Naval Base Kitsap – Bangor
Puget Sound Naval Shipyard & IMF
Naval Station Everett
Joint Base Lewis McChord
Naval Base Kitsap – Keyport
Camp Murray (Washington Military Department)

NOTE: Passenger-only ferry routes to Port Townsend and Vancouver, B.C.

NOTE: BRT concept would use current foot ferry.

Existing Constrained Plan* Full Plan**
Rapid Transit
Bus Rapid Transit
Light Rail***
Commuter Rail
Rail/Bus (to be determined)
State Highway
Arterial
Passenger-Only Ferry
Auto Ferry
Bicycle/Pedestrian
Transit Station
Park and Ride
Regional Growth Center
Urban Growth Area
Manufacturing/Industrial Center
Military Base

* Constrained Plan includes projects and programs covered by the plan's financial strategy.
** Full Plan includes additional projects and programs not covered by the plan's financial strategy.
*** Future Light Rail alignments are yet to be determined.

TBD TBD TBD

Transportation 2040 toward a sustainable transportation system

Appendix S: State of Good Repair

UPDATE MAY 29, 2014

Puget Sound Regional Council
Appendix S: State of Good Repair

INTRODUCTION

Importance of Investing in State of Good Repair Programs
State of good repair projects and programs rarely receive as much public recognition as major expansion projects, yet making these investments is as critical, if not more so, to keeping people and goods moving throughout the region. Ranging from the replacement of fiber-optic cable to seismic retrofits and paving projects, these behind-the-scenes investments make the transportation network function in a safe and usable manner. Choosing to not maintain and preserve existing transportation assets can have serious economic, environmental, performance, safety, and financial consequences down the line.

Unfortunately, years of deferred maintenance have resulted in a tidal wave of maintenance and preservation investment need fast approaching at a time where most agencies are experiencing budget shortfalls due to a slow recovery from the “Great Recession.” Simply put, existing resources are not sufficient to make critical state of good repair and capacity investments to keep people and goods moving. Responding to these fiscal realities, cities, counties, WSDOT, and transit agencies are stretching dollars further through innovative cost saving measures in state of good repair project design, phasing, and timing. Locally, cities are using more expensive concrete when paving highly used transit lanes whereas remaining lanes are treated with asphalt or other less expensive materials. On highways, WSDOT has implemented new approaches to extending the life of pavements through practices such as dowel-bar retrofitting. Additionally, investments such as seismic retrofits are being prioritized with a focus on safety and economic recovery or development. Though owners and operators of the transportation system are making these crucial investments in the integrity of the infrastructure, without additional dedicated revenue tools to fund maintenance and preservation the region faces a continuing degradation of the system, which could severely limit personal and freight mobility and threaten economic recovery.

Federal and Regional Emphasis on State of Good Repair
In July 2012, President Obama signed into law the Moving Ahead for Progress in the 21st Century Act (MAP-21). This new legislation includes long-term funding authorization of surface transportation programs and a transformation of policy and programmatic frameworks to guide the future development of the system. One of the new provisions included in MAP-21 is a renewed emphasis on the maintenance and preservation of existing transportation infrastructure and services (labeled “state of good repair”). This, and other policy direction, will be implemented through new performance-based planning approaches designed to increase accountability and direct resources where they are needed most. Both the federal policy direction and implementation framework have been fully embraced in the central Puget Sound region.

In addition to this federal direction, local decision-makers have acknowledged deteriorating conditions and placed a considerable emphasis on re-investing in the region’s transportation infrastructure to ensure safe and reliable use of the system. This commitment has been demonstrated in both planning and resource allocation efforts such as adopting a regional plan implementation framework that identifies state of good repair as the region’s top priority (see Figure 1). Further, during the 2012 FHWA and FTA project selection process, policy-makers set-aside nearly $40 million of the region’s federal

State of Good Repair means preserving assets: keeping roads, bridges, buses, and trains in a safe operating condition. State of good repair can mean filling potholes on a local street, replacing old buses and ferries, or repairing an aging bridge.
transportation funding for the purposes of investing in the region’s roadway pavements and transit capital preservation. This policy is currently being extended for the 2014 project selection cycle.

Additionally, PSRC is in the process of developing a regional transportation monitoring program. This effort will serve as the foundation for a regional performance-based planning process designed to increase public accountability and satisfy federal requirements. A key component of this effort will focus on state of good repair. Performance measures are currently being refined and in the future, targets will be established to facilitate analyses of how the system is performing relative to regional goals and objectives. This represents a paradigm shift in regional planning and will be used in future efforts such as the 2018 regional transportation plan update and possibly, resource programming decisions. Additional information on PSRC’s monitoring program and performance-based planning can be found in the Transportation 2040 document.

