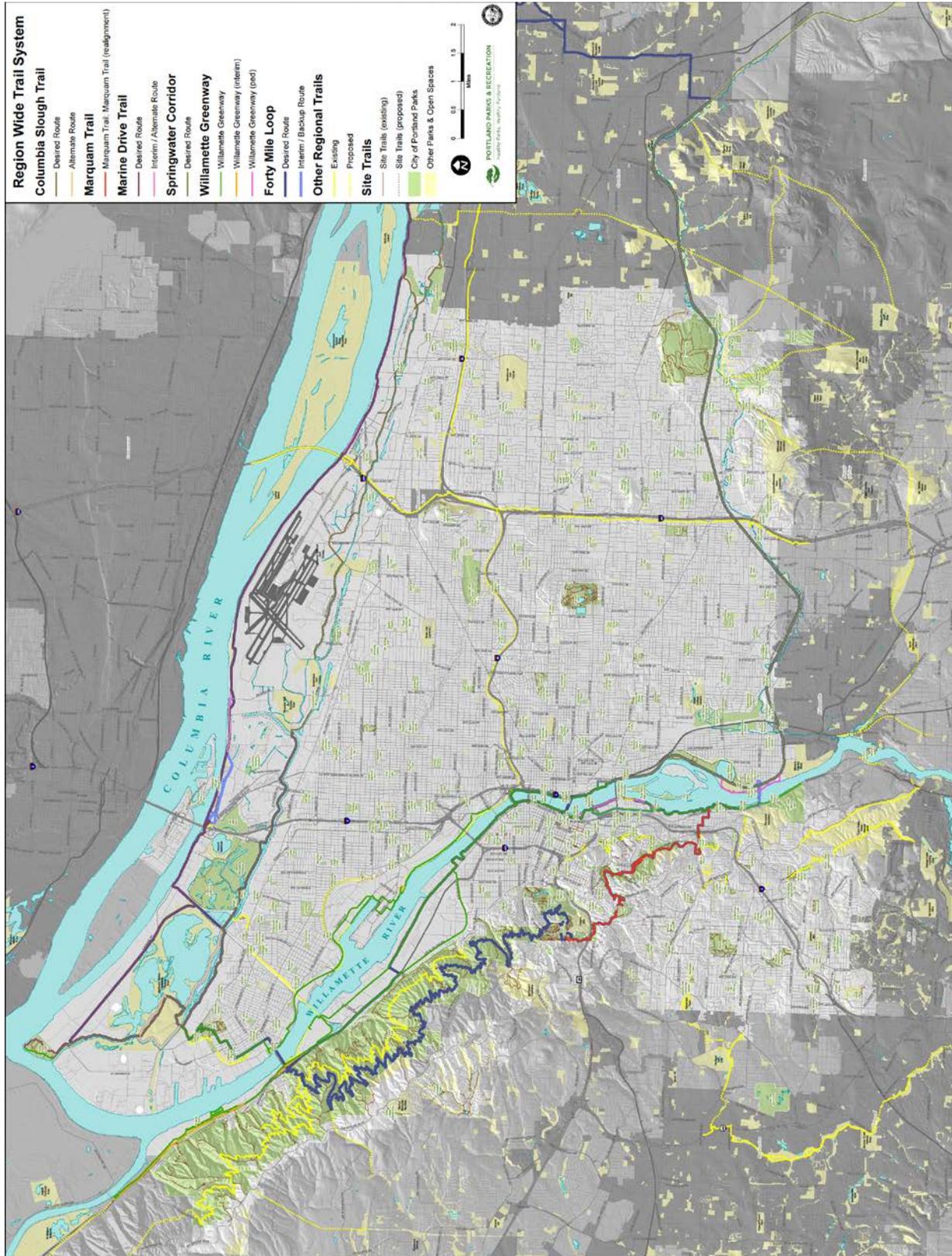


Figure 9.5 Portland Parks & Recreation Recreational Trail Strategy System Map



Needs & Approach

Built Infrastructure

Portland Parks & Recreation uses community outreach processes to inform design of new park and facility master plans. It occurs in the form of surveys, trend analysis, project committees, open houses, and other specific targeted outreach. Public involvement during initial project planning helps to inform creation of capital projects that are added to the 20-year project list.

Portland Parks & Recreation has strategically mapped the areas of the city that are currently not meeting the ½ mile desired service level for proximity to a park or natural area (see Figure 9.3) and areas not meeting the 3-mile desired service level for proximity to a full-service community center (see Figure 9.4). The Bureau is actively working to fill in those gaps. At the same time, Portland Parks & Recreation needs to invest in and maintain existing infrastructure. Portland Parks & Recreation balances the needs for system expansions and maintenance in decision-making.

The PP&R 20-year Capital Project List includes projects to maintain the existing system, and projects to expand or grow the system to meet service level goals. Typically, the 20-year Capital Project List includes development of those new parks where PP&R has acquired property and created a master plan. If all the parks and park facilities on the 20-year Capital Project List were implemented, there would still be some level of service gaps. Additional acquisition is necessary to continue to address those level of service needs, and that acquisition is represented on the 20-year Capital Project List, though until development plans are in place for those future properties, development expenditures are not represented.

Natural Resources

The City's Natural Area Acquisition Strategy (2006), focuses future acquisitions on protecting large, sustainable tracts of land and examples of exceptional value for habitat and watershed health. Of primary importance is protecting a large forested site on Portland's east side, including additional land at Kelly, Powell, and Clatsop Buttes. These, and other "last, best places" in Portland must be protected, as once developed they can never be returned to their natural state.

Portland Parks & Recreation Natural Areas Restoration Plan (2010) is a system-wide, watershed based strategic plan that guides habitat enhancement in natural areas. The plan includes a prioritized list of projects with their objectives and desired ecological outcomes. It guides PP&R in reaching the desired outcome of protecting and enhancing the biodiversity and ecological health of our natural areas, provides direction for near and long-term actions, and establishes management priorities.

Urban Forest

The Urban Forest Management Plan (2004) calls for expanding the urban forest canopy to cover 33 percent of the city and increasing street tree stocking levels, especially in underserved neighborhoods. The Urban Forest Action Plan (2007) contains the major goals and desired outcomes of the management plan, along with sixty-three actions items. Although these public trees provide a large return for the investment, opportunities exist to further improve the structure and management of the urban forest on

public and privately owned property. To maximize benefits, Portland Parks & Recreation and its partners are focusing efforts on retaining and expanding existing canopy, planting the right tree in the right place, planting large-growing species where appropriate, and keeping trees healthy.

Recommended System Improvements

Portland Parks & Recreation's park system has existing areas that do not meet service level goals. To resolve these deficiencies and to meet goals established in Parks 2020 Vision, Portland Parks & Recreation has identified a need for:

- Approximately 150 acres of new parkland throughout the City, and the development existing park properties, to meet the goal of providing a park within ½ mile of all city residents;
- 75 miles of multi-use trails within the City to connect people and places and address both recreational and transportation needs;
- Civic spaces in dense urban centers;
- Community centers to serve recreation needs in inner southeast, central and outer northeast and distant southeast.
- Additional pools, particularly in outer northeast Portland.
- Play areas, particularly in central northeast and outer east;
- Additional facilities, including skate parks, courts, fields, and community gardens in areas throughout the city.
- 33% tree canopy cover city-wide, canopy increase in low canopy and low-income areas, and tree species composition of no more than 10% of any one species, 20% of any one genus, and 30% of any one family.
- Continuing to treat and remove invasive species from 1000 acres of natural area sites per year to improve forest health and enhance wildlife habitat.
- Working with our partners to control invasive species in Forest Park in accordance with the Greater Forest Park Conservation Initiative.

Portland Parks & Recreation also continually looks to expand the system to respond to new and emerging recreational trends, and meet changing community needs.

Investment Strategy

Process

Portland Parks & Recreation gathers requests for capital projects from various sources including staff-identified needs, policy documents such as Parks 2020 Vision, park master plans, technical papers, asset register reports as well as from residents and other public agencies. Potential projects are screened and reviewed against community priorities and system-wide needs annually by a review committee, per the criteria outlined on the next page. Each project is given a Capital Project score.

The review committee recommends projects for either the 1 to 5 year Capital Forecast track for implementation, or for the long-range 20 Year Forecast for future consideration. Projects needed to fulfill the bureau's strategic direction or take advantage of project-specific funding opportunities go to the 1-5 Year Capital Project list. Projects with lower priorities and uncertain funding are put on the 20-Year Long-Range Planning Master List. The 20-Year list is reviewed annually and projects are advanced to the 1 to 5-Year list if they are deemed necessary, have funding, and there is sufficient staff to manage and implement the projects. Both lists are adjusted annually based on changing needs, funding, resource availability and priorities. The final list of recommended projects is considered by the Parks Budget Committee (in 2012-2013 this was the Portland Parks Board), the public and the mayor during the annual budget process.

Once projects are completed, they will be entered into the Bureau Asset Register (under development). Once assets are built, the Bureau tracks asset condition, value, and maintenance of replacement needs. These needs are then submitted as capital requests in ensuing years.

Contributing Plans

Projects added to the Portland Parks & Recreation Capital Project List come from many different sources. Plans referenced include Parks 2020 Vision, Master Plans, Technical Papers, System Plans, and Asset Management Plans. Other sources include field staff requests, community-initiated requests through the Park Proposal Process, or projects that originate through specific funding opportunities like grants, gifts, or sponsorships.

Alternatives Analysis/Prioritization Process

Portland Parks & Recreation has developed prioritization criteria for its capital projects. The criteria are included in the Portland Parks & Recreation Capital Planning Manual (2008). Each project is rated and given a score, based on the following considerations:

- **Legal Compliance:** Project is necessary to meet a legal mandate, directive by Council, condition of Land Use Review, contractual obligation, etc. Excludes ADA.
- **ADA Compliance:** Project is necessary to meet ADA compliance.
- **Public Support:** Project has documented or anticipated public support.
- **Conforms to City or Portland Parks & Recreation Plans:** Project is vital to Portland Parks & Recreation mission and Vision 2020 goals, is part of a Portland Parks & Recreation master plan, City plan, Urban Renewal Area plan, or continues a prior project.
- **Improves Level of Service:** Provides new service or improves existing service for identified need to a significant population.
- **Equity:** Households in project service area are above city average for populations of color, students in free and reduced lunch, or low income.
- **Human Health & Safety:** Project alleviates significant, minor or potential existing health or safety hazard; improves general health and safety.
- **Protects Capital Assets or Facilities:** Project is critical to save structural integrity of existing

facility or repair significant structural deterioration, or repairs important systems/deters major future expenditure, or increases life expectancy of the asset.

- **Environmental Quality:** Improves environmental quality of a large area, facility, or neighborhood, or improves local environmental quality or prevents environmental damage.
- **Financing/Business Opportunity:** Project has outside financing, donation, or business opportunity that covers 50% or more of the cost.
- **Maintenance Financing:** Project has outside funding to cover 50% of ongoing maintenance costs.
- **Effect on Operating Budget:** Project will reduce operations and maintenance costs, or increase revenues.

Investment Strategy

Portland Parks & Recreation has identified many infrastructure needs over the next 20 years to meet the level of service goals outlined in the Parks 2020 Vision, including necessary expansions to the system, and maintenance of existing assets. Portland Parks & Recreation maintains a 20-year capital improvement plan (CIP) list, which includes known growth and maintenance related projects that have been identified at this time. Where Portland Parks & Recreation has not yet acquired property or developed a master plan for a site, those projects are not reflected on the Portland Parks & Recreation CIP list. Tree maintenance and canopy expansion investment amounts have yet to be identified.

Further information about the Portland Parks & Recreation CIP list, including currently identified projects, can be found on the City of Portland's website at: <https://www.portlandoregon.gov/parks/63265>.

The Citywide Systems Plan does not include a detailed 20-year project list for Portland Parks & Recreation because a comprehensive system plan, that reflects asset management needs and community priorities and includes a list of needed investments, costs, and funding sources, will be developed over the next few years. In addition, this information is not required as part of this Plan under Statewide Planning Goal 11: Public Facilities and related statutes and administrative rules.

Examples of projects and programs PP&R will be working to implement are summarized below.

Acquisition Program

- Acquisition for developed parks, natural areas, trails, recreation and maintenance facilities. Priorities would include acquisition of land to:
 - Accommodate growth by maintaining a relatively equivalent city wide level of service in areas where growth is occurring
 - Correct deficiencies by providing parks in park-deficient areas
 - Connect to and complete trail systems
 - Protect and enhance natural resource systems
 - Eliminate park in-holdings or expand existing park land, and
 - Effectively operate and maintain Portland's park system.

Maintenance of Existing Parks, Natural Areas, Trails, and Facilities

- Maintenance or replacement of assets that have reached the end of their useful life

Development of New Community Centers

- Washington-Monroe
- Additional Community Centers in areas not currently within 3 miles of an existing full service community center

Development of New Parks

- Beech Park – funded for construction in 2015
- Cherry Park
- Chimney Park
- Clatsop Butte Park
- Errol Heights Park
- Floyd Light Property
- Gates Property
- Gateway Green
- Gateway (urban plaza)
- Gilbert Primary Park
- Hazeltine Property
- Lynchwood Park
- Mill Park
- Mock's Crest
- North Powellhurst Park
- Parklane Park
- SW Thomas & 53rd Property
- Thomas Cully Park – under construction
- Thompson park
- Werbin Property – funded for construction in 2014
- Wilkes Headwaters Property
- Development of additional new parks or natural areas in areas not currently within ½ mile of an existing park or natural area

Improvements at Existing Developed Parks

- Cathedral Park
- Columbia Children's Arboretum

- Couch Park
- Crystal Springs Rhododendron Garden
- East Holladay Park
- Hillsdale Park
- Leach Botanical Garden – funded for partial improvements in 2015
- Lents Park
- Mt. Tabor Park and Yard
- Spring Garden Park – funded for improvements in 2015
- Washington Park
- Waterfront Park
- Westmoreland Park
- Willamette Park – funded for improvements in 2015

New Trails / Improvements to Existing Trails

- Columbia Slough/ Columbia South Shore Slough Trail
- Marine Drive / Bridgeton Trail
- Mt Scott / Scouters Mountain Trail
- North Portland Greenway
- Red Electric Trail
- Sullivan's Gulch
- Springwater Trail – construction to complete the 'gap' funded in 2016

Natural Area Parks

- April Hill Natural Area – funded for construction in 2015
- Beggars Tick Natural Area
- Buttes Natural Area Complex (Clatsop Butte, Buttes NA, Mitchell Creek Natural Area, Kingsley D. Bundy)
- Elk Rock Island Natural Area
- Errol Heights
- Forest Park
- Deardoff Creek and Wahoo Creek Natural Areas
- Lower Powell Butte Floodplain
- Marshall Park (including Jensen and Foley Balmer properties) – funded for improvements in 2014
- Oaks Bottom/ Ross Island/ Oaks Crossing
- River View Natural Area
- Stephens Creek Nature Park

- Southwest Waterfront Parks (Powers Marine, Willamette Moorage, Butterfly and Cottonwood Bay)
- West Portland Park Natural Area
- Whitaker Ponds – funded for improvements in 2016
- Woods Park Natural Area

The Citywide Systems Plan does not include a detailed 20-year project list for Portland Parks & Recreation because a comprehensive system plan, including a list of needed investments, costs and funding sources, is not available at this time. The project list will be developed over the next few years. In addition, this information is not required as part of this Plan under Statewide Planning Goal 11: Public Facilities and related statutes and administrative rules.

Financial Strategy

Existing Financing Strategies

Definition and Use

The primary sources of revenue to the Parks Capital Improvement Program Fund include service charges and fees from the System Development Charges (SDC) program, Metro Bond local match, General Fund discretionary, local, state & federal grants, and the Portland Development Commission. The Portland Parks & Recreation system has also grown and replaced assets when necessary due to the passage of a bond or levy approximately every decade.

As Portland Parks & Recreation creatively seeks alternative funding sources to respond to priority needs, some types of projects are more readily funded than others. The System Development Charge (SDC) and tax increment financing in urban renewal areas are sources of funding for land acquisition and project development. This is especially true where population growth and capacity-driven needs are the underlying premise to development, since SDC funds are specifically intended to be used to build new parks and facilities to respond to increased park demand that results from new development and growth, and urban renewal area funds are required to be used in those specific geographic urban renewal areas. However, for most existing infrastructure these types of resources are not available. Finding alternative solutions to fund major capital improvements for existing infrastructure as well as improved ongoing operations and maintenance are major challenges. However, options are being explored to meet these challenges.

Anticipated Revenues

On average, Portland Parks & Recreation has been receiving approximately \$1 million annually from General Fund discretionary to address major maintenance, and approximately \$8 million from System Development Charges (SDC), Portland Development Commission (PDC), and grants/donations. These figures fluctuate and will change over time. As more development occurs, Portland Parks & Recreation will receive more SDC funds. PDC funding has been reduced as Urban Renewal Areas expire and PDC shifts its investment focus from community infrastructure development to economic development.

Financial Challenges, Unmet Needs and Risks

Portland Parks & Recreation does not receive adequate capital revenues annually to address identified capital needs. Portland Parks & Recreation reported an estimated \$844 million annual capital funding gap in 2013, including both maintenance to existing assets and expansions of the system to address deficiencies in service. This funding gap represents the total of projects on Portland Parks & Recreation’s 1-10 year Capital Improvement Project list, minus anticipated annual revenues for capital projects, amortized over 10 years.

PP&R has an expected total capital annual funding need of \$93.4 million for each of the next 10 years. PP&R receives an average of \$8 million annually in System Development Charge funds, plus grants and donations. Additionally, City Council has been able to provide about \$1 million annually to address some of the most urgent needs for repair, rehab and replacement and mandated work. This totals an average of \$9 million annually available for capital, leaving a funding gap of \$84.4 million. This includes \$47.8 million for expanding the system to provide standard levels of service for all residents, in addition to \$36.6 million in funding needed to maintain existing assets. Where Portland Parks & Recreation has not yet acquired properties to fill service level gaps, there will be additional need to acquire and develop those properties, which are not currently represented on the Capital Improvement Project list. This would further increase the funding gap.

Table 9.6 Portland Parks & Recreation Annual Funding Gap, 2013

Capital asset type	Value* (in millions)			
	R/R/R	Mandate	Capacity	Total
amenities	\$0.2	\$0.1	\$0.0	\$0.3
buildings and pools	\$11.0	\$3.0	\$23.0	\$37
recreation features	\$4.8	\$2.2	\$3.5	\$10.5
developed park	\$4.1	\$1.7	\$13.9	\$19.7
built infrastructure	\$5.5	\$1.5	\$7.0	\$14.0
green infrastructure	\$2.5	\$0.0	\$0.4	\$2.9
Total	\$28.1	\$8.5	\$47.8	\$84.4

R/R/R: (Repair, Rehabilitation, Replacement): Additional funding necessary to repair, rehabilitate and replace existing assets to bring them up to established service levels. Also includes replacement of assets considered functionally obsolete (not meeting established service levels).

Mandate: Additional funding necessary to improve existing assets to meet regulatory requirements, exclusive of improvements that fall under R/R/R or Capacity

Capacity: Additional funding necessary to meet the demands of existing customers, based on established levels of service.

Alternative Strategies

Portland Parks & Recreation will need to examine options to increase available funding for expansion and maintenance of its park system. Some options could include:

Park Bonds

Continue working with City Council and Portland taxpayers to periodically pass park general obligation “G.O.” bond measures to address capital projects and system expansion. Historically, Portland Parks &

Recreation's park system has developed with the assistance of a park G.O. bond measure approximately every decade.

Dedicated Funding for the Natural Resources and the Urban Forest

Portland Parks & Recreation will need to continue to seek dedicated sources of funding for ongoing natural area restoration and maintenance, including activities such as continued removal of invasive species, planting native species, and safely managing public access to natural areas. The Urban Forest Management Plan calls for the establishment of sustainable funding for the urban forest. Funding sources considered in a 2009 study by Davey Resources Group includes a property frontage fee, among other options.

Increasing Partnerships

Portland Parks & Recreation continues to look for opportunities to develop public-private partnerships to help expand the park system.

Maximizing public use of sports fields

Portland Parks & Recreation has developed a joint-use agreement with Portland Public Schools regarding use of some sports fields, and continues to work with surrounding school districts and organized sports groups to look for mutually beneficial joint use opportunities. A recent partnership in the enhancement of Buckman Field is a good example.

Summary

Portland Parks & Recreation will need to continue to be aware of and implementing best practices and innovative funding techniques used in other jurisdictions may yield other alternative strategies.

If Portland Parks & Recreation is not able to increase funding to address its funding gap, the condition of its assets will worsen, and Portland Parks & Recreation will need to either:

- Reduce levels of service (remove some assets from the system) or;
- Manage a system of assets that is operated with higher levels of risk to the user and organization.

Chapter 10

Other Essential Facilities & Systems

Note: Other essential facilities and systems are not a required urban service under the Oregon public facility planning goals and statutes. The City of Portland recognizes that facilities, technology systems, and vehicles are essential infrastructure and has included this chapter in the interest of comprehensive infrastructure planning. However, the City does not intend for this chapter to be reviewed for compliance with public facility planning rules, including Oregon Statewide Planning Goal 11: Public Facilities, Oregon Statute 197 or Oregon Administrative Rule 660.

OVERVIEW

This chapter describes facilities, technology systems, and vehicles that are vital to the efficiency and effectiveness of all City agencies. This chapter recognizes the critical role this infrastructure plays in meeting the needs of Portlanders and supporting the overall mission of the City of Portland, including emergency response and preparedness. The assets covered in this chapter are used to one degree or another by nearly every City agency that utilizes office space, vehicles, or technology. In total, the combined replacement value for technology and facility assets is over \$1.25 billion dollars.

The decision to include other essential facilities¹ and systems in citywide infrastructure planning represents a different way of thinking about these public assets, one that recognizes the extensive investments in facilities and systems that enable bureaus to provide the urban services within their purview. This consideration goes above and beyond the set of State-mandated public facilities and services addressed elsewhere in the Citywide Systems Plan.

The infrastructure described as other essential facilities and systems is necessary for the provision of some direct public services, including emergency communications, emergency response, and life safety. Other infrastructure provides internal support to every City Bureau that occupies a City building or uses City technology. The assets covered in this chapter contribute to service provision in both direct and indirect ways. For instance, some computer equipment makes it possible for Portlanders to directly access City websites and internet databases. Other equipment facilitates communications through phones and email systems.

This chapter includes three sections – Civic Facilities & Assets, Technology Systems, and Emergency Response. These sections were created using asset groupings from Portland’s annual Citywide Assets Report. For administrative efficiency, these asset groupings do not always correspond with a particular system or set of infrastructure. For instance, Portland’s emergency response infrastructure is included in the “fire facilities”, “police facilities”, and “other buildings” asset groups. See Table 10.1 for more

¹ This definition of essential facilities is different than the “essential facilities” designation utilized in the City’s Natural Hazard Mitigation Plan (p. 38) to identify facilities that are necessary for the continuation of City operations.

information about asset groups covered in different sections of the Other Essential Facilities & Systems chapter.

Table 10.1 Other Essential Facilities & Systems Sections and Asset Groups

Chapter Section		Asset Groups* Covered
Civic Facilities & Assets		Office buildings Other buildings PDC facilities Spectator facilities Performing arts facilities
Technology Systems	BTS:	Communications Production services Strategic technology
	Other bureaus:	Equipment and software Strategic technology
Emergency Response		Fire facilities Police facilities

* Asset groups are based on Citywide Asset Management Group categories. The Emergency Coordination Center and 9-1-1 Center are included in the “other buildings” asset group.

Description of Other Essential Facilities & Systems

For the purposes of this chapter, other essential facilities and systems includes a wide range of assets, such as offices and special purpose buildings, sports and entertainment venues, emergency response facilities, and transmission towers. It covers technology systems such as computer hardware and software, voicemail systems, video systems, microwave radio systems, and other radio equipment, as well as motorcycles, passenger vehicles, vans, SUVs, pickups, dump trucks, loaders, trailers, and other specialized vehicles. It also addresses emergency response infrastructure like police and fire & rescue stations, specialized mobile response units, fire trucks, fireboats, and police cars.²

The chapter focuses on planning for these City-owned assets, but not on planning for the services provided through the use of these assets. For instance, it can inform decisions to align the number and location of fire & rescue stations with growth assumptions in the Comprehensive Plan, but does not directly plan for the manner in which Portland Fire & Rescue will provide services over the next 20 years.

The assets covered in this chapter are owned, managed, or used by several different bureaus and non-City agencies. These bureaus include the Bureau of Emergency Communications (BOEC), the Bureau of Internal Business Services (BIBS), the Bureau of Technology Services (BTS), the Portland Bureau of Emergency Management (PBEM), Portland Fire & Rescue (PF&R), the Portland Police Bureau (PPB), and the Portland Development Commission (PDC). This makes it difficult to compare the Other Essential Facilities & Systems chapter to other chapters oriented around the operational scope of one bureau or agency. Though assets covered in this chapter differ in many important ways from other public facilities

² Vehicles are not typically considered “public facility assets” in this plan or in the Asset Report, with the exception of certain, significant, long-lived fire apparatus. Vehicles are included in this chapter to acknowledge the City’s substantial investment in these assets and the essential role they play in the provision of most City services.

and systems, the sections in this chapter have been structured similarly to other chapters in the Citywide Systems Plan to maintain consistency within the document.

Role of Other Essential Facilities & Systems

The behind-the-scenes support provided by other essential facilities and systems is critical for maintaining a healthy, prosperous city and ensuring the delivery of services that contribute to Portland’s high quality of life. Other essential facilities and systems include the buildings where city employees work on a daily basis, the software they use to display and communicate ideas, the vehicles necessary to provide public services, and the data needed to make informed decisions. This contributes to a high quality of life in an indirect yet integral way, incorporating several city functions often left out of long-term planning discussions. Certain assets in this chapter play an essential role in the City’s emergency response and continuation of operations strategies designed to protect the health and safety of Portlanders in the event of an emergency or natural disaster.

This chapter is the result of the city’s decision to go beyond the minimum statewide planning requirements, to make sure that the full set of services and facilities necessary to support a prosperous, thriving and sustainable city are included in long-term planning conversations. This chapter is intended to inform future investments in these facilities to maintain existing systems, resolve identified deficiencies, serve new population growth, and address other long-term infrastructure needs.



