CITY OF PORTLAND
2014 CITYWIDE ASSETS REPORT
Status and Best Practices

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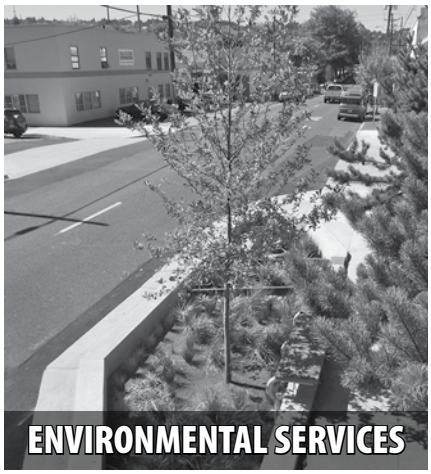
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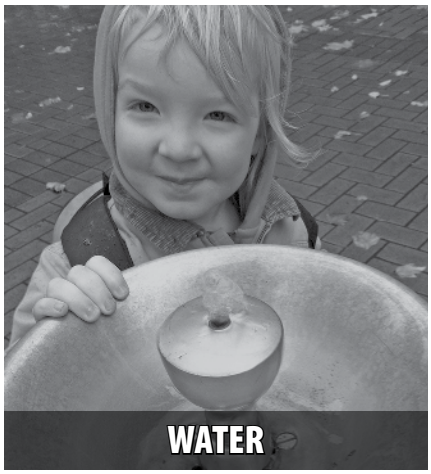
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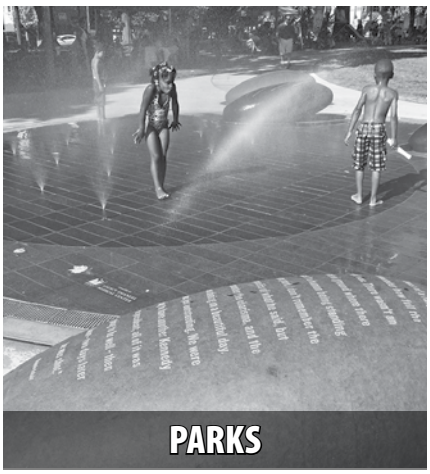
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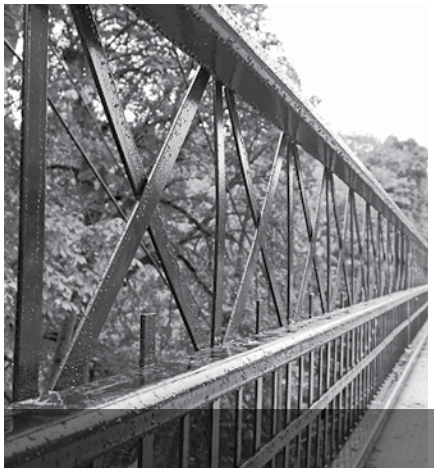

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City Asset Managers Group

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1. Executive Summary

The City of Portland's physical infrastructure assets include roads, pipes, treatment facilities, parks, buildings and more. What does it take to be steward of these community assets? What will we turn over to future generations? This report compiles data and best practices useful to City bureaus and decision-makers in answering these questions. Understanding the value and condition of assets and current asset management (AM) practices will help City decision makers allocate scarce financial resources to deliver public services.

This report provides integrated information about the City of Portland's physical assets. It provides a summary of the number of assets, replacement value, condition, and unmet funding needs. Information in the report assists the City's efforts to ensure infrastructure is in adequate condition and that operation, maintenance, rehabilitation, and development programs are as efficient and effective as possible.

Purpose of Report

This report serves to:

- Provide City of Portland staff, policy makers and general public with information needed to make more informed decisions that extend the life of the City's physical assets and deliver agreed service levels.
- Account for the community's investments and track assets over time — past, present and future.
- Relate challenges, progress and future opportunities.
- Share best practices with peer communities and infrastructure professionals.

This report collects and assembles key data, observations and best practices into a single report. This report leverages asset management expertise, contacts and trainings, through the cross-bureau City Asset Managers Group (CAMG), and enables more effective information exchange and the sharing of best practices within and outside of the City. This report dovetails with bureau-specific reports, City audits and policy reports, and is shared with City Council through the annual budget process.

To develop this report, the City's infrastructure bureaus collect and analyze data on all City-owned buildings and infrastructure. The bureaus strive to follow internationally recognized asset management principles, and use best practices to develop a coordinated approach to citywide asset management. This approach includes determining key measures, such as the value and condition of infrastructure assets, identifying confidence levels for the information presented and acknowledging when information is not available.

Relation to City Policy and Budget

Policy Development

From a policy perspective, there are three key factors to effectively manage the City's infrastructure systems: service levels, funding and risk. Defining service levels and managing risk are described as key best practices, in Section 5 of this report. Annual funding gaps, by asset group, are described in Section 4 of this report.

At current funding levels, some of Portland's infrastructure will continue to deteriorate and bureaus may have to decrease their service levels. Two bureaus, Parks & Recreation (PP&R) and the Bureau of Transportation, lack reliable and stable funding sources to adequately invest in maintaining their assets, which means levels of service will decline and risks will increase by default. Water and BES face political pressures to limit rate increases which will impact their long-term ability to maintain their assets.

Conservatively, infrastructure bureaus estimate a combined annual funding gap of $303 million per year to maintain existing facilities, address regulatory requirements, and meet service levels. This gap will likely grow for each of the next ten years. Some new assets often add to ongoing operations and maintenance needs, potentially adding to the funding gap. Some new assets may also replace existing asset functions and add new functionality.

City infrastructure policies are shaped by the recently-adopted Portland Plan and by the Proposed Draft 2035 Comprehensive Plan, currently under review. The Proposed Draft identifies seven key directions: complete neighborhoods, encourage job growth, create a low-carbon community, improve natural areas and open spaces, provide reliable infrastructure, improve resiliency, and one size does not fit all. Staff and the public are discussing policies to guide priorities to manage and invest infrastructure assets. A parallel process is updating the City's Transportation System Plan.

City Budget Process

The information contained in this report is intended to help decision-makers make more informed decisions in the annual budget process. Bureaus are encouraged to cite terms, data and graphics from the CAMG products (annual report, brochure, etc.) in their budget presentations. Service level data is also coordinated with the City Budget Office's budget mapping exercise.

FY 2014-15 Budget Note

Based on a request made by a team of bureau directors during last year's Budget Work session, Council included a budget note in the FY 2014-15 Adopted Budget. The budget note states:

> *Bureau asset managers are directed to work with the City Budget Office to develop options for funding and allocating resources to address recurring major maintenance and replacement needs of infrastructure assets. A report detailing the options and implementation timeline should be provided with the FY 2014-15 Fall BMP.*

As directed, a workgroup submitted a final report, complete with recommendations and an implementation timeline, to Council on October 2014. The report outlined a suite of options for closing the major maintenance and asset replacement funding gap, noting that there was no single solution.

The report also recognized that without a substantial realignment of resources (existing or new) to address this issue, the City risks higher costs and lower levels of service in the future. Other report recommendations are to:

- Re-establish a General Fund Capital Set-Aside.
- Generate new revenue sources for transportation.
- Make incremental increases in internal service fund rates.
- Develop options for ongoing General Fund allocations to bureaus.
- Initiate policy changes and project prioritization activities.

Council took action on two of the report recommendations in the FY 2014-15 Fall BMP. Additionally, Council passed Resolution 37107 in January 2015 which sets aside 50 percent of one-time General Fund resources identified in the forecast ($7.2 million in FY 2015-16) and states Council's intent to dedicate these funds to emergency preparedness, transportation and parks infrastructure. Council may consider accepting several of the other recommendations in the FY2015-16 budget process. Status of the recommendations will be provided in future publications.

You can view the full report online at *www.portlandoregon.gov/cbo/article/507450*.

Project Ranking and the FY 2014-15 Fall BMP

In parallel to drafting the funding options report, and at the request of Council, the workgroup also developed a process for ranking unfunded major maintenance and infrastructure replacement projects. This effort was helpful in addressing City Financial Policy 2.03 which states Council's direction to dedicate a minimum of 25 percent (revised upward to 50 percent per Resolution 37107 in January 2015) of excess General Fund ending balance to major maintenance and infrastructure replacement needs.

In total, 35 projects requesting $45.3 million in General Fund resources were submitted by bureaus for ranking and consideration in the FY 2014-15 Fall Supplemental Budget. A complete list is available online at the CBO website. The projects included on this list were submitted and self-scored by bureaus using criteria developed to evaluate both the risks of asset failure and the benefits of completing the projects. In order to ensure consistency and accuracy in the scoring process, bureau-scored projects were individually reviewed by a Validation Committee. The Validation Committee, comprised of representatives from the asset managing bureaus, adjusted scores when necessary.

In the end, Council exceeded the 25 percent policy minimum, which was the policy at the time, of $2.5 million, by $1.7 million for total investment of $4.2 million. The funds were primarily awarded to the top ranked projects. Specifically, Council funded major maintenance and replacement projects totaling $490,000 for Portland Parks & Recreation, $1.8 million for the Portland Bureau of Transportation, and $1.9 million for the Portland Communications Center. Additionally, Council agreed to debt finance the replacement of the City's fueling station infrastructure at a total estimated cost of $12.4 million. Approving the fueling station project also fulfills a recommendation outlined in the Funding Options Report detailed above.

Based on the success of this effort, the project scoring criteria have been revised and will be used in current and future budget processes.

Asset Management and Performance

In the FY 2014-15 budget process the Mayor outlined three priority areas: Complete Neighborhoods, Homelessness and Housing, and Emergency Preparedness. In an effort to track the progress and investment in these priority areas, Council approved outcome measures and key performance indicators.

The Emergency Preparedness priority included two asset focused metrics. The first focused on structures that house City employees (percentage of employees in buildings which meet today's seismic standards). The second measure is still being developed, but is likely to focus on identification and readiness of bureau assets and services in the event of an emergency.

These measures, once complete, will be reported quarterly, with data made accessible through the City's website. Additionally, all City bureaus, including asset managing bureaus, have been asked to develop a set of key performance measures that represent the bureau's core services. The results of this exercise will likely yield a set of metrics focused on asset management.

The City Budget Office will report on two citywide infrastructure measures:

- Annual repair, rehabilitation and replacement gap.
- Percent of Capital Improvement Plan funding that was expensed on repair, rehabilitation and replacement.

All of these efforts will continue to highlight the needs that exist around asset management and the condition of the City's infrastructure. Additional information on the impact of these performance efforts will be provided in future reports.

Continuous Improvement

In 2014, the CAMG identified five work tasks. More details are provided in Chapter 5 of this report.

1. Refine service levels, as needed. Each bureau will guide and determine any changes to its service levels.
2. Improve data collection for high-risk assets, and apply mitigation strategies based on asset risk classification. Identify opportunities for bureaus to collaborate on risk assessments and mitigation strategies.
3. Develop bureau and asset-specific templates and application processes, for business case.
4. Apply reliability-centered approach to bureau maintenance.
5. Complete long-term investment profiles, develop tools and methodologies, and develop investment profiles for high-risk assets.

There is also interest in deepening discussions with customers and the public, about service levels, risk and investments in infrastructure systems. These discussions need to extend beyond each bureau's budget advisory committees.

Looking Ahead

In 2014, the CAMG marks advances in data improvements, the shared work plan, and funding.

Data Improvements

- Completing PP&Rs' baseline asset inventories.
- Added fueling stations and fire apparatus to Civic asset group (from OMF and Fire & Rescue).
- Focusing on high risk assets.
- Applying risk exposure to CIPs (BES).
- Applying risk exposure to candidate projects for General Fund Capital Set-aside funds (CBO as lead).

Work Plan

- Using bureau responses to the best practices survey to advance shared priorities.
- Creating visual report cards, consistent with the Council Performance Management Dashboard.
- Dovetailing with Council budget priorities.

Funding

- Voters approved the 2014 Parks Bond.
- Community discussed a street fee proposal.
- Continuing to provide risk-based expertise to the Capital Projects Workgroup, on ranking major maintenance and replacement projects (CBO as lead).
- Helping to implement recommendations from CBO's Funding Options Report.

In motion for 2015

- Facilities condition assessments of major City buildings, including visual seismic assessments (OMF contract).
- Organizing a companion report, Green Infrastructure Assets (BPS as lead).

2. Key Findings

This report cites data and processes for the year ending June 30, 2014. This section includes information regarding the value and condition of city assets, the quality of that data, and an update on improvements to bureau business practices for managing their assets.

Status and Conditions

Highlights from the 2014 data are:

1. The **current replacement value** of the City's physical infrastructure is estimated at $33.7 billion. Current replacement value is an estimate of what it would cost to construct these assets today. It represents substantial investments by several generations of Portlanders. Current replacement value excludes the value of land.
2. At current funding levels, some of Portland's infrastructure will continue to deteriorate and bureaus may have to decrease their service levels. Two bureaus, Parks & Recreation and the Bureau of Transportation, lack a reliable resource base to adequately fund investments in maintaining assets. By default, levels of service will decline and the risk of failure will increase. Water and BES face political pressures to limit rate increases which will impact their long-term ability to maintain their assets.
3. Conservatively, infrastructure bureaus estimate a **combined annual funding gap of $303 million per year** to maintain existing facilities, address regulatory requirements, and/or meet service levels. This gap will likely grow for each of the next ten years.
4. New assets often add to ongoing operations and maintenance needs, potentially adding to the funding gap. Some new assets may also replace existing asset functions and add new functionality while reducing risk.
5. The consistent finding of the City's annual citywide asset reports (since 2002) is that a substantial annual funding gap persists.

Asset Management

In 2014, bureaus continued to advance selected business practices. These include:

Transportation reported service levels in the Transportation Asset Report Card, and captured the unmet need to meet levels of service for asset condition. These unmet needs are factored into a long-term replacement strategy and short-term maintenance budget needs. These needs have been a part of the effort to identify transportation maintenance and safety needs.

Environmental Services applied enhanced risk-based evaluation and decision-making for Capital Improvement Plan projects during planning and design phases. Environmental Services also developed a risk-based Equity Lens to review the distribution of CIP projects across the community.

Water completed another set of Asset Management Plans (AMPs) and continue efforts on risk management (especially for high failure consequence pipes) and business cases. Its approach to estimate the consequence of failure of some water pipe crossings of highways and railroads is innovative.

PP&R updated its method of assessing asset replacement value. For condition, PP&R conducted asset risk profiles of most asset classes. Each year, PP&R adds asset classes to its AM program, which rotates physical inspections. Passage of the 2014 Parks Replacement Bond and SDC funds should reduce the Annual Funding Gap.

Management and Finance (OMF) negotiated a service contract with Cardno TEC to conduct building condition assessments of major City buildings, and has invited other bureaus to add facilities to the contract. Buildings will be visually assessed for physical condition and seismic vulnerability.

These bureaus continued to share their best practices.

Trends, Challenges and Opportunities

The Planning and Development Directors (the CAMG's sponsor) see three general policy trends:

- Assets age and wear out, even with best of maintenance.
- Bureaus are making the best of limited resources, but have a large funding gap.
- The funding gap results in increased risk of failures, reduction in levels of service and perpetuation of long-standing inequities.

There are several challenges to advancing citywide asset management best practices. These include:

- Limited resources to reduce the annual funding gap.
- Prioritizing limited resources. As bureaus seek out long-term, cost-effective approaches to service delivery, the community also wants to reduce historic inequities by ensuring all Portlanders receive at least basic minimum services.
- Challenge of coordinating and communicating across multiple bureaus.
- A steep learning curve, for City staff and decision makers, to understand and apply asset management practices.
- Pending retirements of City staff with hands-on knowledge of how to operate and maintain infrastructure assets (so-called succession planning issue).

Opportunities include:

- Cross-functional teams — the Water Bureau has used cross-functional management plans and ranks risks of asset failure. PP&R is engaging in cross-functional work teams to assess and quantify the risk of certain assets and to determine priorities for investments. Other City bureaus (BES, PBOT, PP&R) have also attended trainings on fundamentals of asset management, and committed to cross-training their departments.
- More shared understanding of infrastructure asset management by decision-makers, managers and line staff.
- Community interest in best value for public services, setting realistic service levels and reducing risk of assets failing. Reducing inequitable access to services is another strong community interest. Process tools, such as Triple Bottom Line and risk assessments, can be calibrated to account for social impacts.
- Extensive contacts with peer communities (especially for utilities) and consultants.

For more details on citywide best practices, see Section 5 of this report.

3. Asset Management Context

General Goals

The goal of strategic asset management (AM) is to develop a sustainable asset base that provides appropriate levels of service and responds to social, economic, and environmental needs. Asset management addresses the full life cycle of the design and specifications, maintenance, repair, rehabilitation, replacement, acquisition and disposal of assets.

Asset management is a set of industry standard best practices that provides a risk mitigation approach to decision making. It is commonly defined as meeting agreed upon public, customer and environmental service levels, while minimizing life cycle costs at an acceptable level of risk.

Asset management activities are driven by asset deterioration, regulations, and community needs (based on service levels). They will differ for each asset type based on maintenance management techniques, scheduling and priorities of activities, failure modes, treatment options, renewal strategies, equipment and practices, and renewal techniques.

Benefits and Elements

Asset management informs asset acquisition, maintenance and operations, renewal and adaptation, and asset disposal. It focuses on reliability and the lowest total life-cycle cost to provide desired levels of service.

Applying AM principles and practices will:

- Support the efficient delivery of services with assets that are cost-effective, well maintained, accessible, energy efficient and safe.
- Improve the ability to make sound business and planning decisions at all levels.
- Promote effective use of resources.
- Improve bureau support and accountability.
- Improve and coordinate City AM planning across bureaus.

Common elements for managing assets include:

- Information systems, such as GIS, CADD and Computerized Maintenance Management Systems (CMMS), that provide data on asset inventories and their condition.
- Good documentation of life-cycle costs, and optimum renewal strategies that ensure the lowest life-cycle cost.
- A needs assessment to evaluate current practices, asset risks, and opportunities.
- Links between service outcomes, bureau programs, AM plans, and performance measures.
- Community engagement to better define desired and affordable levels of service.
- Clear assignment of roles and responsibilities to guide AM efforts.

Collaboration

Some local governments seek to improve AM best practices across their asset groups. A few local governments aspire to a whole-of-city approach. For the City of Portland's commission for of government, a cross-bureau approach seems more achievable. Either way, the objective is to continually improve performance-based information that is available to the public, bureaus, and city leaders as they make choices in the types and levels of service desired.

Drivers

In FY 2001–02, City Council set strategic priorities as part of the Managing for Results exercise. The Council identified the City's deteriorating physical infrastructure as an immediate strategic priority. It remains a top Council strategic priority.

Other policy drivers (federal, state and local) underscore the importance of the condition of municipal infrastructure in supporting a community's economic health, active neighborhoods, and environmental stewardship, including:

- State and federal regulations.
- Public Facilities Plan, a long-range, citywide plan which requires a major projects list for use in annual capital budgets.
- Portland Comprehensive Plan.
- Transportation System Plan.
- The Portland Plan.
- Climate Action Plan, with Climate Change Preparation Strategy.
- Municipal bonded debt covenants.
- City of Portland Budget Manual, which requires bureaus to analyze operations and maintenance costs and savings in new projects.
- U.S. Governmental Accounting Standards Board statements (GASB 34, 42, 48, 49 and 51).
- City of Portland Comprehensive Financial Management Policies.
- Other Council Priorities.

Regulatory Compliance

Regulatory compliance requirements can have major impacts on the management of infrastructure systems and on the resources available for repair and expansion projects. Currently a number of federal, state, and local regulations require additional compliance measures by the City. These mandates vary in compliance requirements, timeline, and level of funding through current City revenues.

Regulatory mandates affect all of the City's infrastructure systems, including sewer and stormwater, transportation, water, parks and civic facility investments. The following represent some of the major regulations on capital systems:

- Clean Water Act, such as the Long Term Enhancement Rule (LT2) and CSO Amended Stipulation and Final Order.
- Environmental Protection Act, including Superfund cleanup requirements.
- Safe Drinking Water Act, including Underground Injection Control requirements.
- Endangered Species Act, such as Habitat Conservation Planning.
- Americans with Disabilities Act.
- Uniform Building Code, including minimum seismic standards.
- Green Building and Energy Efficiency Policies.

Many of these regulations do not have dedicated funds set aside for compliance measures. Compliance often requires significant capital investment, which may require diverting financial resources from capital repair and rehabilitation projects. In addition to existing mandates, future regulations may further impact management of the City's infrastructure systems.

Bureau funding gaps presented in this report include varying degrees of regulatory compliance. Certain requirements, such as ADA accessibility and building code improvements may occur as part of capital repair or rehabilitation projects.

4. Citywide Asset Status and Condition

This section discusses key citywide data, bureau profiles and bureau methodologies. Several appendices support this status and condition analysis, and define terms. The City Asset Managers Group continues to seek opportunities to more closely align methods across bureaus.

A. Key Data

The annual citywide assets reports cite three key measures of the health of infrastructure systems. The measures are: current replacement value, current condition, and annual funding gap. These are fully loaded costs, including overhead. Confidence levels are assigned to communicate the relative quality of the data. In some cases, data is not available or is pending more detailed data collection and analysis.

- **Current replacement value (CRV) —** This is the total cost to replace the entire asset to meet current accepted standards and codes. CRV represents past investments of Portlanders in the City's transportation, water, sewer, stormwater, parks and civic facilities. At critical points in Portland's history, the community has supported major investments — to deliver drinking water from Bull Run (using headworks treatment, conduits and storage reservoirs), to treat sewage water (using sewer pipes and two sewer treatment plants), to improve access for people and goods (by paving streets and accommodating pedestrians and bikes), to provide safe places to play (with landscape plantings, recreation buildings and features), and to provide civic facilities and technology services (including police and fire facilities).

