Perspectives on Portland's Urban Form: Background Report Highlights

These maps highlight key information from Portland Plan background reports that address place- and geographically-specific conditions, characteristics, and issues.

Urban Form

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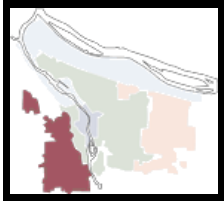
3a. Urban Form

Variations in street and block configurations, natural features, building types and architecture across Portland contribute to the distinct character of Portland's neighborhoods and districts. Whether a neighborhood's streets are straight and lined by porches, or curve through forested hills, for example, their physical characteristics are fundamental to their sense of place.

Portland includes three fundamentally distinct types of neighborhoods: the Inner Neighborhoods, with their main street commercial districts and compact street grid; the Western Neighborhoods, whose urban form is shaped by hilly terrain, streams and other natural features; and the Eastern Neighborhoods, whose diverse mix of urban and more rural forms is set against a backdrop of Douglas firs and buttes. Beyond these three neighborhood urban forms are two other Portland patterns: those of the Central City neighborhoods, Portland's most intensely urbanized area; and the industrial districts, with their own distinct urban form characteristics.

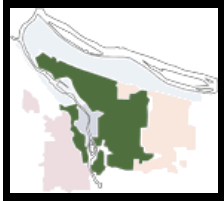
Portland's Five Urban Geographies

Western Neighborhoods



- Development patterns shaped by the area's hilly terrain and other natural features.
- Small number of major streets or highways, which wind through the area following topography.
- Only a few commercial areas, mostly located on multi-lane highways.
- Residential streets are often curvilinear, following hill contours, with poor connectivity in many areas.
- Most residential streets lack sidewalks, and a relatively large number of streets are not paved.
- Trees and lush vegetation are often more prominent than buildings in residential areas.
- Large amount of natural area park land.
- Parks, streams and preserved natural areas provide a network of green that courses through the pattern area.

Inner Neighborhoods



- Urban form shaped during the Streetcar Era.
- Consistent pattern of rectilinear blocks.
- Highly interconnected street system with mostly fully-improved streets and sidewalks.
- Extensive system of main street commercial districts.
- Fine-grain pattern of development on small lots, with buildings oriented to the street.
- Dispersed system of neighborhood parks, typically intensely landscaped, located on major streets and rectilinear in form to fit into the area's urban grid.
- Occasional areas and streets break from the grid pattern, creating distinctive places.

Eastern Neighborhoods



- Diverse range of urban patterns, reflecting incremental development.
- Poor street connectivity in many areas, with vehicles dependent on a small number of major streets for through connections.
- Commercial areas are in the form of automobile-oriented strip commercial areas located on multi-lane streets.
- Most residential streets, and some major streets, lack sidewalks.
- Large, deep lots common in many areas, subject to much recent infill development.
- Trees and other vegetation, rather than consistency in built patterns, serve as character giving aspects of many residential areas.
- Neighborhood parks are usually located in the middle of superblock areas surrounded by single-family houses.
- Buttes and Douglas Firs a distinctive characteristic of the area's skyline.

Central City



- Portland's most intensely urbanized area with its largest concentration of tall buildings and high-density residential development.
- Building types reflect its role as the region's center for finance, commerce, government and culture.
- 200' by 200' block structure and highly interconnected street system.
- Predominance of full-block building coverage contrasts with the fine-grain pattern of detached structures in surrounding residential neighborhoods.
- Extensive system of urban parks.
- Downtown's location between the Willamette River and West Hills provides a strong sense of orientation, boundaries and transition.