Major Needs and Trends for Other Essential Facilities & Systems

The facilities, technology systems, and vehicles included in this chapter experience similar trends and share a few common needs.

Financial Environment

These facilities and systems exist within a complex financial environment where revenue streams are limited and investments are often the result of opportunistic partnerships between agencies. In addition, disparate funding sources, shared responsibilities between multiple City bureaus, a lack of centralized

management, and limited long-term planning create challenges that limit the City's ability to holistically manage these assets. In general terms, a more integrated approach is needed in order to perform analysis and make investment decisions that result in cost savings, capitalize upon operational efficiencies, and maximize shared benefits across City agencies. City agencies and elected officials could also benefit from improving asset management processes to assess and prioritize facility needs across bureaus using consistent evaluation metrics.

Planning for Resiliency

Many assets in this chapter help the City meet goals and policies related to resiliency and climate change, issues that are being increasingly recognized by a wide range of disciplines and institutions. Projects such as the recently completed Emergency Coordination Center and the ongoing Public Safety Systems Revitalization Project (PSSRP) support the City's goals to enhance disaster preparedness and emergency response capacity. Technology featured in this chapter, such as Next-Generation 9-1-1 and renewable microgrid energy systems, has the potential to open up new possibilities to achieve resiliency in the field of emergency preparedness and response. These facilities and systems help Portland prepare for emergencies of different types and magnitudes, allowing for successful long- and short-term recoveries following significant climate-related events or natural or man-made disasters.

Technological Landscape

Other technological advancements could have a significant impact on the management, maintenance, and construction of other essential facilities and systems. These developments have the potential to present new opportunities to manage City assets more effectively, improve communication, and increase safety and health for all Portlanders. While it is difficult to predict exactly how or when these opportunities will arise, the current pace of technological change could warrant more frequent assessments throughout the next twenty years.

Purpose of this Chapter

This chapter describes other essential facilities and systems, highlighting the significant role these assets play in supporting fundamental parts of the City's mission. It outlines desired improvements and levels of service related to these assets, discusses the financial challenges and realities that affect them, identifies a few pressing needs, and makes some recommendations to address those needs.

Though this chapter attempts to provide a comprehensive look at these facilities and systems, a holistic long-term plan is not within the scope of this effort. Instead, the chapter identifies some first steps that can be taken to streamline management processes and more successfully incorporate other essential facilities and systems into public decision-making processes. While there is no State requirement to perform planning for this set of assets and systems, the City has recognized their importance and is engaging in conversations about how to better integrate them into long-range planning discussions.

Bureau Names and Acronyms

The following list includes names and acronyms for bureaus that own, manage, or are the primary users of the other essential facilities and systems included in this chapter:

- OMF – Office of Management and Finance
- BIBS – Bureau of Internal Business Services, a Bureau within OMF
- BIBS Facilities – the Facilities division within BIBS
- CityFleet – the CityFleet division within BIBS
- Office of the CAO – OMF Office of the Chief Administrative Officer (CAO)
- BTS – Bureau of Technology Services, a Bureau within OMF
- PPB – Portland Police Bureau
- PF&R – Portland Fire & Rescue
- PBEM – Portland Bureau of Emergency Management
- BOEC – Bureau of Emergency Communications
- PDC – Portland Development Commission

In addition, all City bureaus occupy and/or use other essential facilities and systems. Specific bureaus mentioned in the various sections include:

- PP&R – Portland Parks and Recreation
- PWB – Portland Water Bureau
- BES – Bureau of Environmental Services
- PBOT – Portland Bureau of Transportation



CIVIC FACILITIES & ASSETS

Introduction

This section includes a broad array of City-owned buildings, facilities, vehicles, and equipment, the majority of which are managed by Facilities and CityFleet divisions in the Bureau of Internal Business Services (BIBS). These assets include offices and special purpose buildings, sports and entertainment venues, emergency response facilities, and wide variety of City-owned vehicles. This collection can be difficult to discuss as a coherent whole, because many different bureaus utilize the assets covered in this section to provide a number of different public services. Civic facilities and assets are nonetheless vital to all City operations, with considerable effects on service provision for each of the other infrastructure systems in the Citywide Systems Plan. Without well planned and managed civic facilities and assets, many City employees would not have a place to work, emergency communications systems could be compromised, and the ability of Portland residents to depend upon basic public services could be eroded.

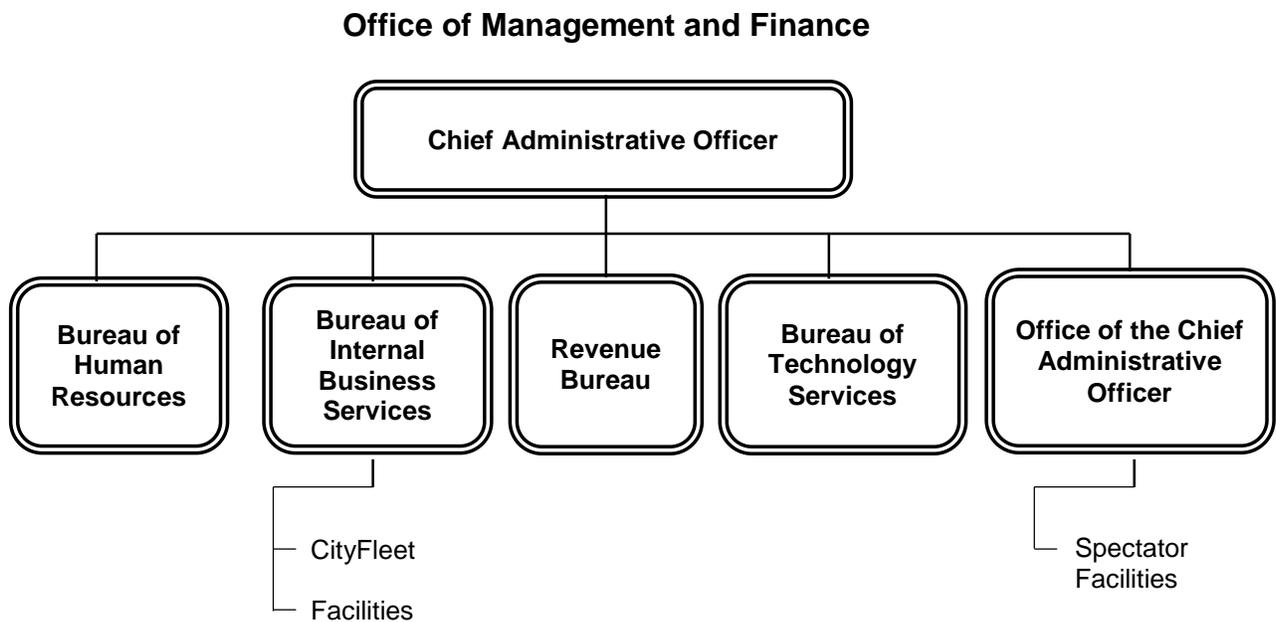
Similar to other sections within the chapter, civic facilities and assets are being incorporated into long-range planning for infrastructure systems for the first time. As such, work will need to be done to bring civic facilities and assets to a similar level of knowledge and understanding as other infrastructure systems like those for water and environmental services.

This section outlines the City's vision for civic facilities and assets and provides an assessment of the current status of planning efforts and other related management techniques. It includes a description of these assets, the services they affect, and relevant trends and issues. The section also assesses a few major needs and recommendations, and summarizes the financial landscape that will impact these assets over the next twenty years.

Agency Organizational Structure

Unlike other chapters within the Citywide Systems Plan, civic facilities and assets are owned and managed by multiple City agencies. Much of this responsibility falls within the purview of the Office of Management and Finance (OMF), a large agency that brings together several bureaus – including the Bureau of Internal Business Services (BIBS) and the Office of the Chief Administrative Officer (CAO). Two divisions of BIBS (Facilities and CityFleet) manage a majority of the facilities and assets covered in this section. The Office of the CAO has responsibility for City-owned spectator facilities, such as Providence Park, and serves as liaison for City-owned performing arts facilities, such as Keller Auditorium. Refer to Figure 10.1 for more information about the structure of OMF as an agency.

Figure 10.1 Office of Management and Finance Organizational Chart



Other assets covered in this section are subject to more complex ownership and management arrangements. For instance, although BIBS Facilities owns and handles maintenance responsibilities for most of the Portland Building, the Portland Water Bureau and the Bureau of Environmental Services own most of the floors that they occupy within the building. For more detail regarding these types of shared arrangements, see Service Agreements later in this section.



Vision

There is no consolidated vision for civic facilities and assets at this point in time, though BIBS Facilities and CityFleet have developed their own bureau-specific vision statements. Based on these statements and other City language surrounding these particular assets, the following vision statement has been developed for civic facilities and assets for the purposes of this document:

City-owned buildings, facilities, vehicles, and apparatus allow City agencies to deliver essential services to the public.

The Office of Management and Finance's and BIBS Facilities' vision statements include aspirations to "demonstrate a commitment to the city's past, present, and future" through enduring form, resilient design, and the use of sustainable operational practices. Other vision language states that these structures "enhance a sense of comfort and beauty in Portland's built environment" and increase the usefulness of City programs by providing quality workplaces for City employees. CityFleet's vision, as stated in their Strategic Plan, is to serve as an "international model for equity and sustainability" and to offer services that illustrate the "power of forward-thinking leaders working together" through the management of City-owned vehicles and apparatus.

Mission and Levels of Service

Civic facilities and assets also lack a consolidated mission statement relevant to this document. Similar to the vision statements, there are a few bureau-specific mission statements that apply to the assets in this section. The following mission statement was developed for the purposes of this document, and is intended to incorporate bureau-specific language through the lens of civic facilities and assets:

Civic facilities and assets provide the infrastructure necessary for efficient and accountable delivery of public facilities and services. This infrastructure includes the buildings, facilities, vehicles, and apparatus that City employees utilize on a daily basis, as well as critical facilities that can be depended upon in the event of an emergency.

The City of Portland is committed to developing and maintaining high performance buildings that limit their environmental impact, contribute to Portland's civic character and make Portland a better place to live and work. This interconnected system of buildings, facilities, vehicles, and apparatus is provided in a cost-effective manner to City and other municipal agencies. BIBS Facilities provides a wide range of preventative, regular, and demand maintenance services designed to ensure that City buildings stay functional throughout their maximum useful life cycle. CityFleet provides a similarly comprehensive range of services for the City's rolling stock of vehicles, offering acquisition and outfitting, fuel management, both preventative and regular maintenance, repair, and other fleet management services.

Services Provided

Most of the services related to civic facilities and assets are not provided directly to the general public. Nevertheless, these services support the everyday operations of nearly every City agency, and have a direct impact on the City's capacity to provide public services. These services include:

- The provision, management, and maintenance of office and special use space for City bureaus and employees;
- Life safety and emergency communications, coordination, prevention, and response services; and
- The procurement, storage, and maintenance of City-owned vehicles and apparatus.

Some of the services related to civic facilities and assets are provided more directly to the public. These include:

- Publicly-accessible facilities to facilitate payments, review development plans, and respond to other inquiries;
- Publicly-accessible spaces to facilitate participation in the government process;
- Publicly-accessible archival services for important historical records and documents; and
- The provision of spectator and performing arts facilities for sports, entertainment, the arts, and community events.

Service Area

For the most part, services related to civic facilities and assets are provided within the Urban Service Boundary (USB) of the City of Portland (see Figure 4.1 on p. 32). However, there are a few exceptions:

- CityFleet has entered into a variety of intergovernmental agreements, several of which involve service provision to organizations or agencies outside of the Portland USB.
- Spectator and performing arts facilities and Union Station are accessible to anyone and provide benefits to residents throughout the region.

Service Agreements

The majority of BIBS Facilities services are financed through interagency agreements (IAs) with City bureaus. There are also a number of intergovernmental agreements (IGAs) that allow City agencies to provide their services to other entities. For instance, CityFleet uses IGAs to offer maintenance and repair services to Portland Public Schools, Multnomah County, and other public agencies.

Private contractors and other public entities (e.g. Metro) handle management and operations oversight for certain civic facilities and assets. These agreements can take the form of contracted service agreements, condominium lease agreements or partnerships, or more general arrangements to deliver services on an as-needed basis.

Other partnerships can arise as the City identifies the need for particular improvements or investments. This occurred when the City issued an RFI (Request for Information) for space to store historical records and documents. The identification of shared needs between the City and Portland State University (PSU) led to the eventual creation of the City of Portland Archives and Record Center on the PSU campus.

Inventory Summary

The Civic Facilities & Assets section includes a range of civic buildings, public facilities, vehicles, and equipment.

This collection includes the office buildings that house City bureaus and employees, such as the Portland Building, the 1900 Building, and City Hall. It includes other buildings for special uses like the Archives and Records Center, where important historical documents are kept, the 9-1-1 Center, where critical emergency communications systems are operated and maintained, the Kerby Garage, where City-owned vehicles are housed and serviced, and Union Station, Portland's passenger rail depot. It also includes spectator facilities for sports and entertainment like the Veterans Memorial Coliseum and Providence Park, as well as performing arts facilities such as the Arlene Schnitzer Concert Hall and other Portland's Centers for the Arts venues. Two City-owned parking facilities at the Rose Quarter are also included in the civic facilities and assets grouping. Please refer to Table 10.2 for more information about principal City-owned office buildings, Table 10.3 for asset groupings and replacement values, and Table 10.4 for the current condition of these assets.

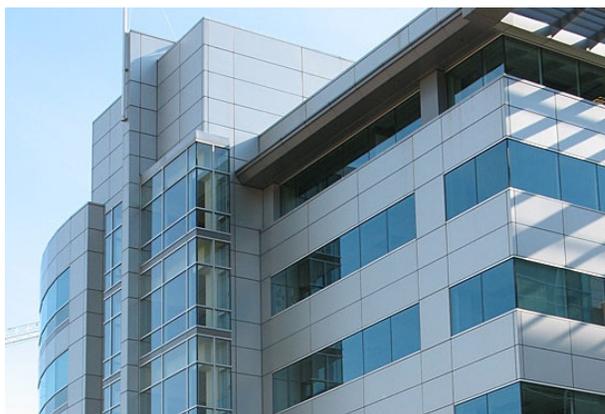


Table 10.2 Principal City-owned Office Buildings

Building name	Address	Square Footage	Replacement value
Portland Building	1120 SW 5th Avenue	406,075	\$106,392,000
1900 Building	1900 SW 4th Avenue	161,185	\$41,747,000
City Hall	1221 SW 4th Avenue	87,500	\$24,150,000

Table 10.3 Civic Facilities & Assets Groups and Replacement Values, 2013

Capital Asset class	Value (in millions)
Office buildings	\$172.3
Other buildings	\$69.3
PDC facilities	\$48.7
Spectator facilities	\$529.6
Performing arts facilities	\$111.2
Total Civic Facilities & Assets	\$882.4

Table 10.4 Current Condition: Civic Facilities & Assets System, 2013

Capital asset type	Current Condition (in %)						Confidence Level
	Very Good	Good	Fair	Poor	Very Poor	TBD	
Office buildings	0	38.2	61.8	0	0	0	4 - High
Other buildings	0	67.7	32.3	0	0	0	4 - High
PDC facilities	0	0	80	20	0	0	4 - High
Spectator facilities	0	36.7	0	63.3	0	0	3 - Moderate
Performing arts facilities	TBD	TBD	TBD	TBD	TBD	0	TBD*

* OMF is beginning to work with Metro/MERC on the status of performing arts facilities.

There are over 2,950 vehicles and pieces of equipment that also fall within to the category of civic facilities and assets through CityFleet, including motorcycles, passenger vehicles, vans, SUVs, pickups in various weights, police cars, dump trucks, loaders, trailers, vactors, and many other pieces of specialized equipment. Because vehicles are not considered “public facility assets” for the purposes of this plan, they are not included in the any of the asset groups described in the tables above.

Key Issues, Trends, Opportunities

De-centralized Property Management

At the current time, the City does not have a centralized property management function. This means that the maintenance and repair needs of City-owned buildings are sometimes assessed using different criteria and decision-making processes. Different bureaus have different levels of success in financing repairs or capital improvements, and the current process can force bureaus to compete with one another for the funding necessary to keep buildings well maintained and operating properly. This lack of integration also makes it more challenging to perform the citywide facilities assessments necessary for emergency response and disaster planning. A more integrated approach is needed in order to perform

analysis and make investment decisions that result in cost savings, capitalize upon operational efficiencies, and maximize shared benefits across City agencies.

Investing in a Building's Life Cycle

Investments in public buildings need to account for maintenance and repair needs that accrue as time goes on. Investing in the full life cycle of a building maximizes the utility and cost-effectiveness of the public expenditure, while at the same time ensuring that City-owned buildings are safe and reliable.

Upfront investments in resilient, high-quality materials and systems can minimize repair costs and significantly extend a building's lifespan. Regularly allocating sufficient amounts of money for major maintenance and replacement reserves can fund repairs as needed, which also minimizes costs over time. These practices help to avoid unexpected expenses to replace major structural components – like roofs and support beams - and other building systems that impact the safety of Portland residents and City employees. Additionally, utilizing funds for ongoing preventative maintenance can help keep a wide range of building components in good condition for longer periods of time.

Diverse Funding Sources

While the majority of BIBS Facilities services are financed through IAs with City bureaus, other funding allocated for civic facilities and assets comes from different sources within Portland's public finance system. These different sources complicate the management and maintenance of civic facilities and assets because each source comes with different provisions about how funds can be spent. Revenue received for the use of one facility or asset category cannot be used for another facility or asset category. Similarly, debt financing for projects in one facility or asset category cannot be used for projects in another facility or asset category.

Changing Codes, Regulations, and Policies

City-owned facilities are constructed and maintained to meet a wide range of codes, policies, standards, and regulations. While codes and regulations stemming from the federal or state level take the form of mandates with specified consequences, other standards and policies serve as more general guidelines that demonstrate the City's commitment to issues like public art, sustainability, and equity. When any of these standards are changed or updated, it can require unanticipated expenditures to bring facilities up-to-date.

The changing regulatory and policy environment can make it difficult to plan for investments in civic facilities and assets, particularly at a time when innovations in building materials and technology continue to develop at a rapid pace. While new codes, regulations, and policies generally produce effective results and operational improvements, the financing necessary for these changes is often placed in direct competition with the funds available for other basic programmatic needs.

Innovations in Sustainability

Municipal services in Portland have become increasingly sophisticated, regularly changing to accommodate new technologies and evolving policy priorities.

For example, several innovative Green Fleet initiatives have been implemented in recent years to help the City meet current sustainability goals. These initiatives analyze City vehicles and pieces of equipment to determine the optimal balance between functionality, fuel type, fuel consumption, and cost. CityFleet utilizes various strategies to realize this balance, offering a broad array of clean fuel technologies and low-emission vehicles to their customers.

Similar technological innovations for buildings, facilities, vehicles, and equipment will no doubt continue to develop in the coming years. The City will likely have several opportunities to capitalize upon these innovations to strengthen energy independence, decrease operating costs, and increase Portland's resilience to changes in the environment.



Regulatory Compliance

Though public facilities planning for civic facilities and assets is not mandated by the State of Oregon, other regulations, standards, and guidelines apply to the City's development, management, and maintenance of these assets. The following list highlights the most relevant of these regulations, standards, and guidelines, but is not intended to be a complete list:

- City of Portland's planning and zoning policies, plans, and regulations, including the **Comprehensive Plan, Zoning Code, and Zoning Map**, provide both guidelines and regulations related to wide array of topic such as land use, building mass and placement, parking and loading, and where applicable, required land use reviews. Portland's plans, policies, and regulations incorporate and are consistent with **regional, state, and federal planning requirements** such as Metro's Regional Framework Plan, Oregon's Statewide Planning Goals, and where applicable, the National Historic Preservation Act.
- A wide range of **building and development codes and regulations** are applied through the City of Portland's building permit and inspection processes, including requirements related to structural components, fire and life safety, accessibility, plumbing, electricity, heating and ventilation, and other issues related to development.
- The **Environmental Protection Agency (EPA)** implements several national regulations related to environmental health and greenhouse gas emissions that impact CityFleet.
- The **Americans with Disabilities Act (ADA)** addresses accessibility of public facilities and programs.
- The **Elevators division** of the Department of Administrative Services (DAS) is responsible for

statewide elevator code development, interpretation, and enforcement.

- The **2007 Portland Fire Code**, which is based on the **2007 Oregon Fire Code** and the **International Fire Code (IFC)**, is implemented by the City of Portland Fire Marshall and provides development and design guidelines to reduce loss of life and property due to fire.
- The **Oregon Department of Environmental Quality (DEQ)** is the State agency tasked with protecting the health and quality of Oregon’s natural environment. Oregon DEQ implements a variety of regulations, including the discharge of pollutants and other hazardous materials, which impact vehicles, apparatus, and facilities used for fueling or de-icing.
- The **Oregon Occupational Health and Safety Division (OR-OSHA)** requires that buildings and facilities comply with statewide environmental controls related to safety, sanitation, and public health.
- The **Oregon Department of Public Safety Standards and Training** is responsible for security-related regulations when required for a project.
- **Leadership in Energy & Environmental Design (LEED)** certification standards are related to existing buildings and new construction.
- The **Department of Justice (DOJ) Community Policing Standards** and **Commission on Accreditation for Law Enforcement Agencies (CALEA)** provide standards for police facilities.

Investment Strategy

Unlike other City-owned infrastructure assets, civic facilities and assets are not related to the provision of a State-mandated public service – like water or sewer. Investment strategies in the Citywide Systems Plan are generally intended to eliminate service gaps and ensure service provision inside of city boundaries. However, an investment strategy for civic facilities and assets is not a required public facilities plan component.

At the current time, the City lacks a systematic method to quantify these needs for civic facilities and assets. As a result, the needs and improvements identified in this section were not informed by a detailed assessment of how to bring the system’s current capacity to a level that can support future development patterns. Instead, this strategy is primarily oriented around improving the current investment process, highlighting some planned and recently completed projects.

Process

Investments in capital improvements for civic facilities and assets seldom result from a linear decision-making process. While there are annual inspections and reviews that provide a foundation for these investment decisions, they are usually made in a less predictable, more opportunistic manner based on funding availability or shared interests among bureaus and other agencies.

The need for a capital investment can be determined based on a comparison between the current operational needs of the primary user and the capacity of the facility or asset. For example, the Kerby Garage facility, originally built as a stable for the City’s equestrian division, does not have sufficient capacity to accommodate CityFleet’s current facility needs.

Once an individual agency need is recognized, common needs can be identified between City agencies. For example, if one bureau is looking to expand, and another bureau is holding surplus property nearby, partnerships can be formed to move forward with the expansion in a way that maximizes benefits for each party.

In other instances, City agencies find opportunities to meet their needs by joining with other agencies on previously planned projects. These resourceful partnerships have become an important tool for City agencies seeking funding when available resources are limited. Not only can partnerships allow more parties to benefit from a public expenditure, but they can also help avoid situations where one bureau is competing with another for funding. This approach also allows bureaus to work together to identify applicable goals and policies, consider current City Council priorities, and ultimately present an actionable proposal for Council approval.

Planned Projects and Improvements

BIBS Facilities and OMF are continually pursuing new projects and improvements to increase their capacity to address facility needs and facilitate the delivery of public services. Notable amongst these planned projects is a scheduled renovation of the 9-1-1 Center – sometimes referred to as the Portland Communications Center.

9-1-1 Center

BIBS Facilities is currently working with BOEC to upgrade the existing 9-1-1 Center. While renovation planning is still underway, the project is intended to address current facility needs that include leaks in the roof structure and an ineffective HVAC system.

This renovation will likely face significant logistical challenges due to the fact that the City's emergency response operations and equipment will need to remain functional on a 24-7 basis throughout the duration of construction. It could be costly, time-intensive, and inefficient to temporarily relocate these operations and equipment while the facility is being upgraded. However, it will be critical to retain emergency communications services at all times to ensure public safety and citywide emergency preparedness. The Emergency Response section includes more information about planned projects and recommended improvements related to other emergency response infrastructure.

Recent Projects

BIBS Facilities seeks to maintain and improve civic facilities and assets through their property management and facility planning services. These efforts vary in complexity from the construction of entirely new, state-of-the-art facilities to everyday maintenance and repair for existing facilities. A notable recent project is the construction of the Emergency Coordination Center (ECC), which was completed in January 2014.

Emergency Coordination Center (ECC)

The ECC project arose in order to address needs within the City's provision of emergency response services. The facility was designed to equip tenants with more space to provide emergency coordination

services, a larger parking lot to accommodate standby emergency vehicles, and a 150-foot telecommunications tower. The \$19.8 million facility was financed through a multi-agency partnership, and is now occupied by the Portland Bureau of Emergency Management and the Portland Water Bureau's Emergency Management and Security offices.

The facility, located on SE Bush Street and SE 99th Avenue, is connected to the existing building for the 9-1-1 Center to facilitate co-location with BOEC. The ECC acts as a nexus for citywide coordination in the event of an emergency, with several design features and building systems included to ensure continuity of operations with or without access to primary sources of energy or communications technology. The Emergency Response section includes additional information about the Portland Bureau of Emergency Management, the Bureau of Emergency Communications, and the City's emergency response infrastructure.

Major Needs & Recommended Improvements

The following sections highlight a few significant projects and procedural changes that will impact the investment strategy for civic facilities and assets. The Buildings and Assets section describes buildings that have received a great deal of public attention due to pressing maintenance and repair needs, and explains the current status of efforts to improve these facilities. The Process and Management section describes other important needs that are not necessarily tied to an individual building or project, and identifies ways to improve decision-making processes for investments in this set of assets.

Buildings & Assets

Many of Portland's most prominent buildings and facilities are showing the impact of deferred maintenance. The following buildings and assets are in need of significant attention to maintain their viability for the coming twenty-year planning horizon.



The Portland Building

The Portland Building is a fifteen-story office building that houses several municipal agencies and departments, including the Bureau of Environmental Services, the Portland Bureau of Transportation, Portland Parks and Recreation, the Portland Water Bureau, and OMF.

