

CITY OF PORTLAND ECONOMIC OPPORTUNITIES ANALYSIS:

Section 2 and 3 – Employment Land Needs and Supply Analysis



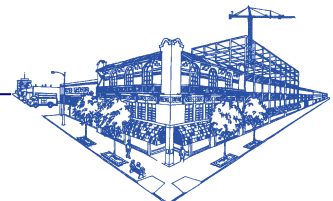
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City of Portland Bureau of Planning & Sustainability

E. D. Hovee & Company, LLC

Economic & Development Services



EXECUTIVE SUMMARY

The EOA is an analysis of the 20-year supply and demand for employment 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 335 acres of land for marine terminals, rail yards, and airport facilities.
- The Buildable Land Inventory of the existing Comprehensive Plan 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 335 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*	95
Airport Facilities	40
Total	335

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	192	113	-79	59%
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	2,895	3,240		
Aggregate Geography					
Central City	44,740	150	266	116	177%
Industrial*	31,630	1,685	1,365	-320	81%
Neighborhood Commercial	35,140	690	1,303	613	189%
Institutions	22,730	370	306	-64	83%
Residential	7,400	-	-	-	-
Total	141,640	2,895	3,240		

* Total land demand shown here includes Traded Sector Support Facilities in marine, rail and air terminals.

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:

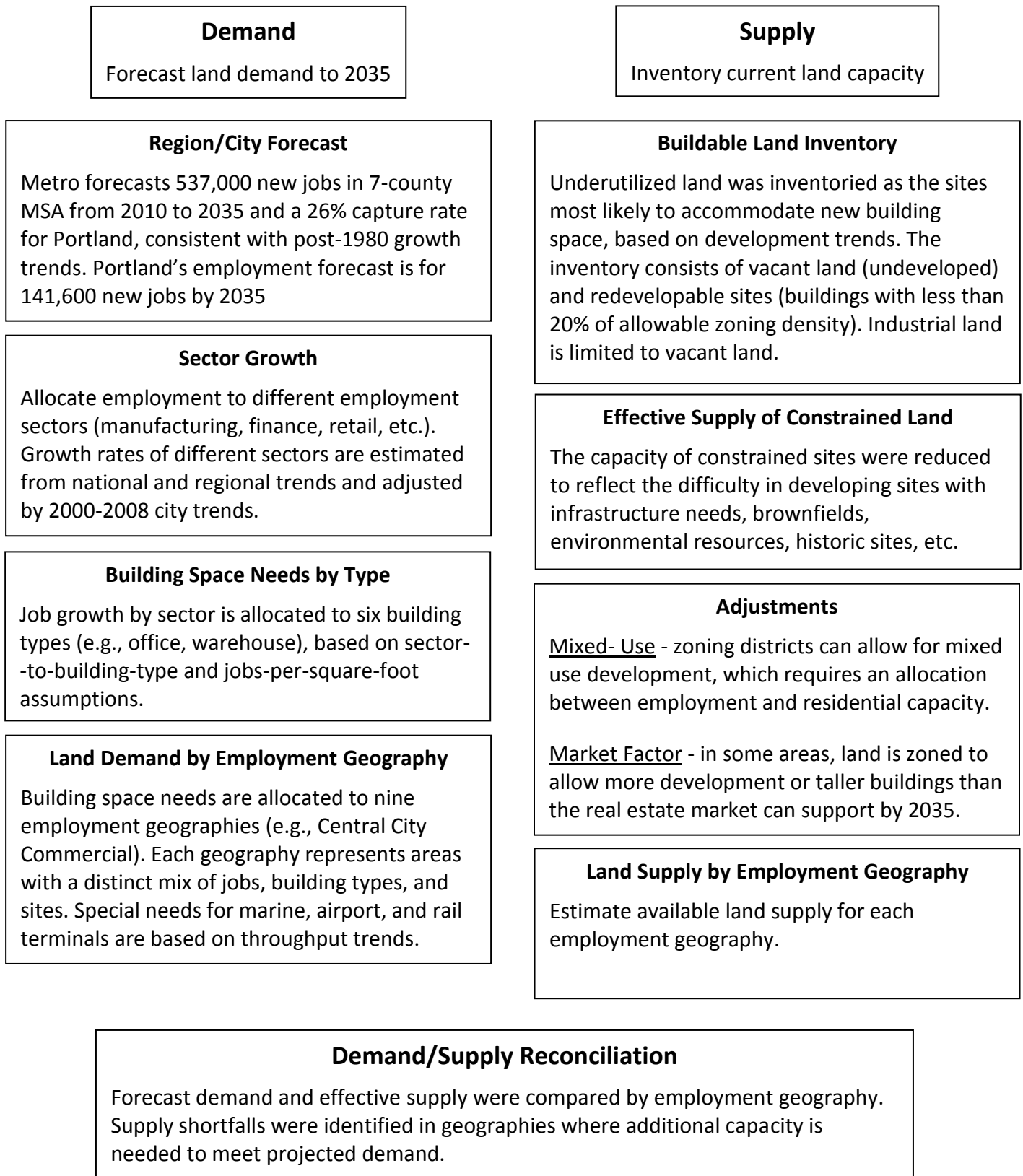
- Employment Forecast and Land Demand Analysis
- Buildable Land Inventory
- Land Needs and Supply Reconciliation
- Short-Term Land Needs Analysis
- Lot Size Analysis