State of Good Repair in Transportation 2040: Past and Current Methods
Transportation 2040 commits, as a top priority, to funding maintenance, preservation and operation of the existing transportation infrastructure in a safe and usable state. Unfortunately, maintenance and preservation is a topic where little detail exists on which to base future cost estimates. Instead, the 2010 version of Transportation 2040 relied primarily on a series of programmatic models based on historic expenditures to project the regional State of Good Repair investment needs. As a consequence of this approach, the financial strategy reflected current maintenance and preservation investment trends based on fiscal realities rather than the magnitude of future needs for most aspects of the transportation system. Where the 2010 version of Transportation 2040 differed from preceding regional transportation plans was in the estimation of pavement preservation needs. During the development of Transportation 2040 PSRC implemented an approach based on pavement condition scores and standard project costs. This revised approach represented PSRC’s first step in evolving state of good repair cost estimation approaches that captures future needs rather than an extrapolation of historic trends. As Transportation 2040 was adopted, staff received Board direction to continue refining these methods.

The goal of PSRC’s State of Good Repair program for the 2014 Transportation 2040 update was to develop unique approaches that more accurately articulate state of good repair investment needs for a variety of asset classes. This represents an interim step in the development of a robust regional asset management program that meets federal performance-based planning requirements and the ongoing needs of PSRC stakeholders. The work discussed below represents the continued evolution of PSRC’s State of Good Repair planning program and makes progress towards these objectives. What follows is a general description of the approaches implemented during in the 2014 Transportation 2040 Update to better articulate state of good repair investment needs.

State of Good Repair Subcommittee
PSRC solicited members of the Regional Project Evaluation Committee (RPEC) to form a subcommittee to identify key components of the transportation network to focus on and craft new approaches to
estimating costs necessary to maintain the system in a state of good repair. This subcommittee met on an ad hoc basis for six months during the mid-point of the 2014 Transportation 2040 update process, and was comprised of a multi-disciplinary set of staff from WSDOT and the region’s cities, counties, and transit agencies. The committee narrowed the focus of this effort to key areas of the transportation system that were determined to be most productive in terms of having the greatest potential impact on costs and where data was available to support the analyses in a timely manner. As a result, the three areas selected for further development were stormwater drainage, a second iteration of pavement preservation investment, and local traffic operations and intelligent transportation costs. Initially, the group also chose to focus on refining transit operations costs; however, after consideration by PSRC transit committees this effort was determined to be better suited for the 2018 update when costs and the configuration of the transit system will be of great focus.

REVISED COST ESTIMATION APPROACHES

The following section generally discusses reasons why the State of Good Repair Subcommittee selected each topic for increased attention as well as the revised approach for developing cost estimates. In all cases this additional focus and refined methods resulted in increased costs associated with maintaining and operating the existing transportation system.

Stormwater Drainage

Stormwater runoff from the transportation system has been an issue of increasing importance in the central Puget Sound for years. Additional impervious surfaces and an inadequate storm drainage and treatment system are causing significant concerns among the local environmental community, particularly with regard to drainage into the Puget Sound. Nationally, stormwater drainage has become a greater issue as well, which has been reflected in the latest strengthening of the National Pollutant Discharge Elimination System (NPDES) permitting process. Since 2009, NPDES Phase I jurisdictions\(^1\), including Pierce, Snohomish, and King counties, as well as the cities of Seattle and Tacoma, have been required to implement enhanced requirements such as higher standards for roadside retention basins and drainage facilities. Phase II jurisdictions\(^2\) will be required to implement the new standards by 2018. PSRC’s existing approach to estimating future stormwater drainage costs did not reflect these new requirements or the cost of satisfying them.

PSRC’s revised methodology isolates the increased expenditures seen in Phase I jurisdictions’ annual Budget Accounting Reporting System (BARS) data and applies similar adjustments to Phase II jurisdictions in the approximate timeframe of the required implementation of new NPDES requirements. To provide a more conservative estimate, stakeholders identified an annual 2% increase in the cost estimates (in real terms) to address future potential strengthening of NPDES requirements. This new approach to estimating future stormwater drainage costs has been shaped by significant stakeholder discussion and consultation with the Washington Department of Ecology, which is responsible for overseeing the implementation of these federal requirements in the state. The updated stormwater costs represent a cost increase to the adopted plan (after being converted to the most recent Regional Economic Forecast) of over $1.3 billion over the 30-year planning horizon of Transportation 2040. Maintenance for both cities and counties has increased rather significantly, reflecting the enhanced

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\(^1\) Phase I of the NPDES Stormwater Program was promulgated in 1990. It requires large and medium municipal separate storm sewer systems (MS4s) located in incorporated counties with a population of 100,000 or more to obtain NPDES permits.