Industrial Districts

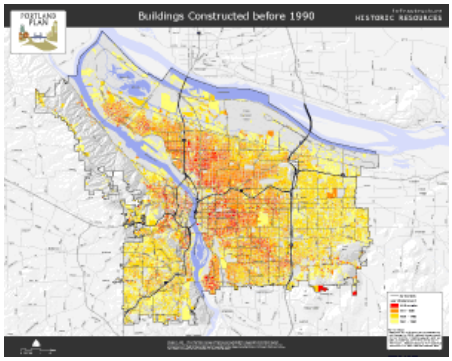


- Concentrated in low-lying riverfront areas.
- Variety of industrial districts with distinct urban forms.
- Inner areas share Central City's pattern of small blocks.
- Large-block industrial districts shaped by industrial needs and functions.
- Block structure and building forms in some areas shaped by railroads, rail spurs and harbor facilities.

- Columbia Slough, levee and greenery course through the Columbia Corridor districts.

Buildings Constructed Before 1990

Buildings are a major part of the physical environment of neighborhoods. Street layouts and the architectural characteristics of buildings reflect the building and design approaches of the time they were built, but also contribute to the distinct character of neighborhoods. Portland's older buildings and its historic landmarks are concentrated within the Inner Neighborhoods.



Buildings Constructed Before 1990 (PDF)

Focus on: Central City/West | North | Inner East | East

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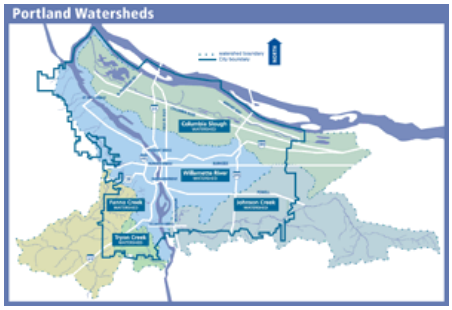
Watersheds

3b. Watersheds

Portland contains five watersheds, each with differing natural characteristics, hydrology, water quality, and habitat issues. In each of the watersheds, the future health of watersheds and the natural environment is dependent on addressing existing problems and on how future growth and development is managed. Portland's watersheds:

- Willamette River Watershed
- Columbia Slough Watershed
- Johnson Creek Watershed
- Fanno Creek Watershed
- Tryon Creek Watershed



Portland Watersheds (PDF)

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Portland's watersheds are based around its rivers and largest urban streams. A watershed is an area that catches rain and snow, beginning at ridge tops and draining to a river, stream, lake, or wetland. Watershed health is influenced by the condition of natural hydrologic systems, water quality, physical habitat, and biological communities. The following highlights characteristics of Portland's watersheds:

General characteristics of Portland's watersheds

- Roads, buildings and other impervious surfaces account for 22-36% of the surface coverage in Portland's watersheds (from 22% in Tryon Creek to 36% in Columbia Slough).
- Tree canopy covers approximately 26% of the City.
- The City's draft natural resource inventory identified over 200 miles of rivers and streams, and about 30,000 acres of riparian corridor and wildlife habitat.
- Overall, water quality has improved, but each major water body has problems with bacteria, nutrients, and toxics.
- The watersheds provide habitat for a plethora of fish, bird, mammal, amphibian and reptile species, including many with state and federal protected or "at risk" status.
- Watershed councils and stewardship groups are instrumental in restoration efforts.

Willamette River Watershed

- The river is 187 miles in length (the lower 17 miles, including the confluence with the Columbia River are in Portland); drainage area of 11,478 square miles (69 square miles in Portland).
- Diverse topography of floodplain, low lands and steep drainages.

- 22% of area is parks/open space, including 5,000 acre Forest Park; 36% is inventoried natural resource area; 13% is protected by environmental zoning.
- Provides habitat for Chinook and Coho salmon, rainbow/steelhead trout, lamprey, beaver, river otter, red-legged frog, Western pond turtle and over 100 resident and migratory bird species (bridges provide nesting sites for Peregrine falcon).
- Oak woodlands, such as those located on the bluffs, are one of the most threatened habitat types in this watershed.

Columbia Slough Watershed

- The slough is 18 miles in length; drainage area of 51 square miles (42 in Portland).
- Topography is generally low land with relatively few steeply sloped areas.
- The middle and upper floodplain is managed by a system of levees and pumps.
- 14% of area is parks/open space; 21% is inventoried natural resource area; 8% is protected by environmental zoning.
- The 2000 acre Smith and Bybee Wetlands Natural Area is considered one of the nation's largest urban freshwater wetlands.
- Provides habitat for Chinook salmon, rainbow/steelhead trout, beaver, river otter, red-legged frog, Western pond and painted turtles, and over 160 resident and migratory bird species of birds.