The building, opened in 1982, is renowned for its status as the world's first major postmodern work of architecture, and was placed on the National Register of Historic Places in 2011. Many structural components and operating systems are in need of repair. A recent assessment by BIBS Facilities included an initial estimate of \$95 million for one potential renovation option for the Portland Building. Though demolition and redevelopment scenarios are being considered, the future of the building remains uncertain.



Veterans Memorial Coliseum

The Veterans Memorial Coliseum (VMC) has a capacity of almost 10,000 seats and currently hosts over 100 events per year. The facility opened in 1960 and many building components are now in need of repair due to years of underfunded major maintenance and inadequate replacement reserves. Needs include the repair or replacement of structural components of the building's rectangular shell and roof, inefficient heating systems, and a lack of ventilation to accommodate cooking at concession stands.

The VMC has a celebrated history; it was dedicated to veterans of all wars when it opened, and was placed on the National Register of Historic Places in September 2009. Several alternate uses and renovation ideas have been proposed for the facility in recent years. An extensive community engagement process and years of planning for a catalytic investment project were placed on hiatus in 2012 when plans did not move forward. The City is currently planning for the future of the facility.

Performing Arts Facilities

The Portland's 5 Centers for the Arts offers five venues in three City-owned facilities³, providing arts and entertainment to the entire region. The collection of facilities comprises the 5th largest performing arts center in the country. These facilities bring over 1,000 music, theater, dance, and lecture performances to Portland every year, generating an annual average of \$60 million dollars⁴ in regional spending.

These buildings are owned by the City, with Metro handling operational oversight and management responsibilities. At the current time, many unknowns remain regarding the facilities' needs and funding sources for major systems replacements and building upgrades.

Westside Emergency Response Center

The former SFC. Jerome F. Sears U.S. Army Reserve Center was acquired by the City through the Federal Base Realignment and Closure process. The location and size of the property make it suitable as an emergency response staging facility on the west side of the Willamette River, particularly because most of the City's emergency response equipment and offices are currently located on the east side. A facility at this site could serve the operational needs of Portland Fire and Rescue and the Portland Police Bureau, and play an integral role in any coordinated citywide emergency response strategy.

The building, originally built in the 1950s, would need to be brought up to current building standards in order to properly function as a backup staging center, de-icing facility and fueling station. The future use of the facility is uncertain. Efforts to complete necessary zoning changes are moving forward, as is the identification of funding for the full range of improvements required for City occupation. In total this work is estimated to cost approximately \$11 to \$12 million.

Process and Management

There are other pressing needs that extend beyond an individual building or facility. The following topics reflect needs regarding the process of planning, managing, maintaining, and repairing civic facilities and assets.

Major Maintenance and Replacements

BIBS Facilities collects a major maintenance and replacements reserve fund through its rental rates on all managed properties. The acknowledged industry standard is to build 3% of a building's replacement value into the rental rates to fund these reserves on an annual basis. Currently, the City has built in approximately 1.2% of replacement value into rental rates for facilities owned by OMF.

Collecting less than the industry standard for reserve funding has led to a significant cumulative funding gap for major maintenance and replacements. Similar challenges are shared by other property-owning bureaus, many of which lack funding strategies. A system-wide review could better assess current

³ The Portland's 5 Centers for the Arts includes the Arlene Schnitzer Concert Hall, the Keller Auditorium, and the Antoinette Hatfield Hall which is home to the Brunish, Newmark, and Winningstad Theaters.

⁴ Portland Center for the Performing Arts (now called Portland's 5 Centers for the Arts), 2011-2012 Annual Report.

funding strategies and prioritize investments to provide more reliable sources of funding for major maintenance reserves.

Holistic Facilities Planning

There is no existing, coordinated plan to prioritize and evaluate investments in civic facilities and assets. Major facility projects and capital improvements are typically implemented on an ad-hoc basis, with annual investment decisions often tied to a bureau's budget proposal. The result is a segregated approach that does not maximize the efficiencies of making investments that provide mutual benefits to multiple City agencies. This approach also does not capitalize on the capacity for coordination that already exists between bureaus to develop opportunistic partnerships for underfunded projects.

A more comprehensive, integrated facilities planning approach for all City-owned or City-managed facilities could be beneficial. While individual agencies currently do their own internal strategic planning, these approaches could be analyzed across bureaus in order to assess facilities needs more thoroughly on a City-wide scale. With participation from agency representatives, facilities needs could be more effectively and efficiently addressed across the board.

Improving Asset Management

The City's existing asset management process provides a methodology for assessing the condition of assets in relatively broad terms – “very good”, “good”, “fair”, “poor”, and “very poor”. While it is helpful to understand the condition of assets using these categories, a greater level of detail is needed to more substantially inform decision making.

In collaboration with the City Asset Managers Group, BIBS Facilities has been working to update and improve the Facilities Condition Assessment used for civic assets and facilities. This more detailed approach to facility assessment will be available to all City infrastructure bureaus. This effort may strengthen the asset management foundation, better facilitate inter-bureau coordination for projects and improvements, and enhance the information available about facility needs throughout the city.

Financial Strategy

Financial strategies in the Citywide Systems Plan are normally intended to address the needs and recommendations identified in the investment strategy. For instance, if the investment strategy points out the need for a new road, the financial strategy is supposed to define ways to finance it. There is no State requirement to provide a financial strategy for civic facilities and assets. In addition, because needs and recommendations for civic facilities and assets aren't currently able to be analyzed at this level of detail, it is difficult to present a corresponding financial strategy. Without the capacity to evaluate required levels of service and develop a project list that will help accommodate those levels of service, financial planning for civic facilities and assets is primarily responsive and opportunistic.

The Sources of Revenue section describes significant sources of funding for each type of asset. The Financial Challenges section identifies funding gaps and other financial issues that affect these assets.

Future efforts to develop a financial strategy could use this information as a starting point, as these challenges will need to be addressed in order for any strategy to be successfully implemented.

Sources of Revenue

The operations of BIBS Facilities depend largely upon revenue collected through rental rates. Historically, the City has tried to limit rental rate increases to prevent potential cuts to services.

Major maintenance money for most City-owned office buildings, maintenance facilities, the 9-1-1 Center, and the Archives and Records Center comes out of rental rate revenue. Rental rates account for the full spectrum of services offered by BIBS Facilities, including overhead costs and other non-billable time. Major maintenance money is also gathered through net income from Union Station, a Portland Development Commission facility managed by the City, a portion of which is used to fund improvements at that facility. Most of these agreements are negotiated through either IAs between City agencies or IGAs between a City agency and another public agency.

CityFleet operates similarly to a private business, billing their customers for services rendered using burdened labor rates, parts, and fuel charges – all charges that include overhead costs.

Major projects and capital improvements for civic facilities and assets are sometimes financed through long-term financing. Bonds, loans or lines of credit can be used to provide funds for a project that cannot otherwise be paid for through the existing resources of the City’s General Fund or rates paid to bureaus for services. General obligation bond measures can be placed on voter ballots, and if approved create a new property tax that supports a reliable, low-interest form of financing for public projects. Taxpayers then fund the resulting annual debt service. Capital improvements and major projects can also be funded through other forms of debt financing supported by resources other than voter-approved property taxes.

Financial Challenges

The City uses an asset management approach to document the condition of its property and make informed investment decisions. The financial condition of these assets is primarily indicated by their annual funding gaps; where noted, a one-time funding gap is used (see Table 10.5).

Table 10.5 Civic Facilities & Assets annual funding gaps, 2013

Capital asset type	Value (in millions)				Confidence level
	R/R/R	Mandate	Capacity	Total	
Office buildings	\$2.2	\$0.0	\$0.0	\$2.2	4 – High
Other buildings	\$1.3	\$0.0	\$0.0	\$1.3	4 – High
PDC facilities	NA	NA	NA	NA	4 – High
Spectator facilities *	NA	NA	NA	NA	4 – High
Performing arts facilities **	TBD	TBD	TBD	TBD	TBD
Total for Civic Facilities & Assets	\$3.5	\$0.0	\$0.0	\$3.5	

R/R/R (Repair, Rehabilitation, Replacement): Additional funding necessary to repair, rehabilitate and replace existing assets to bring them up to established service levels, or replace assets considered functionally obsolete (not meeting those service levels).

Mandate: Additional funding necessary to improve existing assets to meet regulatory requirements, exclusive of improvements that fall under R/R/R or capacity.

Capacity: Additional funding necessary to address existing inequities and deficiencies in levels of service for current customers and citizens.

* Spectator facilities fund gaps are of a one-time nature: \$35M for reserves funding.

** OMF is beginning to work with Metro/MERC on the status of performing arts facilities.

For assets in the “office buildings” and “other buildings” groups, this funding gap is calculated by determining the annual difference between what is collected in rental rates⁵ or set aside from net income for major maintenance and the industry standard of 3 percent of replacement value. The Office of Management and Finance is currently only able to reinvest about 1.2 percent of the replacement value of these civic facilities and assets on an annual basis. The level of reinvestment in major maintenance has declined in recent years, due to rapidly escalating costs to replace buildings (above regular inflation), the increase in the number of new facilities, and rate reductions to meet the declining resources of users of civic facilities and assets.

The funding gap created by this 1.2 percent of replacement value reinvestment will not allow OMF to cover major maintenance and replacement needs for civic facilities and assets for the next five years, with many projects being pushed back beyond this timeframe. Regardless, this is not a severe enough funding gap to force a decrease in the overall condition of individual assets from their current broad designations as either “good”, “fair” or “poor” within a 10-year planning horizon. Since the likelihood of rental rate increases is low, funding for major maintenance should be increased. One way to reduce the funding gap is to direct savings from efficiency improvements to major maintenance reserves.

For spectator facilities and Union Station, the funding gap is noted as the one-time difference between actual fund reserves for capital maintenance and estimated costs to address the deferred maintenance at Veterans Memorial Coliseum and Union Station. For Union Station, the best resource for addressing maintenance needs are grant funds. Recently grant funds have been used mainly for the roof structure, which is the facility’s most pressing need.

⁵ Rental rate increases for City facilities are limited to CPI, though there may be cost element factors that are in excess of CPI.

TECHNOLOGY SYSTEMS

Introduction

Technology systems come in a multitude of forms, with a range encompassing computer hardware and software, voicemail systems, video systems, microwave radio systems and other radio equipment, and transmission towers.

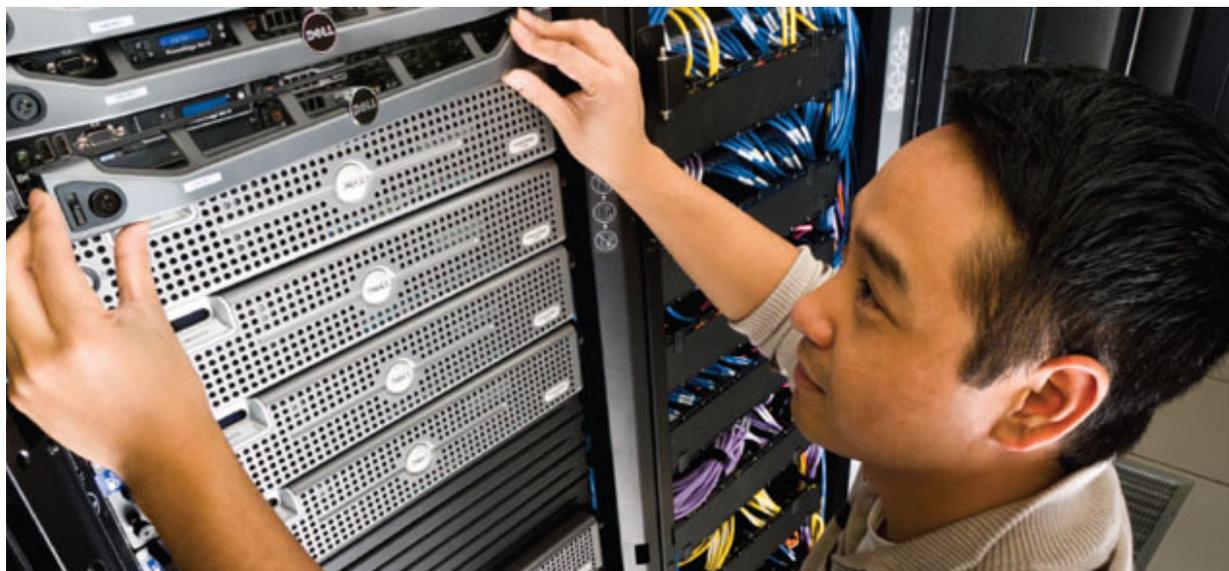
These systems have a direct impact upon nearly every City agency's ability to provide services ranging from routine correspondence to emergency response. They enable City agencies to operate more efficiently, with many bureaus relying on sophisticated modeling software, monitoring systems, and databases for construction permitting, land use planning, spatial analysis, and a variety of administrative processes. Reliable, innovative technology systems play a critical role in Portland's status as a resilient, prosperous, modern city, with many predicting that the importance of these systems will only continue to increase throughout the Comprehensive Plan's twenty-year planning horizon.

It can be challenging to analyze these systems using language and concepts associated with more traditional infrastructure systems. The operational capacity of technology and its potential to impact services is constantly in flux, which makes it difficult to measure performance and conduct meaningful long-range planning. When the original Comprehensive Plan was drafted in the late 1980s it would have been impossible to predict the form and magnitude of change that the internet and other corporate software applications would affect. Because the pace of technological innovation is continuing to accelerate, the future is likely to bring several opportunities for the City to consider new and potentially groundbreaking technologies.

Many City bureaus are capitalizing on opportunities to invest in and utilize innovative technology systems, including cloud computing, interactive mapping applications, and mobile payment systems to streamline operations. Though these technologies may become outdated in the coming years, there will be emerging opportunities for the City to benefit from the evolving technological landscape within the twenty-year planning horizon.

Technology systems within the City of Portland are primarily handled by the Bureau of Technology Services (BTS). The Bureau of Technology Services is tasked with providing management, policy setting, strategic planning, and leadership in the use of computer, radio, and telecommunications technologies for the City. Other City bureaus own or manage specialized technology based assets, particularly computer software. While not the focus of this section, these non-BTS technologies are critical to the City's ability to deliver services. For example, SAP, the City's centralized financial and administrative business software, is integral many City functions.

This section begins with mission and vision statements from BTS, then discusses how technology systems impact an array of City services and programs. The section identifies some trends, issues, opportunities, major needs and associated recommendations for technology systems. It concludes with a brief discussion of the investment process and financial strategy currently utilized by BTS and the Office of Management and Finance (OMF) for City-owned technology assets.



Vision

There is no consolidated vision for technology systems at this point in time, though BTS has developed their own bureau-specific vision statements. Based on these statements, the following vision statement has been developed for technology systems for the purposes of this document:

The City of Portland's technology systems provide forward-thinking solutions for local government. They enable members of the public to engage with City agencies and programs, and help to facilitate a two-way dialogue between residents and government officials. The Bureau of Technology Services aims to be a recognized leader in municipal technology systems, and a valued strategic partner to public- and private-sector efforts that support innovative and resilient technology investments across the city.

In addition, the Corporate Geographic Information Systems program at BTS has a stated vision to "enable superior decision making by providing the highest quality geospatial information to all, anytime, anyplace, and on any platform, in order to provide the highest level of City services".

Mission

Technology systems also lack a consolidated mission statement relevant to this document. Similar to the vision statements, there are a few bureau-specific mission statements that apply to the assets in this section. The following mission statement was developed for the purposes of this document, and is intended to incorporate bureau-specific language through the lens of technology systems:

The Bureau of Technology Services provides innovative, reliable, and secure technology services and strategic leadership in alignment with the needs of the City of Portland, the public, and regional partners. Individual services provided by BTS support the City's goal to deliver efficient, effective, and accountable municipal services, as well as OMF's goal to maximize the cost effective use of technology. These services maintain a world class production technology environment, support mission critical voice and

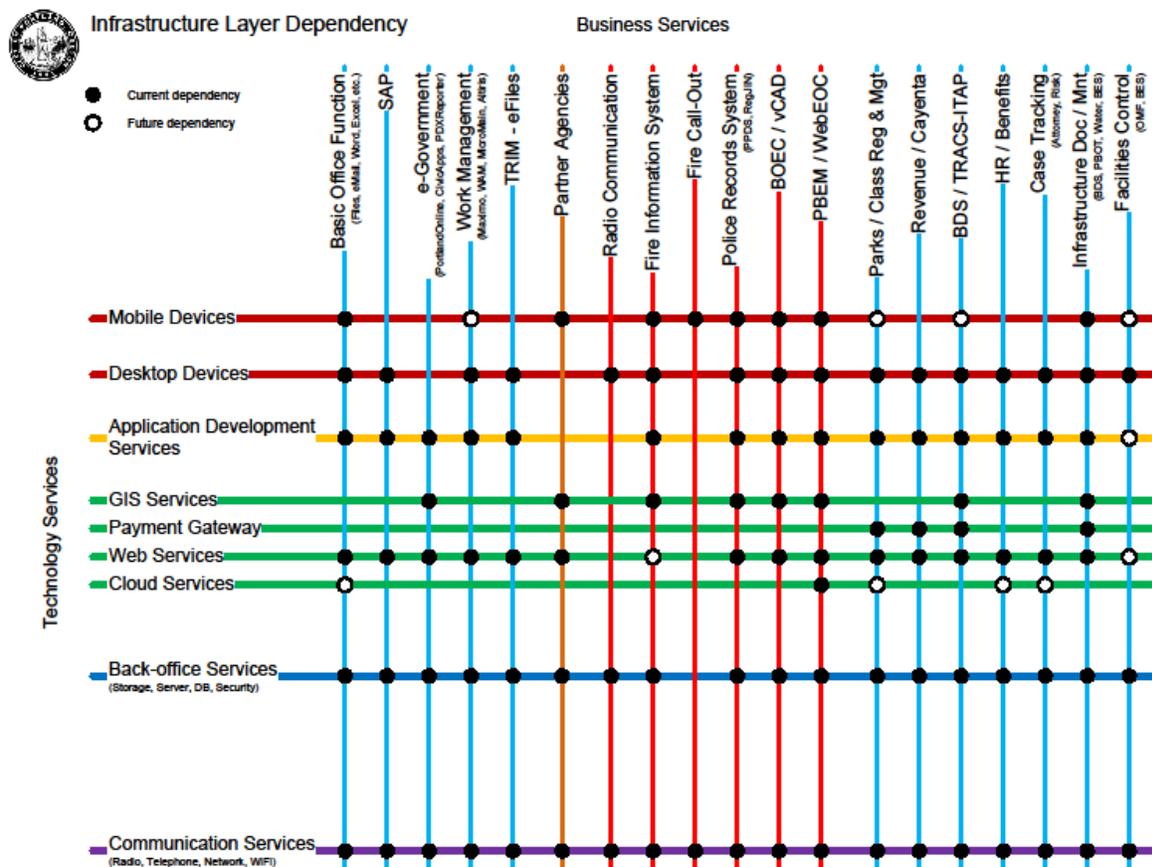
data communications needs, and employ appropriate safeguards required in order to protect the City's information assets.

The Corporate Geographic Information Systems program at BTS also has a mission to “improve the delivery of City services to the public by providing strategic geospatial technology and services that promote informed decision making, foster collaborative partnerships, and enable access to data wherever it is needed”.

Services Provided

The City's major technology systems are all integrated to a significant extent (see Figure 10.2). This means that operations for most BTS technology systems are dependent upon access to other BTS systems, and all systems within this matrix are important for everyday service provision. This matrix of systems has a very broad influence on public service provision, and this influence will continue to expand during the next twenty years.

Figure 10.2 Technology Systems Service Dependency Grid



Technology systems allow City bureaus to perform the wide array of services that rely upon the use of technology. Services provided and impacted by technology systems include:

- Communications services, including telephony;
- Life safety and emergency communications, coordination, prevention, and response services;
- Water provision, transportation services, and nearly every other public service described elsewhere in the Citywide Systems Plan;
- Public access to City websites and internet databases;
- Internal business services;
- Digital archives and data storage services; and
- The ability to take payment for services using credit or debit cards.

Levels of Service

The Bureau of Technology Services uses a long list of performance metrics to assess service provision. The Bureau of Technology Services is not subject to State comprehensive planning requirements to meet any specific service levels. A few key metrics related to public services include.

- The percentage of time Radio Systems operated without failure;
- The average number of unique visitors per day to PortlandOnline;
- The average number of maps per day viewed through PortlandMaps;
- Customer service satisfaction ratings;
- Payment gateway availability; and
- Mission critical communications and production systems availability.

In addition, BTS has several performance metrics for services provided internally to other City bureaus or employees. These include metrics related to support call response times, information security, time spent deploying new software or hardware, and the percentage of time that internet service is available to City staff members.

Service Area

Physical boundaries are less relevant to technology systems than other citywide systems, because much of this technology is either mobile or accessible from remote locations. Most of the technology systems supported by BTS are primarily for the use of the City of Portland and are primarily used within the municipal boundaries as defined by the City's urban growth boundary. However, some of them, including some public safety systems such as Computer-Aided Dispatch and the radio system, are also used by agencies outside of City boundaries.

Other technology systems are used by City agencies outside of city boundaries to support City needs. For instance, the Portland Water Bureau utilizes BTS hardware and software at the Bull Run Reservoir site to support watershed operations. Future years may also bring about other reasons to maintain facilities

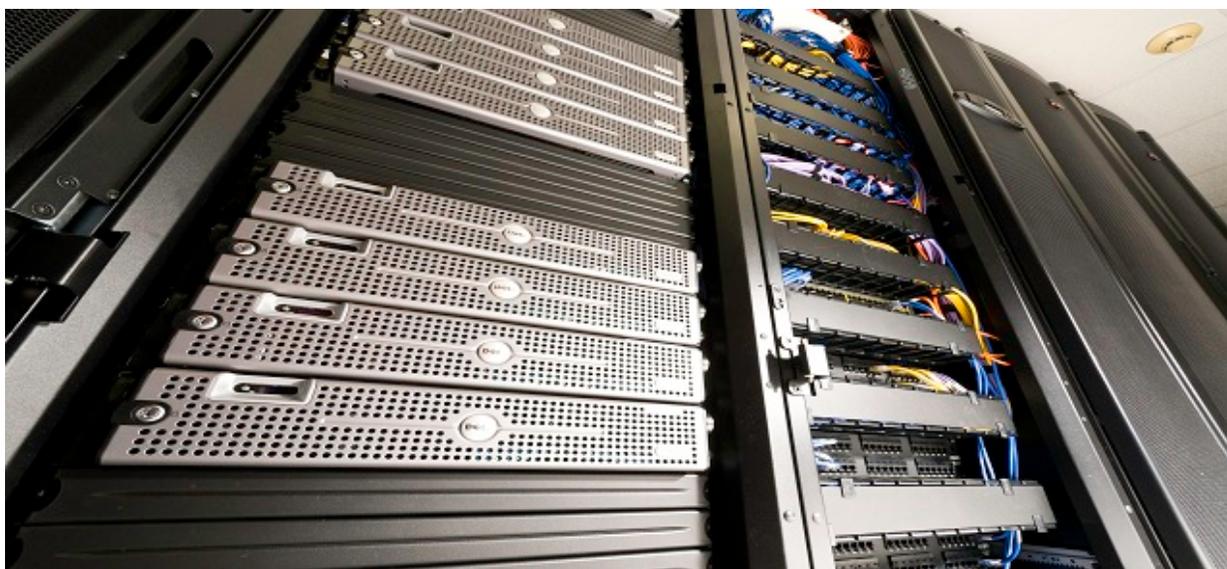
outside of city boundaries to serve needs in Portland – including redundant data centers located remotely to ensure access to important private data servers in the event of an emergency.

Service Agreements

The Bureau of Technology Services has interagency agreements (IAs) with nearly every City bureau. Funds received through IAs are deposited into the Technology Services Fund, an internal service fund that can only be funded through this source. Interagency charges are designed to approximate the cost of the services consumed by the service receivers. These IAs comprise the bulk of the funding for the services BTS provides, and as such most BTS services are provided internally to other City bureaus.

The Bureau of Technology Services also provides services to other agencies and jurisdictions through intergovernmental agreements (IGAs). Intergovernmental services range from 800 MHz simulcast and trucking radio services, to site usage at communications tower locations. The Bureau of Technology Services has negotiated IGAs with organizations including Metro, Tri-Met, Oregon Health and Sciences University, David Douglas School District, and the City of Lake Oswego – among others.

Fiber Network



The Communications program of Bureau of Technology Services manages the Integrated Regional Network Enterprise (IRNE), a fiber optic telecommunications network designed to carry all voice, video and data communications traffic for the City. In addition, IRNE provides high speed data transmission to other state and local government agencies. The IRNE has approximately 63 miles of fiber and 68 sites. The Communications program also oversees

approximately 135 miles of fiber/conduit that may be used for other public purposes or be leased to third parties in the future.

Inventory Summary

Components of technology systems include many different types of assets, ranging from obsolete to newer and more cutting edge equipment. This technology comes in a multitude of forms, with a range encompassing computer hardware and software, voicemail systems, video systems, microwave radio systems and other radio equipment, and transmission towers. See Table 10.6 for more information about technology system groups and replacement values.

Table 10.6 Technology Systems Groups and Replacement Values, 2013

Capital Asset class		Value (in millions)
BTS:	Communications	\$70.8
	Production services	\$2.8
	Strategic technology	\$6.2
Other bureaus:	Equipment and software	\$8.2
	Strategic technology	\$93.8
Total Technology Systems		\$181.8

Table 10.7 provides information about the current condition of technology systems. The condition ratings for these asset groups are based on current age and expected useful life cycle. Condition here is expressed as a percentage of assets, with systems that are considered to be obsolete included in the “poor” condition rating.

Table 10.7 Current Condition of Technology Systems

Technology systems by capital asset type		Current Condition (in %)					TBD	Confidence Level
		Very Good	Good	Fair	Poor	Very Poor		
BTS:	Communications	0	97	3	0	0	0	4 - High
	Production services	0	77	23	0	0	0	4 - High
	Strategic technology	0	84	16	0	0	0	4 - High
Other bureaus:	Equipment and software	0	100	0	0	0	0	4 - High
	Strategic technology	0	88	12	0	0	0	4 - High

The following paragraphs describe and provide examples to clarify each major grouping of technology systems assets.

