

# Infrastructure Condition & Capacity



City of Portland Bureau of  
**Planning and Sustainability**  
Sam Adams, Mayor | Susan Anderson, Director

Imagine Portland with no drinking water, no sewer system, no streetlights, no roads, no parks... Luckily that is not our reality. The City of Portland provides and maintains a range of primary infrastructure systems and services that collectively we own and depend on for our city to be livable. This primary infrastructure represents a significant investment in the City and has a current replacement value of more than \$22 billion. The City provides and maintains primary infrastructure systems and services through the following four bureaus:

- **Transportation** (roads, sidewalks, etc.)
- **Environmental Services** (sewer and stormwater)
- **Parks and Recreation** (community centers, pools, parks and natural areas)
- **Water** (for drinking and for fire protection services)

Providing adequate infrastructure is a **highly complicated and costly** task. Not only is Portland's primary infrastructure operated by four different City bureaus, but the City also **partners** with a wide variety of other area agencies and organizations to provide further infrastructure services. For instance, Metro's responsibility includes regional parks and natural areas, the zoo, and solid waste disposal contracts; Tri-Met owns and operates bus and light rail transit; and public schools are provided by five different school districts for different areas of Portland.

The City's primary **infrastructure systems vary greatly** in age, service area, capacity to accommodate growth, replacement value and maintenance level. Some of the variation in conditions depend on location, as different systems have grown over the past two centuries in ways that reflect the time periods and patterns in which development occurred, and the topography and natural environments of the area of the city in which they were constructed.

The **funding** of the City's primary infrastructure is also complex, with no single source for these vast and long-term projects. Often projects involve costs for land, construction, maintenance, and operations, at various points over long time periods.

### The background report on infrastructure:

- describes the condition and capacity of the City's primary infrastructure systems;
- outlines key issues; and
- identifies some areas of the city which may require changes in service levels or additional investment.

## Key Challenges and Opportunities

### Taking Care of What We Have: Effectively Managing the City’s Infrastructure Systems

The current **replacement value** of the City’s physical infrastructure is estimated at **\$22.4 billion**. The infrastructure bureaus have estimated that the City needs to reinvest approximately \$136 million per year for each of the next 10 years to replace existing aging assets, maintain existing facilities, address regulatory requirements and/or meet service levels. That level of reinvestment would require spending at least 25 to 40 percent more than we currently do on major maintenance and capital projects.

At **current funding levels**, some of Portland’s **infrastructure will continue to deteriorate**. Although the City is still learning more about the condition of its infrastructure, it is estimated that significant numbers of our bridges, traffic signals, street lights, water reservoirs, natural resources and civic buildings currently are in poor condition or will be in 10 years.

Because **city limits cannot expand significantly**, the majority of **new growth** will be accommodated within the **current footprint**. This means that the transportation, parks, water and sewer systems we have now will serve the majority of our current and new residents’ needs over the coming decades. These systems will also be used by new residents of Portland’s suburbs coming into the city to work, shop or play.

**Asset management** is a tool to identify the most cost-effective way to protect existing assets, provide community services and safeguard public health. The City currently is improving asset management practices, but continued improvement in processing, data management, monitoring and evaluation is needed to ensure that asset management practices accurately inform strategic decision making and effective infrastructure management.

### Serving Underserved Residents

Providing service in currently underserved areas is a significant challenge for both Portland Parks & Recreation and the Bureau of Transportation. Each bureau has “levels of service” (LOS) standards which it aims to maintain. These LOS standards evaluate basic services on a quantitative scale. For instance, degree of traffic congestion or household distance from a park is assigned a grade for how well or poorly they are satisfying bureau goals.

The Bureau of Transportation faces some significant deficiencies, based on its level of service and design standards. These include street connectivity, pedestrian and bike access and facilities, safety improvements and substandard streets.