Johnson Creek Watershed

- The creek is 25 miles in length; drainage area of 54 square miles (20 in Portland).
- Topography includes extensive floodplains as well as steep slopes in upland buttes.
- 13% of area is parks/open space; 24% is inventoried natural resource area; 8% is protected by environmental zoning.
- Provides habitat for Chinook and Coho salmon, cutthroat and rainbow/steelhead trout, lamprey and many bird species.
- Beaver are active in helping shape conditions along portions of Johnson Creek.
- Threatened red-legged frogs have been found throughout the watershed.

Fanno Creek Watershed

- Includes nearly 23 miles of open channel (main channel is 15 miles in length); drainage area of 32 square miles (7 within Portland).
- Topography characterized by steep slopes along the creek and its tributaries.
- 5% of area is parks/open space; 28% is inventoried natural resource area; 8% is protected by environmental zoning.
- Cutthroat trout are known to spawn and rear in upper Fanno Creek.
- Provides habitat for over 100 resident and migratory bird species.

Tryon Creek Watershed

- Includes nearly 27 miles of open channel (main channel is 7 miles in length); drainage area of 6 square miles (5 within Portland).
- Topography characterized by steep slopes along the creek and its tributaries.
- 19% of area is parks/open space; 42% is inventoried natural resource area; 17% is protected by environmental zoning.
- Provides habitat to cutthroat and rainbow/steelhead trout, Coho and Chinook salmon, lamprey, and about 60 resident and migratory bird species.
- Portland's smallest watershed, but natural resources cover almost half its area.
- The 630 acre Tryon Creek State Natural Area is Oregon's only state park within a major metropolitan area.

Natural Resources Inventory

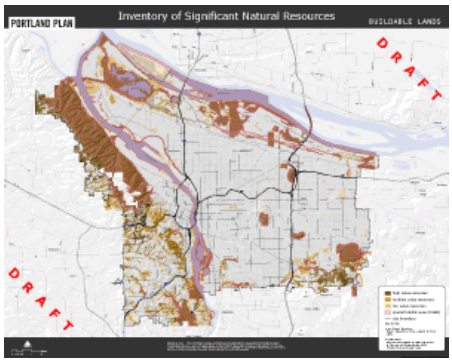
3c. Natural Resources Inventory

The updated Natural Resource Inventory maps the riparian corridors and wildlife habitat areas in Portland and assesses their relative quantity and functionality. The inventory indicates that significant natural resources make up one-third of the area of the city. This includes approximately 242 river and stream miles, about 2,450 wetland acres, and roughly 19,515 acres of forest and woodland areas one acre or larger. Most of these resources are concentrated in several large areas listed below.

- Forest Park
- Tryon Creek State Park
- Smith and Bybee Wetlands
- Headwaters and riparian areas of Tryon, Fanno, and Balch Creek watersheds
- Along the sloughs and wetlands of the Columbia Corridor
- Along streams and wetlands in the Johnson Creek watershed
- Upland east side buttes

- The Willamette River and its associated vegetated riparian corridors, wetlands, wooded eastside bluffs and Ross Island

For more information see the Natural Resources Background Report Overview



Natural Resources Inventory (PDF)

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Urban Forest

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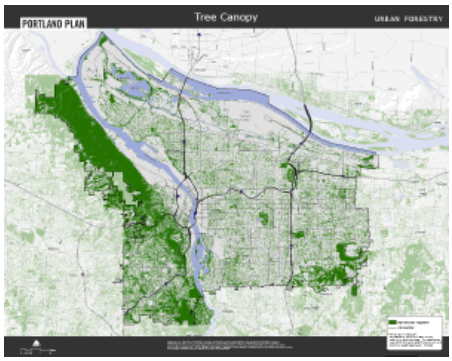
3d. Urban Forest

Portland's existing tree canopy covers about 26% of Portland's land area. The current goal is to have trees cover at least 33% of the city. The tree canopy is most dense in natural areas, such as Forest Park, other parts of the West Hills, on and around Powell Butte and other eastside buttes, and parts of Pleasant Valley in the southeast. Areas with the most concentrated urban development, particularly the Central City, and also industrial areas have the sparsest canopy.