Communications assets owned by BTS include data networks, the Integrated Regional Networking Enterprise telecommunications system, certain transmission towers, and the City’s 800 MHz radio system. These assets facilitate effective and reliable communication between City employees and agencies. For example, the City’s 800 MHz Radio System is used by a number of public safety agencies to coordinate emergency response and other critical communications.

Production services technology owned by BTS includes both virtual and physical servers, the City’s email system and storage area networks, application servers, and backup system hardware and software. These assets store data and facilitate internal communications within the City of Portland. For example, the City’s collection of servers houses software that provides database services to a large number of computers and other computer programs. These servers help display requested data for users within the City network, and perform data analysis and storage tasks necessary for managing large amounts of digital information.

Strategic technology owned by BTS includes both hardware and software for corporate applications such as E-Gov, E-Commerce, and Geographic Information Systems. This asset group also includes information security technology in the form of both hardware and software. Information security

technology is used to ensure continued functionality of the City's technology systems and to keep sensitive information or private data safe from viruses and other internet security threats. A good example of this would be the virus scan software installed on City-owned computers, which ensures that data or programs downloaded from the internet are safe and free of viruses.

Equipment and software owned by other bureaus, such as video systems, certain radio equipment, bureau PCs, and bureau laptops, facilitates access to technology services within individual City agencies, connecting City employees with the array of technology systems listed above. For example, email systems and strategic corporate applications can only be used by City agencies if they have PCs and laptops equipped to handle those functions.



Strategic technology owned by other bureaus includes corporate applications such as Computer-Aided Dispatch; the Portland Police Data System; the Customer Information System; and the Tracking, Review, Application and Construction System (TRACS). These applications help City agencies provide services by making information more accessible and streamlining administrative processes. For instance, TRACS helps the Bureau of Development Services assess permit requests and review construction plans for proposed projects. This also benefits builders and developers by tracking information on projects, reducing the amount of time spent on permitting processes, and reducing the number of trips to the Permit Center.

Key Issues, Trends, Opportunities

Constantly Evolving Technologies with Limited Lifespans

Technology of all types has a limited life span. At present, the increasing availability of high speed internet connections, open source code, “app stores”, cloud computing resources, and the increasing availability of good quality mobile devices with internet access are major influencers of technology. These drivers and influencers of technology will continue to evolve rapidly and can be expected to change significantly in short periods of time.

When technology exceeds its lifespan a variety of problems can occur, including failures, inability to maintain, inability to upgrade, and other problems. The City currently has a material investment in older technology that must continue to be maintained while other technology is evolving rapidly. It will continue to be a challenge to maintain important legacy systems while at the same time researching, adopting and implementing new technologies needed by the City in order to keep pace with the needs of Portlanders over the next twenty years.

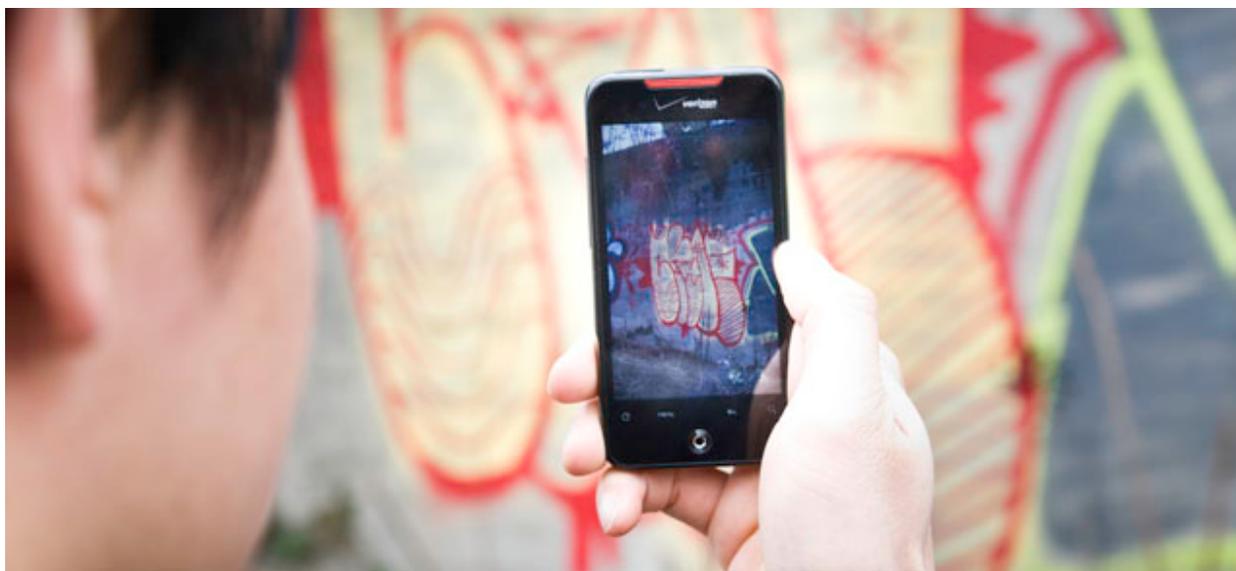
Cloud Computing

Recent years have seen a rise in the popularity of services such as servers, storage, and applications being delivered through the Internet. Commonly referred to as cloud computing, this development presents an opportunity to use resources more efficiently and reduce costs for City bureaus. The City has already started utilizing cloud technologies to a limited extent, with a future deployment of the cloud-based Office 365 software planned for all City bureaus.

If implemented properly, cloud computing has the potential to improve and streamline City operations. However, there are potential pitfalls that come along with storing private or sensitive government information on the internet. As with many technologies, the City has to balance the potential for operational efficiency with a need for the highest level of information security for private data.

Mobile Computing and a Mobile Workforce

Mobile computing has allowed citizens and employees to use technology tools virtually anytime and anywhere without the need to be in a certain location – such as an office. This technology is already making it possible for City employees who work in the field to use mobile tools to allow them to work more efficiently. It also presents opportunities to explore different office space arrangements that would allow City employees to work remotely on a more regular basis, as appropriate.



Consumerization of Technology

Employees and citizens own a variety of technology tools, such as smartphones and tablets, and many people expect to be able to use them when interacting with the City to obtain information or pay for services. This consumerization of technology presents an opportunity to allow the use of personal technology where it supports the City's mission, while making certain that City systems are protected from viruses and malware.

"The Internet of Things"

Another emerging technology trend is "the internet of things" where devices and machines communicate via the internet without the intervention of humans. These devices can sense aspects of the real world, like temperature, location, pressure, fluid levels, and other key indicators, assess that data, and act according to program needs. One example is the driverless car technology being developed by Google and other companies. This technology could be used by a pump programed to assess water levels and turn on when reach a certain height was reached to activate drainage at that location

These capabilities are an emerging driver in the technology field, and it is likely that vendors will start to provide the City with solutions informed by this concept in the near future. Though this technology might seem outdated by the end of the twenty-year planning horizon for the Citywide Systems Plan, it could have a large influence on future technology decisions within the City.

Regulatory Compliance

Though technology systems do not have to comply with quite as many regulations and restrictions as other infrastructure systems, there are still a few relevant standards and guidelines that impact BTS services:

- The use of payment cards (debit and credit cards) is overseen by the Payment Card Industry (PCI) group. This results in periodic audits to evaluate the safeguards applied to the handling of this data in order to prevent identity theft and other misuse. The City processes over 130 million payment card transactions annually.
- The City adheres to the guidelines of the Health Insurance Portability and Accountability Act (HIPAA) which outlines privacy rules for information about an individual's health.
- Certain data, such as law enforcement data, medical data and personally identifiable information (e.g. Social Security numbers) requires a high level of confidentiality. Steps are taken to ensure the proper access to these data.

Investment Strategy

Technology systems require strategic investments in order to stay current with a constantly progressing technological landscape. The City's asset management practices, as well as other internal working groups, have developed a few guidelines and recommendations to inform these investments. These longer-term strategies are often supplemented by flexibility in the short-term, with other more incremental

decisions being made along the way to capitalize on strategic opportunities or recent technological advancements.

Process

Five-year maintenance and replacement plans for technology systems are prepared through OMF's Asset Management program. These plans are produced by BTS staff responsible for asset management, and are refined by a management review group. Priority is given to items that support public safety, improve reliability and availability of critical data systems, and improve efficiency and reduce costs through the consolidation of infrastructure. The Bureau of Technology Services also recently embarked upon a Citywide Technology Assessment, which has resulted in additional recommendations to strengthen the City's technology investment and decision-making processes.

The Bureau of Technology Services currently employs a formal intake process when new work is identified. This practice is supplemented by the use of portfolio management software, which provides a comprehensive picture of the entire BTS work queue as well as the demands the project is anticipated to have on City resources. Major influencers for short-term decisions include the urgency of the need, the availability of funding, the presence of executive support, and the capacity for revenue generation. Certain large technology projects are overseen by the Technology Oversight Committee (TOC), where citizen members review the projects, ask questions, and provide suggestions. TOC reports are also shared periodically by the Chief Administrative Officer with City Council.

Recent and Ongoing Projects

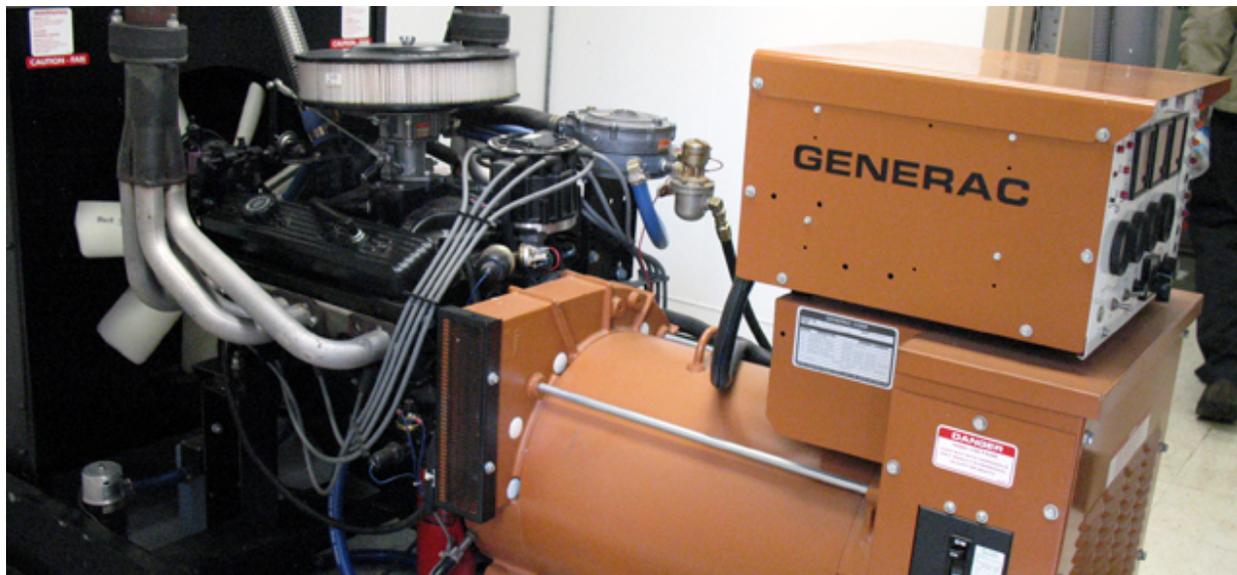
The Bureau of Technology Services is continually implementing any number of projects that aim to provide solutions through technology systems for both City staff and the general public. Recently completed projects include the deployment of Windows 7. Current projects include the deployment of Office 365 and the implementation of the Public Safety Systems Revitalization Project.

Windows 7 & Office 365

The Bureau of Technology Services is currently finishing the deployment of the Windows 7 operating system for all City bureaus. In addition, Office 365, the online version of Microsoft's office suite, is in the process of being deployed citywide.

Public Safety Systems Revitalization Project (PSSRP)

The Office of Management and Finance has established a multi-bureau committee to address the replacement of major public safety technology systems including the 800 MHz radio system, Computer-Aided Dispatch for the Bureau of Emergency Communications, and Portland Police Data System. This work, called the Public Safety Systems Revitalization Project (PSSRP), is addressing funding, governance, coordination, timing, and other issues related to the replacement of these major technology systems.



Planned Projects and Improvements

There are several other projects that are expected to be completed in the next five to ten years. Some of these anticipated projects include replacements of portions of the City's Integrated Regional Networking Enterprise system, production services assets such as storage area networks and servers, and various strategic corporate applications. For instance, the Portland Police Data System is planned to be replaced by a new system called RegJIN by Spring 2015. Additionally, if the 311 Call Center (see p. 347) moves forward it is likely to include a significant technology component.

Major Needs & Recommended Improvements

The following section highlights some projects and procedural changes that would be in alignment with the investment strategy for technology systems. These include expanded system performance metrics; the adoption of an integrated, inclusive decision-making process; and improved disaster recovery planning for technology.

Expanded System Performance Metrics

The Bureau of Technology Services measures both the performance of selected systems and customer experience. There is a need to measure additional characteristics of system performance, such as energy

use, in order to find opportunities for additional efficiencies, Measuring system performance can also help to inform strategic planning and decisions about the purchase of new or replacement technology.

In addition, metrics can provide guidance about system and network load and sizing, thus helping to determine whether the components are the right fit for the work load. This information is useful when expanding or replacing the system. Data centers are notoriously heavy consumers of electricity, which is needed to run technology equipment and to manage temperature and humidity. Expanded system monitoring and performance metrics could provide more precise information about energy consumption and energy savings as changes are made to improve efficiency.

Integrated, Inclusive Decision-Making Process

The City could benefit from a more robust methodology to evaluate the costs and benefits of proposed technology investments before they are approved. This could lead to better assessments of each requested technology systems project by considering factors such as life-cycle cost, which identifies not only purchase and implementation costs but also the cost of maintenance and upgrades. This would allow the City as a whole to make more informed investment decisions and reject projects that do not demonstrate adequate value.

The recent Citywide Technology Assessment conducted by BTS has brought forth some recommendations about best practices and governance. Among these is the recommendation to create Communities of Interest, a collaborative venue for bureaus with similar technology needs to consider solutions that span multiple bureaus. This would increase efficiency and cost savings, and could provide a more complete view of technology needs across the City.

Disaster Recovery Planning for Technology

The City needs a robust disaster recovery plan that includes technology systems in order to prepare for City services to continue during and after a disaster. The implementation of such a plan is critical to Portland's emergency response capacity, and could contribute to the resiliency of many essential City services and programs. The Bureau of Technology Services is working on a plan for technology systems disaster recovery.

Financial Strategy

As mentioned elsewhere in this chapter, financial strategies in the Citywide Systems Plan usually address the needs and recommendations identified in the investment strategy. There is no state requirement to develop a financial strategy for technology systems, and needs and recommendations for technology systems are not able to be analyzed at this level of detail. Without the capacity to develop a project list or detailed investment strategy, financial planning for technology systems will necessarily remain responsive and opportunistic.

The following is a description of the significant sources of funding for capital asset groups included in the Technology Systems section, and a discussion of funding gaps and other financial issues that affect

these assets. Future efforts to develop a financial strategy should use this information as a starting point, as these challenges will need to be addressed in order for any strategy to be successfully implemented.

Sources of Revenue

At this time, the sole sources of revenue for BTS are IGAs and IAs related to service provision. Revenue received from these agreements flows through the Technology Services Fund, an internal services fund requiring that revenue received be used to fund BTS operations. Bureau of Technology Services IA charges are designed to cover the cost of the services consumed by the service receivers.

Other critical projects are usually funded using one-time fund balances or other one-time allocations included in annual bureau-specific budget proposals. Additionally, replacements are sometimes funded through reserve funds.

Due to the fact that technology systems projects benefit different bureaus in different ways, their associated funding sources can vary depending upon the project and its intended scope. For instance, the PSSRP was financed partially through General Obligation bonds approved by voters. This funding source was used to complement a mix of debt and cash financing for the project that was approved by Council as part of prior budget processes.

Financial Challenges

Establishing replacement values, current conditions, and funding gaps for technology systems requires a different approach than for other City assets. This is primarily due to the short lives and quick obsolescence of technology assets. Another important factor is the critical need to stay current with technologies that may not be supported by vendors in the future, which can render the technology unusable. For example, Microsoft recently stopped providing customer support for the Windows XP operating system, which prompted most users to upgrade to the newer Windows 7.

Bureau of Technology Services rates currently only include partial funding for major maintenance and replacement systems. This significant long-term financial challenge is compounded by the fact that replacement values for technology assets are difficult to assess with any certainty, even on a short-term basis. Currently BTS estimates the replacement value of technology assets based on recently completed projects and a rough assessment of the experiences of other governments. The Bureau of Technology Services includes the indirect costs for engineering and other professional services in these replacement values

Another pertinent issue is the value of the revenue lost when technology systems malfunction or become inaccessible. Glitches or other technology failures can result in electronic payments being dropped, valuable data disappearing, and a variety of other negative consequences. Though lost revenue is not incorporated into calculations of the value of technology assets, it has a direct impact on the value of these systems to both City staff and the members of the public that utilize technology systems.

Annual funding gaps and other relevant financial information has been compiled in Table 10.8. Annual funding gap calculations include annual funding necessary to meet industry standards for major

maintenance, and annual needs to ensure replacement and upgrades of technology on accepted schedules.

Table 10.8 Technology Systems Annual Funding Gaps, 2013

Capital asset type		Value* (in millions)				Confidence level
		R/R/R	Mandate	Capacity	Total	
BTS:	Communications	\$5.4	\$0.0	\$0.0	\$5.4	4 – High
	Production services	\$0.4	\$0.0	\$0.0	\$0.4	4 – High
	Strategic technology	\$0.7	\$0.0	\$0.0	\$0.7	4 – High
Other bureaus:	Electronic equipment and software	\$0.7	\$0.0	\$0.0	\$0.7	4 – High
	Strategic technology	\$4.9	\$0.0	\$0.0	\$4.9	4 – High
Total for Technology Systems		\$12.1	\$0.0	\$0.0	\$12.1	

R/R/R (Repair, Rehabilitation, Replacement): Additional funding necessary to repair, rehabilitate and replace existing assets to bring them up to established service levels, or replace assets considered functionally obsolete (not meeting those service levels).

Mandate: Additional funding necessary to improve existing assets to meet regulatory requirements, exclusive of improvements that fall under R/R/R or capacity.

Capacity: Additional funding necessary to address existing inequities and deficiencies in levels of service for current customers and citizens.



EMERGENCY RESPONSE

Introduction

Emergency response infrastructure includes City-owned buildings, facilities, apparatus, vehicles, and equipment primarily owned or managed by the Office of Management and Finance (OMF) or Portland Fire and Rescue (PF&R). Emergency response infrastructure plays a central role in the City's full emergency response system, which delivers life safety and emergency response services for occurrences ranging from vandalism to inclement weather to a major natural disaster.

Under day-to-day circumstances, emergency response infrastructure is utilized by bureaus in the City's four-legged stool of emergency response – the Portland Police Bureau (PPB), Portland Fire and Rescue (PF&R), the Bureau of Emergency Communications (BOEC), and the Portland Bureau of Emergency Management (PBEM) – to respond to calls when Portlanders are in need. This emergency response system places BOEC as the first point of contact for emergency calls, with dispatchers then directing incidents to PPB or PF&R depending on the situation. When incidents or events require the involvement of additional City bureaus, PBEM steps in to coordinate emergency response on a broader scale

The City's emergency response system is vital to Portland's emergency preparedness and continuation of operations strategies, with many components of this section listed as "essential facilities" in the City's Natural Hazard Mitigation Plan (see p. 38). In the event of a large-scale climate event or disaster, the City's emergency response system expands to include the Disaster Policy Council and other City bureaus like the Portland Bureau of Transportation, the Portland Water Bureau, or the Bureau of Environmental Services for additional services as needed. Regardless of the scale or intensity of the emergency, Portland's emergency response system plays a foundational role in increasing citywide resiliency and facilitating an appropriate recovery.

Infrastructure covered in this section includes fire & rescue stations, specialized mobile response units, fire trucks, fireboats, police stations, and other buildings occupied by BOEC, PBEM, PF&R, and PPB.

Due to existing accounting and asset management practices, this collection does not comprise the entirety of the City's emergency response system. Many assets equally critical to emergency response are covered in other sections of this chapter, including the computer-aided dispatch system, the Emergency Coordination Center, the 9-1-1 Center, police vehicles, and emergency communications technology⁶.

Emergency response infrastructure is often utilized by multiple bureaus simultaneously, with many intergovernmental and mutual-aid agreements that extend related services into every jurisdiction that borders the City of Portland. These assets are also subject to different ownership and management structures, and are dispersed throughout different capital asset groups used in City asset management practices. This complexity makes it difficult to perform comprehensive assessments, prioritize investments, and conduct financial planning for emergency response infrastructure. Because the Citywide Systems Plan represents the first effort to plan at this level of detail for emergency response assets, there is more work that needs to be done before long-term strategies can be implemented for the system as a whole.

This section describes how, where, and to what degree emergency response assets impact the provision of life safety services. It also includes a summary inventory for emergency response infrastructure, a discussion of their current condition and capacity, and a compilation of relevant issues, trends, and opportunities likely to arise over a twenty-year timeframe. This section then assesses some needs and recommendations for these assets, and concludes with a consideration of investment priorities and financial strategies to address those needs and recommendations in coming years.

Agency Organizational Structure

The Office of Management and Finance and PF&R manage the buildings, facilities and apparatus included in the Emergency Response section. The Office of Management and Finance is responsible for all police facilities, which are managed through BIBS Facilities much like other City-owned or occupied office buildings. The Portland Police Bureau is the primary user of police facilities, with police vehicles provided through an interagency agreement with CityFleet. Portland Fire and Rescue is the primary user and manager for all fire facilities, as well as a collection of specialized firefighting vehicles, apparatus, and equipment. Portland Fire and Rescue handles ownership and management of these assets in part because their services are heavily integrated with the use of these assets. For instance, extinguishing a fire is nearly impossible without the use of specialized fire-fighting equipment such as hoses, ladders, and the fire apparatus itself. Though PPB depends upon precincts and vehicles to fulfill their bureau's mission, police facilities are less specialized and more flexible in nature.

Other bureaus are directly involved in the provision of emergency response services, particularly BOEC and PBEM. Depending on the circumstance, many other agencies can play support roles in Portland's emergency response system, including the Portland Bureau of Transportation, the Portland Water

⁶ The value of the Emergency Coordination Center and the 9-1-1 Center is included in the "other buildings" asset group in the Civic Facilities & Assets section. The value of police vehicles has not been included in any asset groups within the Citywide Systems Plan. The value of communications technology has been included in the "communications" asset group in the Technology Systems section.

Bureau, and the Bureau of Environmental Services. The Bureau of Technology Services is also involved in emergency communications services and systems.

Vision

Similar to civic facilities and assets, there is no consolidated vision for Portland's emergency response assets. All four emergency response bureaus (BOEC, PBEM, PF&R, and PPB) have their own bureau-specific vision statements, but this language is only partly applicable to the assets covered in this chapter. Based on existing language, the following vision statement has been created for the purposes of this document:

Emergency response buildings, facilities apparatus, vehicles and equipment allow City agencies to provide coordinated, efficient and effective emergency response and life safety services to Portland residents and visitors.

Mission

Emergency response infrastructure also lacks a consolidated mission statement. Based on the mission statements from BOEC, PBEM, PF&R, and PPB, the following mission statement has been developed for Portland's emergency response infrastructure:

Emergency response buildings, facilities and apparatus provide the infrastructure necessary to effectively support services that protect life, property, and the environment, reduce crime and the fear of crime, maintain human rights, contribute to disaster risk reduction, and support the connection between the community and emergency responders.

Services Provided

Emergency response facilities and apparatus are utilized by PPB and PF&R, in coordination with PBEM, BOEC, and other City bureaus as necessary. Emergency response infrastructure enables these bureaus to provide life safety and emergency response services, which include:

- Fire and rescue services;
- Police services;
- Fire prevention services, such as plan review, code enforcement, and Harbor Master services;
- Emergency communications services;
- Emergency coordination and incident management; and
- Emergency prevention education and outreach.

Additionally, emergency response facilities often include conference rooms and gathering spaces used by neighborhood groups and various City bureaus. For instance, the North and East Precinct facilities each have community rooms available to the public, and all three major Precincts (Central, East, and North) also serve Portland citizens by providing a physical point of contact for police-related issues and concerns.

Service Area

Emergency response services are provided within the boundaries shown in Figure 10.3 and Figure 10.4. These services are provided to Portland residents within the City's urban growth boundary.

Additionally, emergency response services are available in areas outside of these boundaries based on a number of intergovernmental agreements entered into by the bureaus responsible for emergency response and life safety service provision. This results in an effective service area that is larger than the urban services area, extending into the areas under the jurisdiction of the Port of Portland as well as those governed by Multnomah County, the City of Gresham, and other municipalities in the region.