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 and 2016. Appendix C of the EOA Section 4 Report includes a detailed description of revisions in these updates. 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 marine terminal demand analysis there was updated in 2016 to account for recent terminal investments that expand existing capacity. The Employment Geographies map was revised to be consistent with the 2035 Comprehensive Plan, including map changes being considered by City Council. 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 2035 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 existing Comprehensive Plan geographies were used to estimate adequate existing capacity to meet the forecasted demand in this report, and the 2035 Comprehensive Plan geographies were used to estimate adequate proposed capacity to meet the forecasted demand in EOA Section 4. 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)*

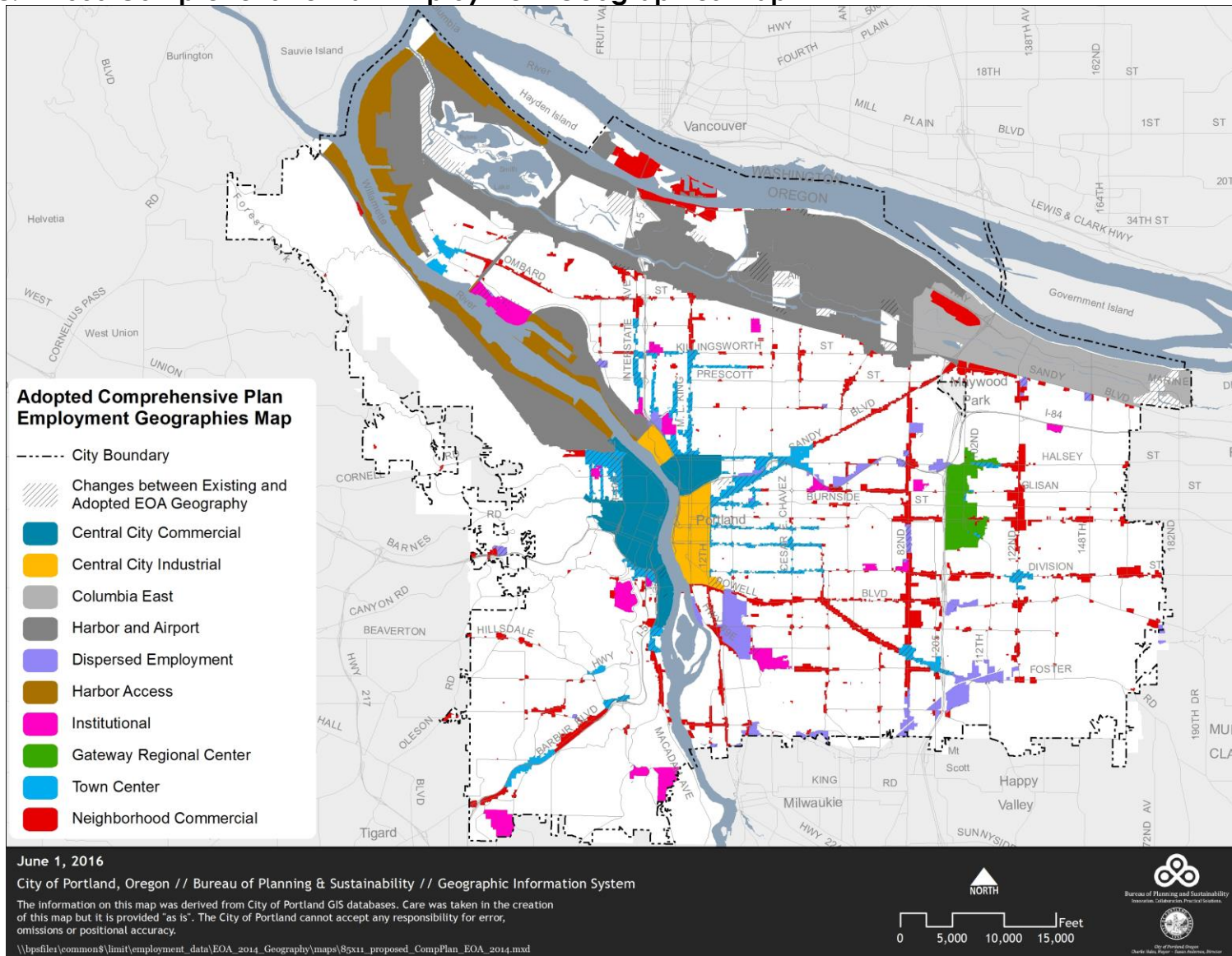
Figure 7. Predominant Site Conditions of Employment Geographies