### Portland Infrastructure Assets

(by service bureau)

#### Transportation:

- 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

#### Environmental Services:

- 1,443 miles of separated storm and sanitary sewers
- 878 miles of combined sewers
- 100 pumping stations
- Two wastewater treatment plants
- Green stormwater facilities

#### Parks & Recreation:

- 10,200 acres of parkland
- 180 developed parks
- 47 habitat parks
- Five golf courses
- Seven botanical gardens
- Arboretum
- Raceway
- Stadiums
- 13 pools
- 12 community centers
- 177 miles of trails
- 142 playgrounds
- Over 300 sports fields
- 31 community gardens
- Over 100 tennis courts

#### Water:

- 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
- Two dams
- 33 wells
- 180,000 service lines
- 44,000 valves
- 182,500 meters
- 15,000 hydrants
- 39 pump stations
- 70 tanks

Portland Parks & Recreation bases its service evaluations on sufficiency and access to park and recreation facilities. Unfortunately, some areas of Portland lack sufficient park and recreation facilities, such as developed parks, community centers and trails and natural areas. Some areas, including parts of outer east, southwest and central northeast Portland, face multiple deficiencies. In addition, many areas – particularly in outer east and southwest – lack the supporting pedestrian infrastructure to allow safe pedestrian access to parks and recreation facilities.

## Accommodating Growth and Increases in Density

The ability of the City's infrastructure to accommodate growth depends primarily on the City's ability first to resolve current deficiencies in serving underserved areas and maintaining the condition of existing infrastructure (the first two challenges, discussed earlier).

To better accommodate growth and reduce system loads, bureaus are actively researching and using a variety of demand management strategies. The ability of bureaus to **innovate, reduce demand or increase efficiency** through new technologies and practices will be instrumental in their ability to serve the city in the future.

Major redevelopment efforts can have significant implications on existing assets and the type and extent of new infrastructure needed to serve an area. Without careful planning, such projects can overstretch the ability of existing infrastructure to meet community needs, particularly in underserved areas. As redevelopment is planned, it will be important to consider the full implications of such efforts on infrastructure needs and financial resources and to coordinate planning with other bureaus whose infrastructure might be impacted.



Each service bureau has its own particular key challenges and opportunities regarding growth and density. Challenges for each are described below.

**Environmental Services – growth and density challenges**

In general, the City’s existing sewer and stormwater infrastructure can accommodate projected population growth. The Bureau of Environmental Services (BES) plans for its facilities based on build-out densities allowed within existing City of Portland Comprehensive Plan land use densities, which are higher than current projections for the 2030 population (as provided by Metro). BES expects to be able to maintain and improve the sewer systems to handle growth needs as long as growth does not exceed densities designated in the current Comprehensive Plan. Additional densities may require modification of existing infrastructure or the construction of new facilities.

**Water – growth and density challenges**

The Portland Water Bureau’s primary distribution system can reliably deliver water through 2030, mostly using existing facilities. The Water Bureau is planning water infrastructure improvements to address increasing retail demands within the city limits; demand is expected to increase from 61.5 million gallons per day in 2005 to 79 million gallons per day in 2030. The Water Bureau also supplies water to regional wholesale customers. Population in areas served through these wholesale contracts is expected to increase significantly, resulting in potentially large increases in water demand.

**Transportation – growth and density challenges**

The success of Portland’s transportation system in meeting future local and regional mobility needs will depend on the City’s—and its partners’—ability to maintain existing assets and make strategic investments. The City faces significant maintenance backlogs for existing assets; deficiencies in service provision; and challenges in providing complete, safe and accessible pedestrian, bicycle, and transit systems.

**Parks & Recreation – growth and density challenges**

To maintain Portland’s quality of life while accommodating growth, it will be necessary to preserve access to high-quality park and recreation experiences by acquiring and protecting park lands, maintaining existing facilities and providing additional recreation facilities and services. The actual number of parks and facilities that will be needed will vary based on where and how growth occurs, the ability of existing facilities to serve additional users and what opportunities arise to locate and build additional parks and facilities. Growth may also place additional pressure on heavily used facilities, such as pools, and it may exacerbate needs in currently underserved areas. These pressures may be particularly acute in centers that currently lack sufficient park amenities, where both existing facilities and acquisition opportunities are scarce.