Figure 10.3 Portland Fire & Rescue Stations, 2014

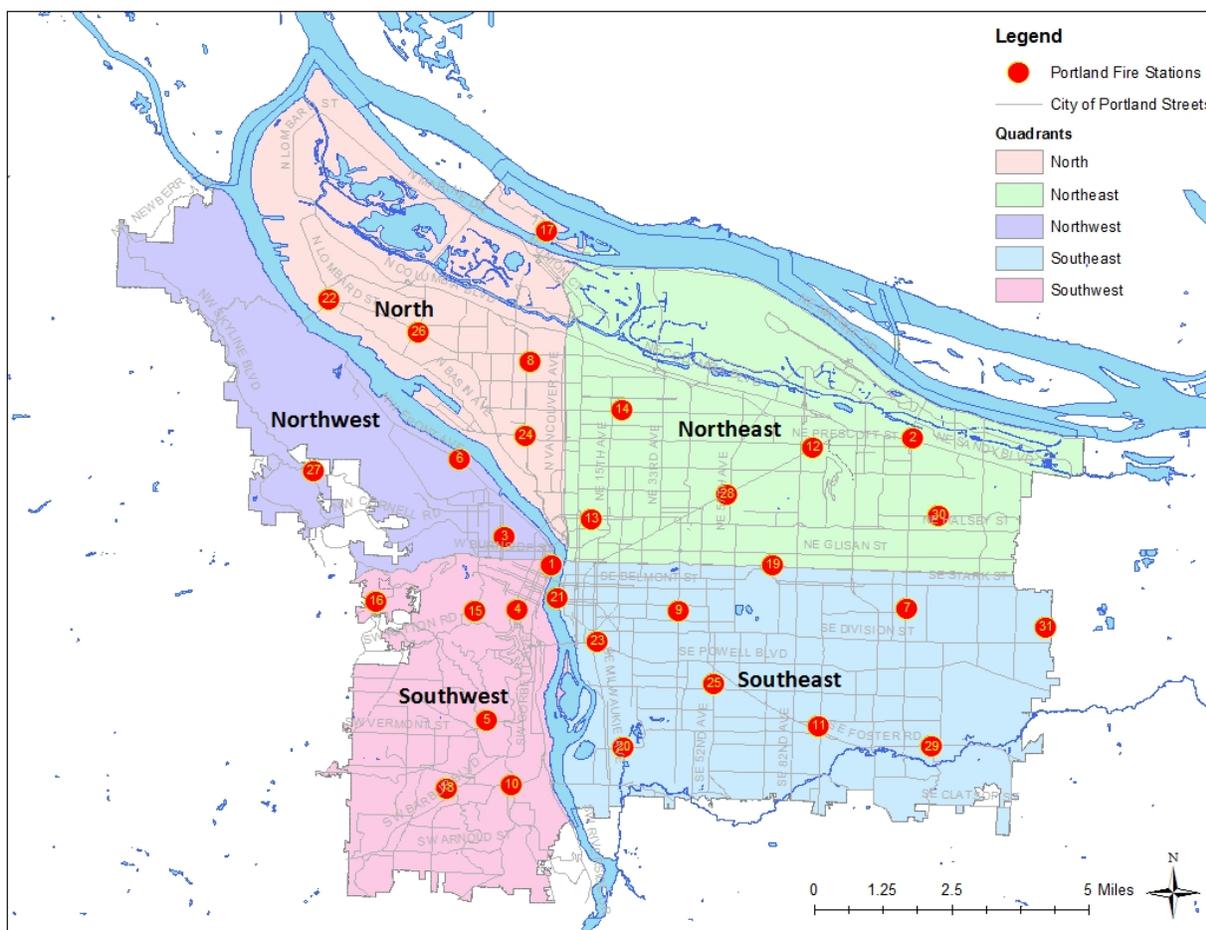
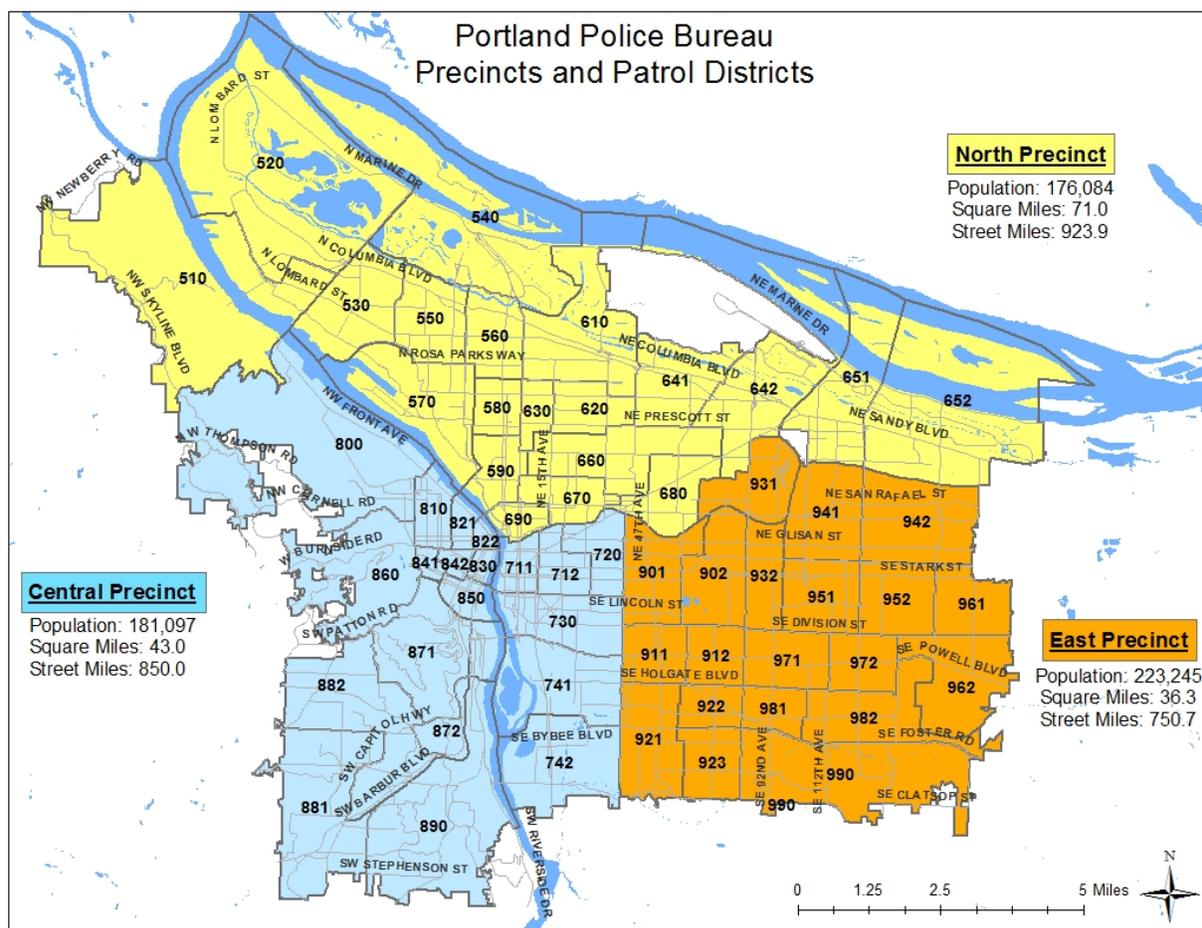


Figure 10.4 Portland Police Precincts and Patrol Districts, 2014



Service Agreements

Service agreements for emergency response infrastructure take similar forms to the agreements for civic facilities and assets discussed earlier in the chapter. These agreements range from interagency agreements (IAs) amongst City bureaus, intergovernmental agreements (IGAs) between city bureaus and outside agencies, and condominium lease agreements, or other partnerships oriented around City-owned assets.

Portland Fire and Rescue has mutual-aid agreements with all jurisdictions surrounding City of Portland boundaries, including waterways and forest areas. For instance, PF&R is a member of the Marine Fire Safety Association (MFSA) serving the Lower Columbia and Lower Willamette River areas along with other emergency response agencies from Vancouver to Clackamas County (for more information on mutual-aid agreements see p.41).

The Portland Police Bureau is involved in over 200 agreements with over 50 different agencies, including the State of Oregon, the State of Washington, and several federal agencies. Many of these are IGAs related to mutual aid in the event of a major emergency, including agreements with Sherriff's offices in

Multnomah and Clackamas County. Other agreements include IAs related to police vehicles leased through CityFleet and technology services provided by the Bureau of Technology Services.

The Bureau of Emergency Communications provides 9-1-1 and responder dispatch services through IGAs with partner jurisdictions ranging from the City of Troutdale to Fire District 30 on Sauvie Island. The Bureau of Emergency Communications provides computer-aided dispatch connectivity services to the Port of Portland through an IGA, in addition to sharing live dispatch data with regional communications partners in Clackamas, Washington, Columbia, and Clark counties, as well as Lake Oswego.

The Portland Bureau of Emergency Management also has interstate mutual aid agreements for services through the nationally-adopted Emergency Management Assistance Compact (EMAC) and the Pacific Northwest Emergency Management Arrangement (PNEMA), which includes the states of Oregon, Washington, Idaho, and Alaska, along with the Canadian provinces of British Columbia and the Yukon Territory.

All primary emergency response bureaus (BOEC, PBEM, PPB, and PF&R) are involved in agreements or other partnerships related to the buildings, facilities, technology, vehicles, and apparatus covered in this chapter. For instance, the portion of the newly constructed Emergency Coordination Center occupied by PBEM is leased through BIBS Facilities, who was able to construct the facility through a joint-partnership with the Portland Water Bureau. Other examples include the Justice Center, which is occupied by PPB through a condominium lease agreement with Multnomah County.

Levels of Service

Emergency response facilities and vehicles are not required to meet any specific or quantifiable levels of service by the State or any other regulatory body. These facilities and vehicles are expected to perform in a cost-effective and efficient manner to support City bureaus in the direct provision of public services, which are listed in the Services Provided section.

Emergency response bureaus utilize a variety of performance measures to assess their provision of emergency response and life safety services to the public. The Portland Police Bureau has a performance measure to respond to 9-1-1 emergency calls in less than five minutes, an industry standard that PPB has been surpassing in recent years. The Portland Police Bureau also measures their success by the percentage of citizens who rate their services as ‘good’ or better, the percentage of residents who feel safe walking alone in their neighborhood at night, and the percentage of crimes cleared. Police services are also assessed through a measure of “part 1” or major crimes per 1,000 residents, and other similar metrics.

Portland Fire and Rescue uses similar measures to quantify the speed and overall impact of their services. The bureau’s performance measure related to response times seeks to respond to medical and fire emergency calls in five minutes or less 90% of the time, from the time of the call to time of arrival on-site. There are many other performance measures being utilized by PF&R to increase proactive health and wellness practices for their employees and enhance existing code enforcement inspection practices.

Inventory Summary

The emergency response asset inventory includes buildings, facilities, apparatus, vehicles, and equipment. These assets fall into the groupings of “police facilities” and “fire facilities”, though it should be noted that “fire facilities” as a grouping includes several mobile fire apparatus units, specialized vehicles, and fire equipment that are not included in the data for either asset group. See Table 10.9 for information about the replacement values of emergency response asset groups, and Table 10.10 for an assessment of their current condition.

Table 10.9 Emergency Response Groups and Replacement Values, 2013

Capital Asset class	Value (in millions)
Police facilities	\$108.8
Fire facilities	\$96.8
Total Emergency Response	\$205.6

Table 10.10 Current Condition: Emergency Response System, 2013

Capital asset type	Current Condition (in %)					TBD	Confidence Level
	Very Good	Good	Fair	Poor	Very Poor		
Police facilities	0	100	0	0	0	0	4 - High
Fire facilities	0	98	0	2	0	0	4 - High

The “police facilities” grouping includes PPB precinct facilities for each of the City’s three patrol divisions, East, North, and Central. The Central Precinct is located in the Justice Center downtown, a facility that is shared with Multnomah County and also utilized as PPB Headquarters. The City also operates the Southeast Precinct as a sub-station of the East Precinct, at a facility that also houses the Property Crimes unit and the Portland Office of Neighborhood Involvement. Other facilities included in the inventory and utilized by PPB include the Rivergate Vehicle Storage facility, the Property Evidence Division warehouse, the Traffic Division in St. Johns, and a training facility on NE Airport Way that is scheduled to open in August 2014.



The “fire facilities” grouping includes all 30 stations for PF&R, as well as dozens of large mobile fire apparatus not provided through CityFleet. Other facilities included in the inventory and utilized by PF&R include a facility on NE 122nd Avenue that houses a Training Center and Emergency Medical Services (EMS) facility, the Public Education Office and Belmont Learning Center, the Fire Code Enforcement and Permit Office in the Gideon Building, the Main Administrative Office on SW Ash Street, and the Logistics Building on SE Powell and 12th Avenue.

Other facilities relevant to emergency response are included in the Civic Facilities & Assets section, such as the newly completed Emergency Coordination Center, the 9-1-1 Center, and police vehicles – which are utilized by PPB through operating agreements with CityFleet. Additionally, communications technology such as Computer-Aided Dispatch (CAD) and 800 MHz radio systems are covered in the Technology Systems section.

Key Issues, Trends, Opportunities

Budgeting For Maintenance

Similar to civic facilities and assets, annual City budgeting processes do not set aside an adequate amount of money for major maintenance of emergency response facilities. Each year, bureaus must evaluate maintenance needs for their facilities in order to prioritize projects that must be dealt with immediately, and defer projects that address less pressing needs. This generally leads to a backlog of projects that tend to become more immediate priorities as budget constraints become tighter. Over time, these delays in repairs and maintenance can cause all projects to become priorities that need addressing.

Currently, PF&R is identifying long-term, ongoing maintenance needs for their existing facilities. For example, a comprehensive roof evaluation for all fire facilities has been completed recently. This will aid in planning for long-term repair or replacement of roofs to last for the next ten to twenty years, and will help to avoid the unnecessary costs of replacing roofs due to deferred maintenance. BIBS Facilities and the OMF perform similar assessments as part of citywide asset management practices, including the Facilities Condition Assessment updates mentioned earlier in the chapter.

Future budgeting processes could benefit from more comprehensive evaluations of emergency response facilities, so that bureaus can better plan for costly repairs and replacements of components such as emergency generators, HVAC systems, and other key building components.

Intensification of Development

Portland’s population continues to grow and development is intensifying, particularly in Centers and along Corridors. This intensification of infill development in neighborhoods and business districts may have both positive and negative impacts on emergency response services. A larger population is expected to increase the total number of incidents requiring emergency response. Increased traffic congestion associated with more intense development along emergency response routes may result in an incremental increase in emergency response times. At the same time, complete neighborhoods promote non-auto modes of transportation for many trips, which may reduce congestion. Reducing the number of

trips made by automobile may also lead to a reduction in automobile collisions, thus avoiding the emergency response generated by those incidents.

The need for additional emergency response facilities/equipment will be affected by the impacts of growth on emergency response time and reliability. Growth and development patterns can affect the geography and intensity of response needs. To address some the effects of growth, the City has designated a number of emergency response routes that avoid streets with traffic-calming devices or other pedestrian-oriented street improvements. Additionally, future siting of fire & rescue or police facilities could mitigate this effect by locating closer to intensified development or otherwise expanding the coverage of mobile response units. Facility and equipment needs may also be influenced by changes in fire and rescue service models or best practices.

Climate Change

Climate change may cause an increase in weather-related emergency events, like extreme heat, wildfires, flooding and landslides. All of these events have the potential to cause medical emergencies, including illness and injury, or require emergency response to protect the public, environment or infrastructure assets. For example, these events may increase demand for law enforcement to respond to increased emergency-related calls, establish roadblocks, reroute traffic, respond to accidents, or facilitate evacuations.⁷

As climate change occurs, the City's public safety and emergency response bureaus, including PF&R, PPB, PBEM and BOEC, will need sufficient emergency management capacity to prepare for, respond to, and recover from weather-related emergencies. The City's Climate Change Preparation Strategy includes number of emergency management objectives to improve this capacity, such as:

- Developing, testing, training and updating emergency response plans that address weather-related hazards that are likely to become more frequent or intense as the climate changes.
- Ensuring service providers have the education, training and tools to succeed in disaster planning, preparedness, response and recovery efforts.
- Planning and staffing for potential increases in weather-related displacement – people may be in need of emergency housing, food or other supplies – and the resulting potential increases in violence, mental illness, chemical dependency and addiction.⁸

Certain populations – including people who are homeless, lack transportation options, live in poverty, or have physical or mental illnesses or disabilities - may be at greater risk during weather-related emergencies, as they may not have the physical, mental or economic ability to prepare for or respond to hazards. Public safety and emergency response bureaus will need to be prepared for potential shifts in the service needs of these populations.

⁷ City of Portland and Multnomah County, "Climate Change Preparation Strategy: Risk and Vulnerabilities Assessment," 2014.

⁸ City of Portland and Multnomah County, "Climate Change Preparation Strategy: Public Comment Draft," 2014.

Emergency response activities occur through multi-agency partnerships. Preparing for and responding to climate change will require continued partnerships between City emergency response bureaus; other City bureaus, like the Portland Housing Bureau and Portland Bureau of Transportation; as well as Multnomah County agencies, including the Departments of Human Services, Emergency Management, Health, Community Services, Community Justice, and the Sheriff's Office.

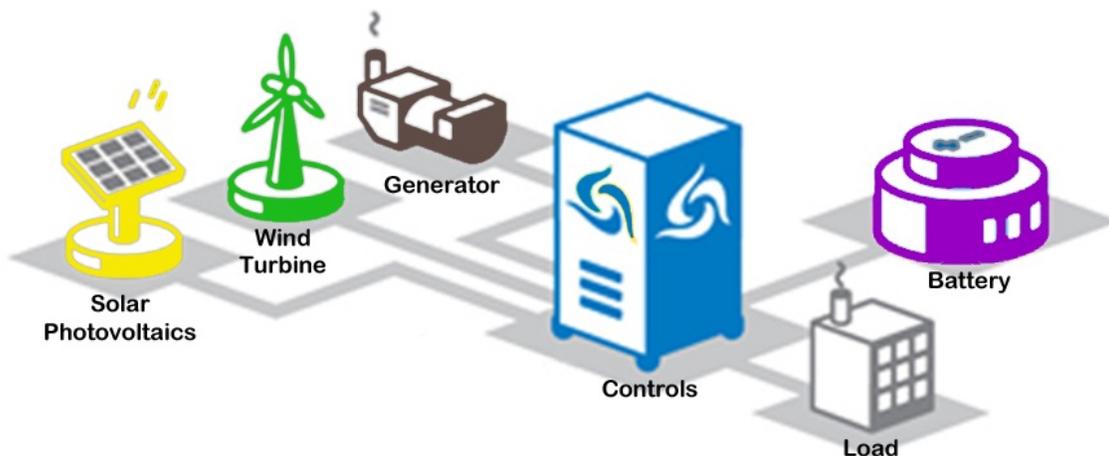
Increasing Role of Social Media

The role of social media continues to evolve during emergencies. The Great Tōhoku Earthquake, Hurricane Sandy and the Boston Marathon bombing tragedies are recent examples where disaster-affected communities and their first responders immediately relied on social media to share and access up-to-date news and information. When an emergency results in degraded telecommunications capabilities and limited bandwidth on cellular networks, texts, tweets, and posts to Facebook are replacing traditional forms of communication. Social media provides a real-time interactive platform for information sharing and first-person accounts of the impacts of the emergency.

However, there are also challenges to the use of social media. Crowd-sourced information is not always accurate, and misinformation spreads as virally as verified information. Additionally, the volume of posts on Twitter, Facebook, Instagram, and other social media platforms can easily overwhelm response agencies trying to monitor and respond to this information. Emerging technology such as Next-Generation 9-1-1 has been designed to better incorporate social media with emergency response systems, allowing people to tweet their 9-1-1 or emergency calls through a system designed to handle this activity. This technology presents opportunities to connect residents with City programs and services, but has yet to be adopted locally due to the large number of regional agencies affected

Microgrids

Redundant technology and equipment is a major part of any emergency response or continuity of operations strategy. When major communications or energy infrastructure is unreliable or not functional, the City can utilize a wide range of redundant systems and equipment, including satellite



communications, backup generators, fuel reserves, and a variety of other equipment. Though these systems are dependable and are situated to play a major role in the event of an emergency, these redundant power sources can only supply a finite amount of energy.

In order to secure the City's energy resiliency for longer-term disasters or emergency events, non-exhaustible backup energy systems could be considered. A microgrid can achieve this by providing a localized system for electricity generation and energy storage that can be operated independently from other energy infrastructure systems. Microgrids could be used to strengthen emergency response and continuity of operations strategies by providing an additional backup power source based on renewable energies, such as wind or solar, that would be more resilient to disruptions to the City's existing energy infrastructure.

Regulatory Compliance

The agencies responsible for the provision, maintenance, and management of emergency response infrastructure are expected to meet a number of regulatory requirements. These codes and regulations have a direct impact on every detailed design component, management technique, maintenance system, and new construction practice utilized for City-owned buildings, facilities, and apparatus. Relevant legislation, regulations, and regulatory agencies are listed in the Regulatory Compliance section for Civic Facilities & Assets.

Investment Strategy

Process

As with the other sections in the Other Essential Facilities & Assets chapter, investments in emergency response infrastructure are not typically the result of linear decision-making or long-range planning efforts. Emergency response and life safety are undoubtedly essential public services, but land-use and infrastructure planning for these services is not mandated by the State like it is for water, sewer, or transportation services. The result is that the Citywide Systems Plan does not include a detailed 20-year project list for public safety and other emergency response facilities and services because comprehensive system plans, including lists of needed investments, costs, and funding sources, are not available at this time. Therefore, the recommendations within this section are primarily oriented towards improving upon current investment practices and preparing for foreseeable major expenditures in the future.

Investments in police facilities are managed by OMF, which performs asset management for police buildings using the same processes and principles employed for other City-owned buildings managed through BIBS Facilities. Fire facilities and apparatus are managed separately, with PF&R taking on management responsibilities instead of BIBS Facilities. Though emergency response infrastructure is managed by multiple bureaus, the processes used to make investment decisions for police and fire assets are similar. Both PF&R and BIBS Facilities take efforts to assess the condition of emergency response assets, including annual inspections, reviews, and other periodic inventory assessments. This information can be utilized to inform annual budget discussions, or it can be used by individual bureaus to justify more opportunistic and less predictable investments based on funding availability or shared interests with other bureaus.

Similar to civic facilities and assets, investments in emergency response infrastructure often benefit from agency partnerships and resourceful financial strategies. For example, the new Police Training Center was able to be constructed after the property was purchased by the City in early 2012. This opportunistic investment allowed PPB to respond to market availability in a cost-effective manner in order to address previously identified training needs.

The following projects and recommendations provide a snapshot of the City's emergency response infrastructure needs. It should be noted, however, that more holistic and detailed assessment efforts are necessary in order to effectively consider facility needs across all City bureaus.

Recent and Ongoing Projects

Emergency response bureaus regularly seek new projects and improvements to increase their capacity to provide public services and address facility needs. At the current time, projects in the construction phase include a new fire & rescue station on the east side of the Willamette River and an expanded PPB training facility on Airport Way. The Civic Facilities & Assets section includes more information about other planned projects relevant to emergency response, including a planned renovation of the 9-1-1 Center.



Inner SE Fire & Rescue Station

In 2010, Portland voters approved a general obligation bond measure that included funding for the replacement of a fire & rescue station in Inner Southeast. The new PF&R fire & rescue station will sit along the Willamette River near the Oregon Museum of Science and Industry. Construction is currently underway, and the facility is scheduled to be completed by November 2014. This station was staffed by closing nearby fire & rescue station 23.



Police Training Center

A new training complex for PPB is slated to open in 2014 at a location on NE Airport Way. The complex will include a shooting range, a practice driving track, a tactical scenario village, and several other training-related facilities. This expands the training capacity of PPB, making it easier to respond to evolving policies and regulations related to the provision of police services in Portland. This will allow PPB to relocate from current training facilities in order to centralize these operations at the new training center.

Major Needs & Recommended Improvements

The following list of major needs and recommended improvements could serve as a starting point for emergency response investment decisions in future years. The Major Needs and Recommended Improvements section for Civic Facilities & Assets includes for other recommendations related to emergency response, including a discussion of a potential Westside emergency operations facility at the current site of the SFC Jerome F. Sears U.S. Army Reserve Center. This list is not complete, and there are a number of other notable facility needs relevant to emergency response that are not addressed in this section.

24-7 Repair and Maintenance

Emergency response facilities and vehicles are utilized on a constant, 24-7 basis in order to ensure life safety services are available at all times. This results in disproportionate wear and tear on these highly-used assets, and also impacts the amount of time that emergency response facilities and vehicles can be out of commission for repair or maintenance purposes. BIBS Facilities and PF&R use a number of employees and programs in order to stay aware of repair needs and maintenance priorities, but a more around-the-clock approach could prove to be useful for unanticipated facility or vehicle failures.

Major maintenance needs for emergency response assets can include roof replacements, emergency generator repair, vehicle maintenance and repair, and other projects that impact critical pieces of the City's emergency response capacity. Because these assets are essential to the continuity of operations of the City as a whole, they deserve special consideration when prioritizing investments.

Gideon Facility Replacement

It is likely that PF&R will need to vacate their Gideon facility located near the new Orange Line MAX station at SE Clinton Street in the near future. Before that can occur, a new site will be needed to accommodate the functions currently served at that site. These functions include: emergency apparatus maintenance, logistics, prevention and training annex. The replacement training annex should be centrally located to reduce time lost to travel.

311 Call Center

City Council passed a resolution in 2012 that established intent to create a 311 Non-emergency Call Center. The project would enable BOEC to run an operation parallel to the 9-1-1 Center that would provide a single point of contact for community requests for information or services in non-emergency situations. Similar 311 systems have been successfully initiated in 80 cities across the country, including Minneapolis, San Francisco, and Los Angeles. These cities have found that using one easy-to-remember number to access all non-emergency City services has had positive impacts on their 9-1-1 systems, including reduced call wait times and more efficient and effective responses.

The City has established an exploratory committee for a 311 Call Center, and a project assessment has already been funded. While nothing decisive has yet come from these efforts, there is a high likelihood that a decision will be made within the next couple of years. A 311 system would establish a communications infrastructure in Portland for non-emergency situations, when residents don't need immediate assistance but still want to contact authorities about a particular issue. This could have a wide range of positive effects on the City's emergency response capacity, and could also improve communications between residents and City agencies in a more general sense. If the City proceeds with a 311 project, facility needs such as office space and communications infrastructure will need to be defined and addressed before implementing the system.

Mounted Patrol Unit

As recently as early 2014, PPB's Mounted Patrol Unit (MPU) – or equestrian division – was located in a former horse barn in the Centennial Mills building. The building began to cause some concern when engineers uncovered structural issues with support beams for the roof of the facility, at which point PPB was forced to relocate their horses to a barn in Aurora. The unit has continued to operate since the move, with horses being driven by trailer to Portland every day from the Aurora facility to maintain normal MPU operations.

This development has reignited questions about the cost and necessity of the MPU, issues which are currently being explored by the City. The Mounted Patrol Unit currently consists of eight horses, one sergeant, four officers, and three non-sworn staff members. Centennial Mills is owned by the Portland Development Commission⁹, and re-development proposals for the site have been under consideration for years. A permanent and easily accessible location for the horse-barn could be necessary once an agreement is reached regarding the future of the MPU.