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.

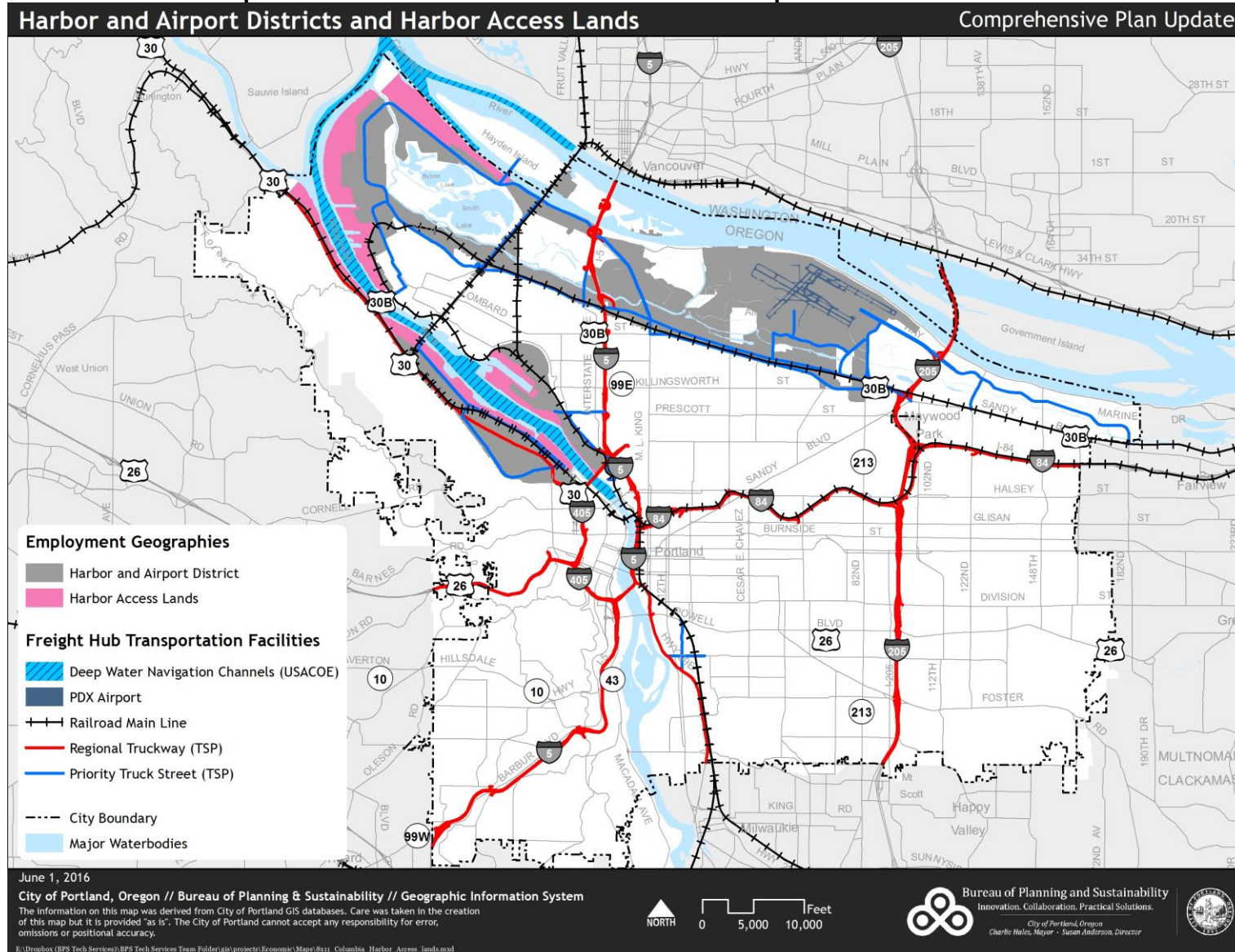
Source: Bureau of Planning and Sustainability