  The City's physical infrastructure has a current replacement value of $33.7 billion. By bureau, the infrastructure value is: PBOT ($9.7 billion); BES ($13.2 billion); Water ($8.0 billion); PP&R ($1.3 billion); and Management and Finance ($1.5 billion).

- **Current condition —** This is the physical condition of the asset, used to assess its rate of deterioration and remaining useful life. Bureaus set priorities for inspecting the condition of assets, and potential high-risk assets may get priority. Methods range from actual field condition assessment, to staff estimates (based on repair history), to deterioration or failure rate curves. Some assets (like buried pressure water pipes) are typically assessed by age and type of pipe, break history and spot excavations. Other assets can be inspected directly, but may be dispersed (as with parks buildings, recreation features, trails, benches and other furnishings).

- **Annual funding gap —** This is the difference between the funding needed to address infrastructure needs of a group of assets at a defined condition or level of service, and the funding that is currently available. It is the amount of money needed to eliminate the backlog and/or maintain the asset to achieve its optimal useful life. There are three types of funding gap:

  - **Repair, Rehabilitation, Replacement (R/R/R):** Additional funding necessary to repair, rehabilitate and replace existing assets to bring them up to current service levels, or replace assets considered obsolete.
  - **Mandate:** Additional funding necessary to improve existing assets to meet regulatory requirements, exclusive of improvements that fall under Repair, Rehabilitation, Replacement or Capacity.
  - **Capacity:** Additional funding necessary to address existing inequities and deficiencies in levels of service for current customers and citizens.

Appendix 3 includes charts and data sheets for each bureau's total funding gap, their funding gap by type (with capacity split out) and compared to their annual budgets (capital and operating). The bureau observations below, describe each bureau's approach to asset management, recent experiences and improvement priorities.

Unfunded federal mandates and external funding of capital projects add to the number and type of physical assets. Although primarily built with leveraged funds, these assets become a long-term City obligation to maintain and operate. Typically, there is little or no set-aside funding for ongoing operating or maintenance of these assets prior to their construction.

For 2013 and 2014, the key citywide measures did not significantly change from prior years. In 2012, the annual report added a separate chart for capacity improvements (Appendix 3.b) and eliminated the future (10-year) asset condition table, since data confidence levels were very low for many asset groups.

Sustainable Funding Levels

This year, the combined annual funding gap for Transportation, Environmental Services, Water, PP&R and Civic assets is $303 million, including street pavement. The ongoing funding gap is the result of under-investing in capital maintenance. This is not a sustainable business practice. With this trend, lower levels of service and more frequent system failures are predictable.

Past Responses

In 1996, City Council increased the General Fund capital set-aside from a base of $3 million. The Council's intent was to add $1 million to it each year until a $10 million set-aside pool was formed. That fund rose to $7 million in FY 2002–03, and then declined after a series of annual budget cuts. The General Fund capital set-aside funded a variety of maintenance, replacement, and improvement projects. Major funded projects included ongoing replacements of fire apparatus, ongoing street lighting improvements, renovation of the Hillside Community Center, major maintenance of the 800 MHz system, purchase of a bomb robot, funding of debt service for the Gateway Child Receiving Center and Streetcar #7, and funding of several PP&R maintenance projects and acquisitions. In FY 2008–09, City Council redirected the capital set-aside to fund the Public Safety Systems Revitalization Project.

The Auditor's 2002 report Managing for Results identified the deteriorating physical infrastructure as a priority. That report recommended that City Council consider a Major Maintenance Fund to increase the investment in capital maintenance. City Council did not act on that recommendation.

In January 2007, the Directors' group reviewed key findings of this report, and asked staff to prepare ideas to 1) start closing the annual funding gap, and 2) more fully maintain existing infrastructure. The City Council must balance many competing demands. This effort would take a number of years. The concept was to build a funding gap finance plan with a planning horizon of 10 to 15 years.

In 2007, the City Asset Managers Group worked with OMF Financial Planning to improve the General Fund Capital Set-Aside allocation process. The revised process used a new set of criteria based on the risk management process (see Appendix 5 of the City of Portland Asset Status and Conditions Report, December 2007). The risk rating process allows ranking of projects based on how effectively they reduce the risk of the high and extreme risk assets. Use of the citywide risk management process is on hold, pending more feedback and direction.

City Council adopted revised Financial Policies effective July 1, 2008. A new provision stated that at least 25 percent of General Fund discretionary revenue that exceeds the budgeted beginning balance (adjusted) will be allocated to infrastructure maintenance or replacement in the fall budget monitoring process (BMP). The percentage calculation will be based on any discretionary funds in excess of the budgeted beginning balance, adjusted for the difference in encumbrances carried over from the prior year. Infrastructure maintenance projects to be considered for funding will be projects requested but not funded in the prior year's budget and projects that are underway but still require funding.

There have been mixed results since this provision was enacted. There was no surplus in beginning balance (FY 2009-10 or FY 2012-13) resulting in no additional General Fund capital allocations. In FY 2010–11, City Council allocated $2.4 million in Capital Set-aside funding for infrastructure maintenance or repair. In FY 2013-14, City Council allocated $4.5 million Capital Set-aside.

B. Transportation

Profile

The Portland Bureau of Transportation (PBOT) manages transportation assets with a replacement value of nearly $10 billion. Improved streets, the sidewalk system, bridges, traffic signals (signal hardware), and streetlights make up 93 percent of the dollar value ($9 billion). In addition to these key assets, the City of Portland owns other assets that ensure the safety and movement of people and goods: streetcars; an aerial tram; various support facilities; traffic calming devices; signs; parking meters; parking garages; pavement markings; bikeways; guardrails; retaining walls; the Harbor Wall; stairways; and traffic signal computer controllers. These assets are worth $694 million.

Asset Management Approach

Transportation utilizes asset management as a way to effectively and efficiently allocate resources, measure performance, and track infrastructure needs. PBOT's Asset Management Advisory Committee (which includes engineers and operations staff as well as maintenance, finance, and information technology managers) sets the priorities for asset management within the bureau and helps implement those priorities into business practices.

Asset Management Achievements

Condition Monitoring — Transportation currently conducts condition monitoring on pavement, bridges, structures, street lights and traffic signal infrastructure. PBOT is working with engineers and technology staff to expand condition monitoring to guardrail and traffic signs. Condition monitoring will allow PBOT to plan for appropriate preventive maintenance, rehabilitation or replacement needs and budget accordingly.

Risk Assessment — PBOT has established a risk assessment for failure of assets. Criteria for assessing consequences and likelihood of failure have been created and are being applied to transportation assets. A risk registry, identifying failure modes and assigning risk of failure will be created. Risk of failure is used to prioritize pavement preservation across the city.

Asset Levels of Service — Levels of service for each infrastructure asset class have been established to track and monitor performance and outcomes achieved. Performance measurement is a way of monitoring progress toward a result or goal. It is also a process of gathering information to make well-informed decisions. An Infrastructure Asset Report Card summarizes achievement of the levels of service.

Asset Management Priorities

In the last year, PBOT has been using asset management as the foundation for community discussions on raising new revenue for maintenance and safety needs. Based on the unmet need calculations and the levels of service targets, PBOT does not have adequate revenue to maintain existing infrastructure. Generating new revenue to address unmet needs has been a priority and culminated in a program called the Portland Street Fund. The Portland Street Fund identified ways to raise new revenue.

Asset Value and Condition

Maintaining and operating the transportation infrastructure are key activities of PBOT. Emerging needs include:

Street Lighting — Street lights are important for the safety of our neighborhoods and for those who use the transportation system. Many of the city's 55,654 street lighting luminaries were replaced in the early 1980s when mercury vapor lights were converted to high pressure sodium lamps.

Signals — Traffic signals are made up of several components (i.e. hardware, software, mast arms, controllers, cabinets and signals). Approximately 31 percent of the traffic signals are in poor or very poor condition. Traffic signals in poor condition are more prone to increased trouble calls, causing safety and congestion problems. Traffic signals in optimal condition provide efficient movement of people and goods and when synchronized reduced greenhouse gases.

Pavement — Approximately 49 percent of the collector and arterial system is in poor or very poor condition, 18 percent is fair and 33 percent is in good or better condition. PBOT's goal is that 80 percent of the arterial and collector system is in fair or better condition and no more than 2 percent are in very poor condition.

Bridges — The City owns 156 bridges. Of these , 29 percent are either structurally deficient or functionally obsolete; of these, 25 bridges are in poor or very poor condition including 22 that are weight restricted. Weight restrictions on bridges impact the ability to move freight and goods, which ultimately has an impact to our economy. Additionally, freight has to find alternate routes, extending travel time requiring the use of more fuel and impacting the environment.

Sidewalk Network — ADA required the City's public facilities be designed and constructed so that they are accessible to all people, including those with disabilities. In total, 48 percent of corners have accessible corner ramps, which met both current and past ADA standards.

Annual Funding Gap

The funding gap is defined as the amount of additional funding and resources needed to bring or restore an existing asset class to a fair or better condition and to maintain it at that condition. This includes preventive maintenance, rehabilitation and replacement needs.

Transportation's maintenance liability continues to increase as the infrastructure ages.

PBOT's primary source of discretionary funds is not keeping pace with inflation, meaning the purchasing power has decreased. This means PBOT has had to make reductions to the budget, resulting in the ability to do less preventive and routine maintenance. This will have a severe impact on the future condition and continued decline of Transportation's infrastructure.

PBOT's annual $181.2 million funding gap consists of $178.2 million in ongoing needs and $3.0 million in one time needs:

Streets — The funding gap is estimated at $71.6 million for collector and arterial streets; another $47.1 million for local streets. Ratings of collector and arterial streets have been completed. Calculations of need are based upon assigned treatment rules, which are based upon pavement condition, road type and road usage.

A road in good repair provides a smooth ride, limits the wear and tear on vehicles and improves safety. The key to keeping pavements in good condition is to prevent water from getting under the surface of the pavement. With proper maintenance, streets last longer and maintenance costs less. Proper pavement preservation techniques mean that the right treatment to fix the road is applied at the right time.

When a road deteriorates to the point where it requires major rehabilitation or reconstruction, the costs are very high. In contrast, it is less expensive to perform preventative maintenance on pavement that is still in good condition. Preventing major deterioration and keeping roads at the preventative maintenance level or better is the best way to invest limited funds. Like other transportation agencies across the nation, PBOT's policy is to prioritize these early-stage repairs.

Sidewalk system — $13.0 million is needed annually to repair, restore or replace curbs to bring them to a fair or better condition and $9.7 million is needed annually to build ADA accessible corners, where there are currently none, and maintain the corners in a fair or better condition. While the sidewalks are owned by the City, it is the adjacent property owner's responsibility to repair, restore or replace sidewalks. Therefore, unmet need for sidewalks is not calculated.

Bridges — The total cost to replace city-owned bridges in poor condition, and address bridge deficiencies is $14.9 million annually as ongoing and $3.0 million as one-time needs to address Vista Bridge rehabilitation.

Signal hardware — A total increase of $12.6 million per year is needed in capital funding.

Street lights — $6.0 million per year is needed to improve the lights to a fair or better condition.

Support facilities — Unmet need for support facilities totals $0.5 million in annual estimates.

Other — Unmet need for pavement markings, street signs, streetcar, traffic signal controllers, other equipment, and retaining walls and stairways totals $2.8 million in annual estimates.

Calculation Methodologies

Replacement Value

Generally, the replacement value is based on the most recent estimates available, including the costs of removal and installation. Overhead in replacement value is accounted for as part of in-house costs. This is consistent with how PBOT capitalizes overhead at year-end on infrastructures for two accounts, improvements (closed projects) and work-in-progress (open projects). Efforts continue to improve in estimating replacement value, with varying levels of confidence. Please note that actual replacement costs would vary by location.

Current Condition

Condition methodology is reported as a percentage of the total number of assets. The methodology for determining asset condition varies by asset group, see below.

Asset Group	Method of Asset Condition Assessment
Pavement	▪ Visual inspection of pavement using the Metropolitan Transportation Commission rating methodology.
Sidewalk System	▪ Sidewalks: Visual inspection; Guidelines in the Operating Policy and Sidewalk Repair Program. ▪ Curbs: Functional purpose, that is, if they protect the street edge and direct runoff and if they present a traffic hazard.
Structures	▪ Bridges: Inspection rating system based on Oregon Department of Transportation and National Bridge Inspection. ▪ Retaining Walls, Harbor Wall: Visual inspection. ▪ Stairways: Visual inspection. ▪ Guardrails: Visual inspection.
Traffic Signals	▪ Hardware & Controllers: Age; Visual inspection. ▪ ITS and Other Equipment: To be determined.
Streetcar	▪ All Components: Age; Visual inspection.
Aerial Tram	▪ Age; Visual inspection; Structural inspection for stations and towers (every 2 years), cables (annually).
Traffic Calming Devices	▪ Visual inspection.
Street Lights	▪ Field inspections; Age of the components; Type of luminaire; Type of system (underground vs. above ground).
Pavement Markings	▪ Painted Markings: Currently no condition assessment. ▪ Durable Markings: Type of material; regular maintenance; visual inspection.
Parking Meters	▪ Single Meters: Age; Visual inspection. ▪ SmartMeters: Notifications of maintenance issues from software system connected to meters.

Annual Funding Gap

Total unmet need is defined as the amount of additional funding and resources needed to bring a given asset class to an acceptable condition and to maintain it at that condition. Reported unmet need does not include sidewalks or unpaved streets. Adjacent property owners are financially responsible for repairing sidewalks; therefore, the City does not have an unmet sidewalk repair need. Figures do not include unpaved streets as the City is not financially responsible for upgrading and maintaining unpaved streets.

PBOT is in the process of updating the Transportation System plan (TSP). In order to place a value on what it would take to address existing inequities and deficiencies in levels of service, an update of the TSP would be needed.

C. Environmental Services

Profile

The Bureau of Environmental Services (BES) provides sewer and stormwater collection and treatment services to approximately 600,000 people, numerous commercial and industrial facilities, and six wholesale customers. The existing system consists of 1,000 miles of separated sanitary sewers, 906 miles of combined sewer that carry both stormwater and sanitary waste, 435 miles of stormwater pipes, 1,900 water quality facilities (green streets, vegetated swales, ponds, constructed wetlands), 97 pump stations, and two wastewater treatment plants. These assets are valued at approximately $13.2 billion.

Asset Management Approach

Asset Management has been part of the business practices at BES for over 20 years beginning with the implementation of the Hansen Maintenance Management Database and condition assessment scoring in 1990. BES' updated Systems Plans incorporate asset management principles to prioritize projects to address the highest risks. The bureau's performance measures include levels of service (LOS).

Asset Management Practices

BES applies AM practices of asset inventory, condition assessment, and computerized maintenance management systems for its system components: treatment, pump stations, and collection systems. The Systems Plan for the sanitary and combined collection system incorporates system inventory, condition, GIS data, and failure records in an AM context to develop a risk register consisting of likelihood of failure times consequence of failure. This work has been incorporated into the annual planning process for the CIP. The plan identifies the appropriate sewer maintenance routines (and repairs) to enable individual infrastructure components to reach an optimal useful service life at an overall least cost. A similar multi-year effort focused on the stormwater system is underway.

The companion Capacity, Management, Operation & Maintenance (CMOM) project identifies the appropriate sewer maintenance routines and repairs to enable the individual infrastructure components to reach an optimal useful service life at an overall least cost.

Asset Value and Condition

The overall replacement value of BES assets increased to $13.2 billion in 2014. This reflects an adjustment for ENR (9291 to 9542). There has been no significant change to overall asset condition.

Annual Funding Gap

The financial plan includes an ambitious pipe rehabilitation program focused on pipes with the highest risk, primarily in the combined system. The financial plan also includes many, but not all, of the recommended capacity related projects from the Systems Plan. The funding gap is based on the following:

- **R/R/R —** The difference between the replacement value of assets in very poor condition and the amount of funding in the financial plan for rehabilitation of those assets. The gap assumes all wastewater pipe rehab projects in the proposed financial plan proceed as programmed.
- The extent of stormwater system needs is unknown. The estimated gap makes very broad assumptions about rehab and capacity needs from the Stephens Creek pilot.
- **Capacity — Combined —** Projects recommended in the Systems Plan with positive benefit/cost ratios (primarily those that address conveyance of the 2-year storm in combination with deteriorated pipes) that are not included in the financial plan. Note that the gap does not include projects required to meet stated LOS for conveying the 25-year storm.
- The value of the stormwater system reflects only the piped system and other constructed facilities (such as sumps, green streets, water quality facilities). It does not include natural systems – either the value of them or the funding gap to address watershed health/habitat or anticipated regulatory changes related to the MS4 permit.

Asset Management Improvement Priorities

BES reported on updated performance measures which incorporate levels of service and expanded use of asset management to refine prioritization of sewer rehab work. Also BES made further progress on documenting the amount of risk reduced by completed projects.

D. Water

Profile

The Portland Water Bureau (PWB) delivers potable drinking water for consumption and fire protection. The City is the largest supplier of domestic water in Oregon, serving more than 800,000 people and providing about 100 million gallons of water per day, or about 36 billion gallons per year. About 60 percent of the water is delivered to customers within Portland city limits. The remaining 40 percent is sold to customers in 19 surrounding cites and special water districts. Water is supplied from the Bull Run watershed and the Columbia South Shore wellfield through more than 2,000 miles of pipes. The water system is valued at $8.0 billion.

Asset Management Approach

The Water Bureau has an Asset Management Group (AMG), located within the Engineering Department, which coordinates asset management activities within the organization. An Asset Management Steering Committee makes policy decisions related to asset management and approves major work items.

Uses of Asset Management

The approach to Asset Management in the Bureau has been to focus on key asset management concepts. To achieve progress in Asset Management, the Water Bureau has taken the following actions:

- Incorporated key service levels into the Water Bureau's Strategic Plan. Those service levels have been tracked since FY 08-09. In FY 2012-13, the Bureau met 20 of its 27 service levels.
- Asset Risk Management. There is a risk service level. The bureau identifies key assets, assessing the potential risk of asset failure, and then is committed to either better understanding the risks or taking steps to mitigate those risks. There are currently two extreme risk assets and 48 high risk assets. All extreme and high risks are being addressed.
- Management of high risk assets. Developed overall strategy for high consequence pipes. Identified primary failure modes. Large diameter leak detection was completed at 18 sites in 2014. Pipes on bridge crossings were inspected at 60 locations in 2014.
- Performing business cases and using the results to support project planning, design, construction and operation decisions.
- Creating Asset Management Plans (AMPs) that define maintenance, repair and replacement strategies for the assets. The bureau completed 13 AMPs in 2012, six more AMPs are due for completion in 2014, and three more AMPs are due for completion in 2015. All recommended strategies are prioritized and considered for implementation.

Asset Management Practice

As noted above, the bureau has continued with its tracking of service levels, identification and mitigation of risks, condition assessments, business case development and creation of Asset Management Plans.

Asset Value and Condition

The overall replacement value of the Portland Water Bureau's assets is estimated at $8.0 billion in 2014.

Since 2007, the overall condition of the water system has improved (although condition ratings based on seismic vulnerability would impact this conclusion if included). Twenty three percent of assets are in fair condition, and eight percent are in poor to very poor condition.

Annual Funding Gap

A funding gap exists in the need to replace assets in poor condition and to maintain the overall condition of other groups of assets. Baseline unmet needs amount to $160 million over 10 years. The following list reflects the Water Bureau's anticipated system needs beyond the current level of funding.

Distribution:

- Replacement of hydrants: Replacement of all screw-type (obsolete) hydrants not being met by current funding levels.
- Replacement of services: Replacing all plastic and galvanized services, and aging copper services, not expected to be replaced under the current funding levels.
- Replacement of valves: Replacement of all large valves in poor condition.

- Facility valves: Install drainage valves at active tanks and pump stations.
- Replacement of high consequence pipe segments in poor condition: Replacement of all poor condition pipe segment crossings of bridges, major arterials, freeways and railroad lines; and funding a pipe condition assessment program.
- Replacement of pump mains: Replacing the sections of two major pump mains that are currently in poor condition but not funded for replacement.
- Pipe relocations and replacements in response to bike boulevards, green improvements, or inadequate cover on road reconstruction.
- Expanded predictive/preventive maintenance program for site valves and pipes, tanks and fountains.
- Tank cathodic protection and seismic upgrading.
- Replacement of manual meter reading with an automated meter reading system.

Transmission — Conduits:

- There is a need to further assess condition and to replace/upgrade sections of the oldest conduits east of Portland.

Supply:

- A significant portion of the Bull Run watershed road system is in need of maintenance.

Facilities:

- Replacement of the operations building in the Bull Run watershed.
- Portland Water Bureau's share of the costs of the Portland Building upgrade.

Asset Management Improvement Priorities

The Water Bureau continues to expand its efforts to implement Asset Management. An updated Asset Management work plan for the organization was created in 2013. A stakeholder group reached consensus on the focus of the next steps of the organization in Asset Management identifying eleven work tasks. The decision was made to complete eight more Asset Management Plans (AMPs), to develop and implement a strategy for high consequence pipes, and to continue to improve the approach to business cases, risk of asset failure, and the reliability centered maintenance program.

Calculation Methodologies

Replacement Value

In most cases, the replacement value is based on the current costs to install assets and includes all overhead costs.

Current Condition

Condition can be based on age, visual inspection, deterioration curves or failure curves. The Water Bureau matches one of these methods to each asset type.