Financial Strategy

Financial planning for emergency response infrastructure takes a more flexible, resourceful, and reactive approach than other components of the Citywide Systems Plan. Given the significant challenges to performing long-range planning for the assets covered in this chapter, it is difficult to develop a meaningful list of future projects or talk about how those projects could be financed. Instead of identifying revenue streams and funding mechanisms to support recommendations in the investment strategy – like it does in other chapters – the financial strategy for emergency response infrastructure is more of a description of current practices and existing financial issues.

The following sections discuss funding sources and financial challenges that impact emergency response buildings, facilities, apparatus, vehicles, and equipment. This information can serve as a starting point for future financial planning discussions once a more comprehensive investment strategy has been developed.

⁹ Centennial Mills is included in the “PDC facilities” asset group, covered in the Civic Facilities & Assets section.

Sources of Revenue

Emergency response infrastructure is funded by many of the same sources as other components of the Other Essential Facilities & Assets chapter.

Because OMF and BIBS Facilities handle financial management for police facilities, sources of revenue for these facilities are identical to those identified in the Civic Facilities & Assets section. Money from the City’s General Fund, general obligation bond measures, and debt financing is sometimes used to fund investments in police facilities.

Portland Fire and Rescue’s management and maintenance of fire facilities has led to the use of other sources of revenue for these assets. A recent program to rehabilitate, relocate, and construct new City fire & rescue stations was financed through a general obligation bond measure approved by voters in 1998. This program, which ended in FY 2012-13, was also designed to address deferred maintenance, seismic requirements, and other program changes at PF&R. A new general obligation bond was passed in 2010 that included funding for the construction of a new fire & rescue station in inner Southeast, a project discussed earlier in this chapter. Portland Fire and Rescue also has annual operations and maintenance budgets for these facilities and vehicles, though the bureau does not have any ongoing budget authority for major maintenance projects at their facilities.

Financial Challenges

Asset management practices are used by OMF to assess the condition of emergency response facilities and vehicles, and inform investment decisions according to identified needs. Within this asset management framework, the financial condition of assets is indicated by their annual or one-time funding gaps. For emergency response infrastructure, funding gaps are calculated by determining the annual difference between what was collected in rental rates or set aside from net income for major maintenance, and the industry standard of 3 percent of replacement value. See Table 10.11 for annual funding gaps in 2013 for police and fire facilities.

Table 10.11 Emergency Response Annual Funding Gaps, 2013

Capital asset type	Value* (in millions)				Confidence level
	R/R/R	Mandate	Capacity	Total	
Police facilities	\$2.8	\$0.0	\$0.0	\$2.8	4 – High
Fire facilities	\$2.9	\$0.0	\$0.0	\$2.9	4 – High
Total for Emergency Response	\$5.7	\$0.0	\$0.0	\$5.7	

R/R/R (Repair, Rehabilitation, Replacement): Additional funding necessary to repair, rehabilitate and replace existing assets to bring them up to established service levels, or replace assets considered functionally obsolete (not meeting those service levels).

Mandate: Additional funding necessary to improve existing assets to meet regulatory requirements, exclusive of improvements that fall under R/R/R or capacity.

Capacity: Additional funding necessary to address existing inequities and deficiencies in levels of service for current customers and citizens.

Currently, OMF is only able to reinvest about 1.2 percent of the replacement value of the assets managed by the bureau, which includes police facilities. This amount has declined from the 3 percent industry standard in recent years due to several factors, including a rise in the cost of building replacements above the level of regular inflation, an increase in the total number of new facilities, and a limit on rental rate increases to the level of regular as opposed to actual inflation. This funding gap will prevent OMF from being able to cover needs for police facilities for the next five years or more, though it is not significant enough to force a decrease in the overall condition of individual assets from their current designations as either “good”, “fair”, or “poor” within the next ten years (See Table 10.10). One way to reduce the funding gap is to direct savings from efficiency improvements to major maintenance reserves. Please see Financial Challenges in the Civic Facilities & Assets section for information about other OMF-managed facilities and assets relevant to emergency response.

For fire facilities and apparatus, PF&R has utilized funds from general obligation (GO) bonds to finance major building seismic upgrades and station remodel projects in recent years. However, aforementioned funding from the GO bond passed in 1998 will shortly be exhausted, and no other ongoing source of major maintenance funding has been identified for future major maintenance expenditures. While this will not cause fire facilities and apparatus to decline in condition from general categories of “good”, “fair”, or “poor” within a ten-year horizon, this strategy could prove problematic in 20 or 30 years when facilities needs become larger and more pressing. The City and PF&R could benefit from identifying future funding sources for fire facilities and apparatus to be set aside each budget year, similar to the process outlined above for police facilities. This could also result in less reliance upon voter-approved GO bonds to fund critical major maintenance projects, in addition to preventing deferred maintenance from accruing to the point where it becomes too expensive to fund using existing resources. Preparing for these future expenditures will allow City bureaus to proactively manage their assets, and give bureaus more freedom to modify and improve buildings according to changing needs.

SUMMARY

The issues, needs, trends, and opportunities described in this chapter provide a baseline level of information to inform public investments in other essential facilities and systems. Though there is still work that needs to be done before these assets are formally incorporated into infrastructure planning discussions, the chapter functions as a starting point for future efforts.

The next twenty years will require a number of investments in order to keep these assets functioning at the levels necessary to maintain State-mandated forms of public facility service provision. Acknowledging the important connections between required service provision and other essential facilities and systems will result in more effective, more efficient public investments and a more resilient financial future.

Appendix A

Investment Strategy

This appendix contains a capital Investment Strategy for the Bureau of Environmental Services, Portland Water Bureau, and Bureau of Transportation. The projects and programs included in the Investment Strategy are intended to maintain existing assets, comply with regulatory mandates, and provide key levels of service to existing and future residents and businesses. More information on how each Bureau's draft Investment Strategy was developed can be found in the relevant chapter of this Plan.

As part of the update to the Comprehensive Plan and to meet public facility planning requirements, the City must also adopt a List of Significant Projects. The List of Significant Projects is intended as a long-term plan for meeting the infrastructure needs of residential and employment growth allowed and planned for by a city's land use designations. The List of Significant Projects includes a subset of projects included in the Citywide System Plan's Investment Strategy. The List of Significant Projects for transportation, water, sewer and stormwater is included as a separate component of the Comprehensive Plan.

Project Maps

Explore interactive maps of the infrastructure projects included in Appendix A through the online **Comprehensive Plan Map App** at <http://www.portlandoregon.gov/bps/mapapp/>

Bureau of Environmental Services

The Bureau of Environmental Services (BES) project list is based on existing system plans and includes programs for treatment plant upgrades for capacity and regulatory compliance; programs for maintenance of the treatment plants, pump stations, collection system pipes; pipe capacity projects by sanitary and combined sewer basins; watershed programs for each of the major watersheds; a stormwater program area to address system connectivity and water quality; and a sanitary sewer extension program.

The Bureau focuses efforts on comprehensive, multi-purpose solutions in the highest priority areas for work in all four program areas of the Investment Strategy. The Bureau anticipates approximately \$2 billion in investment in these programs over the next twenty years. The list assumes that rates are set at a level that is sufficient to meet agreed upon levels of service.

For more information on how this Investment Strategy was developed, please see Chapter 6. Bureau of Environmental Services.

Project ID	Project Title	Project Description	Location	Area	Project Objective	Driver	Estimated Cost by Time Period								Grand Total FY 2013-33	Funding Source	Facility Provider (Partner)
							FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	Total FY 2013-18	FY 2018-23	FY 2023-33			
Sewage Treatment																	
Map SS-1 E10245	CBWTP Improvements	This program includes a number of mid-size improvements at the Columbia Boulevard Wastewater Treatment Plant. CBWTP such as: Seismic Improvements, Outfall Diffuser Extension, Access / Egress Improvements, Bio-Solids Dryer, Dewatered Sludge Hopper, TWAS Piping Upgrade, Centrifuge. Also includes expansion to Secondary Treatment, if required. All are consistent with the Facilities Plan and the Conditional Use Master Plan.	Columbia Blvd Wastewater Treatment Plant	All	Efficiency & Expansion	Population growth/regulations	10,950,000	4,325,000	11,513,000	10,540,000	8,516,000	45,844,000	45,964,000	80,000,000	171,808,000	Bonds	BES
Map SS-2 E10234	TCWTP Improvements	Improvements, as identified in the updated facilities plan. Anticipated projects include property acquisition, new headworks/screenhouse, upgrades to the primary clarifier, and construction of an additional secondary clarifier.	Tryon Creek Wastewater Treatment Plant	SW	Efficiency & Expansion	Population growth/regulations	216,000	210,000	3,000,000	3,500,000	9,000,000	15,926,000	30,000,000	10,000,000	55,926,000	Bonds	BES
Map SS-3 E04661	Pump Station Improvement Program	Program to refurbish or upgrade pump stations not in compliance with current codes, not operating reliably, need improvements because of growth in the receiving sewage basin, and/or are over 20 years old with out-of-date equipment. The Pump Station Improvement Plan guides the selection of projects. This program was developed to ensure the 97 pump stations are maintained in accordance with a scheduled plan to increase pump station reliability. Program will also address the 57 miles of force mains.	Citywide	All	Maintenance & Efficiency	Level of Service	13,810,000	12,091,000	4,000,000	4,000,000	4,000,000	37,901,000	30,000,000	65,000,000	132,901,000	Bonds	BES
Map n/a E04891	Rehab, Repair, and Modifications	This project provides for annual reinvestment in the treatment facilities to protect capital investment and enhance system reliability. It provides best management practice to prevent probable violations of NPDES permit. The aging Columbia and Tryon Creek plants require regular investment. Projects include equipment replacement, capacity upgrades, and restoration of a facility to its original condition and renewal of useful life for more than 10 years, and regulatory mandates.	Columbia Blvd and Tryon Creek Wastewater Treatment Plants	All	Maintenance & Efficiency	Level of Service	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	10,000,000	15,000,000	30,000,000	55,000,000	Bonds	BES
Maintenance & Reliability																	
n/a	Sewage Pipe Rehabilitation	Based on regular inspection, this program rehabilitates the highest risk pipes.	Citywide	All	Maintenance	Level of Service	49,895,000	51,869,000	42,924,000	31,285,000	19,583,000	195,556,000	160,000,000	300,000,000	655,556,000	Bonds	BES
n/a	Sewer Capacity Upgrades	Based on the Systems Plan, program adds capacity by upsizing pipes and/or adding surface infiltration facilities. Projects are prioritized based on risk and benefit/cost. Work may also include high priority pipe rehabilitation. Work will occur in small areas within the combined sewer system that are not addressed by basin specific projects.	Citywide	All	Maintenance	Level of Service	0	0	0	0	0	0	0	50,000,000	50,000,000	Bonds	BES
Map SS-4	Holladay/Stark/Sullivan - capacity upgrades	Based on the Systems Plan, program adds capacity by upsizing pipes and/or adding surface infiltration facilities. Projects are prioritized based on risk and benefit/cost. Work also includes high priority pipe rehabilitation, if located within the project area.	Between Fremont & Stark to NE 24th. South of I-84 to I-205	NE/SE	Capacity	Level of Service	500,000	1,000,000	3,000,000	3,000,000	3,200,000	10,700,000	12,000,000	12,000,000	34,700,000	Bonds	BES
Map SS-5	Beech/Essex - capacity upgrades	Based on the Systems Plan, program adds capacity by upsizing pipes and/or adding surface infiltration facilities. Projects are prioritized based on risk and benefit/cost. Work also includes high priority pipe rehabilitation, if located within the project area.	Willamette River east to Grand b/w Knott and Alberta.	NE	Capacity	Level of Service	0	100,000	900,000	4,500,000	4,000,000	9,500,000	9,000,000	0	18,500,000	Bonds	BES
Map SS-6	Oak - capacity upgrades	Based on the Systems Plan, program adds capacity by upsizing pipes and/or adding surface infiltration facilities. Projects are prioritized based on risk and benefit/cost. Work also includes high priority pipe rehabilitation, if located within the project area.	Willamette River to NE 24th, b/w Irving and Stark.	NE/SE	Capacity	Level of Service	2,000,000	100,000	0	0	500,000	2,600,000	20,000,000	0	22,600,000	Bonds	BES
Map SS-7	Taggart/Insley - capacity upgrades	Based on the Systems Plan, program adds capacity by upsizing pipes and/or adding surface infiltration facilities. Projects are prioritized based on risk and benefit/cost. Work also includes high priority pipe rehabilitation, if located within the project area.	Willamette River to NE 60th; Stark to south city limit	SE	Capacity	Level of Service	7,700,000	6,200,000	2,200,000	900,000	3,800,000	20,800,000	30,000,000	10,000,000	60,800,000	Bonds	BES

Project ID	Project Title	Project Description	Location	Area	Project Objective	Driver	Estimated Cost by Time Period								Grand Total FY 2013-33	Funding Source	Facility Provider (Partner)
							FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	Total FY 2013-18	FY 2018-23	FY 2023-33			
Map SS-8	Wheeler - capacity upgrades	Based on the Systems Plan, program adds capacity by upsizing pipes and/or adding surface infiltration facilities. Projects are prioritized base on risk and benefit/cost. Work also includes high priority pipe rehabilitation, if located within the project area.	Willamette River, Grand, Prescott, 24th, Hancock	NE	Capacity	Level of Service	400,000	1,300,000	4,300,000	4,300,000	0	10,300,000	0	0	10,300,000	Bonds	BES
Map SS-9	Lloyd District - capacity upgrades	Based on the Systems Plan and extensive redevelopment activity, program adds capacity by creating a separated stormwater system and/or upsizing pipes and/or adding surface infiltration facilities. Projects are prioritized base on risk and benefit/cost. Work also includes high priority pipe rehabilitation, if located within the project area.	Lloyd District	NE	Capacity	Level of Service	0	500,000	1,500,000	1,500,000	5,000,000	8,500,000	10,000,000	0	18,500,000	Bonds	BES
Map: SS-10	Alder - capacity upgrades	Based on the Systems Plan, program adds capacity by upsizing pipes and/or adding surface infiltration facilities. Projects are prioritized base on risk and benefit/cost. Work also includes high priority pipe rehabilitation, if located within the project area.	Willamette River to SE 42nd bw Stark & Hawthorne; inc. Ladds Addition	SE	Capacity	Level of Service	0	100,000	1,600,000	5,200,000	11,600,000	18,500,000	22,500,000	0	41,000,000	Bonds	BES
Map: SS-11	NE 13th Ave Basin - capacity upgrades	Based on the Systems Plan, program adds capacity by upsizing pipes and/or adding surface infiltration facilities. Projects are prioritized base on risk and benefit/cost. Work also includes high priority pipe rehabilitation, if located within the project area.	Vancouver, Columbia Blvd, NE 42nd, Prescott	NE	Capacity	Level of Service	500,000	1,300,000	1,400,000	5,000,000	8,000,000	16,200,000	1,200,000	0	17,400,000	Bonds	BES
Map: SS-12	Northwest Neighborhoods - capacity upgrades	Based on the Systems Plan, program adds capacity by upsizing pipes and/or adding surface infiltration facilities. Projects are prioritized base on risk and benefit/cost. Work also includes high priority pipe rehabilitation, if located within the project area.	NW inc. hills to ridgeline, excluding downtown	NW	Capacity	Level of Service	2,700,000	2,100,000	1,300,000	3,400,000	3,500,000	13,000,000	23,000,000	5,000,000	41,000,000	Bonds	BES
Map: SS-13	North Portland - capacity upgrades	Based on the Systems Plan, program adds capacity by upsizing pipes and/or adding surface infiltration facilities. Projects are prioritized base on risk and benefit/cost. Work also includes high priority pipe rehabilitation, if located within the project area.	West of Peninsular Ave.	N	Capacity	Level of Service	0	0	0	0	0	0	0	5,000,000	5,000,000	Bonds	BES
Map: SS-14 E10034 E10035 E10474	Sanitary Sewer Collection system capacity (Infiltration & Inflow)	A series of projects are proposed to address infiltration and inflow in the sanitary sewer system in SW Portland. Projects typically involve rehabilitation of main lines and laterals and disconnecting storm inlets from the sanitary sewer.	SW	SW	Capacity	Level of Service / Regulatory mandate	2,425,000	1,955,000	4,695,000	7,015,000	7,150,000	23,240,000	18,100,000	15,000,000	56,340,000	Bonds	BES
Surface Water Management																	
Map SM-1 E10040	Johnson Creek Willing Seller Ph. 2	Based on the Johnson Creek Restoration Plan, acquisition of land in four target areas for floodplain restoration. Properties are purchased at fair market value and used to implement restoration projects detailed in other capital projects on list.	Johnson Creek Target Areas	SE	Flood management, water quality, habitat	Level of Service	500,000	500,000	500,000	500,000	500,000	2,500,000	2,500,000	5,000,000	10,000,000	Bonds	BES
Map SM-2 E06941	West Lents Flood Mitigation	Based on the Johnson Creek Restoration Plan, restore floodplain and wetland function in the West Lents target area for flood storage and water quality, stabilize stream banks to protect nearby homes, businesses and downstream sewer infrastructure, and restore habitat. Projects address TMDL requirements, ESA plans and other regulations.	West Lents target area	SE	Flood management, water quality, habitat	Level of Service, regulatory	0	0	300,000	545,000	2,757,000	3,602,000	2,815,000	0	6,417,000	Bonds	BES
Map SM-3 E07383 E08382	East Lents Area Flood projects	Based on the Johnson Creek Restoration Plan, restore floodplain and wetland function in the East Lents target area for flood storage and water quality, stabilize stream banks to protect nearby homes, businesses and downstream sewer infrastructure, and restore habitat. Projects address TMDL requirements, ESA plans and other regulations.	East Lents target area	SE	Flood management, water quality, habitat	Level of Service, regulatory	70,000	70,000	1,800,000	2,300,000	1,000,000	5,240,000	3,000,000	0	8,240,000	Bonds	BES

Project ID	Project Title	Project Description	Location	Area	Project Objective	Driver	Estimated Cost by Time Period								Grand Total FY 2013-33	Funding Source	Facility Provider (Partner)
							FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	Total FY 2013-18	FY 2018-23	FY 2023-33			
Map SM-4 E08406 E08247 E07158	Other Johnson Creek Target Area Floodplain Projects	Based on the Johnson Creek Restoration Plan, restore floodplain and wetland function in the Tideman Johnson and Powell Butte target areas, and smaller target areas, in partnership with creek-side property owners for flood storage and water quality. Stabilize stream banks to protect nearby homes, businesses and downstream sewer infrastructure, and restore habitat. Projects address TMDL requirements, ESA plans and other regulations.	Tideman and Powell Butte Target areas plus CRP	SE	Flood management, water quality, habitat	Level of Service, regulatory	806,000	1,506,000	1,306,000	1,427,000	0	5,045,000	0	0	5,045,000	Bonds	BES
Map SM-5 E07466 E06947	Johnson Creek Restoration Program Projects	Priority projects along the main stem and tributaries of Johnson Creek to mitigate flooding, improve water quality and wildlife habitat, address stormwater outfalls and culverts, and sanitary sewer protection. Includes restoration of floodplain and wetlands, construction of stream enhancements, and partnership projects with other agencies to meet the objectives of the 2001 Johnson Creek Restoration Plan. Projects address TMDL requirements, ESA plans and other regulations.	Johnson Creek Watershed, various	SE	Flood management, maintenance, water quality, habitat	Level of Service, regulatory	500,000	3,000,000	650,000	875,000	0	5,025,000	2,000,000	2,000,000	9,025,000	Bonds	BES
Map SM-6 E10563 E05564	Columbia Slough Outfalls	Design and construction of pollution control facilities for separated stormwater areas flowing through 220-city owned outfalls to the Columbia Slough to address DEQ Sediment Order. Program prioritizes outfalls draining Columbia Boulevard and other high traffic City roadways.	Columbia Boulevard area	N/NE	Water quality	Regulatory	150,000	100,000	1,000,000	1,000,000	2,000,000	4,250,000	10,000,000	0	14,250,000	Bonds	BES
Map SM-7 E10377 E07177 E10176	Columbia Slough Restoration Projects	Culvert replacement, water quality facilities and wetland and habitat restoration and enhancement to improve water quality, habitat and hydrology. Projects address TMDL requirements, infrastructure deficiencies, ESA plans and other regulations and may include partnership with other agencies. Includes in-stream restoration as well as stormwater system improvements.	Columbia Slough Watershed, various	N/NE	Water quality, hydrology, maintenance, habitat	Level of Service, Regulatory	5,152,000	1,144,000	0	500,000	325,000	7,121,000	2,000,000	2,000,000	11,121,000	Bonds	BES
Map SM-8 E08676 E08675 E08677	Fanno Creek Stormwater System Improvements	Projects to address TMDLs, recommended by the Fanno/Tryon TMDL predesign. 1-5 year projects include stormwater retrofits along the Beaverton-Hillsdale Highway, addressing deficient stormwater outfalls, and other stormwater system improvements.	Fanno Watershed: Beaverton-Hillsdale corridor and various	SW	Water quality, capacity, conveyance	Level of Service, Regulatory	551,000	1,616,000	533,000	0	0	2,700,000	0	0	2,700,000	Bonds	
Map SM-9 E08679 E08687	Tryon Creek Stormwater System Improvements	Projects to address TMDLs, recommended by the Fanno/Tryon TMDL predesign. 1-5 year projects include stormwater retrofits along the I-5 and Barbur Blvd. corridors, addressing deficient stormwater outfalls, and other stormwater system improvements.	Tryon Watershed: I-5/Barbur area, and various	SW	Water quality, capacity, conveyance	Level of Service, Regulatory	2,000,000	100,000	35,000	270,000	270,000	2,675,000	0	0	2,675,000	Bonds	
Map SM-10 E10373 E10131	Fanno/Tryon Drainage Shoulder Improvements	Drainage improvements for high priority City maintained roadside ditches along arterials in the Fanno and Tryon watersheds. Projects address water quality, as recommended by Fanno/Tryon TMDL predesign. Includes SW Hamilton and SW Stephenson and future projects.	Fanno and Tryon Creeks watersheds (various)	SW	Water quality, capacity, conveyance	Level of Service, Regulatory	100,000	463,000	1,448,000	1,195,000	1,195,000	4,401,000	1,000,000	0	5,401,000	Bonds	
Map SM-11 E08682 E08680 E09105	Fanno/Tryon Restoration Projects	In-stream restoration and improvements to address water quality, hydrology and habitat, including TMDL requirements, ESA plans and other regulations. Includes culvert replacement, stream daylighting, sanitary sewer protection and other restoration in both the Fanno and Tryon creek watersheds. Projects recommended by the Fanno/Tryon TMDL predesign and watershed plans.	Fanno and Tryon Creeks watersheds, various	SW	Water quality, hydrology, maintenance, habitat	Level of Service, Regulatory	231,000	250,000	1,602,000	1,179,000	295,000	3,557,000	2,000,000	2,000,000	7,557,000	Bonds	
Map SM-12 E10498	Willamette River Restoration Projects	Projects to improve water quality, habitat and hydrology along the main stem river and tributaries (subwatersheds) to address TMDL requirements, ESA plans and other regulations. Includes in-stream and floodplain restoration and enhancement.	Willamette River Watershed	All	Water quality, hydrology, habitat	Level of Service, regulatory	0	0	800,000	3,400,000	3,400,000	7,600,000	5,000,000	5,000,000	17,600,000	Bonds	
Map SM-13 E10488	Stephens Creek Stormwater System Improvements	Address stormwater issues in the Stephens Creek subwatershed, including unmanaged stormwater discharge, pollution reduction and detention facilities, restoration of riparian and wetland functions, erosion and sediment loading at outfalls.	Stephens Creek Subwatershed	SW	Capacity, conveyance, water quality, habitat	Level of Service, regulatory	965,000	1,162,000	996,000	800,000	200,000	4,123,000	10,200,000	0	14,323,000	Bonds	BES

Project ID	Project Title	Project Description	Location	Area	Project Objective	Driver	Estimated Cost by Time Period								Grand Total FY 2013-33	Funding Source	Facility Provider (Partner)
							FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	Total FY 2013-18	FY 2018-23	FY 2023-33			
n/a	Stormwater Management Program Implementation	Improvements to the stormwater management system resulting from Stormwater System Planning. Areas of particular concern include parts of SW (in addition to Stephens Creek), outer east, and the Columbia Slough. Specific improvements have not been identified as of FY14.	Various/Citywide	City	Capacity, conveyance, water quality, habitat	Level of Service, regulatory	0	0	0	300,000	1,000,000	1,300,000	15,000,000	40,000,000	56,300,000	Bonds	BES
Map n/a E08967 E10372	Culvert Replacement Program	Replace or improve stream culverts citywide to improve fish passage and water quality, and address flooding and maintenance needs. Includes completion of culvert replacements on Crystal Springs Creek and other priority projects to address ESA plans and other system needs.	Various/Citywide	City	Habitat, flooding, water quality, maintenance	Level of Service, regulatory	1,364,000	1,507,000	1,431,000	0	0	4,302,000	5,000,000	5,000,000	14,302,000	Bonds	BES
Map: n/a E08905 E10486	Watershed Land Acquisition Ph. 1 & 2	Program targets acquisition of medium to high functioning natural resource lands in support of watershed health and stormwater management.	Various/Citywide	City	Water quality, habitat, hydrology	Level of Service, regulatory	2,000,000	2,000,000	2,500,000	1,500,000	2,000,000	10,000,000	6,000,000	0	16,000,000	Bonds	BES
Systems Development																	
Map: n/a	Sewer Extensions	Sewer extensions are proposed to relieve septic systems at risk of failure, to correct party sewer situations, and to provide service where development will be occurring soon and service is currently not available.	Various	City	Replacement; Efficiency	Level of Service	6,776,000	3,594,000	4,017,000	4,725,000	4,350,000	23,462,000	20,000,000	40,000,000	83,462,000	Bonds	BES
Total All Projects							114,261,000	102,162,000	103,250,000	106,656,000	109,141,000	535,470,000	513,279,000	683,000,000	1,731,749,000		

Flood Management																		
Map: FM-1	Columbia River Levee Improvement Project	Identify and implement necessary improvements to the levees within the Multnomah County No 1, Peninsula No 1 and Peninsula No 2 Drainage Districts, so that they are certified as being protective of a 1% chance flood.	MCDD No. 1, Peninsula No. 1 and No. 2 drainage districts	N, NE	Repair/ Rehabilitation/ Replacement	Level of service, Regulatory	tbd	\$100 - \$200 million	District rates and bonds; Local, State, and Federal funds	MCDD 1, PEN 1, PEN 2								

Portland Water Bureau

The Portland Water Bureau (PWB) project list is based on existing system plans and includes projects and programs to address longer term infrastructure replacement and maintenance needs, while addressing short-term water system infrastructure needs to ensure compliance with drinking water regulations. The project list focuses on regulatory compliance, improving the condition of aging infrastructure, and addressing operations and maintenance needs.