Urban Forest (PDF)

Focus on: Central City/West | North | Inner East | East

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This map shows the distribution of trees in the city, including dispersed canopy, clusters of trees and swaths of canopy extending through some residential areas. Canopy has expanded in some areas over the last 30 years, including in many Inner Neighborhoods due in large part to the planting of new street trees and the growth of established trees. Other areas, such as in some outer southeast and southwestern neighborhoods, have seen losses of mature trees to make room for new development.

Portland's urban forest consists of trees along city streets and around houses, businesses and institutions, and trees and vegetation in parks and natural areas. Currently, trees cover about 26 percent of Portland's land area—roughly half on private property and half on public property. North Portland and the city's higher density residential, commercial and industrial areas have the sparsest tree canopy.

Although overall tree canopy cover in Portland has increased slightly over the last 30 years the City is not meeting its goals for tree canopy cover:

LAND USE	CURRENT CANOPY	TARGET CANOPY
Residential	30%	35-40%
Commercial/industrial	7%	15%
Parks/open spaces	28%	30%
Rights-of-way	17%	35%
Citywide	26%	33%

Much more is known about trees on public property than on privately owned land in the city. Portland's parks and parking strips have at least 170 different types of trees. More than half of them are deciduous (primarily maple), and

about half are smaller than 6 inches in diameter. Large trees (30 inches in diameter and larger) represent less than 10 percent of Portland's park and street trees. Not surprisingly, large-growing native species such as Douglas fir and western hemlock are more common in Portland's parks and natural areas than along its city streets.

Because trees play an important role in maintaining watershed functions, the Bureau of Environmental Services (BES) has planted more than 2 million trees citywide as part of its Watershed Revegetation Program. Tree planting in Portland continues through the efforts of the City, Friends of Trees and other organizations.

Currently, trees in City natural areas such as Forest Park, and neighboring properties are at risk of damage from catastrophic wildfire, as a result of long-term fire suppression and the consequent buildup of fuels. Fire suppression also has allowed the conifer population to out-compete native oak and madrone trees, resulting in declines in these native trees, habitat loss and increased fire susceptibility in some areas.

It appears that in parts of Portland, large trees and groves are being removed as a result of development and being replaced with smaller species that fit on small lots and narrow parking strips. Of particular community concern is the removal of remnant stands of native Oregon white oak and madrone trees on the Willamette bluffs, and Douglas fir trees in outer southeast Portland to accommodate infill residential development. Current landscaping regulations that apply to new development are achieving only a fraction of the target canopy levels established for residential, commercial and industrial development. Additionally, for some areas of the city where there are many aging, large trees of the same species, disease can spread quickly because the trees are homogenous and in close proximity to each other. Removal of these trees has a substantial impact on neighborhood character.

Economic Development

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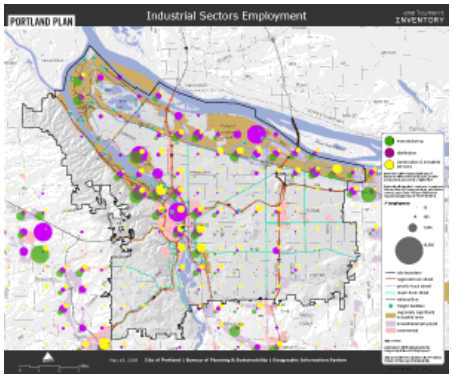
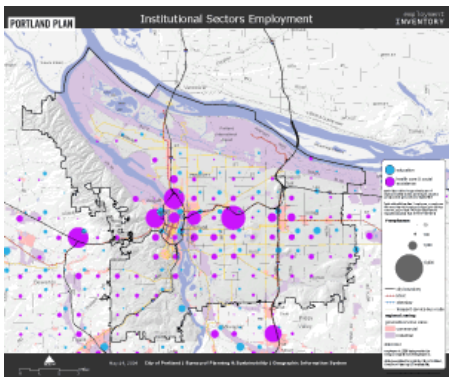
3e. Economic Development