The Water Bureau uses available information to assess physical condition of its assets. The least specific is a rating based on asset age relative to useful life. The most specific form of rating is based on an actual field condition assessment of individual assets. Intermediate forms of estimating condition involve ratings based on the judgment of Bureau personnel most knowledgeable about a particular asset or group of assets or partial inspection data, extrapolated to an entire asset class. For pipes, the Water Bureau uses Weibull curves of the failure rate by age of the asset class. Deterioration curves are used for pump, tank, and several other assets.

All reported condition information values are based on the percentage of value of assets. All notable asset groups are included.

E. PP&R

Profile

Bureau Highlights

Portland Parks & Recreation (PP&R) continues to refine and implement its asset management practices.

- **Technology —** PP&R uses MicroMain, a Computerized Maintenance Management System (CMMS) to track assets, issue work orders, and schedule preventive maintenance. While not fully integrated, the CMMS shares key ID data with GIS, enabling mapping of assets and condition. Work to more tightly integrate these systems continues. The diversity of parks and facilities asset types presents a significant challenge, range from swimming pool filtrations systems to the Washington Park International Test Rose Garden. No single asset management system is well suited to such a diversity ranging from mechanical equipment to botanical collections.
- **Assessments —** PP&R continues to conduct inspections and assessments of the asset system, with regular inspections of all buildings, pools, and play equipment. The bureau continues to add new assets to its inspection and condition assessment program. A comprehensive asset condition survey was completed in 2013. The Asset Risk Profiles project created a baseline of asset condition. In 2014 these scores were updated to reflect major maintenance and renovation projects accomplished in the year.
- **Strategic Plan —** PP&R's 2012–15 Strategic Plan includes Asset Management as one of six key strategic themes. Five initiatives are aimed at adapting best practices to the widely diverse portfolio of public parks, recreation and natural area assets.
- **Bureau Structure —** Four existing positions, previously partially involved in asset management, have been wholly dedicated to the Asset Management program. The program manager reports directly to the Senior Manager for Planning, Development and Asset Management. A new position focused on facilities condition inspections has been approved and is in the HR hiring process.

Asset Management Approach

- All PP&R assets, both built and natural, that are owned and managed by PP&R are accounted for in six asset class groups: Amenities, Buildings/Pools, Recreation Features, Utilities, Circulation, and Green Infrastructure. All major assets are identified in PP&R's Geographic Information System (GIS). Work continues to add all assets to the GIS and CADD systems, as well as keep up with changes on the ground.
- Asset Management practices and principles are used to coordinate asset data, develop accurate asset inventories and produce up-to-date reports. Accurate AM data coupled with statistically valid information on customer needs and desires allows PP&R to make informed decisions about the assets needed to provide specific services.
- PP&R's AM program continues to help implement Parks 2020 Vision by ensuring the provision of high-quality facilities, providing for long-range capital needs and developing best management practices. It allows PP&R to fulfill a major part of its mission of developing and maintaining excellent facilities and places for public recreation.
- Initial work focused on the more heavily used facilities and on the basic elements that provide good visitor experiences. Current efforts expand inventory and condition assessments to parks and natural areas circulation systems and infrastructure.

Uses of Asset Management

AM information is utilized in preparing PP&R's capital plans and budgets, developing consistent maintenance and operations regimes, fulfilling City and federal reporting requirements, informing system planning, and supporting financial forecasting. Applying asset management principles and practices helps prioritize capital projects and allocate scarce resources.

As asset management continues to be integrated into PP&R management practices, PP&R is better able to determine acquisition and capital improvement needs, provide appropriate levels of maintenance, and determine which assets to acquire and which to dispose of in order to develop a stable asset portfolio that meets service needs.

Asset Management Practices

- Current efforts focus on improving the inventory, attribution and condition of circulation systems and utilities infrastructure. Buildings and playgrounds have been inventoried and are assessed regularly. A new green infrastructure, natural area condition methodology has been developed, and PP&R intends to continue updating the condition using the new methodology. Marine facilities, docks and ramps have been assessed and are included in a longer-term rotation. PP&R has developed an inspection and condition assessment work plan intended to bring new assets into the condition assessment rotation.
- For many assets, PP&R has completed the initial inventory and condition assessments and is in the process of inspecting 20 percent of all assets each year. A special project to verify construction and condition of some 240 bridges will occur in 2014. Bridges in PP&R range from railroad trestle bridges on the Springwater Corridor Trail to small foot bridges on footpaths in natural areas. Due to the wide variety of asset types, PP&R will continue to pursue a blended approach of ongoing inspections and special assessment projects.
- PP&R is pursuing a lean approach to developing and implementing asset management. A small staff team is developing and implementing best practices system-wide, working in collaboration with parks, recreation facilities, and natural areas maintenance staff.

Asset Value and Condition

The overall replacement value of PP&R's assets increased from $1.02 billion in 2012 to $1.3 billion in 2014. A new methodology, three years in development, was implemented in 2014. This methodology applies updated unit replacement costs to comprehensive asset inventories across all asset classes. The older methodology if applied to 2014 assets would have produced an overall replacement value of $1.05 billion. Thus an increase of $258 M in overall replacement value is due to the methodology change. Current Replacement Values include overhead and other soft costs, e.g. engineering and permits that are also capitalized.

Overall condition improved slightly from 2013 to 2014. More asset classes are included in the report than in prior years, mostly stemming from the Asset Risk Profiles project. This project delivered an overview of the risk exposure of most asset classes in PP&R. Thus the percentage of TBD dropped from 44 percent to 32 percent of assets. Improvement in condition is primarily attributable to newly included asset classes in better overall condition than the whole base. Facilities inspections focused on smaller buildings in 2014, and many of these are older with components in poorer condition. As with last year, when scaled by replacement value, the condition of high value assets — such as community centers and pools — fell slightly.

Annual Funding Gap

PP&R has a total capital annual funding need of $72.1 million for each of the next 10 years. This includes $47.7 million for expanding the system to provide standard levels of service for all residents, in addition to $24.4 million in funding needed to maintain existing assets. The funding need calculations are based on the 1-to-10-year list of all identified PP&R projects, less identified and secured funding.

Passage of the Parks Replacement Bond dedicates $68 million to repair or replacement of current assets that are at risk of failure or have already failed. This reduces the Annual Funding Gap by $6.8 million over the 10 year horizon.

Additionally, City Council has been able to provide about $1.5 million annually to address some of the most urgent needs for repair, rehab and replacement and mandated work. This major maintenance commitment has increased by $500 thousand from prior years through new commitments from City Council and recognition of existing ongoing resources traditionally dedicated to major maintenance projects.

Parks system capacity, meaning addressing growth, represents two-thirds of the Annual Funding Gap. Realization of these projects would mean more and improved parks, community centers, aquatics facilities, trails, and natural areas. Some areas of the City are underserved, notably neighborhoods east of I-205. However, there are neighborhoods that are not within one-half mile of a park or natural area throughout the city (one of PP&R's key Level of Service targets).

The economic recovery has delivered a significant increase in System Development Charges flowing to PP&R. The forecast for SDC funds, plus grants and donations has been increased to $8 million annually. These funds are dedicated to addressing new growth and therefore the Capacity component of the Annual Funding Gap grew less than expected.

Maintaining existing assets in good condition requires regular repair and replacement, which depends on sufficient regular funding. The recommended standard for reinvestment needed to maintain building assets in good condition is from 2 percent to 4 percent of the asset's current replacement value (CRV). In 2014, PP&R invested 2.0 percent of CRV, just at the lower threshold (based on calculation of major building and pool reinvestment only). This indicator should improve markedly during the years that the Parks Replacement Bond funds are invested in building and pool renovations.

Asset Management Improvement Priorities

The 2012–15 Strategic Plan includes asset management as one of six strategic themes. Five initiatives outline the bureau's priorities over the next three years, as follows below:

- Establish levels of service by asset classes.
- Assess condition of assets to determine remaining useful life.
- Develop asset risk profiles.
- Prepare asset management plans.
- Develop funding strategies for capital improvements.

Calculation Methodologies

Replacement Value

PP&R calculates the replacement value for its assets by estimating the installed cost to replace the asset in kind, without increasing its size or changing its functionality, but bringing it up to current code. As PP&R expands and improves its asset management program, more specific valuations are being gathered for all assets. Where specific information is not available, general estimates of the value of all assets are provided, albeit with varying levels of confidence.

Method of Asset Replacement Value Calculation	
Asset Group	**Method**
Amenities	Per each for assets such as benches, tables, drinking fountains, etc.
Buildings and Pools	Square foot costs per type of facility.
Recreation Features	Square foot costs or per each.
Built Infrastructure	Lineal feet by asset type.
Green Infrastructure	Per acre or square foot.

Current Condition

Condition is primarily determined by visual inspections and tests unless the asset is hidden from view. In those cases, previous experience or manufacturer's recommended replacement dates are used to estimate condition and remaining life. Additional testing may be required in some cases.

Method of Asset Condition Assessment		
Asset Group	**Method**	**Status**
Amenities	Visual inspection	Furnishings in developed parks are complete; furnishings in natural areas are in process.
Buildings and Pools	Visual inspection and/or remaining life	Major and minor building assessments complete and ongoing.
Recreation Features	Visual inspection	Assessments for most recreation features have been completed. Ongoing assessments are in place for certain assets, but need to be developed for many others.
Built Infrastructure	Visual inspection and remaining life	Roads and parking lots have been inventoried and assessed; many regional trails have been assessed; paths and walks in developed parks need to be assessed; utilities have been inventoried but few have been assessed.
Green Infrastructure	Visual inspection	Natural Area green infrastructure were inventoried and assessed in 2010.

PP&R is updating its annual asset inspection program to determine the condition of all assets and aims to inspect 20 percent of all critical assets each year. All assets will be inspected at least once every five years and more often in the cases of pools and play equipment or other items that require more oversight and maintenance. PP&R is working to add asset classes to the Asset Management Program each year.

Annual Funding Gap

PP&R identifies capital needs for the next 20 years on its Capital Improvement Project (CIP) list. The PP&R funding gap represents the difference between the anticipated annual revenue PP&R receives for CIP projects and the cost it would take to complete all the projects within the first 10 years of the 20 year CIP list, annualized over ten years. In 2014, identified funding includes the Parks Replacement Bond of $68 million.

PP&R tracks four categories of projects on its CIP list. Preserve (repair, rehabilitate, and replace) and Efficiency (projects that improve the cost effectiveness of maintaining and operating assets) are combined into the R/R/R category for the citywide report. Safety (projects needed to bring existing assets up to current codes and meet mandates such as ADA) is reported as Mandate. Growth (projects that expand the system and are needed to meet level of service targets for all customers) is reported as Capacity. Examples of Capacity projects include developing new parks, new community centers, and new trails, or building new features in parks, like new spray play features or skate parks in neighborhoods where current levels of service are below PP&R standards.

F. Civic

Profile

Asset Management Approach

The Civic Asset's AM program includes two asset groups: Facilities and Technology. The Facilities group includes facilities managed by the Office of Management and Finance (Police facilities, office buildings, other buildings, Union Station, and spectator facilities) and facilities other organizations manage (fire facilities, fire apparatus and Portland Center for the Performing Arts). The Technology group includes the technology assets that OMF owns and manages through its Bureau of Technology Services and the Enterprise Business System owned and managed by Enterprise Business Solution division.

OMF takes the lead for the Civic Assets group. In 2014, fire apparatus was added to Facilities.

Asset Management serves as the basis for documenting the physical and financial status of these assets, coordinating asset data, developing accurate asset inventories and producing up-to-date reports and maintenance plans. Accurate AM data allows OMF and other organizations to make informed decisions about assets. The annual and one-time funding gaps are the main indicators of financial status of these assets.

Uses of Asset Management

OMF uses AM information to prepare its capital planning and budgets; develop consistent maintenance, operations, and replacement programs; fulfill City and other reporting requirements, and support financial forecasting. Applying asset management principles and practices helps to prioritize projects and allocate scarce resources.

Annual Update

A key component of the OMF Asset Management program for Facilities is the preparation of five-year maintenance plans. These plans are developed with input from internal and external customers, as well as staff who maintain the infrastructure, and are influenced by City Council's established goals, objectives, and policies. A final step is balancing needs with resources. OMF works closely with its customers to understand their businesses and how their facilities support and serve their work objectives.

A key component of the OMF Asset Management program for Technology Services is the preparation of five-year maintenance and replacement plans. These plans are produced by BTS staff responsible for AM and are reviewed and refined by a management review group. Priority is given to items that support public safety, improve reliability and availability of critical data systems and improve efficiency and reduce costs through the consolidation of infrastructure.

Over the last several years the City has invested in the replacement of large Civic assets. These investments include the replacement of the IBIS financial system with the SAP enterprise business solution, the replacement of the Police property warehouse, and the replacement of the Auditor's archives center. Additionally, a combination of General Fund resources approved by the Council and General Obligation (GO) bonds approved by voters in November 2010 fully funds the Public Safety Systems Revitalization Project that replaced Computer Aided Dispatch in April 2011 and will replace the Portland Police Data System and the 800 MHz radio system.

However, other Civic Assets continue to have large annual and one-time funding gaps for major maintenance.

Fire Facilities and Apparatus— Voters approved a GO bond measure in November of 1998 to rehabilitate, relocate, and construct new City fire stations. The program addressed deferred maintenance in addition to addressing seismic requirements and program changes within Fire & Rescue. The program was completed in FY 2012-13. An additional GO bond measure approved by voters in November 2010 provides for funding of the replacement of a fire station in inner SE on the Willamette River. This project was completed in FY 2014-15.

Fire & Rescue has regular maintenance supplies and services budgets for these facilities of approximately $700,000 annually, of which $250,000 is for major maintenance or replacement projects. However, without identifying major maintenance funding, Fire & Rescue may not have sufficient funding for scheduled building system maintenance, such as roof replacements, overhead door refurbishment, and parking lot and driveway repaving. Without these upgrades, in 20-30 years the City will find itself in the same position as in 1998 when there was too much deferred maintenance

to fund and the buildings had not been modified for the changing needs of the bureau. Funding for major maintenance of fire facilities should be set aside each budget year, as is done for Police facilities and office buildings.

In addition to facilities, Fire & Rescue must procure and maintain rescue apparatus such as engines, trucks, and fireboats. The replacement cost of major frontline apparatus ranges from $500,000 to $1.2 million. These capital assets, however, have not been included in the replacement value and funding gap calculations in previous versions of the Citywide Assets Report. The major frontline apparatus have been added to this year's report because they are a vital asset class in performing Fire & Rescue's mission and are managed in largely the same way as their facilities. For example, given the large cost of an individual apparatus, they require the same level of planning, financing, and maintenance as Fire & Rescue's facilities. As a result, combining facilities and apparatus provides a more complete view of planning and costs necessary to maintain their infrastructure.

The 2010 GO bond measure also includes $19.8 million for fire apparatus replacement. Through 2015-16, apparatus replacement is funded by the GO bond, which is scheduled to replace 27 frontline apparatus. Apparatus replacement will have to be funded through General Fund discretionary resources thereafter. PF&R maintains a 15-year apparatus replacement plan, which calls for replacement of all frontline fire engines and trucks after 15 years or 120,000 miles. Once an apparatus reaches these thresholds, it is rotated into reserve status for a period of at least five years. Fire apparatus maintenance is included in PF&R's General Fund operating budget.

Facilities Services — Through its rental rates, Facilities Services collects major maintenance money for office buildings (Portland Building, City Hall, and 1900 Building), Police facilities, maintenance facilities, the Portland Communications Center, the Archives and Records Center and the new Emergency Coordinations Center. Major maintenance money is also carved out from net income of Union Station to fund major maintenance projects at that facility.

While the industry standard, and OMF's goal, for facility maintenance is to reinvest three percent of a building's current replacement value each year, OMF is currently only able to reinvest about 1.2 percent. This level of reinvestment has declined in recent years. Reasons for the decrease are rapidly escalating costs to replace buildings (over regular inflation), the increase in the number of new facilities, and only increasing the major maintenance component of rental rates at the level of regular inflation.

This 1.2 percent reinvestment level does not allow OMF to cover needs in the five-year horizon, and projects are having to be pushed to the out years. However, this is not severe enough that over the 10-year period of FY 2014-15 to FY 2024-25 overall conditions are not expected to decrease from the very broad categories of good, fair, and poor. Contributing to this is the relative low age of these facilities and the recent renovation of some facilities. However, when large major maintenance needs come due in 20 to 30 years, asset conditions will decline.

Funding for major maintenance should be increased by directing savings from efficiencies identified to major maintenance until the 3 percent goal is achieved.

The City has recently addressed one of its poorest rated facilities by replacing it. The City's archives center moved from an old building in Chimney Park to a newly constructed building on the PSU campus.

For all facilities, except spectator facilities and Union Station, the funding gap is the annual difference between what is collected in rental rates, or set aside from net income, for major maintenance and the industry standard of 3 percent of replacement value. For spectator facilities and Union Station, the gap is the one-time difference between actual fund reserves for capital maintenance and costs to upgrade Memorial Coliseum and Union Station to address deferred maintenance.

Union Station has received grants to assist in maintaining the asset. These monies have been used mainly for the roof, which is the most pressing need. Grants are this facility's best resource for addressing maintenance needs.

The Portland Building provides office space for approximately 1,300 City employees, as well as retail space and office space for other agencies. Since its completion, the building's exterior envelope has presented numerous and chronic problems with water infiltration. In addition, an assessment conducted in 2013, it was determined that the building structure would perform poorly in a wide range of seismic events.

Some envelope issues have been identified and resolved during previous repairs, but ongoing repairs are not sustainable or practical, and will not work to address some of the structural issues. The Portland Building is also considered a historic building and on the National Register of Historic Places, which means additional

requirements for addressing the building's issues. In FY 2015-16 OMF will use $3,750,000 of major maintenance monies to fund design and cost estimating services through the construction documents phase for an exterior, interior and structural improvements project. This work will provide detailed and necessary direction on how best to design and construct needed repairs to the Portland Building, with utilization of a construction contractor to identify cost efficient construction phasing and methodology that will have the least impact on business operations of tenants in the Portland Building. It will provide information needed to develop a full financing package.

OMF has confidence in this assessment. It is based on a complete inventory of buildings. The conditions are assessed based on visual inspection by qualified personnel on a regular schedule.

Fleet Services Fueling Stations — This program is being added to this report because the City has a significant asset infrastructure set up for fueling City vehicles at locations throughout the City, and will be adding two new sites. The Council recently approved a funding plan to replace five of these stations and construct the two new stations. But, funding for these assets future replacement does not exist.

Spectator Facilities — This program includes Veterans Memorial Coliseum, the Rose Quarter parking garages, and Jeld-Wen Field. This program is managed by OMF and operated by contractors.

Portland 5 Center for the Arts (formerly Portland Center for the Performing Arts) — This complex includes the Keller Auditorium, Arlene Schnitzer Concert Hall, and the Antoinette Hatfield Hall. The City owns these assets and through an intergovernmental agreement Metro/MERC manages, operates and maintains them. The replacement values of these three assets are included, but the City has limited information on their status. OMF has made progress working with Metro/MERC to provide more City oversight to these assets and will continue to make progress. Next steps include identifying long term capital needs of the facilities.

Technology Services — Establishing replacement values, current conditions, and funding gaps for technology infrastructure requires a different approach than for facilities infrastructure. Unlike buildings, technology infrastructure can quickly become unusable. This is primarily due to the short lives/quick obsolescence and the critical need to stay current with technologies that may not be supported by vendors in the future and render the technology unusable. Below is a discussion of the unique nature of BTS infrastructure replacement values, conditions and funding gaps.

OMF has high confidence in these assessments,.

OMF has established a multi-bureau committee to address the replacement of major Public Safety technology systems including the 800 MHz radio system, BOEC CAD, and Portland Police Data System. This work, called the Public Safety Systems Revitalization Project (PSSRP), addresses funding, governance, coordination, timing, and other issues related to the replacement of these major systems. Replacement values of these systems are based on project budgets or actual costs incurred for completed projects.

As part of prior budget processes the Council authorized a mix of debt and cash financing for the PSSRP. This and GO bonds approved by voters in November 2010 fully fund the program.

800 MHz Radio System — Core System — The 800 MHz system will be replaced by FY 2016-17. The system has to be replaced. Motorola, the system's vendor, will not provide support to it, as technology is becoming obsolete. The underlying component chips are old, it is an analog system, and Motorola is focusing on digital systems.

800 MHz Radio System — Devices — Just as the core system has to be replaced, the system's devices which use the system have to be replaced and will be as part of the system replacement project.

CAD and PPDS — A replacement for the CAD system was completed in April 2011. The PPDS system will be replaced prior to FY 2015-16.

Communications — Integrated Regional Networking Enterprise (IRNE): Assets in this group include the City's telephone switch, sonnet gear, and software. The replacement value listed does not include the fiber provided to the City as part of franchise agreements and partnerships.

Production Services — Assets in Production Services include storage area networks (SAN), data networks, email system, and core servers. This infrastructure has a life of five to eight years.

Strategic Technologies — Corporate Applications — Corporate applications include GIS, TRACS, CAD, PPDS, and CIS. CAD and PPDS are discussed above as part of the PSSRP.

BTS has limited funding for major maintenance and replacement of its assets in FY 2014-15 and expects to increase the level of funding in the FY 2015-16 budget. Currently no replacement funding is collected on 800 MHz radio system devices. Sustaining the major maintenance funding and reinstituting replacement funding on 800 MHz radio system devices will continue to be a significant issue for BTS and the City.

EBS Services: This asset grouping includes the City's enterprise business system implemented to replace IBIS and numerous other information systems. Plans call for the asset to be continually improved and expanded in functionality.