The Bureau anticipates approximately \$1.6 billion in investment in these projects and programs over the next twenty years. The list assumes that rates are set at a level that is sufficient to meet agreed upon levels of service.

For more information on how this Investment Strategy was developed, please see Chapter 7. Portland Water Bureau.

Project ID	Project Title	Project Description	Location	Area	Project Objective	Driver	Estimated Cost by Time Period								Grand Total FY 2013-33	Funding Source	Facility Provider
							FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	Total FY 2013-18	FY 2018-23	FY 2023-33			
Customer Service																	
n/a	Automated Meter Reading (AMR) Implementation	This project provides for the Installation of automatic water meter reading equipment throughout the City.	Various	All	Efficiency	Service Level	0	0	0	0	0	0	45,000,000	0	45,000,000	Bonds	PWB
n/a	Dodge Park	Improvements will continue to address security and visitor amenities at the site, trespass/hazard warning signs, alternative park management arrangements, and visitor management. The bureau is committed to improving the maintenance of the park including preservation of existing infrastructure, repairs, replacements and upgrades. New uses for the park include an amphitheater, camping, training area, facility upgrade to the existing building, and special needs assistance for using the park amenities.	Dodge Park	E	Expansion	Service Level	0	0	0	0	0	0	400,000	800,000	1,200,000	Bonds	PWB
Map W-1 W01401	Emergency Coordination Center	This project designs and constructs the City's Emergency Coordination Center. The bureau will locate its emergency response and security staff at the location. The project location is adjacent to the City's 911 Call Center at SE 99th Ave and Powell Blvd. The total project cost is \$19.85M and PWB is a contributing bureau.	Emer. Coord. Center (SE 99th and Powell)	E	Maintenance	Service Level	1,807,000	0	0	0	0	1,807,000	0	0	1,807,000	Bonds	PWB (POEM)
Map: n/a WBCSSE	Security and Emergency Management	The bureau is committed to increasing flexibility and preparedness to meet future security challenges, to enhance security throughout the water system and to modernize security practices and infrastructure. Projects funded by this budget will include physical security improvements to major and smaller facilities as well as improved security in the overall water distribution system and control/communications system.	Various	All	Maintenance	Service Level	0	0	250,000	500,000	500,000	1,250,000	2,500,000	5,000,000	8,750,000	Bonds	PWB (BTS)
Distribution																	
Map W-2 W01632	Bertha Service Area Improvements	This project will connect the Bertha 962 pressure zone with the 937 pressure zone with new 8-inch and 4-inch main and a new regulator. This work will allow for the abandonment of the existing main that passes through steep, unimproved right-of-way while maintaining an adequate level of service to the Bertha Service Area.	Bertha Service Area	SW	Replacement Efficiency	Service Level	430,000	426,000	0	0	0	856,000	0	0	856,000	Bonds	PWB
Map W-3	Burnside Pump Station Replacement	This project will decommission the old undersized pump station and modify the nearby Verde Vista pump station to serve the Burnside pumping needs for the next 50 years. The project will also acquire property for the future Burnside pump station to be built 50 years from now.	Burnside Pump Station	NW	Maintenance	Service Level	0	0	0	0	0	0	2,000,000	0	2,000,000	Bonds	PWB
Map W-4 W01674	Carolina Pump Main Extension, Phase II	This project will connect the existing Carolina Pump Main (Westwood Tanks) and the Fulton Pump Main (Burlingame Tanks) together. This will be a pump main from the intersection of SW Capital Hwy and SW Terwilliger Blvd to the Burlingame Tank site.	SW Capitol Hwy – SW Terwilliger	SW	Expansion	Service Level	690,000	2,494,000	0	0	0	3,184,000	0	0	3,184,000	Bonds	PWB
Map: n/a WBDIDM	Distribution Mains	This program includes rehabilitation and replacement of substandard mains, expansion due to applications from private developers, increasing supply for fire protection, improving water quality and water system upgrades due to local improvement districts (LIDs), and street improvements. Water main replacements also include appurtenances such as fire hydrants, valves, pressure regulators, service branches, and other facilities.	Various	All	Replacement	Service Level	11,717,000	13,911,000	15,875,000	16,775,000	17,460,000	75,738,000	75,000,000	150,000,000	300,738,000	Bonds	PWB
Map W-5 W01652	Division Street Piping	This project will design and construct improvements located in the ROW for the Tabor Reservoir Adjustments project. Improvements will be made to the distribution and transmission systems as well as to Conduits 2 and 3 in SE Division St.	SE Division St	SE	Replacement	Service Level	1,480,000	200,000	0	0	0	1,680,000	0	0	1,680,000	Bonds	PWB

Project ID	Project Title	Project Description	Location	Area	Project Objective	Driver	Estimated Cost by Time Period								Grand Total FY 2013-33	Funding Source	Facility Provider
							FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	Total FY 2013-18	FY 2018-23	FY 2023-33			
Map n/a WBDIFS	Field Support	This project funds vehicles and major equipment purchases, including heavy construction equipment such as dump trucks and backhoes, and Bureau owned computer software with a unit cost greater than \$5000.	Various	All	Replacement Efficiency	Service Level	3,755,600	3,501,500	3,388,900	3,460,138	3,459,338	17,565,476	17,500,000	35,000,000	70,065,476	Bonds	PWB
Map W-6 W01359	Forest Park Low Tank	This project will plan, design and construct a single 1.3 million gallon AWWA D110 type 1 tank. This storage is to augment regular system capacity and increase fire flow.	Forest Park Low Tank	NW	Growth	Service Level	2,210,000	0	0	0	0	2,210,000	0	0	2,210,000	Bonds	PWB
Map: n/a WBDIFO	Fountains	The bureau has responsibility for 27 decorative fountains, including repairs, replacements and upgrades. Funding includes provisions for repair of drain lines and valves, replacement of liners, repair and replacement of electrical equipment and lighting systems, repair and replacement of pumps, addition of telemetry, and various improvements to exterior surfaces.	Various/ Citywide	All	Maintenance	Service Level	150,000	150,000	150,000	150,000	150,000	750,000	750,000	1,500,000	3,000,000	Bonds	PWB (PP&R, RACC)
Map W-7 W01358	Fulton Pump Station	This project will replace the Fulton Pump Station with a new pump station located in Willamette Park.	Fulton Pump Station	SW	Replacement Efficiency	Service Level	2,220,000	6,740,000	100,000	0	0	9,060,000	0	0	9,060,000	Bonds	PWB (PPR)
Map W-8	Greenleaf Pump Station	This project will plan, design and construct a replacement Greenleaf pump station at the existing site. Flow upgrades will remove the Penridge tank from the system. The new pump station will pump directly to the distribution system.	Greenleaf Pump Station	NW	Replacement Efficiency	Service Level	0	0	0	0	0	0	3,500,000	0	3,500,000	Bonds	PWB (PPR)
Map: n/a WBDIHY	Hydrants	The bureau maintains about 16,000 fire hydrants. These hydrants allow Portland the flexibility and preparedness to meet the challenge of a fire emergency through coordination with the Fire Bureau. This project provides for the replacement of fire hydrants that are no longer repairable. Replacements may also occur as part of the bureau's ongoing efforts to standardize hydrant types for more efficient and effective management of maintenance and repair activities.	Various/ Citywide	All	Replacement Efficiency	Service Level	1,100,000	1,200,000	1,200,000	1,200,000	1,200,000	5,900,000	6,000,000	12,000,000	23,900,000	Bonds	PWB (PFB)
Map W-9 W01400	Interstate Facility Renovation	The bureau's System Control Center and Operations and Maintenance Facility, located on North Interstate Avenue, serves as the hub for maintenance and construction crews, vehicles, equipment and materials, and the emergency operations center. This project consists of a comprehensive plan of reconstruction and improvements that will address seismic and other site vulnerabilities, and bring the facility up to current safety and building codes.	Interstate Facility (NE Interstate)	All	Efficiency; Maintenance	Service Level	12,377,000	16,248,390	6,138,422	560,000	0	35,323,812	0	0	35,323,812	Bonds	PWB (OMF)
Map: W-10 W01348	Portland-Milwaukie Light Rail Project	This project consists of planning, design and construction for relocation of over 5,000 feet of main required for the Portland-Milwaukie Light Rail project. PWB Construction crews and Construction Management Team will assist during the construction phase of the project.	PMLR alignment, SW/SE	SW, SE	Replacement	Service Level	1,100,000	0	0	0	0	1,100,000	0	0	1,100,000	Bonds	PWB (PBOT, TriMet)
Map: n/a WBDIME	Meters	This project funds the purchase and installation of water meters. The Bureau objective is to maintain meter accuracy to within 3% of actual values.	Various/ Citywide	All	Replacement Efficiency	Service Level	1,700,000	1,590,000	1,800,000	1,800,000	1,800,000	8,690,000	9,000,000	18,000,000	35,690,000	Bonds	PWB
Map: n/a WBDIPT	Pump Stations and Tanks	This program maintains a large variety of infrastructure consisting of water storage tanks, pumps, and pump and control facilities. The bureau uses a reliability centered maintenance (RCM) analysis to prioritize projects in these areas. A key focus of the next five years will be to replace the remote telemetry units at over 140 remote sites. The existing units are over 15 years old, and are becoming obsolete. The servers are at the end of their service cycle, and must also be replaced.	Various/ Citywide	All	Replacement Efficiency; Growth	Service Level	500,000	510,000	1,480,000	1,098,000	1,415,000	5,003,000	5,000,000	10,000,000	20,003,000	Bonds	PWB
Map: W-11 W01581	Rose City Sewer Rehabilitation	The project will install 1207 feet of 8 inch DI, 2 new hydrants and 39 new water services 2 inches or smaller.	Rose City area	NE	Replacement	Service Level	2,000	0	0	0	0	2,000	0	0	2,000	Bonds	PWB

Project ID	Project Title	Project Description	Location	Area	Project Objective	Driver	Estimated Cost by Time Period								Grand Total FY 2013-33	Funding Source	Facility Provider
							FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	Total FY 2013-18	FY 2018-23	FY 2023-33			
Map: W-12 W01651	Raymond Tank Supply Improvements	This project will design and construct improvements at Raymond Tank Site and at an intersection of SE Holgate Boulevard and SE 136th Avenue.	Raymond Tank, vicinity	SE	Efficiency	Service Level	125,000	410,000	0	0	0	535,000	0	0	535,000	Bonds	PWB
Map:W-13	Sam Jackson Pump Station	This project will add multiple capital improvements including seismic improvements, replacement of RTU and motor controllers, installation of pump control and check valves, extension of the crane rail, a concrete pad, and installation of a security fence and gate.	Sam Jackson Pump Station	SW	Replacement ; Efficiency	Service Level	0	0	0	0	0	0	1,400,000	0	1,400,000	Bonds	PWB
Map n/a WBDISV	Services	This project constructs replacement and customer requested water services. A water service is the connection between the water main and any given customer's service meter. Service connections are always performed by Water Bureau crews directed by a certified Water Service Mechanic. An ongoing budget of approximately \$4 million per fiscal year provides for installation of about 1,000 water service connections annually and other upgrades to existing water services.	Various/ Citywide	All	Expansion	Service Level	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	20,000,000	20,000,000	40,000,000	80,000,000	Bonds	PWB
Map: W-14 W01590	Willamette River Pipe Crossings	The project replaces major pipelines to strengthen the transmission link between Powell Butte and the service areas west of the Willamette River, including downtown and the storage reservoirs at Washington Park. It includes construction of a new seismically strengthened river crossing to replace the first one of potentially two Willamette River crossings, and new transmission piping on both sides of the river.	Various, Powell Butte – Wash. Park	CC	Expansion	Service Level	460,000	2,600,000	5,000,000	20,000,000	28,540,000	56,600,000	0	55,000,000	111,600,000	Bonds	PWB
Regulatory Compliance																	
Map: n/a W01355	Bull Run Dam 2 Tower	The Water Bureau plans to install steel multi-level intake structures onto the North Dam 2 Tower located in the Bull Run watershed. Modifications are designed to allow selective water withdrawal, proper operation during flood conditions, and enable the towers to better withstand seismic loadings.	Bull Run	Bull Run	Maintenance	Service Level	5,975,000	475,000	0	0	0	6,450,000	0	0	6,450,000	Bonds	PWB
Map: n/a W01534	HCP Alder Creek Fish Passage	This project will design and install two fish passage facilities as planned in the Habitat Conservation Plan (HCP). The project is in Alder Creek, a tributary to the Sandy River. There will be a fish ladder at the waterfall and a fish ladder at a water diversion.	Bull Run	Bull Run	Maintenance	Service Level	458,000	0	0	0	0	458,000	0	0	458,000	Bonds	PWB
Map: n/a WBRCRC	Water Quality and Regulatory Compliance	The bureau recognizes the Bull Run watershed as a diverse ecosystem. The bureau is committed to preserving this habitat and complying with federal regulations using practical, locally driven solutions. Many of the projects in this subprogram respond to the Endangered Species Act (ESA), including the implementation of the Bull Run Habitat Conservation Plan (HCP) as adopted by City Council and approved by the National Marine Fisheries Service. Consistent with HCP commitments, this program funds easements, purchases land, and also supports projects jointly conducted with other watershed partners.	Bull Run	Bull Run	Efficiency	Service Level	1,304,000	3,642,000	9,300,000	2,350,000	2,000,000	18,596,000	10,000,000	20,000,000	48,596,000	Bonds	PWB (EPA, OHHS)

Project ID	Project Title	Project Description	Location	Area	Project Objective	Driver	Estimated Cost by Time Period								Grand Total FY 2013-33	Funding Source	Facility Provider
							FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	Total FY 2013-18	FY 2018-23	FY 2023-33			
Supply																	
Map: n/a WBSUBR	Bull Run Watershed	The bureau is committed to updating the Bull Run watershed protection and maintenance procedures and agreements based on the 2007 Bull Run Agreement with the Mt. Hood National Forest. The function of this program is to allocate funds for the capital projects necessary to maintain, improve, and protect the watershed facilities that are not directly related to the water supply system facilities. This includes Bull Run Watershed road reconstruction to ensure continuous, reliable, and safe access to all facilities, as well as maintenance of other city-owned infrastructure within the watershed.	Bull Run	Bull Run	Maintenance	Service Level	380,000	780,000	2,500,000	2,750,000	2,000,000	8,410,000	10,000,000	20,000,000	38,410,000	Bonds	PWB (USFS)
Map: n/a	Dams and Headworks Repair and Rehabilitation	This program provides for assessment of the condition and rehabilitation of dams and other facilities at Headworks. As many of these facilities are between 50 and 70 years old, their safe and reliable operation requires ongoing investment. The program includes preliminary engineering and design of needed repairs, rehabilitation of these facilities, and actual repair work.	Bull Run	Bull Run	Maintenance	Service Level	0	0	0	0	0	0	1,000,000	2,000,000	3,000,000	Bonds	PWB
Map: n/a WBSUGW	Groundwater Improvements	The Columbia South Shore Wellfield (CSSW) is Portland's alternative supply of water should the Bull Run watershed supply be interrupted for any reason. Projects funded in this program improve the maintenance of this aging infrastructure, including repairs, selective replacements and upgrades.	CSSW	NE	Maintenance	Service Level	300,000	450,000	450,000	500,000	500,000	2,200,000	2,500,000	5,000,000	9,700,000	Bonds	PWB
Map:W-15	Groundwater Collection Main Hardening	Much of the piping connecting the wells to the Groundwater Pump Station is located in liquefiable soils which are vulnerable during a seismic event. This project would design and install measures to "harden" the piping and reduce this vulnerability.	CSSW	NE	Maintenance	Service Level	0	0	0	0	0	0	0	20,000,000	20,000,000	Bonds	PWB
Map: W-16 W01371	Groundwater Electrical Supply Improvements	This project designs and constructs a new 115kV/4160V transformer and other components to complete a double-ended electrical substation at the Groundwater Pump Station. It will also design and construct a 5kV main breaker replacement and purchase selected spare components.	CSSW	NE	Efficiency	Service Level	79,000	1,992,000	0	0	0	2,071,000	0	0	2,071,000	Bonds	PWB
Map: W-17	Groundwater Pump Station Expansion	As water demand increases, the bureau will need to increase the available flows from the groundwater system. The system expansion will include upgrade of the Groundwater Pump Station to provide additional capacity.	CSSW	NE	Expansion	Population	0	0	0	0	0	0	0	10,000,000	10,000,000	Bonds	PWB
Map: W-18	Groundwater Wellfield Expansion	As water demand increases, the bureau will need to increase the available flows from the groundwater system. The system expansion will include additional well development and collection mains in the Columbia South Shore area.	CSSW	NE	Expansion	Growth	0	0	0	0	0	0	2,000,000	10,000,000	12,000,000	Bonds	PWB
Map: W-19	Groundwater Wellfield Reliability Enhancement	The bureau is attempting to increase the flexibility and preparedness to meet the future challenge of an interruption of Bull Run water. The bureau is improving its emergency preparedness by evaluating electrical vulnerability for the pumping system, reviewing the flood inundation vulnerability of the site, and development of a Groundwater Intertie that would reduce transmission system vulnerability. The inundation review may be partially completed through a partnership with Multnomah County Drainage District.	CSSW	NE	Efficiency	Service Level	0	0	0	0	0	0	1,000,000	2,000,000	3,000,000	Bonds	PWB
Map: W-20	Powell Valley Well Improvements	The project includes upgrade of the facilities in the previous Powell Valley Road Water District area and connection and integration of these facilities to the PWB water system.	CSSW	NE	Efficiency	Growth	0	0	0	0	0	0	1,000,000	2,000,000	3,000,000	Bonds	PWB
Map: n/a W01669	Road 1008	This project will design and construct an overlay for the Bull Run 1008 road.	Bull Run	Bull Run	Maintenance	Service Level	60,000	650,000	0	0	0	710,000	0	0	710,000	Bonds	PWB
Map: n/a W01670	Road 10 MP 0.6-1.8	Design and construct walls, widening, culverts and repave this portion of the Bull Run 10 road.	Bull Run	Bull Run	Maintenance	Service Level	60,000	840,000	0	0	0	900,000	0	0	900,000	Bonds	PWB

Project ID	Project Title	Project Description	Location	Area	Project Objective	Driver	Estimated Cost by Time Period								Grand Total FY 2013-33	Funding Source	Facility Provider
							FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	Total FY 2013-18	FY 2018-23	FY 2023-33			
Support																	
Map: n/a	Building Maintenance	The bureau maintains hundreds of structures from the Bull Run watershed to Downtown Portland. These structures range in size from small pump houses to the maintenance hub on Interstate Avenue. The necessary work involves structural repairs and maintenance.	Various/ Citywide	All	Maintenance	Service Level	0	0	0	0	0	0	1,000,000	2,000,000	3,000,000	Bonds	PWB (OMF)
Map: n/a	WBASPL	Planning	Various/ Citywide	All	Efficiency; Maintenance	Service Level	1,500,000	1,500,000	2,000,000	2,500,000	2,500,000	10,000,000	12,500,000	25,000,000	47,500,000	Bonds	PWB
Map: n/a	Sandy River Station Upgrade	This project consists of upgrades to the Sandy River Station facilities including an evaluation of a potential move to a different site.	Sandy River station	E	Efficiency Maintenance	Service Level	0	0	0	0	0	0	0	5,000,000	5,000,000	Bonds	PWB (OMF)
Map: n/a	West Side Maintenance Facility	A hub is needed on the west side of the Willamette River for maintenance and construction crews, vehicles, equipment and materials, and emergency operations. This project includes construction of the facility within the next 20 years.	West of Willamette River, tbd	W	Efficiency; Maintenance	Service Level	0	0	0	0	0	0	5,000,000	0	5,000,000	Bonds	PWB (OMF)
Transmission & Terminal Storage																	
Map: n/a	Conduit 5	This project would include installation of sections of a new Conduit 5 as growth occurs and the condition of the existing conduits worsens.	Conduit 5, east of city limits	E	Maintenance Expansion	Service Level; Growth	0	0	0	0	0	0	0	75,000,000	75,000,000	Bonds	PWB
Map: n/a	WBTTCT	Conduits and Transmission Mains	Various/-C itywide	E	Maintenance	Service Level	425,000	8,500,000	12,600,000	5,000,000	7,000,000	33,525,000	10,000,000	20,000,000	63,525,000	Bonds	PWB
Map W-22	W01424	Kelly Butte Reservoir	Kelly Butte	SE	Replacement	Service Level; Growth	35,000,000	27,000,000	4,970,000	0	0	66,970,000	0	0	66,970,000	Bonds	PWB
Map: n/a	New Conduit Intertie	This project would address concerns about the capability of the conduit system to withstand hazards and deliver an uninterrupted supply to the City. The project will improve reliability of flow during emergency conditions and for maintenance by providing additional isolation and interconnectivity.	Conduit, east of city limits	E	Maintenance Efficiency	Service Level	0	0	0	0	0	0	0	10,000,000	10,000,000	Bonds	PWB
Map W-23	W01343	Powell Butte Reservoir 2	Powell Butte	SE	Replacement	Service Level; Growth	27,520,000	7,700,000	0	0	0	35,220,000	0	0	35,220,000	Bonds	PWB
Map W-24	Powell Butte Reservoir 3	This project constructs a third reservoir at Powell Butte and possible bypass piping around the Butte.	Powell Butte	SE	Expansion	Growth	0	0	0	0	0	0	0	100,000,000	100,000,000	Bonds	PWB
Map: n/a	Sandy River Conduit Relocation, Phase II	The bureau is committed to increasing the flexibility and preparedness to meet the future challenge of a natural disaster. This project will relocate the Sandy River crossings of Conduit 3. The crossings of Conduit 2 and 4 have already been completed. These conduits were identified in the system vulnerability study as vulnerable to seismic, volcanic, flooding, and other natural and manmade hazards.	Sandy River crossing	E	Replacement	Service Level	0	0	0	0	0	0	5,000,000	0	5,000,000	Bonds	PWB

Project ID	Project Title	Project Description	Location	Area	Project Objective	Driver	Estimated Cost by Time Period								Grand Total	Funding Source	Facility Provider
							FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	Total FY 2013-18	FY 2018-23	FY 2023-33	FY 2013-33		
Map W-25 W01524	Tabor Reservoir Adjustments	This project includes adjustments to piping, structures and other features at Mt. Tabor in order to move storage elsewhere and physically disconnect the open reservoirs from the public water system for compliance with LT2. Project does not include disposition of the reservoirs after they have been disconnected from the public water system.	Mt. Tabor	SE	Replacement	Service Level	225,000	1,140,000	1,990,000	0	0	3,355,000	0	0	3,355,000	Bonds	PWB
Map W-26 W01402	Washington Park Reservoir 3	The project will plan, design and construct a new buried reservoir to replace open reservoir No. 3. This project is one solution toward compliance with LT2 replacement of the open reservoirs. It is assumed that Reservoir # 4 will be used as the overflow detention structure. We envision that the buried reservoir would be topped with a reflecting pond and historical features would be protected to retain its visual appeal.	Washington Park	SW	Replacement	Service Level	3,600,000	2,300,000	2,900,000	19,300,000	24,000,000	52,100,000	0	0	52,100,000	Bonds	PWB
Map W-27	West Side Transmission Main Improvements	These mains include the Sam Jackson to Downtown Pipeline and the Jefferson Street Supply mains. These large transmission mains are needed to strengthen the supply to terminal storage located on the west side of the Willamette River.	Various, SW Portland	E	Maintenance Expansion	Service Level; Growth	0	0	0	0	0	0	10,000,000	10,000,000	20,000,000	Bonds	PWB
Map: n/a	Wholesale Connections	This project provides for facilities servicing wholesale customers including repairs, replacements, and upgrades of pump stations and meters. Additional interties may be needed in the future.	Bull Run	All	Efficiency	Service Level; Growth	0	0	0	0	0	0	0	2,000,000	2,000,000	Bonds	PWB
Treatment																	
Map: n/a W01582	Headworks Flow Meters	This project would install new flow meters on the Primary Intake conduits; install new flow meters and flow control valves on Screen house #3 conduits; and, address the sump pump drainage system in Bailey PRV vault.	Bull Run	Bull Run	Maintenance	Service Level	2,500,000	0	0	0	0	2,500,000	0	0	2,500,000	Bonds	PWB
Map: n/a	Treatment Facilities Improvements	Treatment of Portland's drinking water is the most complex activity the bureau engages in while operating the water system. This project would include several related projects for the Bull Run water supply, at Bull Run Headworks and the Lusted Hill Facility. Projects would likely be driven by State and Federal regulations	Bull Run	Bull Run	Maintenance	Service Level; Growth	0	0	0	0	0	0	50,000,000	100,000,000	150,000,000	Bonds	PWB (EPA, OHHS)
Total All Projects							125,209,600	110,949,890	76,092,322	81,943,138	96,524,338	490,719,288	309,050,000	767,300,000	1,567,069,288		

Bureau of Transportation

The Portland Bureau of Transportation project list includes planned transportation projects, based on the Portland's Transportation System Plan (TSP) and the Regional Transportation Plan (RTP). These multi-modal projects address the needs of pedestrian, bicyclists, transit users, freight movers, and motorists. Investments in the City's transportation system are needed to maintain existing facilities and to ensure the system meets the needs of Portlanders for decades to come. Anticipated funding is not adequate to support completion of all projects identified in the Investment Strategy.

The City is updating the Transportation System Plan along with the Comprehensive Plan Update. This update of the Transportation System Plan will include refining the list of projects included here to reflect anticipated funding, project timing; recent plans, new goals and policies, and proposed centers, corridors, and greenways.

For more information on the TSP update project, visit <http://www.portlandoregon.gov/transportation/63710>.

To review the Recommended Transportation Investment Strategy, please see the project list included in the Recommended Transportation System Plan. A copy of the final Transportation Investment Strategy will be inserted here in the final Adopted Plan.