These maps show where jobs are distributed geographically, by sector: industrial, institutional, office, and retail. Portland's Central City accounts for 34% of the City's employment base; regional and town centers accounts for 4%; neighborhoods comprise another 28%; industrial districts (outside the Central City), 25%, and institutional areas, 9%.



Industrial Sectors (PDF)

Most of Portland's job growth since 2000 has been in the Central City, where there has been an increase of about 12,000 jobs, while the rest of the city has lost jobs. The largest growth sector outside the Central City has been institutional, largely in health care and education. The majority of this institutional employment is located in residential zones.



Institutional Sectors (PDF)

Employment Trends

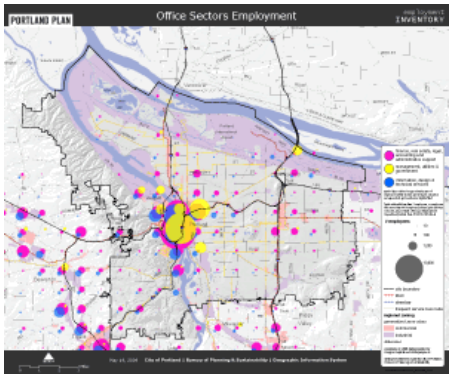
As of 2006, Portland accounts for 40% of the 1.015 million jobs in the 7-county metro area (PMSA) and accounts for 26% of the region's 2.1 million residents. From 2000 to 2006, covered employment data reveals an average annual growth rate of just 0.2% in the city and 0.7% in the 7-county region. However, the Central City experienced an annual employment growth rate of 1.6 %. When considered by Comprehensive Plan designation, approximately 29% of in-city employment is located within the Central Commercial zone in 2006, 22% within Industrial Sanctuary and 12% with Central Employment designations. These Central City and industrial zones account for 63% of Portland's job base. The most rapid employment growth has occurred within the Central Employment designation. By geographic subareas rather than zoning, Portland's Central City accounted for 34% of the City's employment base; regional and town centers accounted for 4%; neighborhoods comprised another 28%; industrial districts (excluding the Central City industrial districts of Central Eastside and Lower Albina), 25%, and institutional areas, 9%.

Economic Geography

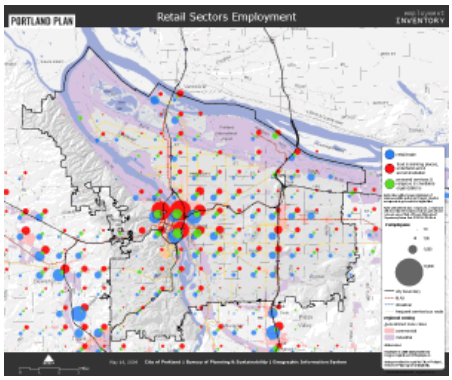
Industrial sectors concentrate in industrial districts to meet infrastructure and compatibility needs. They include manufacturing, wholesale trade, transportation, construction, and industrial services. About three out of four manufacturing and distribution jobs in the city are located in the industrial districts, as well as about half of the construction and industrial service jobs. This geographic concentration of industry is supported by Portland's 1980 industrial sanctuary policy to provide room for industrial growth. A legacy of freight hub infrastructure investments (marine, rail, air, pipeline, freeways) in the Working Harbor and Columbia Corridor districts also support the city's role as a West Coast trade gateway, Oregon's distribution hub, and the region's largest heavy industrial districts.