Asset Management Improvement Priorities

OMF has identified the following asset management improvement priorities:

- Improving data (particularly condition and tracking of maintenance activities).
- Improving data integration.
- Completing system-wide asset management plans.
- Evaluating service delivery.
- Improving coordination of AM activities.
- Improving staff AM knowledge.

Calculation Methodologies

Methods for civic assets fit into two categories: Facilities and Technology.

Facilities

Replacement Value

Replacement values are based on the size of facilities, the type of facility, and costs per square foot to construct that type of facility. To this are added percentage mark ups for indirect costs, including overheads or in cases of new facilities, actual cost incurred are used.

Condition

Condition assessment is based on an inventory of buildings. Conditions are assessed based on visual inspection by qualified personnel on a regular schedule and are expressed as a percentage of assets in each rating category. Condition ratings for the Portland Center for the Performing Arts have not been determined at this time.

Annual Funding Gap

For all facilities, except spectator facilities and Union Station, the funding gap is the annual difference between what is collected in rental rates, or set aside from net income, for major maintenance and the industry standard of 3 percent of replacement value. Current funding at 1.2 percent of replacement value will not allow relative condition (percentage in good, fair, and poor condition) to be maintained.

Due to the level of deferred maintenance at Veteran's Memorial Coliseum, the spectator facilities funding gap is the one-time difference between actual fund reserves for capital maintenance and the costs to upgrade Veteran's Memorial Coliseum. OMF is conducting a comprehensive review of the facility to identify all of the facility's capital needs. Union Station has a similar one-time funding gap based on unfunded deferred maintenance. Unmet needs for the Portland 5 Center for the Arts are not included in the total.

Technology

Establishing replacement values, current conditions, and funding gaps for technology infrastructure requires a different approach than for facilities infrastructure. Unlike buildings, technology infrastructure can quickly become unusable. This is primarily due to the short lives/quick obsolescence and the critical need to stay current with technologies that may not be supported by vendors in the future and render the technology unusable. Additionally, some technology assets require funding of their replacement and their major maintenance during their life.

Replacement Value

The replacement value assessment is based on recently completed projects and the experience of other governments, but we have not had an opportunity to analyze their experiences to assess the degree of similarity. These values include indirect costs for engineering and other professional services, but do not include indirect costs for City overheads.

Condition

Condition ratings for Technology assets are based on current age and expected useful life. Condition is expressed as a percentage of assets. Systems considered to be obsolete are included in the poor condition rating.

Annual Funding Gap

The funding gap includes annual funding necessary to meet industry standards for major maintenance; and annual needs to ensure replacement and upgrades of technology on accepted schedules.

5. Asset Management Practices and Process

Asset management is an industry standard that provides a risk mitigation approach to decision making. It is commonly defined as meeting agreed upon customer and environmental service levels, while minimizing life cycle costs at an acceptable level of risk.

At present, bureaus apply elements of AM best practices customized to meet each bureau's unique needs. The City Asset Managers Group (CAMG) continues to prepare the annual Citywide Asset Report, and works to identify key measures, define terms, and collect and display each year's data.

A. History and Progress

For over 20 years, individual City bureaus have initiated components of Asset Management. Five of Portland's infrastructure bureaus — Transportation (PBOT), Water (PWB), Environmental Services (BES), Parks & Recreation (PP&R), and Management and Finance (OMF) — apply AM principles to some of their practices. Separately, the Office of Housing Policy and Portland Development Commission (PDC) track affordable housing units. Unlike the five infrastructure bureaus, the City does not own most affordable housing units in the city.

Ten years ago, the AM focus began to broaden to a citywide focus. At that point, infrastructure bureaus began to prepare an annual citywide report on assets. These reports are presented annually to the Planning and Development Directors' group, which represents infrastructure, development permitting, financial and planning bureaus. The Directors' group oversees policies and resource allocation, coordinates long-range planning, and manages certain cross-bureau planning and development initiatives. After reviewing findings of the annual report, the Directors' group provides recommendations to City Council. Each AM report is presented to the City Council at the start of annual budget work sessions.

Although the City's infrastructure bureaus started with, and continue to use, different AM strategies, bureaus collaborate actively with the long-term goal of improving AM practices citywide. As such, bureaus use common definitions and terminology but apply techniques consistent with their bureau's structure and the unique needs of their assets.

The following timeline identifies major milestones in the development of citywide asset management within the city.

2002
The Auditor, City Commissioners and bureau directors completed a strategic exercise, Managing for Results. They identified seven priority issues and flagged five of them for immediate action. One of the priority issues was aging physical infrastructure.

2003–2004
Asset managers from the City's infrastructure bureaus formed a City Capital Maintenance Committee to collaborate on AM issues and prepare an annual report on the City's physical assets. Their reports to City Council in 2003 and 2004 focused on the current and projected condition of infrastructure, not on the strategies needed to manage assets over their whole life. Efforts to describe assets and needs varied from bureau to bureau as did confidence in the information. This made it difficult for City Council to make decisions using that information.

A special feature of the 2003 report was to identify potential funding sources to bridge Portland's maintenance funding gap. It used a matrix format, based on a January 2001 analysis of potential transportation revenue options (prepared by PBOT).

2005
The committee became the City Asset Managers Group (CAMG), adopting a more holistic approach to AM and looking for ways to collaborate on common AM issues. While Transportation had an existing program of AM, other bureaus were just beginning to adopt AM principles and techniques. By joining forces, the CAMG identified common long-term AM needs and helped frame AM throughout the City using a consistent approach.

In the FY 2005–06 budget process, City Commissioners asked for better data on the funding gap in capital maintenance. There were questions about the quality and completeness of the data, and doubts about bureaus' stated funding needs. To address Council's concerns and to reflect the current state of City asset management, the 2005 report added three features: common definitions for basic asset management terms, data confidence levels, and bureau observations on their asset management activities.

2006
The 2006 report added affordable housing as an asset category. For purposes of this report, affordable housing was defined as multi-family rental housing units with direct City investment (leveraged financing) and a regulatory agreement with the Portland Development Commission.

2007
The 2007 report included a pilot of risk analysis and a framework for the inclusion of green infrastructure. BES reported on some green infrastructure.

2008
To assess current capacity and interest in improving AM best practices, Transportation, Water, Environmental Services, and PP&R completed a survey, prepared by the Bureau of Planning. Generally, the survey found that the participating infrastructure bureaus have initiated elements of AM best practices, with each bureau taking a different approach. The survey identified five priority AM best practices areas for further exploration: data collection and management, service levels, asset management plans, risk management, and business case. The 2008 report introduced these AM best practices and reported on bureaus' current and potential capacities to adopt them.

2009
In 2008, the CAMG retained an outside consultant to assess the use of asset management best practices to optimize City investments in infrastructure. The assessment included research on high-performing peer communities in North America and established recommendations for a sequence of AM best practices. These recommended best practices were used as a basis for development of a citywide asset management work plan for 2010–2014, included in the 2009 report.

2010
The CAMG updated its work plan (see below) and edited definitions for annual funding need. Both actions respond to recommendations of the Planning and Development Directors in the 2010 City Assets Report.

2011
In 2011, the CAMG featured service level examples, from four City bureaus:

- **Transportation** showed service levels for thirteen transportation asset classes (from PBOT's Infrastructure Asset Report Card — 2010). The focus was on the maintenance of existing transportation infrastructure. Its purpose was to develop and implement levels of service for each asset class to track and monitor performance and outcomes achieved.
- **Environmental Services** showed service levels in seven action areas. It tied customer and technical service levels, based on customer core values and strategic outcomes.
- **Water** showed the status of eleven service level indicators, from Portland Water Bureau Strategic Plan 2008–2011. The Water Bureau has created key service levels (27) and programmatic service levels (40+).
- **PP&R** showed how performance measures track progress toward outcomes in its three year Strategic Plan. Each performance measure is linked to a target.

2012
This 2012 report separates out policy recommendations, distinguishes between data and business practices, and displays annual funding gap in more ways.

2013
The current report provides new data, using last year's structure. No changes were made to the shared work plan.

2014
At the Council Budget Work Session of April 2, 2014, a team of bureau directors presented Citywide Infrastructure and Investment Needs. On behalf of the Planning & Development Directors, the bureau directors proposed a budget note, with three parts:

- Review options to help pay for major maintenance of General Fund assets;
- Develop Major Maintenance policy and funding strategy that includes re-envisioning the General Fund Capital Set-Aside Fund; and
- Use Asset Management data, tools, best practices to inform and prioritize decisions about allocations.

The directors group sought to secure a more dependable, annual revenue stream to maintain, renew, rehab and replace parks, transportation and civic assets – including those of OMF, Fire & Rescue and Police. Specifically, the directors group asked for the opportunity to work with the Budget Office to propose a new and improved decision-making approach to the allocations of the Capital Set-Aside to help avoid some of the short-comings encountered previously. Asset Management can help identify and prioritize the most strategic projects.

With this context, the CAMG made two changes in the 2014 report:

- Some bureaus broke out Annual Funding Gap into one-time and recurring unmet funding needs (in bureau profiles).
- The Citywide AM work plan (next) was reorganized, to separate out process-related work tasks from content-related work tasks.

B. Citywide Asset Management Work Plan

Start up

In 2009, the City Asset Managers Group (CAM) developed a Citywide Asset Management Work Plan to guide asset management improvements between 2010 and 2014. The work plan was informed by the internal survey (completed in 2008–2009) and a review of peer communities (completed in 2009). This work laid a foundation for identifying the steps necessary to move the City towards more comprehensive asset management practices.

Between 2009 and 2013, four City bureaus participated in the work plan: Environmental Services, Water, Transportation and Parks & Recreation. In 2012, the CAMG realized that some tasks will take longer than the initial five years, and affirmed the importance of making continuous improvements. For the 2012 report, the CAMG outlined milestones for the tasks through the year 2019 (a second five-year interval).

How It Works

The CAMG anticipates that the work of individual bureaus will progress on varying timelines based on the status of current practice, resources, and relative priorities. As many of these best practices are interdependent, the CAMG recognizes that achieving the goals outlined in the work plan will require continuous and iterative improvements.

Each bureau director is tasked to implement the bureau's core mission, goals and values, along with the City Charter, state and federal mandates, and community priorities. AM offers a framework and tools to examine and address infrastructure needs to help meet this charge. As asset management improves across the bureaus, so will the ability of City Council, bureau managers, and citizens to make informed decisions about asset-related services.

However, advances in AM practice are not accomplished overnight. Each bureau encounters a unique set of challenges and barriers to implementing AM best practice. Bureaus are constrained by budget and resources, limitations in data and data management systems, and other commitments and priorities.

To meet these challenges, the work plan relies on the CAMG to continue to share information and mentor each other to build AM capacity and expertise citywide. The work plan assumes a phased implementation of AM improvements, with flexibility to meet the needs and capacities of each bureau. The CAMG will report to the Planning and Development Directors.

The CAMG plans to apply these best practices to all assets in the future. However, due to limited resources and breadth of this work plan, many tasks focus initially on highest risk assets. The CAMG will report on progress in each of these tasks annually through the Citywide Assets Report and through updates to the Planning and Development Directors.

This work plan lays out general approaches and timelines for cross-bureau work. During this initial period, the work plan identified seven advanced asset management best practices:

- Service levels.
- Risk management.
- Report cards.
- Business case.
- Reliability-centered maintenance.
- Long-term investment profiles.
- Community information and consultation.

2014 Update

Work Plan Shift

In 2014, the CAMG shifted the process-related work tasks (#3 report card, and #7 community information and consultation) into the work plan context section of this report. This leaves five content-related work tasks:

- Task 1: Service levels
- Task 2: Risk management
- Task 3: Business case
- Task 4: Reliability-centered maintenance
- Task 5: Long-term investment profiles

In 2014, several bureaus in the CAMG took a Survey of Progress on Asset Management Best Practices. The survey is adapted from an EPA survey, and captures a bureau's challenges, innovations and progress in advancing the best practices. In future years, participating bureaus will be invited to take the survey. Each year, bureaus can opt to take the survey.

The survey covers both parts of this report — data and best practices.

Report Card

Report cards are a clear and uniform metric (e.g., a letter grade) to indicate the health of the City's infrastructure and bureau's business practices. The metric could combine various measures, including the condition of assets; the degree to which customer requirements (i.e., service levels) are being met; the quality of the information and practices in place for maintaining the assets over their lifecycle; and the degree to which funding is available for lifecycle management of the assets.

Report cards can display the current and projected status of assets, identify trends and issues, and track the City's path to sustainability. The report card will be highly graphic, and may take the form of a dashboard of selected data.

Report cards serve to educate the public, inform City decisions (operations, budget, etc.) and track progress over time. For content, the report card could address asset condition, achievement of levels of service, AM business practices, and/or levels of unmet need.

In the 2011 City of Portland Citywide Assets Report, several bureaus provided service level examples. For instance, PBOT provided a highly visual transportation maintenance report card. Each transportation asset group was compared against a defined target, with scores displayed over consecutive years. Other bureau report cards include:

- Customer and technical service levels (BES)
- Service level progress report and budget report (Water)
- Organizational performance report (PP&R)

Purpose of Best Practices Survey

Six years ago, five City bureaus (CAMG members) took a survey on asset management best practices. Surveys can capture a snapshot of performance levels across varied infrastructure providers, and help to identify next steps. Using the survey results, the CAMG created the shared work plan of AM best practices. Participating bureaus track progress over time, on seven work tasks.

In early 2014, the CAMG decided to overhaul the shared work plan. The Water Bureau brought to the CAMG's attention a survey tool prepared by the US Environmental Protection Agency (EPA), for use by

infrastructure agencies. In Fall 2014, the CAMG chose to take the best practices survey, and added three narrative questions — inviting bureaus to describe challenges, progress and innovation. As with the first CAMG survey, bureau assess themselves. This section discusses survey results, in the form of findings and a report card. The report card is an initial effort, and expected to evolve over time.

The CAMG intends to take this survey each fall, as a tool to track performance and inform the citywide AM work plan.

Best Practices Survey Results

BPS received responses from all five asset groups (PBOT, Water, BES, PP&R and Civic). OMF and Fire & Rescue participated for the Civic asset group.

- Water and BES had similar scores (107 and 110 points, respectively; out of a possible 150 points). For Civic, Fire & Rescue scored relatively higher than other civic facilities and technology. This is the CAMG's first year of taking the survey. No attempt has been made to normalize bureau scores.
- In Challenges, Water and BES cited the need to engage their customers to discuss service levels. This is Task #7, Community Information and Consultation, from prior year CAMG work plans. Another Water challenge is to implement recommendations from AM plans and to complete some data management tasks. BES seeks to develop and implement a more comprehensive AM program that covers finance, operations, customer service in addition to the CIP program that is already well addressed.
- In Progress, Water is completing another set of AM plans, is evaluating the risks of asset failure, and are performing condition assessment and evaluating the likelihood of failure on some their highest risk pipes. Water is recognized nationally for its work on AM plans and pipe risk management. BES has made progress in enhanced risk-based evaluation and decision-making for CIP projects during planning and design phases. BES is developing AM operations and maintenance methods for the treatment plant based on Reliability-Centered Maintenance techniques.
- As to Innovation, Water cites its approach to estimating the consequence of failure of some water pipe crossings of highways and railroads. BES developed a risk-based Equity Lens to review the distribution of CIP projects across the community.

Community Involvement

The CAMG recognizes the importance of communicating with the public, especially in setting and refining service levels, understanding funding levels and gaps, and how asset management informs investments (build, operate, maintain and replace assets).

It is necessary to identify appropriate service levels, based on community needs, costs, and ability to pay. In addition, outreach and information can help broaden the base of support for revenues needed to adequately maintain the City's infrastructure systems.

Objectives are to:

- Inform the public about the state of the City's assets and to improve the public's understanding of the City's asset management program and needs.
- Involve the public at key decision points, including establishing service levels.

Typically, bureaus engage the public in bureau budget advisory committees. Bureaus may also hold service level-related meetings, conduct public surveys and convene focus groups.

All four bureaus will continue to consult with public members on their budget advisory committees, to help identify investment priorities. The CAMG anticipates that improvements in reporting and information to the public will improve as the tasks of this work plan are completed. However, the CAMG believes that it is particularly critical to have informed community conversations regarding desired levels of service, the cost of providing such service, and resulting investment priorities.

In particular, development of a report card with tangible performance measures can help the City better describe asset needs to the community.

The CAMG also prepares a high level brochure, Portland's Infrastructure Investments. The brochure is updated with data and findings from the annual citywide assets reports.

Work Tasks

A summary chart and report card follow a profile of the five work plan tasks. Service levels (Task #1) and risk mitigation (Task #2) interact directly with funding levels.

Task #1: Service Levels

Definition Service levels establish measurable goals against which actual achievement can be compared. Service levels set expectations for what service to provide, in what quantities, and how often. Service levels are most useful in a long term perspective (sustainable). There are internal and external service level targets. Service levels may address reliability, quality, quantity, and safety. AM planning allows bureaus to set service levels and cost of service. Both can be evaluated with customers and regulators to set the optimum service level they are prepared to support.

Goal To develop meaningful and measurable service levels based on system needs that match the expectations of customers to guide funding and investment decisions.

Desired Outcomes The four participating CAMG bureaus will have established tangible service levels or performance measures, with targets consistent with industry peers. Each bureau will use service levels to bridge its organizational strategies to its tactical assets. Progress in service level work is reported in the annual city asset reports.

Approach For CAMG bureaus without refined service levels, research and information-sharing will help identify what service level changes they need. Bureau service levels will be developed or refined, in combination with appropriate community consultation. Any established service levels will be adopted as a component of the Citywide Systems Plan. Further refinement of service levels will occur over time, as needed.

Interrelationships Defining service levels for assets sets a foundation for all of the remaining work plan tasks.

2014 Status Currently, bureaus have capacity to measure and track a limited number of actual levels of service.

Environmental Services BES has developed a draft Level of Service document, and will test and adjust service levels as needed. Benchmarks and performance measures are in progress. BES has 44 service levels (a mix of system and maintenance). There is no formal process to adopt the service levels.

Water PWB has created two tiers of service levels: 27 key service levels and more than 40 programmatic service levels. The bureau also has workload measures in each budget program that supports specific service levels. In FY 2013–14, the bureau met 20 of its 27 service levels.

Transportation PBOT has developed service levels for infrastructure maintenance. These are reported in the Transportation Asset Report Card.

Parks & Recreation Parks 2020 Vision establishes broad levels of service for parks, trails, and recreation programs. Established performance measures report on progress toward Strategic Plan outcomes and service level targets. These provide additional management level of service targets. Linkages between broad levels of service to operational levels of service are in process.

Task #2: Risk Management

Definition Risk management provides a structure to assess and act on risk of assets failing to provide defined levels of service. It navigates degrees of uncertainty by identifying possible events, understanding their likely consequences and determining an appropriate response. Effective risk management relates asset failure to decisions to acquire, maintain and renew assets.

Goal To identify assets most critical to achieving sustained performance of agreed service levels. In more advanced stages, bureaus will use risk data to prioritize resources and collaborate with other bureaus to identify collateral risks to other public assets.

Desired Outcomes The four participating CAMG bureaus have identified high-risk assets and have begun to prioritize monitoring and data collection within available resources.

Approach The CAMG has discussed risk management methodologies. The CAMG will look for opportunities to collaborate, such for interdependent assets. As appropriate, bureaus will identify high risk assets, improve data collection for these assets and apply mitigation strategies based on asset risk classification.

Interrelationships Data collected will inform Task #3: Report Card, Task #5: Reliability Centered Maintenance, and Task #6: Long Term Investment Profiles. Data will also inform the Citywide Systems Plan (part of the Proposed Draft 2035 Comprehensive Plan).

2014 Status Bureaus collect a variety of data on their assets, though the extent of and confidence in this data varies by bureau. Bureaus are making progress in identifying high risk assets, at least on some of their asset groups. Bureaus continue to encounter limited capacity to predict likely failure modes for assets and have not estimated the likelihood and consequences of asset failure.

Environmental Services The combined and sanitary sewer elements of the BES Systems Plan estimates the likelihood and consequence of failure and identifies projects with positive benefit/cost ratios for near term investment. The stormwater system plan is in progress. Building on watershed work, BES is in the process of identifying high risk assets of the stormwater system.

Water One of the Water Bureau's service levels is for risk. PWB has identified high risk assets through a process, Consequence Likelihood Evaluation Methodology. CLEM identifies assets/failure modes that may pose substantial risk to the bureau and a process to evaluate the risk and guidelines for action. Asset management plans for asset groups include a risk analysis of all assets. An evaluation of high consequence pipes is ongoing.

Transportation PBOT has an established risk approach for key infrastructure, including pavement and traffic signals. The risk assessment allows for improved prioritization of resources and management of risks.

Parks & Recreation PP&R completed a comprehensive review of risks to service delivery of all assets. The Asset Risk Profiles report provided a list of assets at high risk of failure to deliver levels of service. This report informed new capital projects to repair, rehabilitate or replace high risk assets. High risk assets are regularly inspected. Each year, the bureau will add new assets to the inspection program.

Task #3: Business Case Template

Definition A business case is an economic analysis tool used to evaluate alternative investment decisions in a systematic and logical manner. At the project level, a business case compares project alternatives — such as do-nothing or status quo — and uses the costs and benefits to help the bureau make decisions on the best use of financial resources. Business cases are also used at the program level to determine the best level/type of maintenance and operational strategies.

Goal To develop a framework or template to justify infrastructure improvements based on lifecycle costs, benefits, and impacts to the triple bottom line (economic, social and environmental factors).

Desired Outcomes The four participating CAMG bureaus will have developed a methodology and template for business case and piloted application of the template within their bureau, as appropriate.