Figure 8. 2035 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.

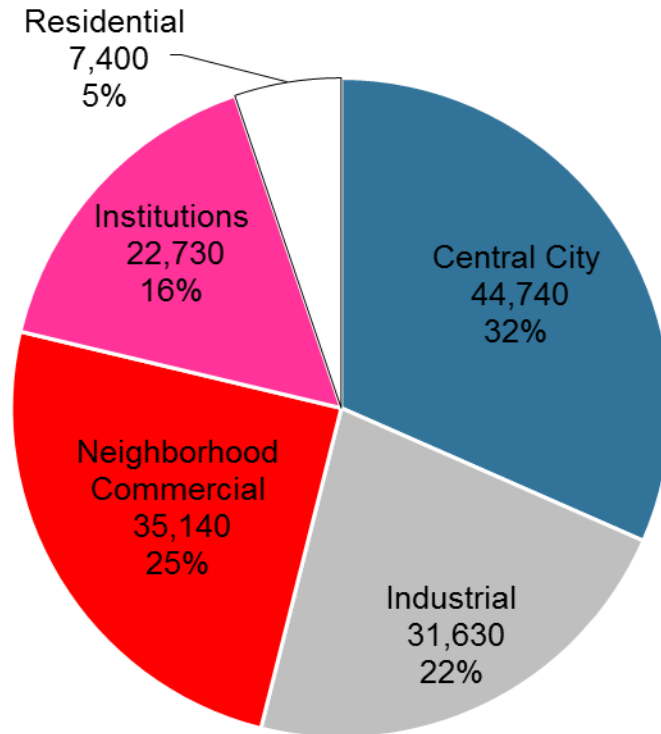
The City of Portland employment forecast allocation of 141,600 additional jobs is distributed to the employment geographies based on actual employment distribution in 2010 and trends from the recent 2000-2008 business cycle (Figure 11).

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.

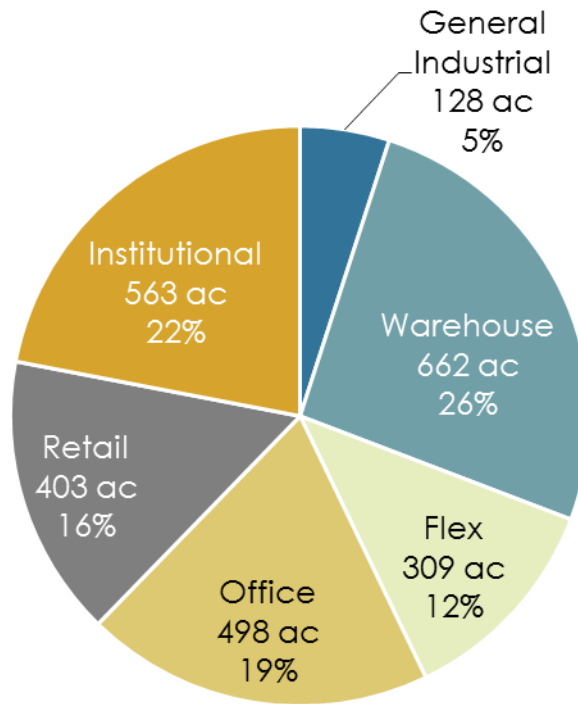
Source: E.D. Hovee & Company, LLC

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 excludes 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 Portland/Vancouver Commodity Flow Forecast, 2015). 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	95
Total	335

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				
Marine Terminals	150	850	55	95

* 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 projections apply the medium cargo forecast need for new auto and grain facilities and practical site size assumptions as described in EOA Section 1.