## Complying with Regulatory Mandates

In addition to meeting maintenance and repair needs, the City also must comply with a variety of federal and state regulations, primarily related to service provision, public health and environmental quality. At the federal level, these mandates often are related to the Clean Water Act, Clean Air Act, Safe Drinking Water Act, Endangered Species Act or Americans with Disabilities Act. Complying with these mandates has a very significant impact on the City’s capital priorities and represents a large component of infrastructure spending. These regulations often require involved and costly changes to the City’s infrastructure but generally do not bring associated funding; this can mean that other maintenance, repair and improvement projects must be put on hold, or additional funding must be allocated.

Although the City can estimate the cost to comply with existing mandates, potential future regulations could require additional funding and/or further restrict the City’s infrastructure priorities. Potential future mandates that would require significant capital expenditures include LT2 compliance, new water quality requirements for stormwater and wastewater, and the Portland Harbor cleanup.



### Findings:

**K**ey infrastructure deficiencies tend to be clustered into broad geographic areas of the city, with shared characteristics based particularly on the time period and the topography in which they were built. For instance, development in hilly areas or during automobile-dominated times more often lacks sidewalks than does development in flat lands or during the pre-automobile horse and streetcar eras.

It is helpful to examine City infrastructure in terms of three broad urban form pattern areas which geographically group neighborhoods that share many infrastructure conditions and characteristics. The three groups are listed below and described more fully on the pages that follow:

- **Eastern Neighborhoods:** Primarily east of I-205; some areas west of I-205 (notably the Cully neighborhood)
- **Western Neighborhoods:** Primarily west of downtown, excluding streetcar-era neighborhoods adjacent to downtown.
- **Inner Neighborhoods and Central City:** Primarily neighborhoods from I-205 west to the southwest hills. The Central City is included because it has similar infrastructure deficiencies as the inner Portland neighborhoods.

Deficiencies are defined as infrastructure challenges that may impede the area’s ability to serve existing residents and adequately accommodate additional infill development. In general, Eastern and Western neighborhoods have greater infrastructure deficiencies than inner neighborhoods or the Central City.

**Specific findings by general neighborhood pattern type are outlined as follows.**

## 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.

### Transportation

- 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 lacking sidewalks.

### Environmental Services

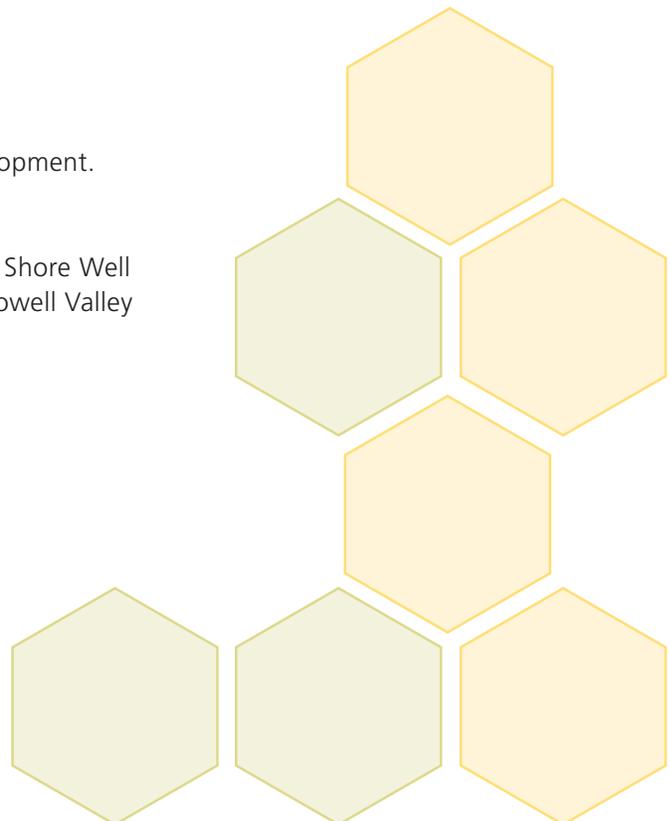
- The sanitary sewer system is in good condition.
- Issues with stormwater runoff and infiltration.
- Potential compliance issues with underground injection controls (sumps).