Approach The CAMG will share information and research to build a foundational understanding of business case among bureaus. Bureaus will evaluate the applicability for their assets and practices and develop templates and application processes, as needed. Application of business case templates will be completed as appropriate for each bureau.

Interrelationships Application of business cases could impact project priorities in the annual budget process.

2014 Status Most bureaus evaluate multiple alternatives for significant asset investment decisions. Most bureaus consider life cycle costs to maintain and operate, and triple bottom line impacts (economic, social, and environmental).

Environmental Services BES has applied business case analysis to the collection system (sanitary and combined). All BES CIP projects must have a business case analysis. Formats vary by project. BES expects to create a business case template and application process within two years. BES has modified its project request form for capital projects (CIP) to better reflect business case criteria. The CIP project evaluation criteria have also been modified. One of the next steps will be to use the revised criteria to re-evaluate CIP projects in the 10-year plan.

Water The PWB uses a standardized business case approach that incorporates total life cycle costs with triple bottom line considerations. Business cases, mainly cost-benefit analysis, are used in investment decisions (CIP Planning).

Transportation PBOT has applied business cases to certain projects and proposals. There is a goal to incorporate into the budget development process, estimates of the full cost of infrastructure investments.

Parks & Recreation PP&R uses established criteria for capital investment decision-making. In the future, the bureau will develop business case analysis for specific project alternatives.

Task #4: Reliability-Centered Maintenance

Definition Reliability-centered maintenance is an approach to identify the optimal or safe minimum level of maintenance for assets. RCM includes identifying failure modes and maintenance tasks to address those failures before they occur, including preventative and predictive maintenance. An RCM investment strategy can form the basis for calculating a long-term investment profile for an asset type. Application of RCM is considered an advanced asset management best practice.

Goal To develop cost-effective maintenance programs for assets to address the main causes of failure and ensure assets continue to perform important functions.

Desired Outcomes The four participating CAMG bureaus will have identified appropriate maintenance strategies and schedules for high risk assets, based on RCM principles. Bureaus have begun to align maintenance practices as appropriate.

Approach Application of the reliability-centered approach will occur on a bureau determined basis.

Interrelationships RCM program should be based on performance measures and risk assessments. These steps should be completed for targeted assets before a full RCM program is developed. RCM should inform a bureau's long-term investment strategy.

2014 Status No collective progress reported.

Environmental Services BES documented RCM in response to CMOM (Capacity, Management, Operations, and Maintenance) regulations of the federal Clean Water Act. CMOM products were submitted by DEQ in 2013. RCM is already utilized for the treatment system.

Water PWB is working on reliability-centered maintenance (RCM) for some asset groups. There is an RCM key service level goal in place for the bureau. Many recurring work orders for preventive maintenance activities are in place.

Transportation PBOT utilizes infrastructure condition data, levels of service goals and risk of failure analysis to conduct the right treatment at the right time on the right asset. This is illustrated with the Pavement Management System that is used to guide where pavement preservation is applied to street segments.

Parks & Recreation PP&R's approach is asset-specific, focused on optimal operations and maintenance for each asset group.

Task #5: Long-Term Investment Profile

Definition Long-term investment profiles are projections of major maintenance, repair, and replacement needs by asset group based on set service levels over a long-term forecast. By developing long-term investment profiles, bureaus will be better equipped to define funding gaps and identify future needs to maintain a sustainable system.

Goal To project revenue needs for major maintenance, repair and replacement, by asset group, over a long-term forecast.

Desired Outcomes The four participating CAMG bureaus will have collected necessary data, developed tools and methodologies to project investment needs. As possible, bureaus will have identified long-term investment profiles for high risk assets.

Approach The CAMG will share information and research regarding long-term investment profiles. Bureaus will develop tools and methodologies to prepare investment profiles for their assets, as appropriate. Investment profiles will help bureaus determine the optimal mix of operations, maintenance and capital acquisition to achieve lowest long-term system costs.

Interrelationships Development of long-term investment profiles is dependent on setting service levels (Task 1: Service Levels) and on identifying maintenance needs (Task 5: Reliability Centered Maintenance). Work on long-term investment profiles may also inform the 20-year capital project list under development for the Citywide Systems Plan.

2014 Status In October 2014, the report *Closing the Major Maintenance and Asset Replacement Funding Gap* was delivered to City Council, responding to the FY 2014-15 budget not. Acknowledging that there is no single solution, the report recommends a five-point financial strategy to address the funding gap. It describes the need for ongoing funding of long-term predictable and recurring investments in existing assets as one of these key strategies. The CBO has requested bureaus to develop data supporting these periodic and recurring investment needs.

Environmental Services BES' work plan does not currently include development of 50-year investment profiles. BES has created remaining life models for pipes. This is complete for collection systems; it is in progress for the treatment plant.

Water PWB has projected the long-term replacement needs of many of its asset classes.

Transportation PBOT captures the unmet need that is needed to meet levels of services for asset condition. These needs have been articulated in the recent community conversation on the proposed Portland Street Fund. These needs are factored into the long term replacement strategy and short term maintenance budget needs.

Parks & Recreation PP&R is creating long-term investment profiles by asset group and will then create a PP&R composite profile. PP&R has completed 75-year investment profiles for community and arts centers and pools.

Survey Report Card

The following report card serves to summarize bureau responses for 2014, with an eye toward possible strategies that are tailored to a bureau's recent experiences, capabilities and needs. Responses can be tracked over time. The CAMG invites feedback from readers, on this first attempt to capture key messages in the City of Portland's asset management best practices.

Survey of Progress on Asset Management Best Practices

		Score by Section						
Asset Group		**Bureau Embraces AM**	**AM Data**	**Service Levels**	**Risk Mgmt.**	**Life Cycle Cost**	**Financing**	**Total**
CAMG Work Tasks, 2013 (details below)		**n/a**	**Chapter 4 and appendix**	**Tasks #1 and #7**	**Task #2**	**Tasks #4, #5 and #6**	**Task #6**	**Total**
PBOT		19	21	17	15	13	12	97
Water		17	19	16	20	16	19	107
BES		14	22	17	15	19	23	110
PP&R		10	15	16	16	8	12	77
Civic:	**Fire facilities**	9	15	17	8	10	9	68
	OMF facilities	6	9	7	2	4	9	37

Work Tasks from 2013 Citywide Assets Report

1. Service Levels
2. Risk Management
3. Infrastructure Report Card
4. Business Case Template
5. Reliability-Centered Maintenance
6. Long Term Investment Profile
7. Community Consultation and Information

The CAMG will refine and adapt the report card from feedback received on this report.

Progress on Previous Recommendations

In previous years, the Directors' group endorsed the following major recommendations for citywide AM practices. Progress on these recommendations is also noted below.

Recommendation	Progress Update	Status
1. Improve asset management practices.		
a. Continue with Whole-of-City Approach.	CAMG continues to implement	Ongoing
b. Review service levels and pursue community consultation.	As part of Portland Plan and Comprehensive Plan update, bureaus are encouraged to set or amend service levels. Each bureau determines its scope, pace and community consultation.	Varies by bureau
2. Report on asset status and condition.		
a. Continue annual reports and improvements.	This remains a CAMG priority.	Ongoing
b. Include and distinguish between repair/ rehabilitation/replacement, mandate, and capacity-related needs in the annual funding gap.	Starting in 2009, the annual report distinguishes between funding gaps for these various types of needs.	Ongoing
3. Prioritize infrastructure spending.		
a. Prepare strategies related to service levels, funding allocations, and management practices to align revenues with service levels.	This activity is detailed in the work plan, see Task #1 Service Levels, Task #6 Long Term Investment Profile, and Task #7 Community Consultation.	Future
b. Track local and regional discussions related to infrastructure financing.	Metro has evaluated infrastructure needs to accommodate projected growth of the region. PDC and the Water Bureau served on the project advisory committee. BPS collected and assembled data from City bureaus, for use in the Metro analysis. The City of Portland adopted Portland Plan and is updating the City's Comprehensive Plan. Both plans will guide long-term growth and development in Portland. The CAMG is tracking and involved with this process.	Ongoing
c. Develop a funding strategy to shrink the unmet budget needs for infrastructure maintenance.	Bureaus are individually addressing infrastructure maintenance in the context of available budgets.	Fall 2014 BMP
4. Integrate with related planning efforts.		
a. Integrate Asset Management into other planning efforts, including community visioning, strategic planning, and long term capital planning.	Asset management will be a key component of the Citywide Systems Plan (part of the Comprehensive Plan).	Ongoing
b. Track local and regional discussions related to infrastructure.	City staff is tracking local and Metro discussions.	Ongoing
5. Prepare a plan to guide continued improvement in citywide asset management best practices.		
a. Complete an evaluation of current citywide asset management practices.	The CAMG completed an internal survey of AM practices in 2008–2009.	Updating
b. Identify key gaps based on research into best practices and each bureau's unique needs.	The CAMG, with the support of an outside consultant, completed research on best practices within peer communities.	Updating
c. Prioritize improvements necessary to achieve best practices in asset management.	The work plan identifies and prioritizes AM best practices improvements.	Updating
d. Establish implementation steps and schedule.	The work plan identifies key implementation steps and timelines for each best practice.	Updating
e. Report on progress annually.	The 2010 report included the first annual progress report.	Ongoing
6. Build capacity to implement asset management best practices within capital bureaus and citywide.		
a. Enable bureaus to make continuous improvements to asset management practices based on their respective needs.	The work plan is based on cross-bureau collaboration but allows flexibility for bureaus to proceed on their own schedule.	Ongoing
7. Use asset management as a tool to improve decision making.		
a. Define and revise service levels to align service provision with system requirements, community needs, and sustainable funding levels.	This activity is detailed in the work plan; see Task #1 Service Levels.	Future
b. Determine appropriate asset management strategies to reduce maintenance liabilities.	This activity is detailed in the work plan, see Task #5 Reliability Centered Maintenance and Task #2 Data Collection for High Risk Assets.	Future
c. Set infrastructure investment priorities.	This is related to Task #4 Business Case and Task #6 Long Term Investment Profile.	Future
d. Identify sustainable funding levels.	This activity is detailed in work plan; see Task #6 Long Term Investment Profile.	Future

Citywide Asset Managers Group
Work Plan Tasks by Year — updated for 2011 City Assets Report

Timeline	Service Levels (SLs)	Risk Management	Infrastructure Report Card	Business Case	Reliability-Centered Maintenance	Long Term Investment Profile	Community Consultation or Information
2010	Scoping.	Discuss methodology and information needed.	Identify reporting needs (could include status of assets, service levels, business practices, and unmet need). Examples from Water and PP&R (2011).	Research and share information. Evaluate appropriateness for each bureau. Each bureau experiments with business cases.	Apply reliability-centered approach on a bureau-determined basis.	Research and share information on long-term investment profiles.	Each bureau consults with public members on its budget advisory committee.
2011	Developing bureau service levels.	Identify high risk assets, by asset group.					
2012		Start to collect condition data on high risk assets.					
2013	Adopt some SLs in Citywide Systems Plan (CSP).	Improve data collection for high risk assets, and apply mitigation strategies based on asset risk classification.	Relate to Comprehensive Plan Update process.				Monitor Citywide Systems Plan.
2014	Refine service levels, as needed.						Continue public consultation in budget advisory committees. Discuss lessons from Citywide Systems Plan and pilots from any bureaus.
2015			Include a report card in 2015 Citywide Assets Report.	Develop bureau and asset-specific templates and application processes.		Develop tools and methodologies.	
2016		Refine risk assessment methods. Identify opportunities to collaborate, including assessment and mitigation strategies for cross-bureau asset risk.	Refine report card format.				
2017				Share business case examples, and identify key questions in analysis.		Develop investment profiles for high-risk assets.	
2018							
2019							

Appendices

1. Current Replacement Values of City Assets

a. Current Replacement Value, by Asset Type
b. Current Replacement Value Data Sheet

2. Current Condition of Capital Assets

a. Summary of All Bureaus
b. Transportation
c. Environmental Services
d. Water
e. PP&R
f. Civic
g. Current Condition Data Sheet

3. Annual Funding Gap

a. Annual Funding Gap by Asset Type
b. Annual Funding Gap by Type of Gap
c. Annual Funding Gap (Mandates, Repair, Rehabilitate, Replace) by Bureau
d. Capacity Related Annual Funding Gap by Bureau
e. Annual Funding Gap Compared to Bureau Program Budgets
f. Annual Funding Gap Data Sheet

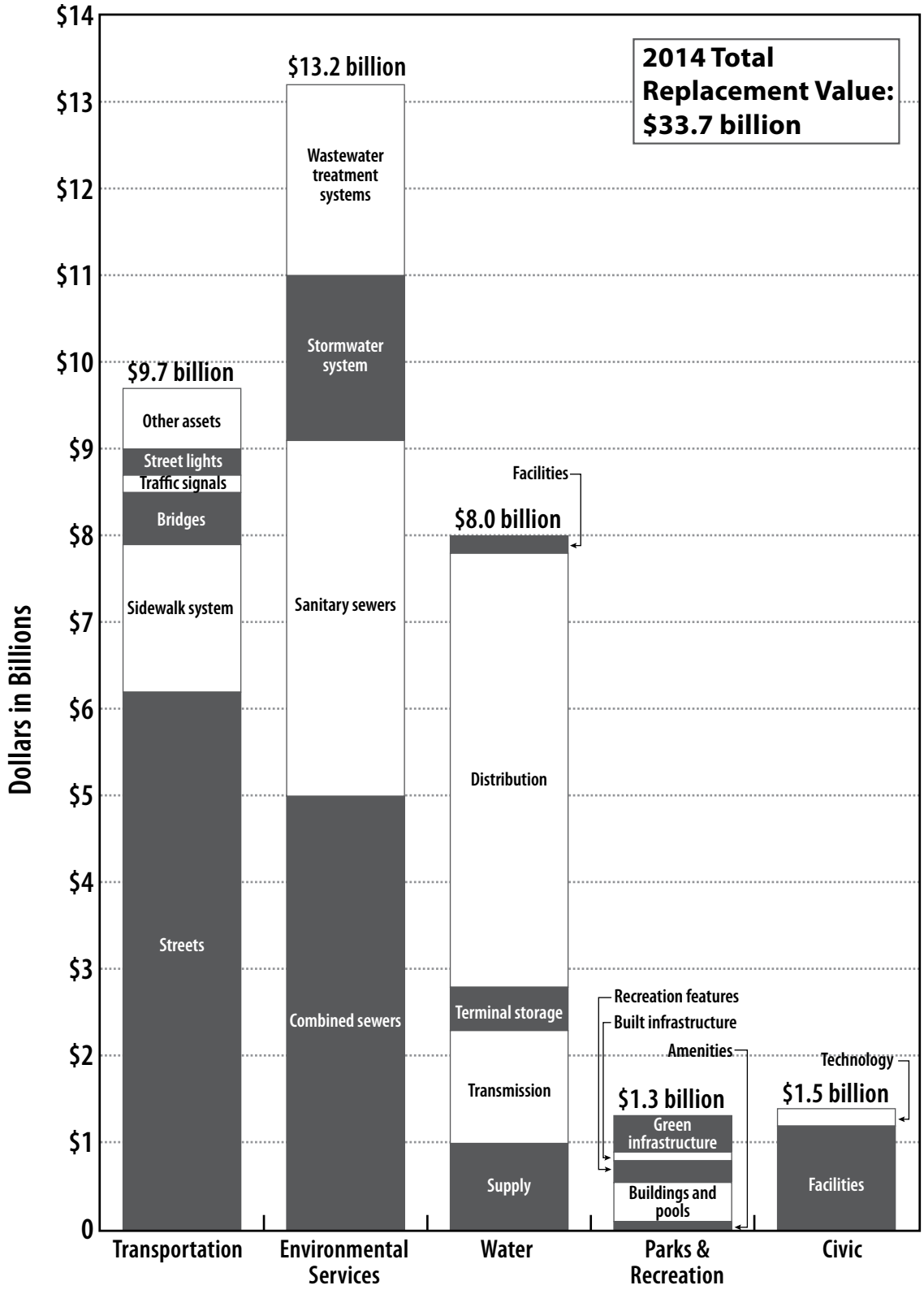
4. Data Confidence Level Summary

5. Definitions

Table continued on next page.

Appendix 1a: Current Replacement Value by Asset Type

in billions, December 2014



Appendix 1b: Current Replacement Value

Data Sheet, December 2014

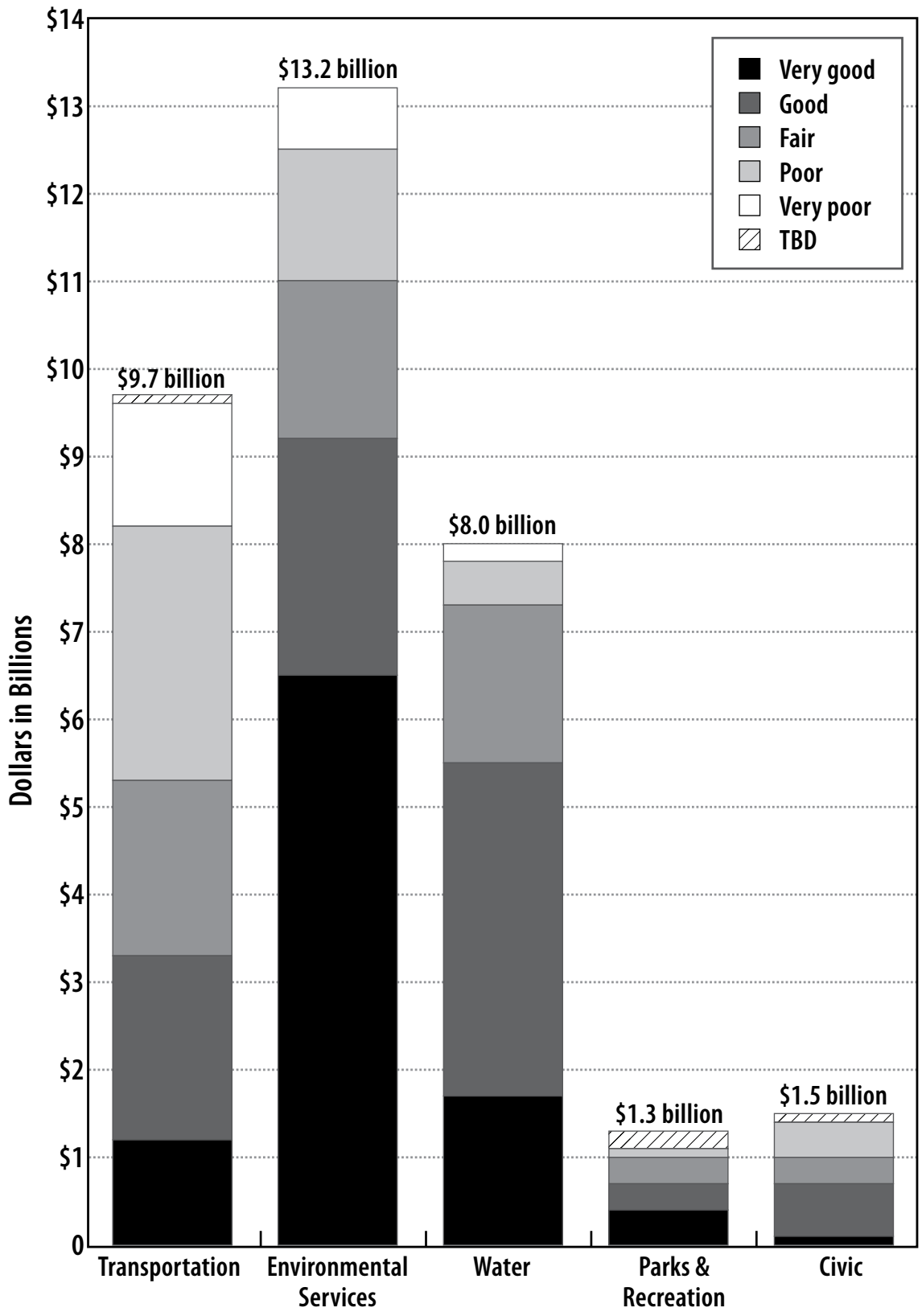
Capital Asset Class	Description	Value (in millions)	Confidence level	Notes
Transportation				
arterial & collector streets	1,866 lane miles	$3,165.2	3 - Moderate	
local streets	2,968 lane miles	$3.038.7	3 - Moderate	
sidewalks	8,883,140 sq yds	$1,074.9	4 - High	
curbs	3,265 centerline miles	$499.9	3 - Moderate	
corners	37,884 corners	$160.0	4 - High	
structures (bridges only)	156 bridges	$610.0	4 - High	
traffic signals (hardware only)	916 traffic signals	$247.0	3 - Moderate	
street lights	55,654 street lights	$202.4	2 - Low	
support facilities	various buildings	$15.4	2 - Low	
other transportation assets		$678.8	Low to Optimal	
Total Transportation		$9,693.0		
Environmental Services				
combined sewers	906 mi. of pipe & access structures	$5,018.8	4 - High	All dollars updated for ENR (construction cost index). No significant new assets accounted for in value.
sanitary sewers (owned and/or maintained)	1,001 mi. of pipe & access structures	$4,104.4	4 - High	
stormwater system	455 mi. of pipe; 1,900 water quality facilities	$1,946.7	3 - Moderate	
wastewater treatment systems	2 treatment plants & 97 pump stations	$2,168.0	3 - Moderate	
Total Environmental Services		$13,237.91		
Water				
supply	158 miles of roads, 1609 culverts, 12 bridges, 1 195-ft high concrete dam, 1 145-ft high earth dam, 27 active production wells, 1 groundwater pump station, treatment facility, tank, and 11 miles of groundwater collection mains	$1,020.0	3 - Moderate	
transmission	75 miles of large diameter conduits, with various supports, 9 conduit trestles and 4 conduit bridges, 9 river crossings, 59 miles of large diameter transmission mains	$1,273.1	3 - Moderate	
terminal storage	228 million gallons finished water storage (as of December 2013), interconnecting piping, post-storage treatment facilities, and microhydro facility	$480.7	3 - Moderate	
distribution	2,100 miles of distribution pipes, 186,000 service lines, 52,000 valves, 178,000 meters, 14,200 hydrants, 257 active pressure regulating station, 39 pump stations, 54 active storage tanks	$5,047.6	4 - High	
facilities (buildings and support facilities)	buildings, SCADA, vehicles, construction equipment, lab equipment, computers, and infrastructure components in inventory	$172.7	4 - High	
Total Water		$7,994.1		

Table continued on next page.