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 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

⁵ BST Associates, *Pacific NW Marine Cargo Forecast Update and Rail Capacity Assessment*, October, 2011

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, additional vacant land supply is needed to accommodate forecast marine terminal capacity beyond the employment-based land demand forecast described above. Projected marine terminal land needs to 2035 are 150 acres (see Figure 17), based on the medium cargo forecast and practical site-size estimates identified EOA Section 1, which are intended to reflect a conservative estimate of harbor land demand. Three cargo forecast scenarios and three terminal site sizes for each cargo type are reviewed in Section 1.

The medium cargo forecast is met in the existing Harbor Access Lands geography, through vacant and redevelopable land development at Port of Portland T-6 (approximately 40 vacant acres), T-4 (approximately 30 redevelopable acres at the former Cargill terminal), and 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). In addition,

⁶ Entrix, Inc., West Hayden Island (WHI) Economic Foundation Study, July 2010.

⁷ ECONorthwest, Portland Harbor: Industrial Land Supply Analysis, May 2012.

existing industrially-zoned land is potentially available for marine terminal expansion outside of the Harbor Access Lands geography, including 15-20 acres east of the Union Pacific rail line at T-4 and 35-45 acres south of Marine Drive near T-6.

TOTAL EMPLOYMENT LAND DEMAND

The employment growth forecast demand is combined with the traded sector support facilities (air, rail, and marine terminals) to determine the total land need (Figure 18).

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	850		95	
Total			335	
Total Land Demand			2,895	

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.

Figure 19. 2010-2020 Short-Term Employment Forecast and Land Demand

Employment Geography	2010-2020		
	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	82
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	1,949

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 land needs for traded sector support facilities, 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	104	50	0	192	190
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	156	100	200	2,525	1,941
Aggregate Geographies										
Central City	86	45	9	10	0	0	0	0	150	64
Industrial	119	252	322	266	269	156	100	200	1,685	1,566
Neighborhood Commercial	379	136	102	74	0	0	0	0	690	311
Total	584	432	434	350	269	156	100	200	2,525	1,941

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.⁸ 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.⁹ 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.

⁸ BPS, 2012 Buildable Land Inventory, Appendix A

⁹ 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 2002-2008.¹⁰

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

¹⁰ 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.¹¹ 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 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 (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.

¹¹ 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	192	113	-79	59%
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	2,895	3,240		
Aggregate Geography					
Central City	44,740	150	266	116	177%
Industrial*	31,630	1,685	1,365	-320	81%
Neighborhood Commercial	35,140	690	1,303	613	189%
Institutions	22,730	370	306	-64	83%
Residential	7,400	-	-	-	-
Total	141,640	2,895	3,240		

* Total land demand shown here includes Traded Sector Support Facilities in marine, rail and air terminals.

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	-241	-131
Harbor Access Lands	-1	-2	-9	-8	12	-62	-9	0	-79	-77
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	289	507	-200	409	488
Aggregate Geographies										
Central City	48	7	29	-1	10	24	0	0	116	68
Industrial	-98	-127	-221	-149	-84	167	436	-200	-320	-177
Neighborhood Commercial	16	231	66	21	111	98	71	0	613	598
Total	-34	111	-126	-129	37	289	507	-200	409	488

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. Three cargo forecast scenarios for marine terminal growth are

analyzed in Section 1. Under the medium forecast scenario, adequate vacant and redevelopable sites exist to meet forecast marine terminal land needs, but existing buildable land meets only 59% of the overall forecast demand for Harbor Access Lands, resulting in a 79-acre shortfall. Options to meet the shortfall involves 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 support facilities represent a longer term investment in the regional economy, so that land demand is not included in the short-term forecast. 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 (200 acres) demand for 100+ acre sites, primarily for 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)