### Parks and Recreation

- An additional 58 acres of parks needed.
- 48% of park properties are undeveloped.
- Poor pedestrian access to parks.
- Poor recreation facility distribution.
- Natural areas targeted for acquisition.
- Few street trees and private trees being lost to development.

### Water

- 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 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.

### Transportation

- Streets generally meet connectivity standards.
- Lower vehicle miles traveled per person.
- Good sidewalk coverage.
- A number of high-crash intersections.
- 16 bridges in poor condition.
- Declining traffic signal condition.

### Environmental Services

- Pipes with insufficient capacity and/or in poor condition are widely distributed, raising the risk of the basement sewer back ups during storm events.
- Significant combined sewer overflow (CSO) improvements to be completed in 2011.

### Parks and Recreation

- Park development deficiencies in select areas.
- Limited parkland deficiencies.
- Additional/improved recreation facilities needed.
- Very limited walkable access to natural habitat.

### Water

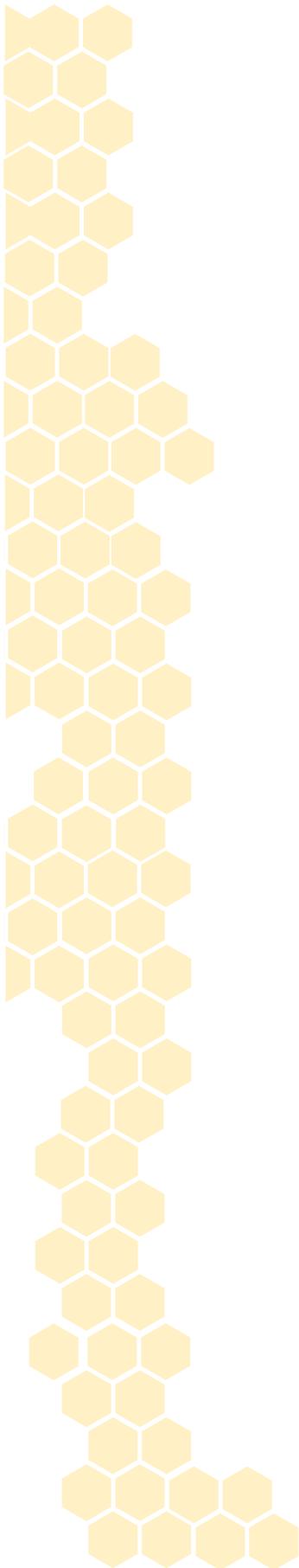
- Area has some of the oldest water infrastructure, resulting in high maintenance needs.
- A new seismically hardened Willamette River transmission line crossing will be needed in the next 20 years.

## Western Neighborhoods

Much like the neighborhoods themselves, infrastructure in Western neighborhoods often is shaped by the area's topography.

### 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 Services

- 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 and Recreation

- Six undeveloped park properties.
- Significant protected open spaces, but lacks sufficient developed parks and some recreation facilities.
- 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.

## Recommendations

To provide a high level of infrastructure services in the future, the City will need to:

- 1. Set appropriate service levels.** The City must decide what services it will deliver, and at what level. It may be necessary to adjust service standards to match community goals.
- 2. Develop geographically sensitive approaches.** Topographic and environmental constraints vary throughout the city, as do community needs and goals.
- 3. Identify strategic investments.** The City should identify major public infrastructure needed in the next 20 years to address aging assets, regulatory requirements, deficiencies and new growth needs. A coordinated investment strategy should also consider the City's financial limits and factors such as risk, environmental and economic impacts, and health and equity outcomes.
- 4. Pursue innovative funding sources.** The City should pursue new or expanded funding sources, partnerships, and work with the community to make tough priority choices.