Capital Asset Class	Description	Value (in millions)	Confidence level	Notes
Parks & Recreation				
amenities	decorative elements and furnishings	$97.1	4 - High	2014 valuation represents a new methodology. Current inventory of assets multiplied by the current replacement cost for each asset type. Project management and overhead costs are included.
buildings and pools	community and arts centers, pools, restrooms, maintenance facilities	$445.6	4 - High	
recreation features	sports fields, courts, playgrounds, water play areas, community gardens, skate parks, etc.	$241.9	4 - High	
built infrastructure	roads, major trails, utilities	$106.5	3 - Moderate	
green infrastructure	urban forest, turf, shrub beds, botanic gardens	$422.6	2 - Low	
Total PP&R		$1,313.7		
Civic				
Facilities (buildings, structures)				
Police facilities	Four precincts, Justice Center, property warehouse, equestrian division, and vehicle storage lot	$117.5	4 - High	
Office buildings	Portland Building, 1900 Building, City Hall	$186.0	4 - High	
Other buildings	Archives and Records Center, Kerby Garage, and Portland Communications Center	$74.8	4 - High	
PDC facilities	Train station and related buildings, Centennial Mills	$52.6	3 - Moderate	
Spectator facilities	Memorial Coliseum, Rose Quarter parking garages, and PGE Park	$572.0	3 - Moderate	
Portland Center for the Performing Arts	Portland Center for the Performing Arts	$120.0	3 - Moderate	
Fueling stations		$13.3	4 - High	
Fire & Rescue facilities	30 stations, administration building and support facility	$107.1	4 - High	
Fire & Rescue apparatus	Engines, trucks, other major apparatus	$43.7	4 - High	
Technology				
Communications-BTS	Data networks, WiFi network, 800 MHz radio system	$70.9	3 - Moderate	
Production Services-BTS	Storage area network, core servers, and email system	$3.3	3 - Moderate	
Strategic technology-BTS	Large corporate applications owned and managed by BTS such as GIS	$6.2	3 - Moderate	
Electronic equipment and software — other bureaus	Video systems, electronic equipment, Office Suite software, bureaus' PC's and laptops	$9.1	3 - Moderate	
Strategic technology — other bureaus	Large corporate applications such as TRACS, CAD, PPDS, CIS and EBS	$93.8	3 - Moderate	
Total Civic		$1,470.3		
Total Capital Assets		**$33,709.0**		

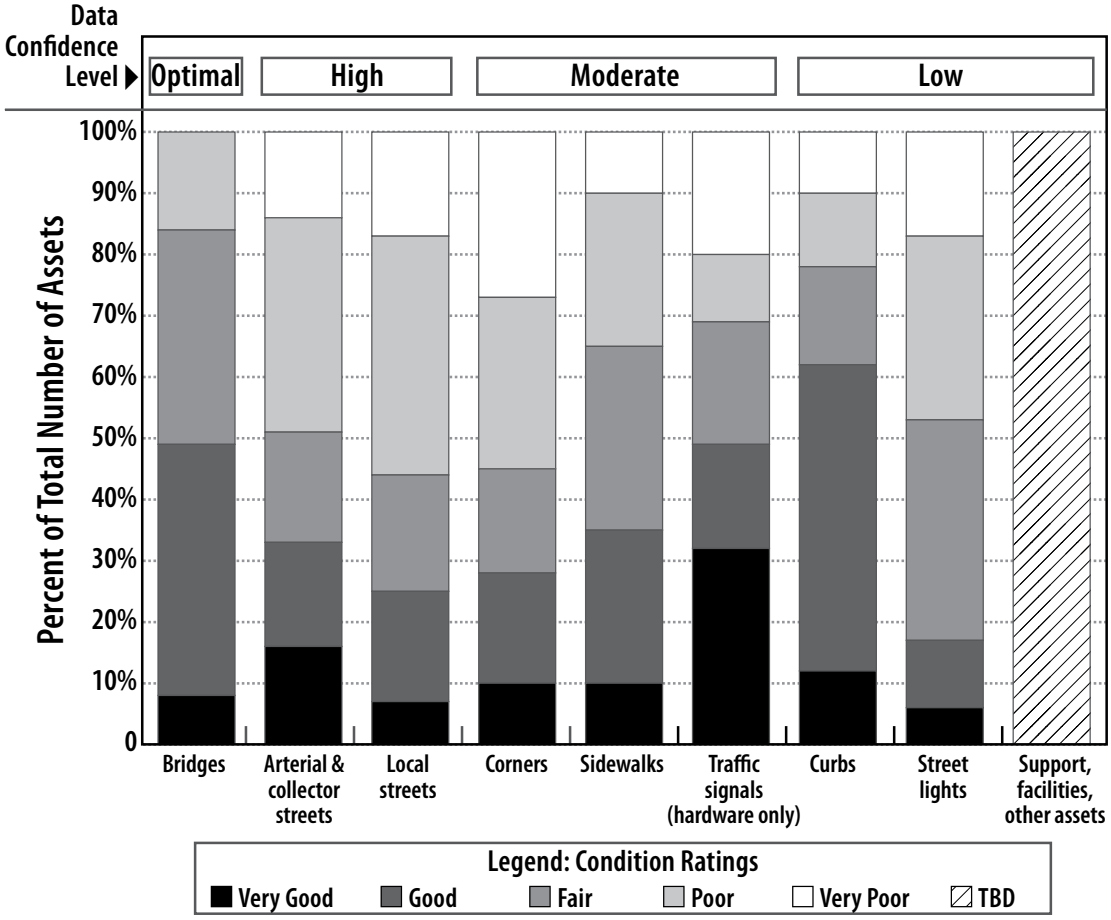
Appendix 2a: Current Condition of Capital Assets

Summary of all Bureaus, December 2014



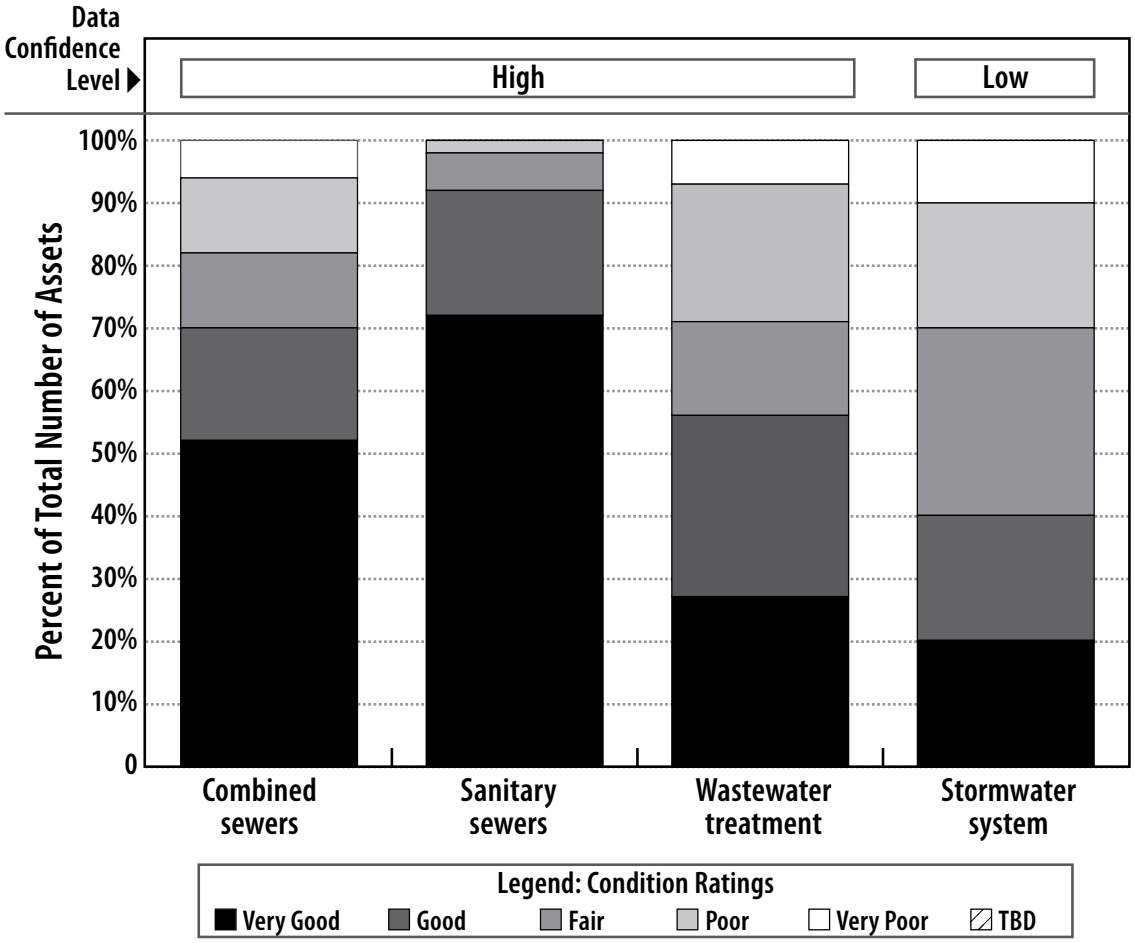
Appendix 2b: Current Condition of Capital Assets

Office of Transportation, December 2014



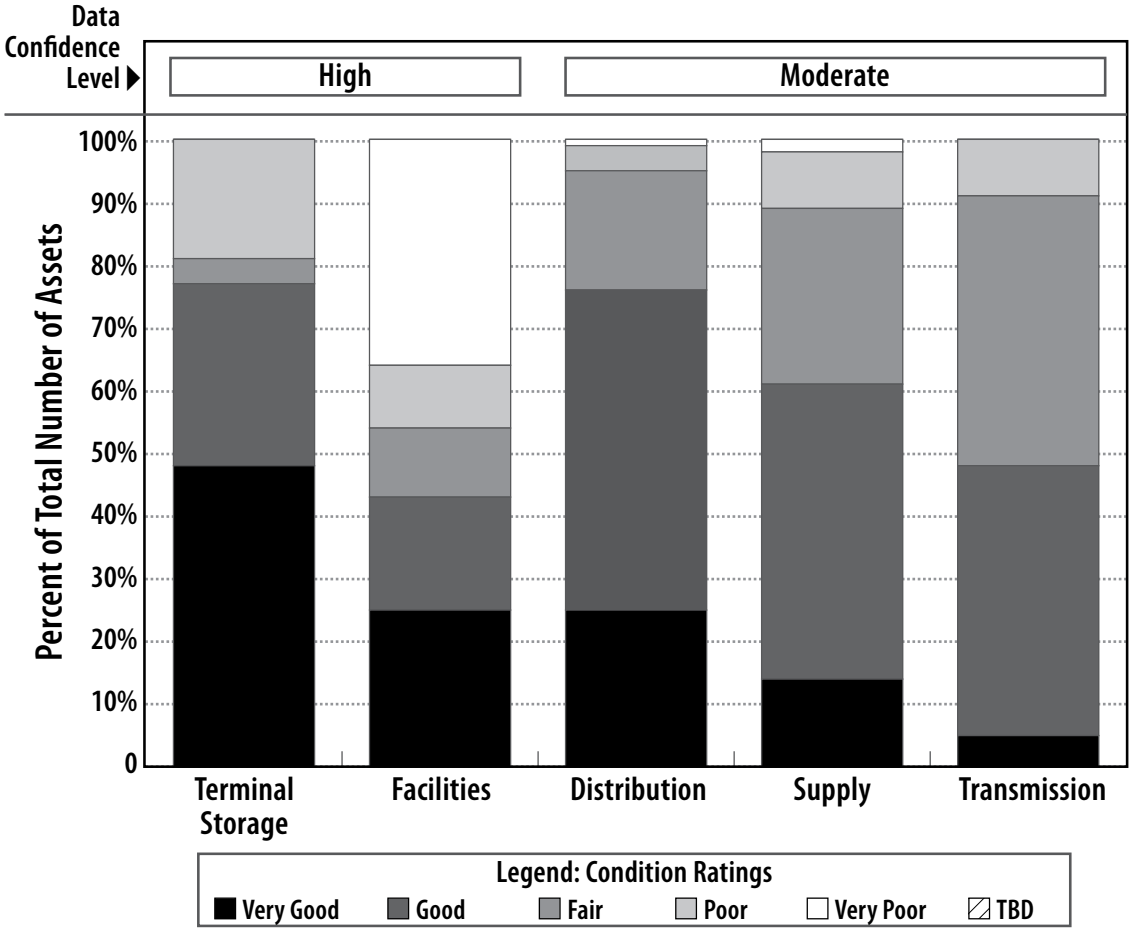
Appendix 2c: Current Condition of Capital Assets

Environmental Services, December 2014



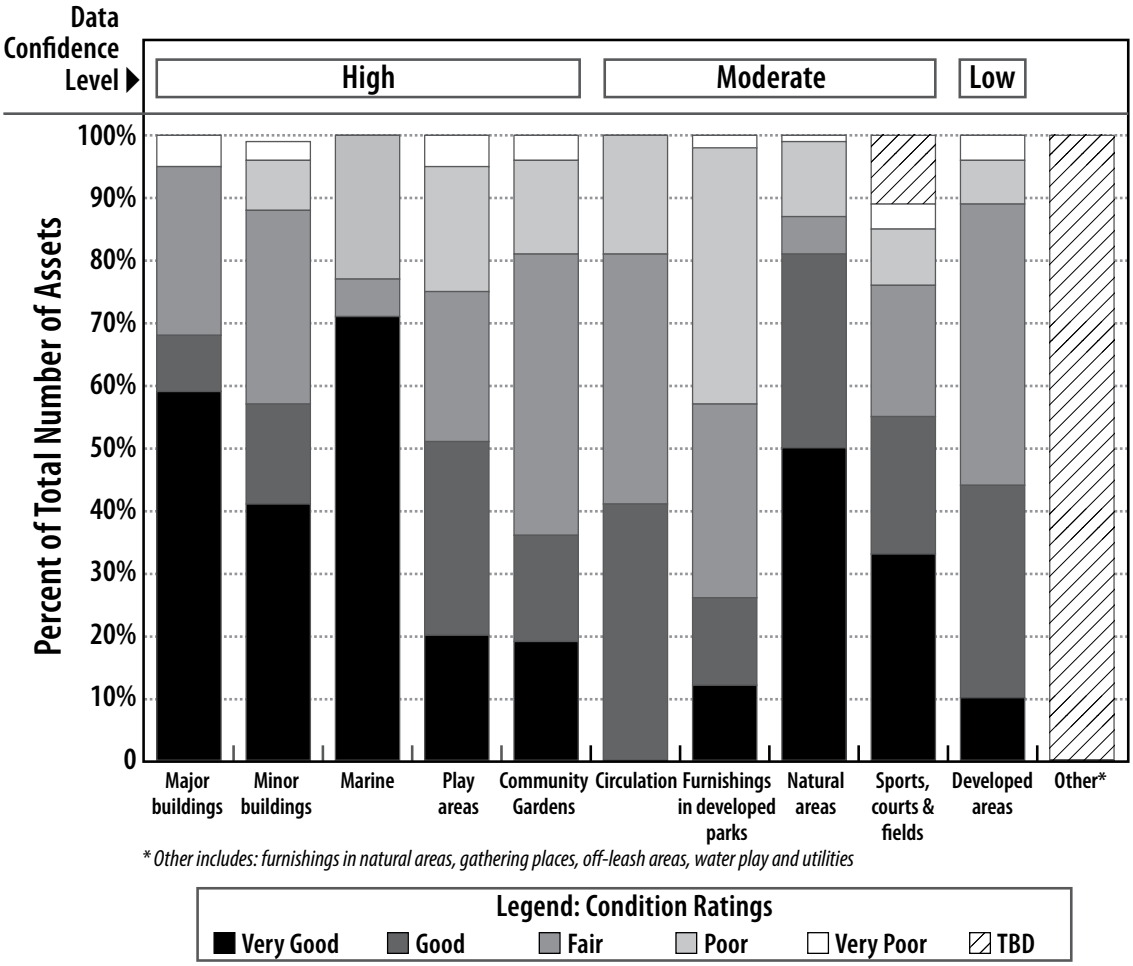
Appendix 2d: Current Condition of Capital Assets

Water Bureau, December 2014



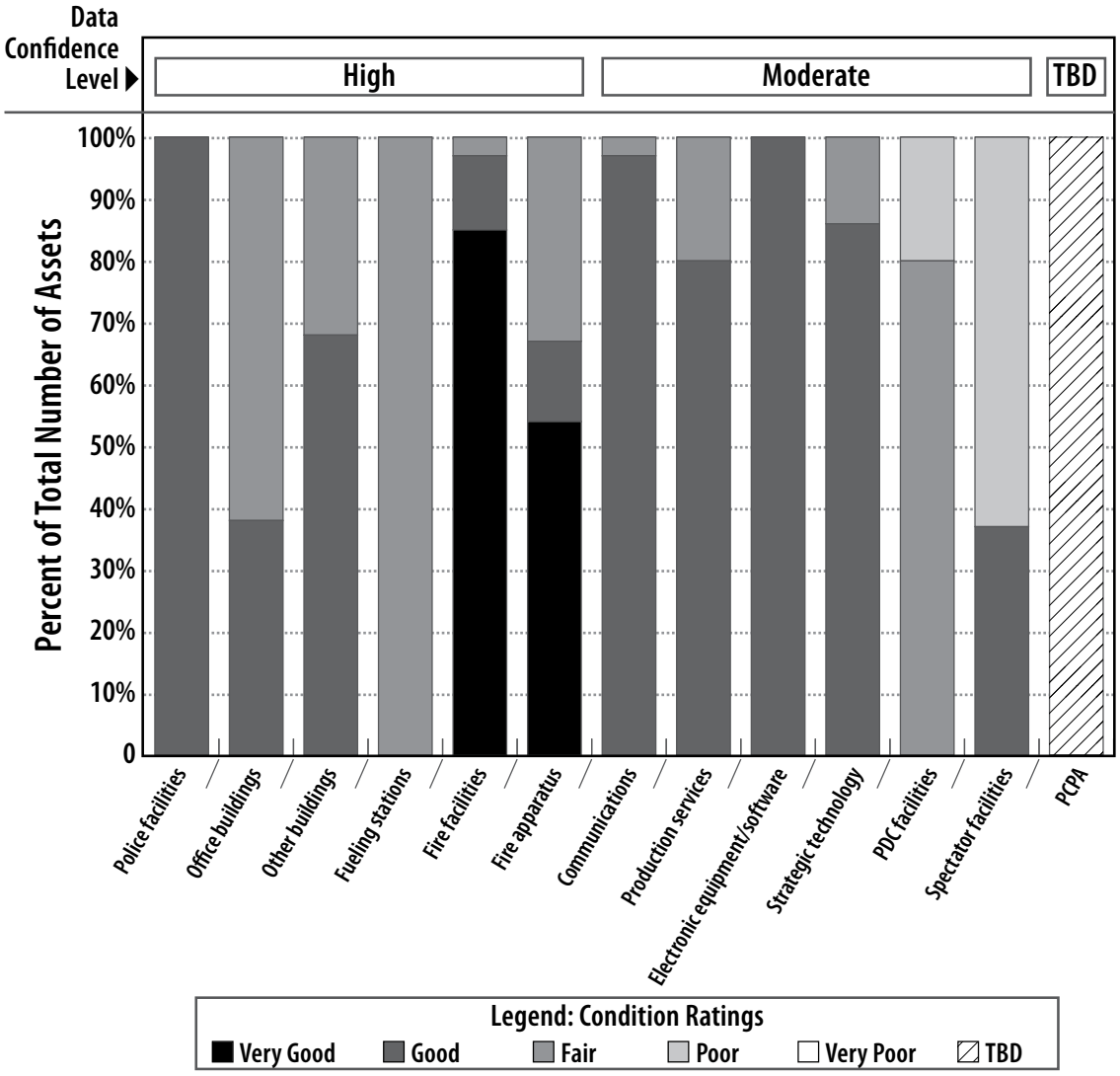
Appendix 2e: Current Condition of Capital Assets

PP&R Bureau, December 2014



Appendix 2f: Current Condition of Capital Assets

Civic (OMF, Police, Fire & Rescue), December 2014



Appendix 2g: Current Condition Data Sheet

December 2014

Bureau and capital asset type	Current Condition (in %)						Confidence level	Notes
	Very Good	Good	Fair	Poor	Very Poor	TBD		
Transportation								
arterial & collector streets	16	17	18	35	14		4 - High	
local streets	7	18	19	39	17		4 - High	
sidewalks	10	25	30	25	10		3 - Moderate	
curbs	12	50	16	12	10		2 - Low	
corners	10	18	17	28	27		3 - Moderate	
structures (bridges only)	8	41	35	16	0		5 - Optimal	
traffic signals (hardware only)	32	17	20	11	20		3 - Moderate	
street lights	6	11	36	30	17		2 - Low	<– Weighted average of Option B & C lights
support facilities (for PBOT & BES)	condition ranges from very poor to good						2 - Low	
other transportation assets	condition range from very poor to very good or tbd						Low to Optimal	
Environmental Services								
combined sewers	52	18	12	12	6		4 - High	Although the bureau has a relatively aggressive program for pipe rehabilitation, the amount of work is insignificant compared to the size of the system. No change overall.
sanitary sewers	72	20	6	2	0		4 - High	
wastewater treatment systems	27	29	15	22	7		4 - High	
stormwater system	20	20	30	20	10		2 - Low	
Water								
supply	14	47	29	8	2		3 - Moderate	
transmission	5	43	43	9	0		3 - Moderate	
terminal storage	48	29	4	19	0		4 - High	
distribution	25	51	19	4	1		3 - Moderate	Condition rating does not account for seismic vulnerability. For example, old cast iron pipes rated in fair condition in terms of physical deterioration are considered deficient (very poor) in likely seismic response.
facilities (buildings and support facilities)	25	18	11	10	36		4 - High	

Table continued on next page.