Appendix B

Urban Service Agreements

Urban service agreements are being reviewed and updated as part of the Comprehensive Plan Update implementation phase (Task 5). When available, a list of relevant agreements will be added here to comply with Oregon Revised Statutes 195 and 197.

Appendix C

Resources

Document	Date	Source
Airport Futures	2010	BPS/Port
Bicycle Plan for 2030 (Bicycle Master Plan)	2010	PBOT
Bull Run Water Supply Habitat Conservation Plan	2008	PWB
Bureau of Environmental Services Strategic Plan	2011	BES
BES Capital Improvement Plan	Annual	BES
Climate Action Plan	2009	BPS
Columbia Boulevard Wastewater Treatment Plant Conditional Use Master Plan	2010	BES
Columbia Boulevard Wastewater Treatment Plant Facilities Plan	2008	BES
Combined Sewer System Plan		BES
Comprehensive Plan	1980-2010	BPS
CSO Facilities Plan	2011	BES
Distribution System Master Plan	2007	PWB
Fanno and Tryon Creeks Watershed Management Plan	2005	BES
Freight Master Plan	2006	PBOT
Infrastructure Master Plan	2000	PWB
Johnson Creek Restoration Plan	2001	BES
Metro 2040 Growth Concept	1995/2012	Metro
Metro Regional Framework Plan	1997/2005	Metro
Metropolitan Greenspaces Master Plan	1992	Metro

Recommended Plan		Citywide Systems Plan
Mt. Hood National Forest Land and Resource Management Plan	1990	USDA Forest Service
Natural Area Acquisition Strategy	2006	PP&R
Natural Areas Restoration Plan	2010	PP&R
Northwest Forest Plan	1994	USDA Forest Service
Oregon Highway Plan (OHP)	1999	ODOT
Oregon Transportation Plan (OTP)	2006	ODOT
Parks 2020 Vision	2001	PP&R
Pedestrian Master Plan	1998	PBOT
Portland Parks & Recreation Strategic Plan	2012	PP&R
Portland Plan	2012	BPS
Portland Watershed Management Plan (PWMP)	2006	BES
Powell Valley Road Water District Wellhead Protection Plan	1998	PVRWD
PWMP 5-Year Implementation Strategy 2012-2017	2012	BES
Regional Transportation Plan (RTP)	2013	Metro
Regional Water Supply Plan	1996/2004	RWPC
Seasonal Water Supply Augmentation and Contingency Plan, also referred to as the Summer Supply Plan (SSP)	Annual	PWB
Statewide Comprehensive Outdoor Recreation Plan (SCORP)	2008	OPRD
Stephens Creek Stormwater System Plan	2012	BES
Stormwater Discharge Monitoring Plan	2012	BES
Stormwater Management Manual	2008	BES
Stormwater Management Plan	2011	BES
Streetcar Concept Plan	2009	PBOT
Transportation System Plan	2006	PBOT

Recommended Plan	Citywide Systems Plan	
Tryon Creek Wastewater Treatment Plant Facilities Plan	1999	BES
UIC Corrective Action Plan	2006	BES
Underground Injection Control (UIC) Management Plan	2012	BES
Urban Forest Action Plan	2007	PP&R
Urban Forestry Management Plan	2004	PP&R
Urban Growth Management Functional Plan	1996/2013	Metro
Water Management and Conservation Plan	2010	PWB

Appendix D

Glossary

Bureau abbreviations

- BES - Bureau of Environmental Services
- BES - Bureau of Environmental Services
- BPS - Bureau of Planning and Sustainability
- PBOT - Portland Bureau of Transportation
- PBEM - Portland Bureau of Emergency Management
- PPB - Portland Police Bureau
- PP&R - Portland Parks & Recreation
- PWB - Portland Water Bureau

Local, State and Federal Agency abbreviations

- DEQ - Oregon Department of Environmental Quality
- EPA - U.S. Environmental Protection Agency
- MCDD - Multnomah County Drainage District
- Metro - Elected regional government for the Portland metropolitan area
- ODOT - Oregon Department of Transportation
- ORPD - Oregon Parks and Recreation Department
- RWPC - Regional Water Providers Consortium
- USDA - U.S. Department of Agriculture

Access. 1) The ability to approach or make use of transportation facilities, parks and open space, public infrastructure, or businesses and services that are open to the public. Good access means within close proximity (up to a half mile) that is free from physical barriers for those with limited mobility. 2) Providing a wide variety of information and involvement opportunities, activities, and settings as part of meaningful community engagement in public decision-making.

Active transportation. Transportation that involves physical activity, including walking, biking, and using transit (because usually one must walk or roll to the bus or train).

Adaptive management. A dynamic planning and implementation process that applies scientific principles, methods, and tools to incrementally improve management activities. Management strategies change as decision makers learn from experience and better information, and as new analytical tools become available. Adaptive management can involve frequent modification of planning and management strategies, goals, objectives, and benchmarks.

Asset management. The continuous cycle of asset inventory, condition, and performance assessment that has as its goal the cost-effective provision of a desired level of service for physical assets. Investment decisions consider planning, design, construction, maintenance, operation, rehabilitation, and replacing assets on a sustainable basis that considers social, economic, and environmental impacts.

Best practice. An activity that has proven its effectiveness in multiple situations and may have applicability in other situations.

Centers. Places with concentrations of commercial and community services, housing, gathering places, and transit connections. Centers provide services to surrounding neighborhoods and are intended to be places that are a focus of growth, where increasing numbers of people will live, work, and visit. Different types of centers have varying functions, levels of activity, and scale and intensity of development.

- **Central City.** Corresponds to the Central City plan district, which serves as the region's premier center, anchoring an interconnected system of centers.
- **Gateway Regional Center.** Corresponds to the Gateway plan district, East Portland's largest center, which is intended to be enhanced as an employment and community service hub within the area and region.
- **Town Centers.** Large centers that serve a broad area of the city and have an important role in accommodating growth. They provide a full range of commercial and community services, high-density housing, mid-rise commercial and mid-rise mixed-use buildings (typically up to five to seven stories in height), are served by high-capacity transit connections, and have a substantial employment component. Town Centers provide housing opportunities for enough population to support a full-service business district.
- **Neighborhood Centers.** Centers that primarily serve adjacent neighborhoods and provide opportunities for additional housing and low- to mid-rise commercial and mixed-use buildings (typically up to three to five stories in height). They provide a range of local commercial and community services and transit connections. Neighborhood Centers provide housing opportunities for about half the population needed to support a neighborhood business district.

Centers and corridors. When used together, "centers and corridors" refers generally to places where development is concentrated, including the Central City and the Gateway Regional Center, Town Centers, and Neighborhood Centers, and along Civic Corridors and Neighborhood Corridors, and at Transit Station Areas.

City. City is capitalized when it refers specifically to City of Portland government. When it is used to designate a geographic area it is not capitalized.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). A federal law, commonly known as Superfund, that was enacted in 1980 and established requirements for hazardous waste sites; authorized actions to address releases or threatened releases of hazardous waste; provided for liability for responsible parties; and established a trust fund to provide for cleanup of hazardous waste when no responsible party can be identified.

City Greenways. A system of distinctive pedestrian- and bicycle-friendly streets and trails, enhanced by lush tree canopy and landscaped stormwater facilities that support active living by expanding transportation and recreational opportunities and making it easier and more attractive to reach destinations across the city. City Greenways are a network that includes the following types of infrastructure:

- Enhanced greenway corridors are distinctive green streets with extensive tree canopy and landscaped stormwater facilities that provide connections between major centers, schools, parks, natural areas, and the rivers.
- Trails are often located along rivers or through natural areas, providing pedestrian and bicycle connections.
- Heritage parkways are iconic streets or segments of streets with elements such as linear parkways, scenic views, and distinctive landscaping or street design.
- Neighborhood greenways are an extensive network of streets with low volumes of motor vehicle traffic that are prioritized for bicycles and enhance the pedestrian environment, working in conjunction with the rest of the City Greenways system to extend the system into all neighborhoods.

Clean Water Act (CWA). A law passed by the U.S. Congress in 1972 that makes the discharge of pollution into surface or ground waters without a permit illegal, and that encourages the use of the best achievable pollution control technology to reduce the impact of discharged effluent.

Combined sewer overflow (CSO). In areas with combined sewers that convey both sewage and stormwater in a single pipe, stormwater runoff during rainstorms can exceed the capacity of pipes, causing overflow of sewage and stormwater into a waterbody.

Community. A group of people with a shared sense of identity or belonging.

Complete neighborhood. A neighborhood where people have safe and convenient access to the goods and services needed in daily life, which include a variety of housing options, grocery stores and other commercial services, high-quality public schools, and parks. Complete neighborhoods are also easily accessible by foot, wheelchair, bike, and transit for people of all ages and abilities.

Complete streets. Complete streets provide accessibility to all users of the right-of-way regardless of age, ability, or mode of transportation. They are designed and operated to make better places and to enable safe access for all modes, including people walking and bicycling, those using a mobility device, motorists, and transit riders.

Corridor. An area that may be a single major street, or a broad mobility corridor that provides connections for a range of transportation modes (transit, pedestrians, cyclists, freight, motor vehicles, etc.), not necessarily on the same street. There are three types of corridors.

- **Civic Corridor.** These are a prioritized subset of the city's most prominent transit and transportation streets. They connect centers, provide regional connections, and include segments where commercial development and housing are focused. Civic Corridors are intended to continue their important transportation functions while providing livable environments for people,

and evolving into distinctive places that are models of ecological design.

- **Neighborhood Corridor.** Main streets that connect neighborhoods with each other and to other parts of the city. They support neighborhood business districts and provide housing opportunities close to local services, amenities, and transit lines. Neighborhood Corridors are streets that include a mix of commercial and higher-density housing development. They have less intense development and transportation function than Civic Corridors.
- **Freight Corridor.** Primary routes into and through the city that support Portland as an important West Coast hub and a gateway for international and domestic trade. These facilities are integral to the growth of traded sector businesses such as manufacturing, warehousing, and distribution industries.

Critical infrastructure. Assets and systems that are essential for the functioning of society and the economy, including energy generation, transmission and distribution; telecommunications; water supply and wastewater; transportation systems; public health; and security and emergency response services.

Displacement. Households or businesses involuntarily forced to move from a neighborhood because of increasing market values, rents, or changes in the neighborhood's ability to meet basic needs in the case of households or erosion of traditional client base in the case of businesses.

Ecological function. The physical, chemical, and biological functions of a watershed such as flow conveyance and storage, channel dynamics, nutrient cycling, microclimate, filtration, control of pollution and sedimentation, water quality, terrestrial and aquatic habitat, and biodiversity.

Ecosystem services. The contribution of ecosystem conditions and processes to human well-being, including the production of goods and processes that control variability, support life, health, and safety, enrich cultural life, and preserve options. Examples include pollination of trees and plants, climate regulation, flood mitigation, stormwater management, clean air and water, recreational opportunities, and satisfaction of aesthetic and spiritual needs.

Endangered Species Act (ESA). A law passed by the U.S. Congress in 1973 that established programs for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The U.S. Fish and Wildlife Service maintains the list of threatened and endangered species.

Engagement. A process that strives to build collaboration between local government and the community. Engagement is an umbrella term to describe all levels of public participation including education, outreach, involvement, collaboration, and shared decision-making.

Environmental justice. The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Equity. Equity is when everyone has access to the opportunities necessary to satisfy their essential needs, advance their well-being, and achieve their full potential.

Gentrification. An under-valued neighborhood that becomes desirable, resulting in rising property values and changes to demographic and economic conditions of the neighborhood. These changes include a shift from lower-income to higher-income households, and often there is a change in racial and ethnic make-up of the neighborhood's residents and businesses.

Green infrastructure. Public or private assets—either natural resources or engineered green facilities—that protect, support, or mimic natural systems to provide stormwater management, water quality, public health and safety, open space, and other complementary ecosystem services. Examples include trees, natural areas, ecoroofs, green street facilities, wetlands, and natural waterways.

Green street. A green street is a street with a landscaped street-side planter or bioswale that captures stormwater runoff from the street and allows it to soak into the ground as soil and vegetation filters out pollutants. A green street is not the same as a City Greenway, though a City Greenway may include green street elements.

Habitat-friendly development. Strategies to provide habitat for and prevent harm to native resident and migratory wildlife. Examples include habitat-oriented ecoroofs, bridges, buildings, and sites, including features such as nest platforms and bat boxes. Strategies also involve development design and practices that limit the amount of light, noise, vibration, and other disturbance or hazards that negatively affect wildlife and wildlife habitat, especially during vulnerable wildlife life cycles (such as mating/nesting season and migration); improve wildlife access and passage, by limiting fencing, roads, culverts and other barriers between important habitats (e.g., desirable feeding and watering sites); and minimize the impact of construction on and in rivers, and on terrestrial species (such as nesting birds).

Healthy watershed. A healthy urban watershed has the hydrologic, habitat, and water quality conditions suitable to protect human health and maintain viable ecological functions and processes, including self-sustaining populations of native fish and wildlife species whose natural ranges include the Portland area.

High-capacity transit. High capacity transit is public transit that has an exclusive right of way, a non-exclusive right of way, or a combination of both. Vehicles make fewer stops, travel at higher speeds, have more frequent service, and carry more people than local service transit such as typical bus lines. High-capacity transit can be provided by a variety of vehicle types including light rail, commuter rail, streetcar, and bus.

High-risk infrastructure. Infrastructure assets that have a high risk of failure, based on the likelihood and consequence of that failure.

Hydrologic. Of or pertaining to the properties, circulation, or distribution of water on or below the surface, in the soils and aquifers, or in the atmosphere.

Infrastructure. Necessary municipal or public services, provided by the government or by private companies and defined as long-lived capital assets that normally are stationary and can be preserved for a significant number of years. Examples are streets, bridges, tunnels, drainage systems, water and sewer lines, parks, pump stations and treatment plants, dams, and lighting systems. Beyond transportation and

utility networks, Portland includes buildings, green infrastructure, communications, and information technology as necessary infrastructure investments that serve the community. See also Public facility.

Level of service. A defined standard against which the quality and quantity of service can be measured. A level of service can take into account reliability, responsiveness, environmental acceptability, customer values, and cost.

Low-impact development. Strategies to reduce the environmental impact of development on natural systems, including hydrology and vegetation. These strategies include using paving and roofing materials to reduce effective impervious area; clustered or small lot development that reduces disturbance area; the use of vegetated stormwater management to mimic pre-development site hydrology; alternative road layout and narrower streets; natural area protection; and landscaping with native plants.

Municipal Separate Storm Sewer System (MS4). A publicly-owned conveyance or system of conveyances that discharges to waters of the U.S. and is designed or used for collecting or conveying stormwater, but is not a combined sewer or part of a publicly-owned treatment system. The MS4 stormwater system is regulated under the Clean Water Act.

National Environmental Policy Act (NEPA). A federal law that promotes protection and enhancement of the environment and established procedural requirements for environmental assessments (EAs) and impact statements (EISs) for proposed federal agency actions.

National Pollutant Discharge Elimination System (NPDES). Wastewater and Surface water quality program authorized by Congress as part of the 1987 Clean Water Act, and administered by the state Department of Environmental Quality. NPDES provides guidance to municipalities and state and federal permitting authorities on how to meet wastewater and stormwater pollution control goals as flexibly and cost-effectively as possible.

Pattern Areas. Five primary geographies in Portland that have differing physical characteristics, needs, and assets. Each of these areas has unique topographies and natural features, patterns and types of development, street and other infrastructure characteristics, and histories that have shaped their urban form. The five primary Pattern Areas are:

- **Central City.** This area corresponds to the Central City plan district and is also a major center.
- **Inner Neighborhoods.** This area includes inner portions of the city that originally developed during the streetcar era, prior to World War II. It includes a large part of the city east of the Willamette River, extending roughly to 82nd Avenue, and also the inner westside “flats,” located between the river and the West Hills.
- **Western Neighborhoods.** This area includes the West Hills (Tualatin Mountains) and areas to the west.
- **Eastern Neighborhoods.** This area includes eastern portions of the city, mostly located east of 82nd Avenue and largely annexed to Portland in the 1980s and 1990s.
- **River.** This area includes the land along the Willamette and Columbia Rivers and the Columbia Slough.

Plans and investments. Legislatively adopted land use plans, zoning maps, zoning regulations, comprehensive plan map designations, the Transportation System Plan, and changes to the List of Significant Projects. The phrase “planning and investment decisions” is also used to mean decisions about plans and Investments as defined here.

Portlanders. People who live, work, do business, own property, or visit Portland, including people of any race, ethnicity, sex, gender or gender identity, sexual orientation, belief system, political ideology, ability, socioeconomic status, educational status, veteran status, place of origin, language spoken, age, or geography.

Prime industrial land. As defined by Statewide Planning Goal 9 – Economic Development, land that is suited for traded sector industries and possesses site characteristics that are difficult or impossible to replace elsewhere in the region.

Prosperity. When the term prosperity is used, it includes prosperity for households not just for businesses.

Public facility. Any facility, including buildings, property, and capital assets, that is owned, leased, or otherwise operated, or funded by a governmental body or public entity. Examples of public facilities include sewage treatment and collection facilities, stormwater and flood management facilities, water supply and distribution facilities, streets and other transportation assets, parks, and public buildings. See also Infrastructure.

Residential areas. Predominantly residential areas located outside centers, civic corridors, and transit station areas.

Resilience/resiliency. The capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.

Rural Land. Land that is within the City Limits but outside the Regional Urban Growth Boundary, having been annexed prior to establishment of the boundary

Special service district. An independent governmental unit that exists separately from the general purpose government. Special service districts provide specialized services to persons living within a geographic area. Examples include drainage districts, port authorities, and mass transit agencies.

Total Maximum Daily Loads (TMDLs). A calculation of the maximum amount of a pollutant a waterbody can receive and still meet water quality standards. The Clean Water Act establishes and regulates TMDLs.

Traded sector. A business sector consisting of companies that compete in markets extending beyond the metropolitan region. These companies include exporters to markets outside the region, suppliers to regional exporters, and businesses whose products substitute for regional imports.

Trails. Designated routes on land or water that provide public access for recreation or transportation purposes, like walking and bicycling. Trails are often located along rivers, through natural areas, or along rail or highway rights-of-way, with connections to and through neighborhoods.

Transit Station Areas. Areas within a half-mile of light rail and other high-capacity transit stations. Some transit station communities are located within centers or civic corridors and are subject to policies for those types of places.

Transparency. Reliable, relevant, and timely publicly available information about government activities and decision making.

Underground Injection Controls (UIC). An injection system that distributes or injects fluids such as stormwater runoff or wastewater below the surface of the ground.

Under-served. People and places that historically and currently do not have equitable resources, access to infrastructure, healthy environments, housing choice, etc. Disparities may exist both in services and outcomes.

Under-represented. People and communities that historically and currently do not have an equal voice in institutions and policy-making, and have not been served equitably by programs and services.

Universal Design principles. Underlying Universal Design is the principle that buildings and their sites should be built or renovated in ways that can work for all — for a “universal” population. People have varying abilities, temporary or permanent, throughout life. Rather than doing special or separate design to accommodate differences in age and ability, Universal Design principles foster design that works for all. The seven principles of Universal Design are. equitable use; flexibility in use; simple and intuitive use; perceptible information; tolerance for error; low physical effort; and size and space for approach and use.

Urban Habitat Corridor. Natural and built areas that provide safe, healthy places for resident and migratory fish and wildlife species that live in and move through the city. As a system, they link habitats in Portland and the region, facilitating safe fish and wildlife access and movement through and between habitat areas. Enhanced habitat corridors are places where there is existing significant fish or wildlife habitat, as identified in the Natural Resource Inventory, and where habitat connectivity will be improved over time. Potential habitat corridors will be established over time. They are places where habitat features and functions (e.g., trees, vegetation, nesting and perching sites, food, etc.) will be integrated into generally more developed areas of the city.

Urban land. Land that is within the City Limits, the Regional Urban Growth Boundary, and the City’s Urban Services Boundary.

Urban heat island. The urban heat island effect is a measurable increase in ambient urban air temperatures resulting primarily from the replacement of vegetation with buildings, roads, and other heat-absorbing infrastructure. The heat island effect can result in significant temperature differences between rural and urban areas.

Urbanizable land. Land that is beyond the City Limits, within the Regional Urban Growth Boundary and within the City’s Urban Services Boundary.

Watershed. The area that catches rain and snow and drains into a corresponding river, stream, or other waterbody. A watershed is a geographic area that begins at ridge tops (highest elevations) and ends at a

river, lake, or wetland (lowest elevation). Within a watershed, there can also be sub-watersheds. These drainage areas are smaller and are defined by their tributaries.

Goal and Policy verbs: The following verbs have been defined for use in the Comprehensive Plan Goals & Policies, portions of which are included in Chapter 5: Goals & Policies.

- Adopt: This directs the City to adopt a specific plan or regulation.
- Comply: Has been evaluated against the Comprehensive Plan's applicable goals and policies and on balance is equally or more supportive of the Comprehensive Plan as a whole than the existing language or designation.
- Consider: Take into account when planning or making decisions.
- Continue: Persist in an activity or process.
- Coordinate: Work together with others toward a common goal; collaborate.
- Discourage: Deter or prevent from happening by showing disapproval or creating disincentives.
- Enable: To supply with the means, knowledge, or opportunity; make able.
- Encourage: Promote or foster using some combination of voluntary approaches, regulations, or incentives.
- Ensure: To make something certain; to make sure that something will happen or be available.
- Establish: Create something, such as a program or project that does not yet exist.
- Expand: Make something that already exists more extensive.
- Evaluate: Assess the range of outcomes, and identify costs and benefits.
- Facilitate: To make something easier; to help bring about or make run more smoothly.
- Foster: Encourage or guide the incremental development of something over a long period of time.
- Guide: Shape or direct actions over time to achieve certain outcomes. This verb is used when the City has a role in shaping outcomes but implementation involves multiple other implementers and actions taking place over a long period of time.
- Implement: To put something into effect.
- Improve: Make the current situation better; increase; enhance; expand services, facilities, or resources to become better in terms of quality, condition, effectiveness, or functionality.
- Include: Incorporate as part of a whole.
- Invest: Spend money and/or other resources.
- Limit: Minimize or reduce something or the effects of something relative to the current situation or to a potential future situation.
- Maintain: Keep what you have; conserve; preserve; continue.
- Prevent: Proactively avoid or hinder adverse impacts or outcomes.
- Prioritize: To treat something as more important than something else. Policies that use this verb must identify the things that will be treated as more important, and the other things that will be

treated as less important.

- Prohibit: Don't allow at all; stop from happening.
- Promote: Further the progress of, advance, or raise.
- Protect: To defend or guard against loss, injury, or destruction. Policies calling for protection apply to multiple topic areas and can be accomplished or supported using various tools, such as regulations to prohibit or limit an action, investments such as land acquisition, agreements, and community partnerships.
- Provide: To supply, offer, or make available. The City must be able to supply the item or service in question.
- Recognize: To acknowledge and treat as valid.
- Reduce: Lessen something relative to the current situation.
- Remove: To do away with; eliminate.
- Require: Compel; demand something.
- Restore: Recreate elements that are missing; move something back to its original condition; rehabilitate.
- Strive: Devote serious effort or energy to; work to achieve over time.
- Support: To aid the cause of.
- Utilize: To put to use; to make practical or worthwhile use of. Conveys intention to apply a resource toward a purpose.

IMPACT STATEMENT

Legislation title: Adopt new and amended supporting documents for an update of Portland's *Comprehensive Plan*; Accept report of the Citizen Involvement Committee (Ordinance)

Contact name: Eric Engstrom

Contact phone: 503-823-3329

Presenter name: Susan Anderson, Joe Zehnder, Eric Engstrom, Tom Armstrong

Purpose of proposed legislation and background information:

Under Oregon state land use law, cities are required by the state to periodically update their Comprehensive Plans. Portland is under state order to do so at this time. Comprehensive plans serve to establish a land use planning process and policy framework that is the basis for all decisions and actions related to use of land. The Comprehensive Plan is the City's principle growth management tool, and promotes orderly and efficient arrangement of public facilities and services necessary to serve anticipated growth. Portland's state-directed work plan includes five steps. Council has taken previous related action to adopt a work plan, adopt a public involvement plan, and adopt background reports. This third step adopts supporting documents that provide alternatives analysis supporting step 4.

Financial and budgetary impacts:

This ordinance adopts supporting reports for the recommended Comprehensive Plan that are necessary to comply with Oregon land use law. These include:

- Community Involvement Report for Periodic Review Tasks III and IV
- Updated Inventory Map of Buildable Lands and Estimate of Remaining Capacity
- Growth Scenarios Report
- Economic Opportunities Analysis
- Citywide Systems Plan

The Comprehensive Plan is binding on a defined realm of decisions as prescribed in Oregon law—specifically, land use decisions and related growth management actions. It does not impact all City decisions. The supporting documents adopted with this plan contain facts that will be used in the future to make land use decisions, or provide background for public facility investments.

This ordinance does not amend the budget, or make any changes to appropriations. It does not authorize additional spending at this time. The Comprehensive Plan, and the supporting documents adopted with this ordinance are long-term 20-year land use and growth management planning documents. The financial impacts of this ordinance are long term in their nature. Further Council action is required before any of the capital projects described in the Comprehensive Plan can be built, or before any specific policy is translated into an action.

Adoption of the Comprehensive Plan fulfills a state mandate. The state is authorized to penalize jurisdictions that fail to regularly update their Comprehensive Plans. Penalties can include loss of state funding, or direct state assumption of local planning and zoning powers.

The more specific impact of the recommended Comprehensive Plan is described in the impact statement filed with that separate ordinance. The supporting documents adopted with this ordinance have no separate independent financial impact.

Community impacts and community involvement:

Community impacts and community involvement for the recommended Comprehensive Plan is described in the impact statement filed with that separate ordinance. The supporting documents adopted with this ordinance have no separate independent impact. Public involvement in the development of these supporting documents was integral to the larger public involvement process for the Comprehensive Plan Update.

Budgetary Impact Worksheet

Does this action change appropriations?

YES: Please complete the information below.

NO: Skip this section

Fund	Fund Center	Commitment Item	Functional Area	Funded Program	Grant	Sponsored Program	Amount