Institutional sectors include health care and education, and tend to operate in a campus setting or near their customers. Education and health care have been the largest job growth sectors, adding about 14,000 jobs in the city between 2000 and 2006. Like retail and services, the institutional sectors are dispersed throughout the city, mostly within neighborhoods. About 60 percent of the institutional employment is in residential zones. Current land use policies in most cases do not acknowledge Portland's large institutional campuses as employment lands and limit their growth according to residential zoning standards. Since city job growth has been concentrated in these sectors, this land use policy has significant job growth implications for the city.

The City's ***office sector*** is also well positioned in the core of the city and continues to show greater job growth than the rest of the city (1.6% annual growth). The sectors represented include the finance, real estate, legal, accounting and administrative support, management, utilities, government, information, design and technical services. Office sector jobs in the City of Portland make up over 50 percent of the three county metro areas in all of these sectors.



Office Sectors (PDF)



Retail Sectors (PDF)

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The city's ***retail, food and drink, and accommodation sector*** employment is concentrated in the Central City with a dispersed neighborhood business district presence. In total, neighborhoods subareas accounted for just fewer than 110,000 jobs in 2006, 28% of the citywide job total. The city has 93 commercial corridor segments outside of the downtown with varying uses ranging from a mix of upscale, artful, locally serving, and mostly auto-oriented commercial areas. In addition, independent businesses, specialty shops, and "slow food" (distinct from fast food) districts are quickly evolving, forming important commercial market niches. Market performance, however, of these 93 commercial corridors varies widely – a combination of soft (underperforming markets) to transitional (emerging corridors) to healthy (revitalized) corridors. These corridors offer great opportunities for job growth, improved quality of life, and infill and redevelopment.

Housing and Transportation Affordability

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3f. Housing and Transportation Affordability

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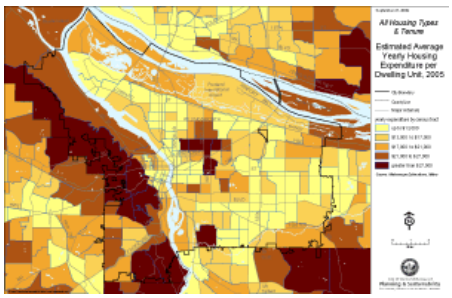
Housing and transportation are the two largest cost-of-living items for typical households. The maps show that while housing costs are sometimes less in areas further from the city center, these same outer areas also have more expensive transportation costs.

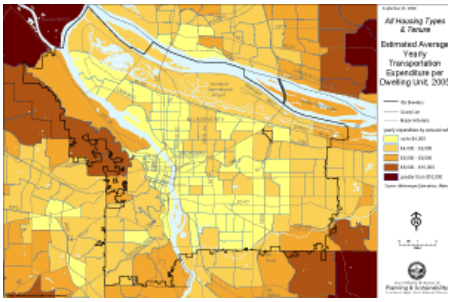
These three maps show how households costs for housing, transportation, and housing and transportation combined, vary across the city.



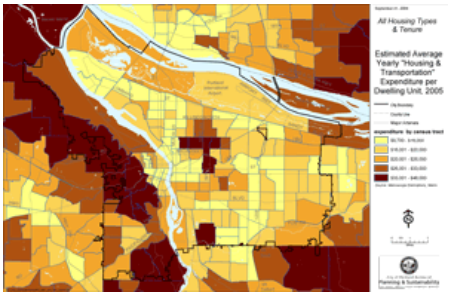
Housing Expense (PDF)

Increasingly, housing affordability is seen as a function not just of income and direct housing costs but also of location. Given the high (and rising) costs of transportation, a home's proximity to jobs, transit, shopping and services greatly affects its affordability. In Portland, many of the neighborhoods with the best access to jobs, transit and services also have become the most expensive, leading lower income households to move farther out, where rents and housing prices are lower but transportation costs are higher. The combined housing and transportation costs leave many lower income households "cost burdened," meaning that they spend more than the recommended maximum of 30 percent of their household income on housing and associated transportation.

Although Portland has a substantial supply of subsidized rental housing, supply is not equal to demand. Housing prices and rents are most affordable in areas to the north and east, farthest from the city's center, which is the region's largest job center. The transportation costs and commuting times for households seeking affordable housing in these areas are likely to be high.