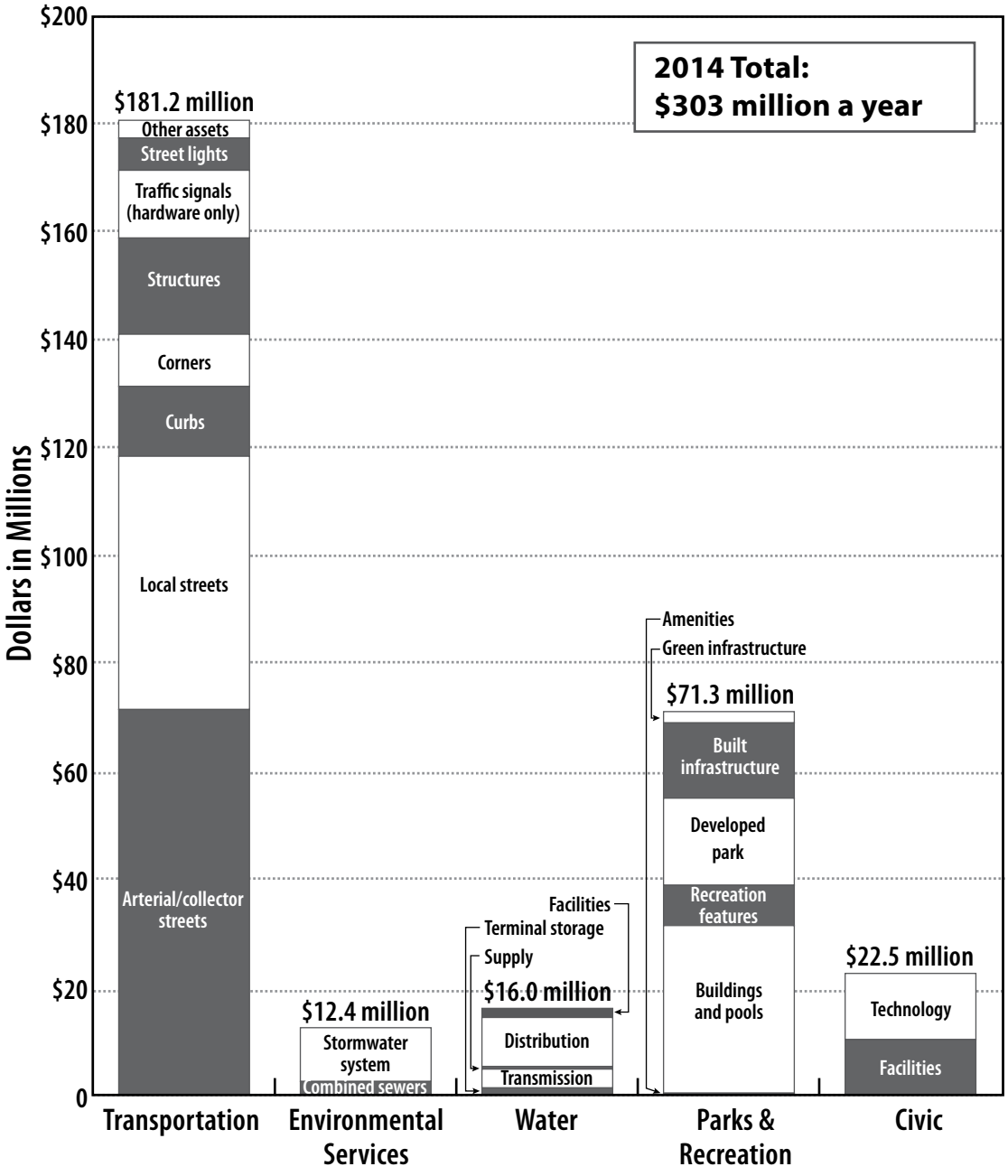
Bureau and capital asset type	Current Condition (in %)						Confidence level	Notes
	Very Good	Good	Fair	Poor	Very Poor	TBD		
Parks & Recreation								
amenities								
furnishings in developed parks	12	14	31	41	2	0	3 - Moderate	Asset Risk Profiles 2013
furnishings in natural areas	0	0	0	0	0	100	1 - TBD	
decorative elements	28	31	19	21	1	0	3 - Moderate	Asset Risk Profiles 2013
buildings and pools								
major buildings	59	9	27	0	5	0	4 - High	Ongoing condition inspections, with goal to inspect each major building every five years.
minor buildings	41	16	32	8	4	0	4 - High	
recreation features								
gathering places	0	0	0	0	0	100	1 - TBD	Inspection methodology in development
marine	71	0	6	23	0	0	4 - High	Asset Risk Profiles 2013
off-leash areas	0	0	0	0	0	100	1-TBD	Inspection methodology in development
play areas	20	31	24	20	5	0	4 - High	Asset Risk Profiles 2014
sports courts and fields	33	22	21	9	4	11	3 - Moderate	Asset Risk Profiles 2013
water play	0	0	0	0	0	100	1 - TBD	Wading pools closed per health regulation. Splash pads and interactive fountains TBD.
community gardens	19	17	45	15	4	0	4 - High	Asset Risk Profiles 2013
built infrastructure								
circulation	0	41	40	19	0	0	3 - Moderate	Includes paved vehicular circulation (2009 assessment). "Very Good"/"Very Poor" categories not used. Other circulation (pathways, etc.) TBD
utilities	0	0	0	0	0	100	1 - TBD	
green infrastructure								
natural areas	50	31	6	12	1	0	3 - Moderate	Based on new methodology from Natural Areas Restoration Plan (October 2010)
developed areas	10	34	45	7	4	0	2 - Low	To be re-inspected

Table continued on next page.

Bureau and capital asset type	Current Condition (in %)						Confidence level	Notes
	Very Good	Good	Fair	Poor	Very Poor	TBD		
Civic								
facilities (buildings, structures)								
police facilities	0	100	0	0	0	0	4 - High	
office buildings	0	38	62	0	0	0	4 - High	
other buildings	0	68	32	0	0	0	4 - High	
PDC facilities	0	0	80	20	0	0	3 - Moderate	
spectator facilities	0	37	0	63	0	0	3 - Moderate	
Portland Center for Performing Arts	tbd	tbd	tbd	tbd	tbd	0	TBD	Working with Metro/MERC on oversight.
fueling stations	0	0	100	0	0	0	4 - High	
fire facilities	85	12	3	0	0	0	4 - High	
fire apparatus	54	13	33	0	0	0	4 - High	
technology								
communications-BTS	0	97	3	0	0	0	3 - Moderate	
production services-BTS	0	80	20	0	0	0	3 - Moderate	
strategic technology-BTS	0	84	16	0	0	0	3 - Moderate	
electronic equipment and software — other bureaus	0	100	0	0	0	0	3 - Moderate	
strategic technology — other bureaus	0	88	12	0	0	0	3 - Moderate	

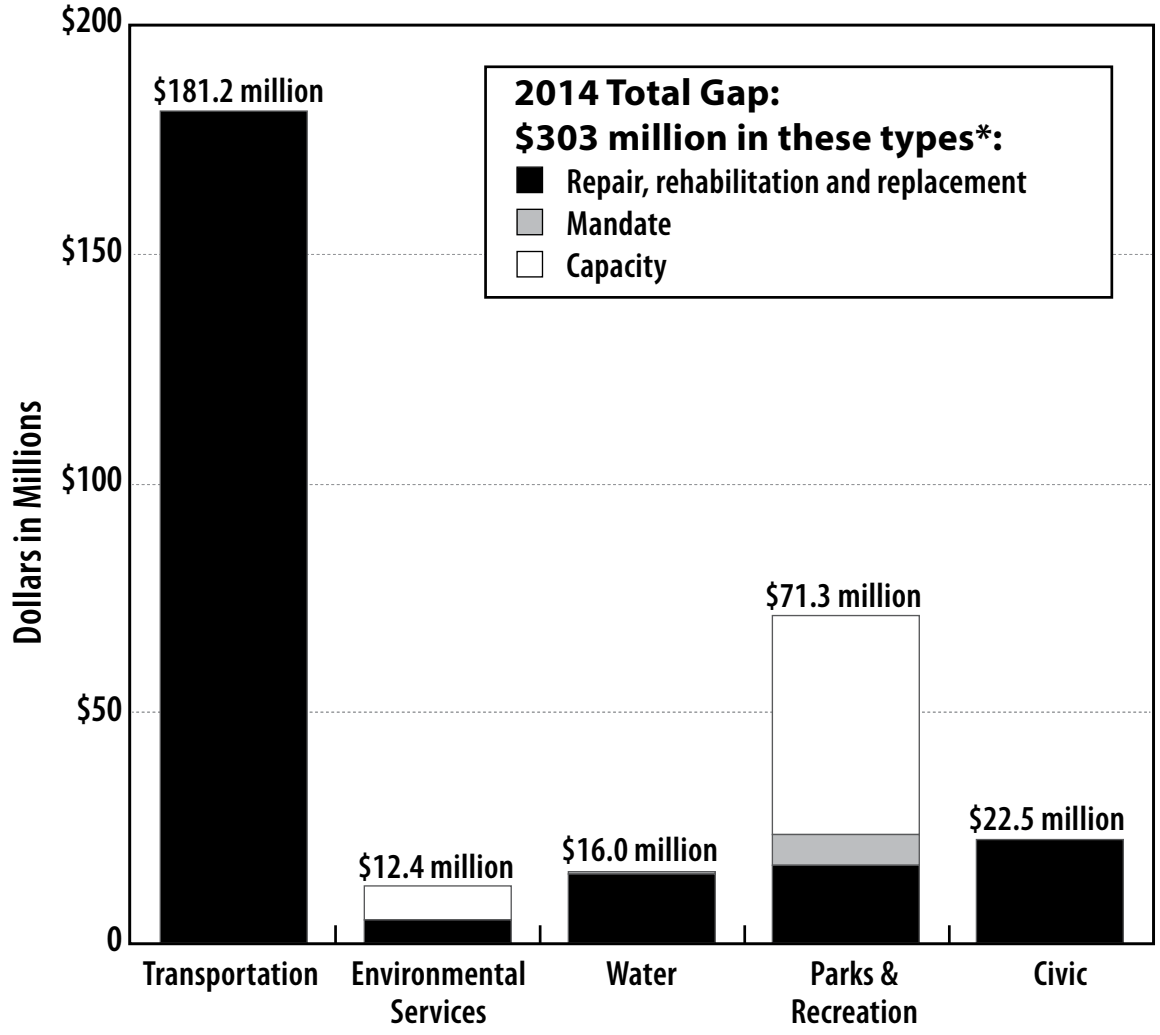
Appendix 3a: Annual Funding Gap, by Asset Group

in millions per year, December 2014



Appendix 3b: Annual Funding Gap, by Type of Gap

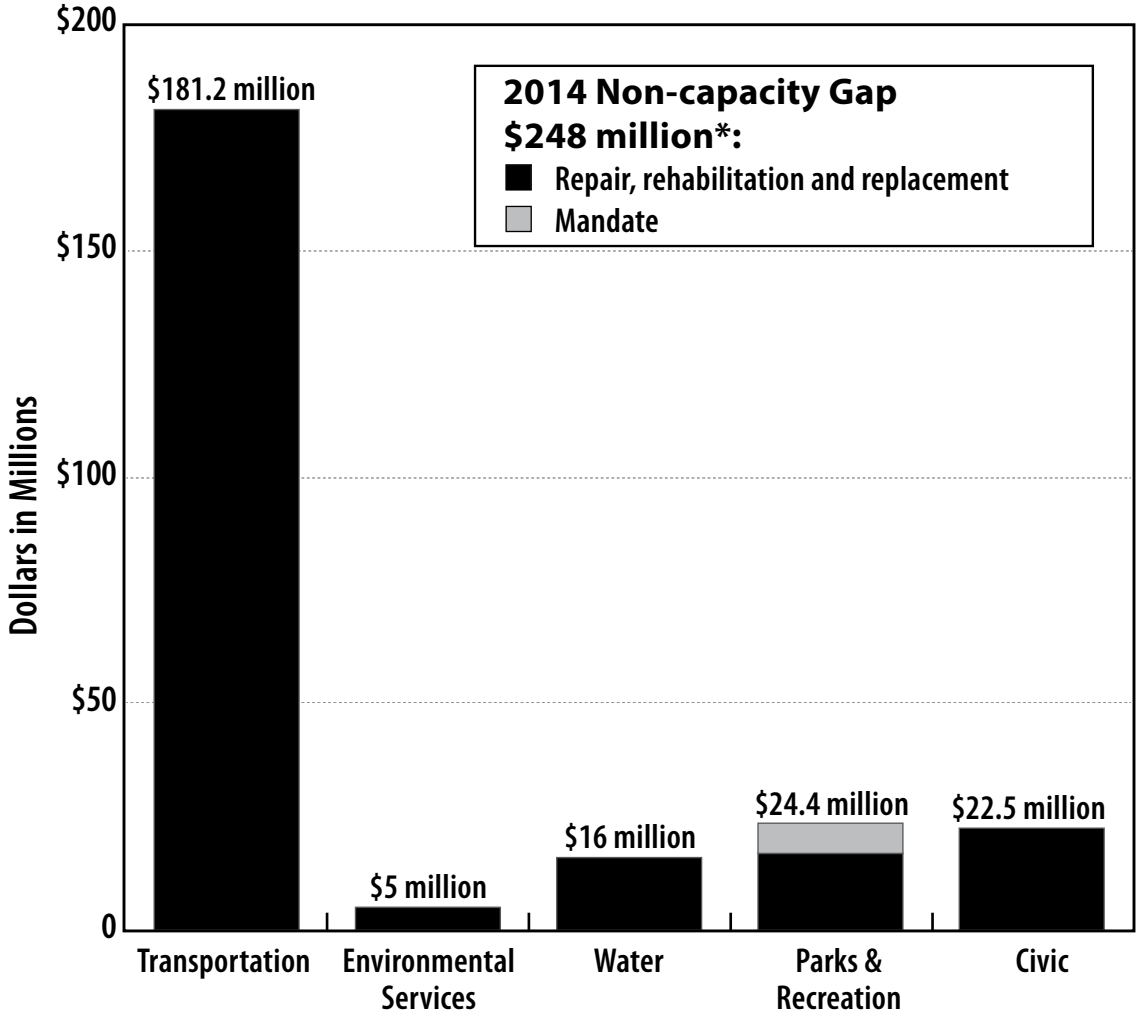
in millions per year, December 2014



* The three types of Funding Gap are defined in Appendix 5 of this report.

Appendix 3c: Annual Funding Gap (Mandates, Repair, Rehabilitate, Replace), by Bureau

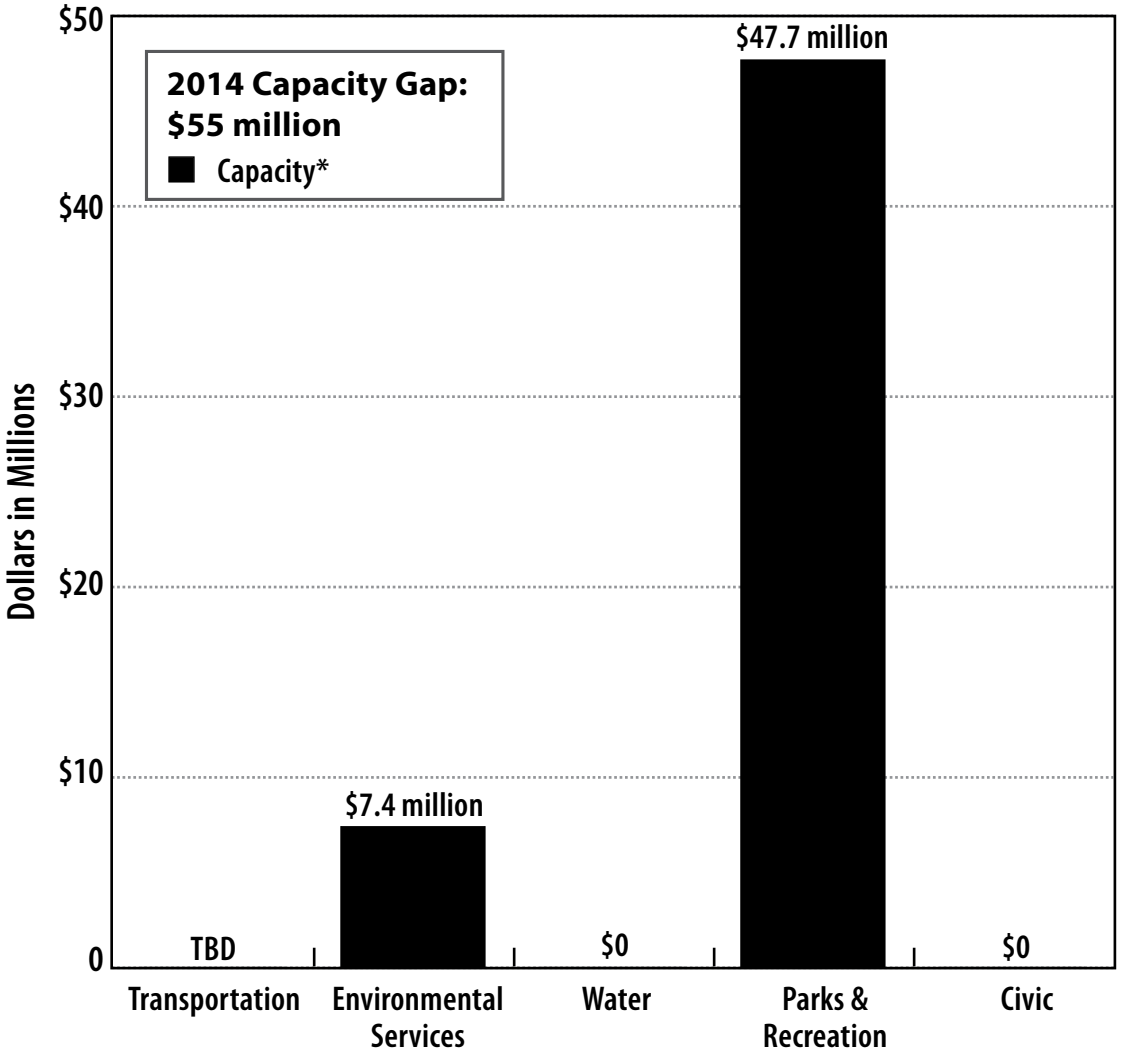
in millions per year, December 2014



** The three types of Funding Gap are defined in Appendix 5 of this report.*

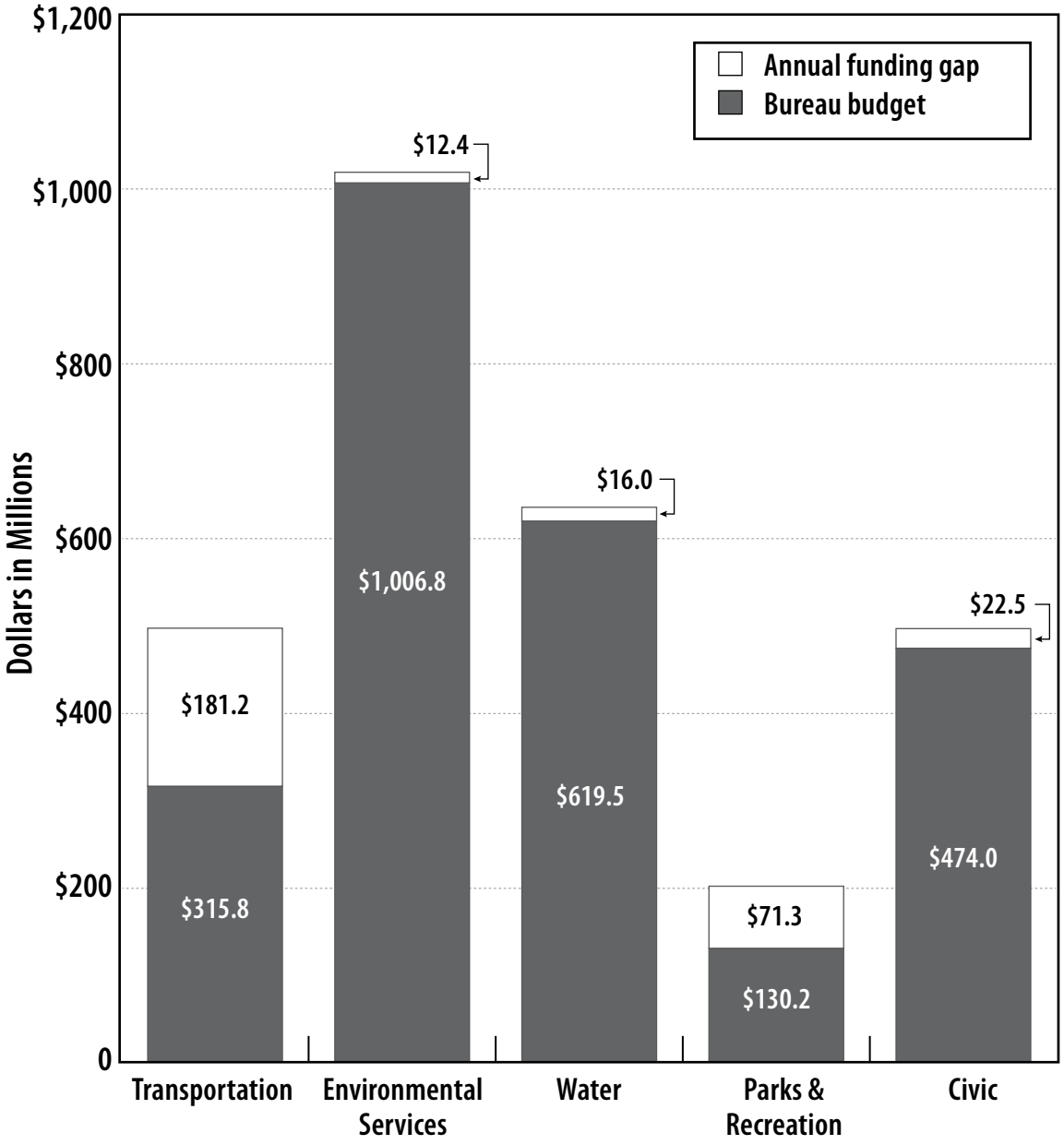
Appendix 3d: Capacity Related Annual Funding Gap, by Bureau