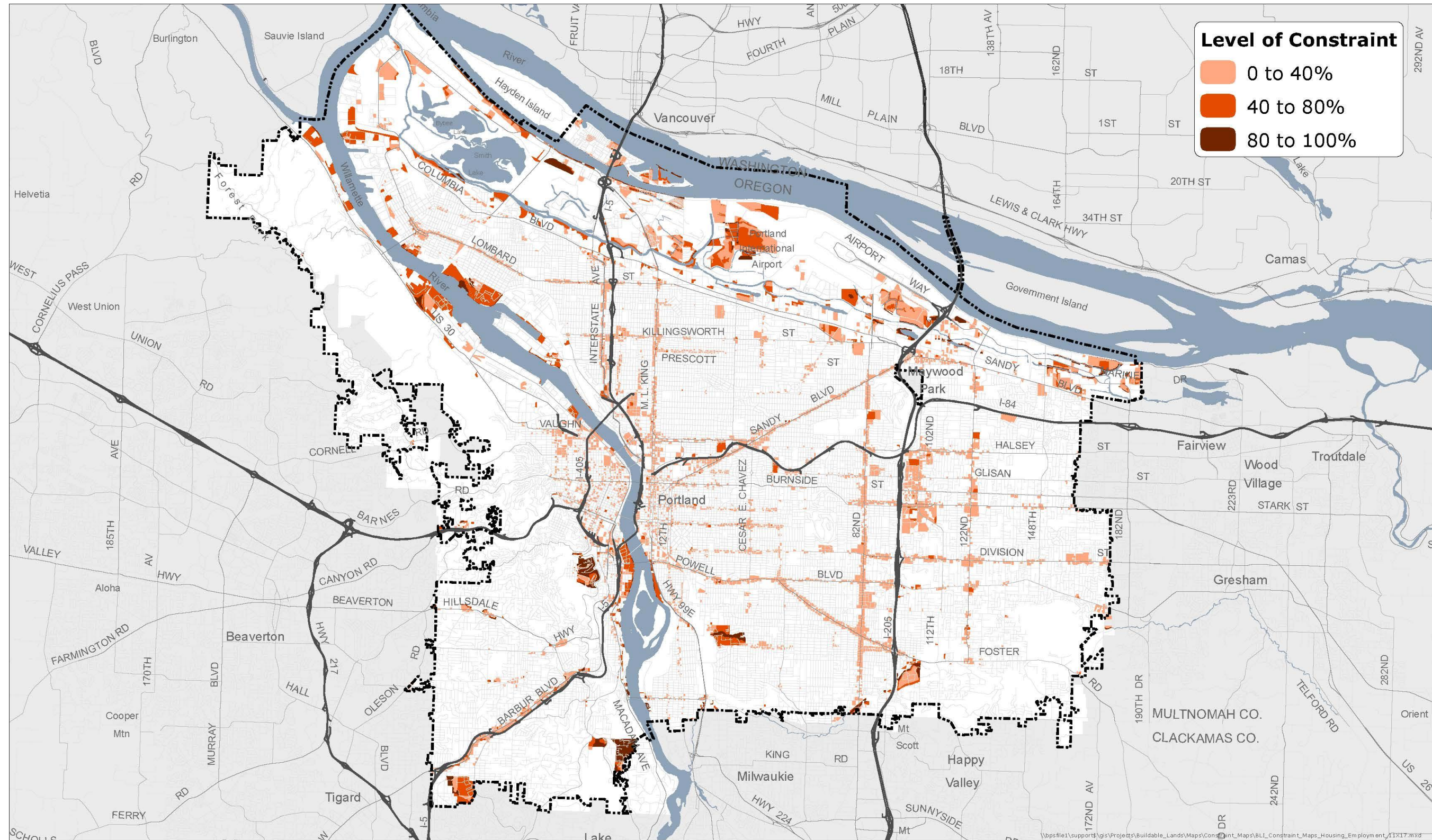
Employment Geography	10 to 20 acres			20 to 50 acres			More than 50 acres			Total Before Constraints	Total After Constraints	Total Adjusted Capacity	Employment Geography
	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	After Constraints	After Market Adjustment	Before Constraints	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 2035 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 2035 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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