Transportation Expense (PDF)



Combined Expense (PDF)

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Schools

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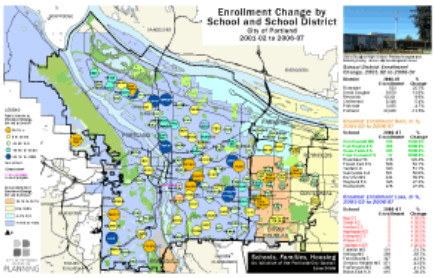
3g. Schools

Portland includes within its boundaries schools that are in the Portland, Parkrose, David Douglas, Reynolds, and Centennial school districts. This map shows trends in school enrollment. It shows that, while student enrollment in many schools within the Portland Public Schools district have been flat or have declined since 2001, some eastern districts, particularly David Douglas, have seen large increases in enrollment. The David Douglas School District area includes some of the most affordable housing in Portland, and has been the location of a large amount of new family housing development.



School Enrollment (PDF)

Focus on: Central City/West | North | Inner East | East

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Citywide Systems and Infrastructure

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3h. Citywide Systems and Infrastructure

Issues related to Portland's transportation, sewer and stormwater, water, and parks systems vary geographically:

Eastern Neighborhoods
Portland's eastern neighborhoods face a variety of infrastructure challenges that may impede the area's ability to serve existing residents and adequately accommodate additional infill development.

Western Neighborhoods
Much like the neighborhoods themselves, infrastructure in western neighborhoods often is shaped and constrained by the area's hilly topography and streams.

Inner Neighborhoods and Central City
Infrastructure deficiencies in inner neighborhoods and central Portland are less severe than those in other areas and in general should not impede development. However, some of these deficiencies may affect the quality of life of area residents.

PORTLAND'S INFRASTRUCTURE

	Transportation	Environmental	Parks	Water
Citywide 	3,949 lane miles of roads; 157 bridges; 992 traffic signals, eight million square yards of sidewalks; 37,352 improved corners; 53,000 street lights.	1,443 miles of separated storm and sanitary sewers; 878 miles of combined sewers; 100 pumping stations; 2 wastewater treatment plants; green stormwater facilities.	10,200 acres of parkland; 180 developed parks; 47 habitat parks; 5 golf courses; 7 botanical gardens; arboretum; raceway; stadiums; 13 pools; 12 community centers; 177 miles of trails, 142 playgrounds, over 300 sports fields, 31 community gardens and over 100 tennis courts.	Bull Run watershed; Columbia South Shore wellfield; 220 million gallons finished storage; 75 mi. of conduits; 43 mi. of mains; 2,200 mi. of pipes; 1,500 culverts; dams; 33 wells; 180,000 service lines; 44,000 valves; 182,500 meters; 15,000 hydrants; 39 pump stations, 70 tanks.
Eastern Neighborhoods 	Poor street connectivity. A number of unimproved and substandard streets. Highest average vehicle miles traveled per person. Five deficient bridges. Issues with pedestrian, cyclist and automobile safety. Many streets lack sidewalks.	The sanitary sewer system is in good condition. Issues with stormwater runoff and infiltration in the Johnson Creek Watershed. Potential compliance issues with underground injection controls (sumps).	An additional 58 acres of parks needed. 48% of park properties are undeveloped. Poor pedestrian access to many parks. Poor recreation facility distribution. Natural areas targeted for acquisition. Few street trees and private trees being lost to development.	The City's backup water source, the Columbia South Shore Well Field, is located primarily in east Portland, as is the Powell Valley well system. Deficiencies limit fire flow in areas near Powell Butte
Inner Neighborhoods	Streets generally meet connectivity standards. Lower vehicle miles traveled per person.	Pipes with insufficient capacity and/or in poor condition are widely distributed, raising the risk of basement sewer	Park development deficiencies in select areas. Limited parkland access deficiencies. Additional/improved recreation facilities	Area has some of the oldest water infrastructure, resulting in high maintenance needs. A new seismically hardened