in millions per year, December 2014



Appendix 3e: Annual Funding Gap Compared to Bureau Program Budgets

in millions per year, December 2014



Appendix 3f: Annual Funding Gap Data Sheet

in millions per year, December 2014

Bureau and capital asset type	Value* (in millions)				Confidence level	Notes
	R/R/R	Mandate	Capacity	Total		
Transportation						
arterial & collector streets	$71.6	$0.0	$0.0	$71.6	3 - Moderate	
local streets	$47.1	$0.0	$0.0	$47.1	3 - Moderate	
sidewalks	n/a	n/a	n/a	n/a	n/a	<– adjacent property owners are financially responsible for repairing sidewalks
curbs	$13.0	$0.0	$0.0	$13.0	2 - Low	
corners	$9.7	$0.0	$0.0	$9.7	3 - Moderate	
structures (bridges only)	$17.9	$0.0	$0.0	$17.9	4 - High	
traffic signals (hardware only)	$12.6	$0.0	$0.0	$12.6	3 - Moderate	
street lights	$6.0	$0.0	$0.0	$5.8	2 - Low	
support facilities (for PDOT & BES)	$0.5	$0.0	$0.0	$0.5	2 - Low	
other transportation assets	$2.8	$0.0	$0.0	$2.8	Low to Moderate	
Total Transportation	$181.2	$0.0	$0.0	$181.2		
Environmental Services						
combined sewers	$0.0	$0.0	$2.4	$2.4	3 - Moderate	No change from prior year. Gap assumes requested rate increases continue to be funded.
sanitary sewers	$0.0	$0.0	$0.0	$0.0	3 - Moderate	
stormwater system	$5.0	$0.0	$5.0	$10.0	2 - Low	
wastewater treatment systems	$0.0	$0.0	$0.0	$0.0	3 - Moderate	
Total Environmental Services	$5.0	$0.0	$7.4	$12.4		
Water						
supply	$0.5	$0.0	$0.0	$0.5	3 - Moderate	
transmission	$3.5	$0.0	$0.0	$3.5	3 - Moderate	
terminal storage	$1.2	$0.0	$0.0	$1.2	3 - Moderate	
distribution	$9.1	$0.0	$0.0	$9.1	3 - Moderate	
Facilities (buildings, structures)	$1.7	$0.0	$0.0	$1.7	3 - Moderate	
Total Water	$16.0	$0.0	$0.0	$16.0		
Parks & Recreation						
amenities	$0.1	$0.0	$0.0	$0.1	3 - Moderate	Funding Gap changes influenced by newly assessed high risk assets at end of useful life and ADA deficiencies. Economic recovery brings increased SDC revenues, reducing Capacity investment gap. Parks Replacement Bond infuses $68M, which reduces R/R/R gap.
buildings and pools	$7.5	$3.4	$20.7	$31.6	3 - Moderate	
recreation features	$2.7	$2.1	$3.0	$7.8	3 - Moderate	
developed park	$2.2	$0.0	$14.0	$16.2	3 - Moderate	
built infrastructure	$2.6	$2.1	$9.6	$14.0	3 - Moderate	
green infrastructure	$1.7	$0.0	$0.4	$2.1	2 - Low	
PP&R Subtotal	$16.9	$7.5	$47.7			
PP&R Subtotal Current Assets	$24.4					
Total PP&R				$72.1		

Bureau and capital asset type	Value* (in millions)				Confidence level	Notes
	R/R/R	Mandate	Capacity	Total		
Civic						
Facilities (buildings, structures)						
Police facilities	$2.9	$0.0	$0.0	$2.9	4 - High	
Office buildings	$2.5	$0.0	$0.0	$2.5	4 - High	
Other buildings	$1.4	$0.0	$0.0	$1.4	4 - High	
PDC facilities	NA	NA	NA	NA	3 - Moderate	
Spectator facilities	NA	NA	NA	NA	3 - Moderate	
Portland Center for the Performing Arts	tbd	tbd	tbd	tbd	tbd	Working with Metro/MERC on oversight.
Fueling stations	$0.4	$0.0	$0.0	$0.4	4 - High	
Fire & Rescue facilities	$3.0	$0.0	$0.0	$3.0	tbd	
Fire & Rescue apparatus	$0.0	$0.0	$0.0	$0.0	tbd	
Technology						
Communications-BTS	$5.3	$0.0	$0.0	$5.3	3 - Moderate	
Production Services-BTS	$0.4	$0.0	$0.0	$0.4	3 - Moderate	
Strategic technology-BTS	$0.7	$0.0	$0.0	$0.7	3 - Moderate	
Electronic equipment and software — other bureaus	$1.0	$0.0	$0.0	$1.0	3 - Moderate	
Strategic technology — other bureaus	$4.9	$0.0	$0.0	$4.9	3 - Moderate	
Total for Civic Assets	$22.5	$0.0	$0.0	$22.5		
Total Capital Assets	$241.6	$6.7	$55.1	$303.4		

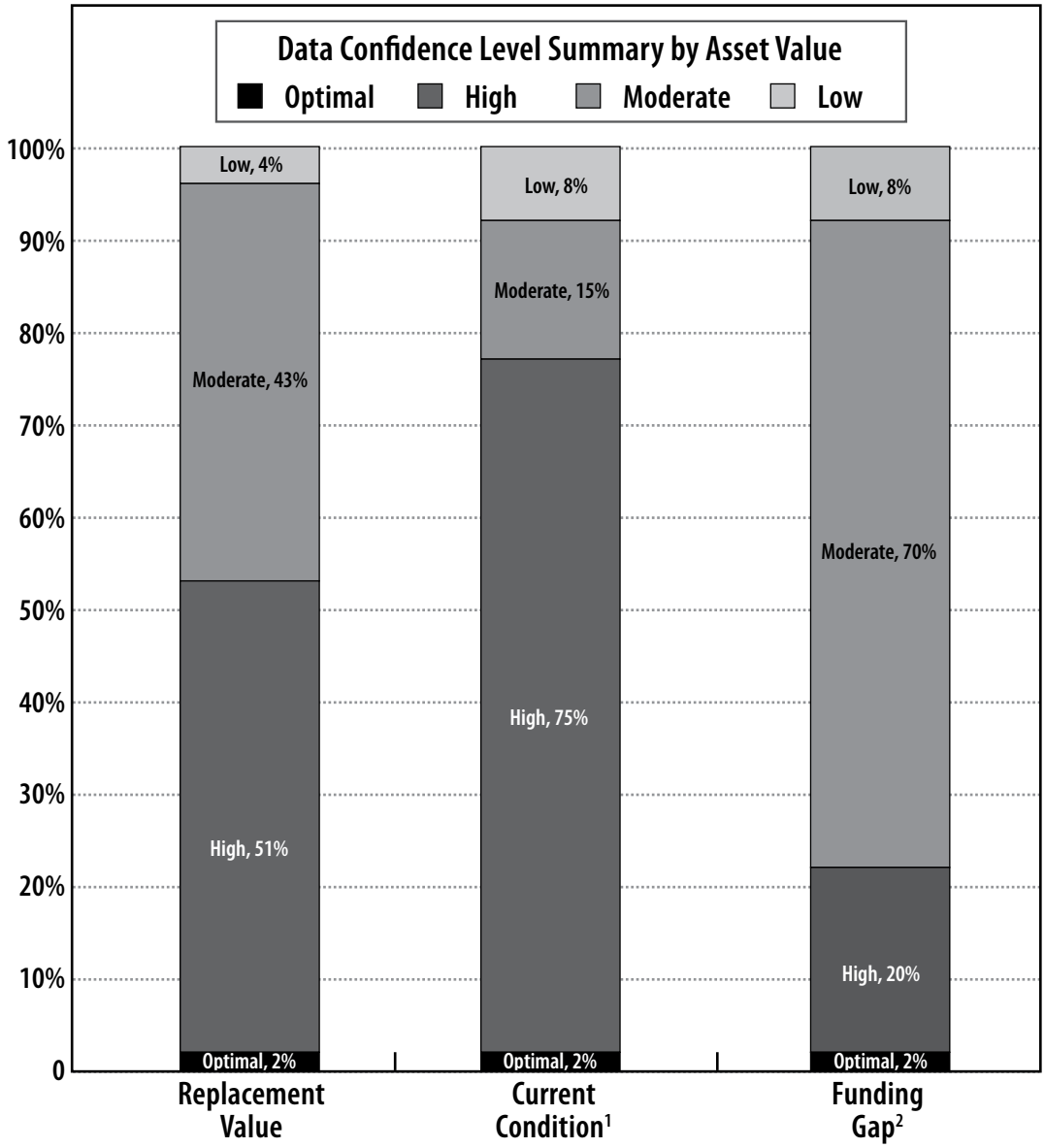
R/R/R (Repair, Rehabilitation, Replacement: Additional funding necessary to repair, rehabilitate and replace existing assets to bring them up to established service levels, or replace assets considered functionally obsolete (not meeting those service levels).

Mandate: Additional funding necessary to improve existing assets to meet regulatory requirements, exclusive of improvements that fall under R/R/R or Capacity.

Capacity: Additional funding necessary to address existing inequities and deficiencies in levels of service for current customers and citizens.

Appendix 4: Data Confidence Level Summary

Citywide, December 2014



[1] Current Condition is to be determined for parks furnishings in natural areas, parks gathering places, off-leash areas, water play and Portland Center for the Performing Arts.

[2] Annual Funding Gap is to be determined for transportaton support facilities and the Portland Center for the Performing Arts.

Appendix 5: Definitions

The following definitions and confidence levels draw on several AM sources, including GHD Consultants (used by the Water Bureau and PBOT), trained bureau staff, and literature searches.

Asset A physical component of infrastructure or a facility which has value and has an expected useful life of more than one year, that would be replaced if destroyed, and is not surplus to needs.

Asset Management The continuous cycle of asset inventory, condition, and performance assessment that has as its goal the cost-effective provision of a desired level of service for physical assets. Investment decisions consider planning, design, construction, maintenance, operation, rehabilitation, and replacing assets on a sustainable basis that considers social, economic, and environmental impacts.

Backlog The sum of deferred activities, such as maintenance, operations, and rehabilitation, needed to achieve the lowest life-cycle cost for an asset. Backlog results from lack of money, materials, or staff to perform the needed work. (See Funding Gap.)

Capital Expansion Projects or facilities that create new assets, increase the capacity of existing assets beyond their original design capacity or service potential, or increase the size and service capability of a current service area, including service to newly annexed, undeveloped, or under-served areas. Generally increases the total maintenance requirements because it is increasing the total asset base.

Civic A collection of City-owned assets, including facilities (office, police, fire, parking garages, spectator facilities, Portland Center for the Performing Arts) and technology services (800 MHz radio system, telecommunications, IT operations, strategic technology). Bureau maintenance facilities are assets of the operating bureau.

Condition Assessment The method used to quantify the deterioration rate and remaining useful life of an asset. Methods of condition assessment vary by asset classification and range from use of industry estimates for deterioration rates up to documented physical inspection regimens on established cycles that ensure optimum economic life of an asset.

Condition Measure/Rating A means of classification using information from periodic inspections or measurements to indicate the ability of an asset to deliver a particular level of service.

Confidence Levels (in data/information) The expression of accuracy and reliability in the areas of information (source and reliability), process (ad hoc or repeatable) and documentation (documented or not documented).

Confidence Levels in Data and Information

Confidence level	Label	Inventory completeness	Condition assessment method and frequency	Process and documentation
No confidence	**1-TBD**	No inventory	No assessment method (to be determined)	No process (to be determined)
Low confidence	**2-Low**	Partially complete inventory	Estimates used to assess condition	Process not well documented
Moderate confidence	**3-Moderate**	Inventory complete	Subjective process to estimate condition estimated followed on a regular schedule	Some documentation in place
High confidence	**4-High**	Inventory complete	Condition surveys conducted on a regular schedule by well-trained personnel	Well documented process followed
Optimal confidence	**5-Optimal**	Inventory complete	Condition surveyed on a regular schedule	Objective process followed; Accuracy of data verified and well documented

Consequence of Failure The outcome of an event expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain. There may be a range of possible outcomes associated with an event. There may be economic, social and/or environmental consequences of asset failure.

Critical Infrastructure Infrastructure assets that are essential for the functioning of society and the economy, including energy generation, transmission and distribution; telecommunications; water supply and wastewater; transportation systems; public health; and security and emergency response services.

Current Replacement Value (CRV) The CRV is the total cost to replace the entire asset to meet current accepted standards and codes. For this report, the CRV excludes land value. The CRV does not match financial book value or market value.

Failure Mode The reason why an asset failed to provide the function for which it was installed.

Funding Gap The difference between the funding needed to address infrastructure needs of an asset at a defined condition or level of service and the funding that is currently available. The funding gap varies with the funding level and affects the level of service. The funding gap is the amount of money needed to eliminate the backlog and/or maintain the asset to achieve its useful life. Given a certain funding level, the resulting level of service can be forecast; if a certain level of service is desired, the funds needed to achieve it can be estimated. There are three types of funding gap:

- **Repair, Rehabilitation, Replacement:** Additional funding necessary to repair or rehabilitate existing assets to bring them up to current service levels, or replace assets considered obsolete.
- **Mandate:** Additional funding necessary to improve existing assets to meet regulatory requirements, exclusive of improvements that fall under Repair, Rehabilitation, Replacement or Capacity.
- **Capacity:** Additional funding necessary to address existing inequities and deficiencies in levels of service for current customers and citizens.

Funding Types Over the life of an infrastructure asset, one-time and recurring investments are needed.

- One-time investments include initial land acquisition and master planning (neither are included in Current Replacement Value, Condition or Annual Funding Gap) and asset design,development and enhancements (both are included in the key assets data).
- Recurring investments can be timed to extend the useful life of assets and deliver agreed service levels at total life-cycle costs. Examples of recurring investments are roofing (every 20-30 years), rooftop HVAC systems (every 12-15 years), road resurfacing (every 30 years or so), and replastering swimming pools (12-15 years).

Green Infrastructure Infrastructure that uses natural processes, systems, or features to provide traditional infrastructure services. There are two types of green infrastructure:

- Natural networks of streams, rivers, and open spaces that naturally manage stormwater, provide habitat, improve air and water quality, reduce flooding risk, and provide areas for human recreation and respite; and
- Engineered facilities, such as green street treatments or eco-roofs, which use natural processes in an infrastructure setting.

High-risk Infrastructure Infrastructure assets that have a high risk of failure, based on the likelihood and consequence of that failure.

Infrastructure Consists of assets in three general networks that serve whole communities — transportation modalities (roads, rail, etc.), utilities and parks. These are necessary municipal or public services, provided by the government or by private companies and defined as long-lived capital assets that normally are stationary in nature and can be preserved for a significant number of years. Examples are streets, bridges, drainage systems, water and sewer lines, pump stations and treatment plants, community centers and pools, and police and fire stations. Beyond transportation and utility networks, Portland includes parks, buildings, green infrastructure, communications, and information technology as necessary infrastructure investments that serve the community.

Inventory A list of assets and their principal components.

Level of Service A defined standard against which the quality and quantity of service can be measured. A level of service can include reliability, responsiveness, environmental acceptability, customer values and cost.

Life-Cycle Cost The sum of all costs throughout the life of an asset, including planning, design, acquisition, construction, operation, maintenance, rehabilitation/renewal and disposal costs.

Likelihood of Failure The probability or possibility of an event that will cause the asset to fail.

Maintenance Activities that keep an asset operating as designed or prevent it from deteriorating prematurely, excluding rehabilitation or renewal which may extend asset life. Maintenance can be planned or unplanned. Planned maintenance is:

- **Preventive** maintenance conducted at regular scheduled intervals based on average statistical/anticipated lifetime.
- **Condition-based** maintenance based on objective evidence of need from tests, measurements and observations.
- **Deferred** — the shortfall created by postponing prudent but nonessential repairs to save money or materials. Generally, a policy of continuing deferred maintenance results in higher costs when repairs are eventually made, or failure that occurs sooner than if normal maintenance had been performed.

Unplanned maintenance is:

- **Reactive or Emergency-corrective actions** taken upon failure or obvious threat of failure, usually at a higher cost than planned or preventive maintenance.

Operations The ongoing activities that allow the use of an asset for its intended function.

Performance Indicator A qualitative or quantitative measure used to compare actual performance against a defined standard. Indicators are commonly used to measure cost, performance, or customer satisfaction.

Performance Monitoring The periodic assessments of actual performance compared to specific objectives, targets, or standards.

Rehabilitation/Renewal Maintenance performed on an asset to restore it to its original level of service or capacity and achieve its useful life, which may result in an extension of the asset's service life.

Retirement/Removal Decommissioning or removal of an asset through disposal, abandonment, demolition, or sale that may involve retiring deteriorated assets and recovering salvage value.

Risk	The chance of something happening that will have an impact upon objectives. Risk is measured in terms of likelihood and consequences.
Risk Analysis	A systematic use of available information to determine how often specified events may occur and the magnitude of their consequences.
Risk Management Strategy	The systematic application of management policies, procedures and practices to the tasks of establishing the context, identifying, analyzing, evaluating, treating, monitoring and communicating risk.
Triple Bottom Line	A method to categorize the benefits and impacts an organization can expect from investing in its assets. The benefits are categorized into Social, Economic, and Environmental benefits to ensure a comprehensive evaluation in the decision-making process (measure, manage and report).
Useful Life	the period of time over which an asset is expected to deliver efficient service with normal or appropriate maintenance (defined as accepted industry standard or documented local experience).

Appendix 6: Best Practices Survey Questions

I. General Asset Management

- Is AM terminology understood throughout the organization?
- Does the organization have a clearly defined AM Plan?
- Is AM fully embraced by the elected officials or governing body of the organization?
- Does the organization have a strategy for communicating the AM strategy throughout the organization?
- Does the organization have an overarching goal or mission statement for AM?

II. Current State of the Assets

- Does the organization have an asset inventory?
- Does the organization have a map of asset locations?
- Does the organization have a process for condition assessment?
- Does the organization have a means of estimating useful life?
- Has the organization determined asset replacement values?

III. Level of Service

- Does the organization have a means of communicating to the customers, including communicating the goals of the Level of Service?
- Does the organization have clearly defined Level of Service goals and are they aligned with customer expectations/desires?
- Does the organization meet current regulatory requirements and, if not, does it have a plan to meet these requirements in the future? Does the organization anticipate future regulatory requirements and their impact on operations and infrastructure needs?
- Does the organization measure progress towards meeting the goals of the Level of Service?
- Does the organization analyze current and anticipated customer demands, including planning for future growth or population decline?

IV. Assets Critical to Sustained Performance

- Does the organization have a process to assess the probability of failure of assets?
- Does the organization have a process to assess the consequence of asset failure?
- Does the organization have a process to rank assets according to the likelihood and consequences of asset failure (i.e., according to overall risk)?
- Do the likelihood and consequences of asset failure (i.e., the overall risk) drive asset investment decisions?
- Does overall risk drive asset operation and maintenance (O&M) decisions?

V. Life Cycle Cost

- Is the organization moving from reactive maintenance to planned or proactive maintenance?
- Does the organization have a program to fully consider all aspects of Life Cycle Costing when making infrastructure investment decisions, including initial capital cost, operation and maintenance, repair, and disposal?
- Does the organization have a long-term Capital Improvement Plan?
- Does the organization have a validation process for its capital projects that include consideration of non-asset solutions as well as non-traditional approaches (i.e., green infrastructure, decentralized treatment, water conservation to reduce need for new sources)?
- Does the organization have a program to analyze the use of operation and maintenance processes to extend the life of the existing assets?

VI. Financing

- Does the organization maintain reserve funds/accounts?
- Does the organization target its rates and other revenue streams to adequately fund all long term costs, including both operations and maintenance (O&M) and capital investment/capital debt needs?
- Does the organization have a plan to fund capital improvements for the long term?
- Is investment in assets prioritized based on overall business risk?
- Does the organization provide a program for disadvantaged customers so that adequate rates are possible?