	Good sidewalk coverage. A number of high-crash intersections. Sixteen bridges in poor condition. Declining traffic signal condition.	back ups during storm events in some areas. Significant combined sewer overflow (CSO) improvements to be completed in 2011.	needed. Very limited walkable access to natural habitat.	Willamette River transmission line crossing will be needed in the next 20 years.
Western Neighborhoods 	**Transportation** Few major arterials. Streets do not meet connectivity standards. Many unimproved or substandard streets. Higher average vehicle miles traveled per person. Most residential streets lack sidewalks. Less than 1/3 of bikeways have been constructed.	**Environmental** Sanitary sewer concerns in Fanno Basin and related to Fanno Pump Station. Efforts underway to inspect older sanitary sewers, which may have condition problems. Significant stormwater management concerns.	**Parks** 6 undeveloped park properties. Significant protected open spaces, but lacks sufficient developed parks and some sports fields. High urban canopy rate, though it is being lost in some areas due to development.	**Water** Pump station & supply improvements are needed to improve fire flow in hilly areas.

[Stormwater Management and Infrastructure]

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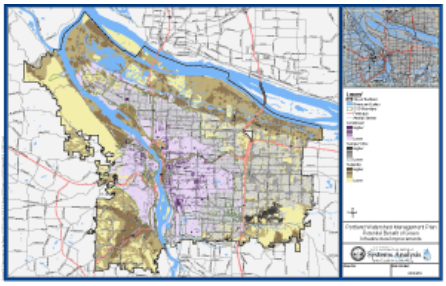
3i. Stormwater Management and Infrastructure

Where does all that rainwater go?

This map shows where stormwater goes in the city and where green infrastructure improvements (tree planting, green streets, ecoroofs, stream restoration) could make the most difference by removing pollutants, reducing runoff or improving natural conditions. The darker the colors, the more benefits we can expect.



Stormwater Management and Infrastructure (PDF)

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The City of Portland manages stormwater in one of these ways:

1. Older Portland neighborhoods have a **combined sewer system**, which collects stormwater runoff from streets and sewage from buildings in the same pipes. Most of this mixture flows to the treatment plant. But when it rains, some combined sewage overflows to the Willamette River. When Portland's CSO control program is complete at the end of 2011, combined sewers will overflow an average of three times each winter and once every three summers instead of every time it rains.

2. In much of Portland, either east of 52nd Avenue or north of Fremont Street, stormwater runoff flows into the ground via sumps, also known as **underground injection control (UIC) facilities**. Sumps are perforated, vertical pipes usually connected to sedimentation manholes which help

remove pollutants. Sedimentation manholes collect stormwater, allowing solids to settle to the bottom and trapping oils and greases in the manhole before the treated stormwater flows to the sump and percolates into the ground. In areas where groundwater is high, the city is redesigning some UICs and replacing others with swales and other green stormwater management facilities to increase the distance between the bottom of the UIC and groundwater. These types of facilities replenish groundwater supplies that feed cool, clean water to rivers and streams.

3. The rest of the city has a **separate storm sewer system**. Sanitary sewers carry sewage from buildings to the treatment plant, and stormwater runoff flows to streams through public and private pipes, drainages, swales and other stormwater conveyances. Stormwater runoff that isn't properly managed can cause stream bank erosion, landslides and flooding, and harm water quality.

In all of these areas, the City of Portland invests in stormwater management projects that mimic nature and manage stormwater at its source. Swales, rain gardens and other green stormwater management facilities reduce stormwater runoff, and filter sediments and other pollutants. These projects also help the city meet federal Clean Water Act regulations aimed at restoring and maintaining the health of rivers, streams, lakes, and wetlands.

In some areas, redevelopment can improve environmental conditions by replacing parking areas, paving, conventional roofs and other impervious areas with planted stormwater facilities like green streets, swales or ecoroofs. These facilities slow and reduce stormwater runoff. Trees and other vegetation can also beautify, shade and cool the site and provide habitat for native birds and pollinators.

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