\(^2\) Phase II of the NPDES Stormwater Program was promulgated in 1999. It requires MS4s not regulated by Phase I, and small construction activities to obtain NPDES permits and develop comprehensive stormwater management programs that will eliminate illicit discharges to MS4s and reduce pollutants in stormwater runoff.
NPDES requirements for cleaning retention basins and other roadside facilities. The preservation/construction component differs in the impacts of the new approach. Whereas the estimate for cities increased, the preservation/construction component of the county stormwater estimate decreased by approximately $151 million, primarily due to the significantly inflated estimate in the currently adopted plan.

**Pavement Preservation**

During the 2010 Transportation 2040 development process, PSRC took steps to refine past approaches for estimating future pavement preservation needs. The revised approach was based on the most recently available pavement condition data provided by local agencies and relied heavily upon a series of broad assumptions, including the timing of investments and average costs for paving and reconstruction projects. A significant drawback of this approach is that it did not factor in lifecycle analyses based on the current condition of a given facility, facility type, or surface. Further, this approach was not outcome-based and, as such, did not facilitate an analysis of tradeoffs between investing in pavement preservation and other areas of the transportation system. Responding to Board direction and MAP-21 legislation, the RPEC State of Good Repair Subcommittee felt that these were important attributes to incorporate into a refined estimate of need. To that end, for the 2014 Transportation 2040 update the committee designed an approach for cities and counties that would allow PSRC to capitalize on local asset management policies, practices, and project costs, and result in an average pavement condition score of 70 (or local equivalent).

An average pavement condition score of 70 (or local equivalent) was selected as a desired regional outcome based on a review of local measurement approaches and thresholds of what is considered to be “good” condition. Additionally, an average rating score of 70 establishes an outcome close to what could be considered “optimal” management of the system since investing in lower-cost treatments in the “sweet spot” on the pavement deterioration curve results in minimizing lifecycle costs relative to investments made lower on the curve. Figures 2 and 3 illustrate the importance of re-investing in pavement earlier in the lifecycle of a roadway segment, for maintaining higher quality pavements at a lower cost.

**Figure 2:** Illustration of Pavement Condition Index Relationship to Pavement Deterioration Curve

**Figure 3:** Roadway Maintenance Treatment Cost Comparison

Source: FHWA Office of Asset Management
The approach developed by the RPEC State of Good Repair Subcommittee relies heavily on data provided by cities and counties through a survey instrument designed to capture three key components.

- **Existing conditions**: Respondents were asked to validate or update the existing pavement conditions PSRC has on file by facility type (based on federal functional classification system).
- **Investment Backlog**: Jurisdictions were asked to provide an estimate of the current backlog of roadway preservation needs relative to a desired pavement condition score of 70.
- **Long-term pavement preservation need**: Respondents were asked to utilize their pavement management systems to develop a cost estimate to maintain an average pavement condition score (by facility type across their jurisdiction) of 70.

The results of the survey approach have three distinct advantages over the previous methods. First, it establishes a regional desired condition rating which begins to move the region in the MAP-21-established direction of outcome-based planning at the regional level. Second, this level of service can be used to inform decision-making and tradeoff discussions. Finally, this approach better reflects local planning policies and project costs. Though this approach represents a significant improvement over the previous methodology, there are still challenges ahead. A significant cost that is not explicitly captured in this approach is the additional cost necessary to comply with the Americans with Disabilities Act requirements governing pedestrian improvements at intersections as pavement preservation projects are implemented. This cost is generally accounted for in another element of the maintenance and preservation program; however, PSRC will look to refine that figure during the 2018 plan update.

**Local Signal Operations and Intelligent Transportation Systems (ITS)**

Costs associated with maintaining, preserving, and operating local traffic operations programs and equipment were specifically identified by the RPEC State of Good Repair Subcommittee as an area of interest. Given the emphasis placed on operating an efficient transportation system in Transportation 2040, it is crucial that the costs associated with preserving and operating these systems is accurately captured in the plan. Historically, future investment in these activities has been based on an extrapolation of past levels of investment by cities and counties, which as discussed previously, has led to investment estimates in the plan that underestimate the true needs of the system.

To better account for these needs in the Transportation 2040 update, staff engaged PSRC’s Regional Traffic Operations Committee (RTOC) to develop a city and county survey similar to the pavement preservation effort. The goal of this survey was to compare what is currently spent on local signal and ITS operations with what the system would cost under an “optimal” scenario. PSRC defined “optimal” as an agency being fully staffed and able to carry out all intended functions in a timely manner, including regular maintenance, and all capital components of the signal operations/ITS system are replaced within their intended lifecycle. PSRC requested a comparison of these two funding levels for three primary areas:

- **Capital preservation**: This element includes costs to replace all existing physical infrastructure including components such as signals, cabinets, poles, transportation management center components, and fiber optic cable.
- **Maintenance**: Includes day-to-day maintenance activities such as inspections and general upkeep such as changing light bulbs in signals.
- **Operations**: Primarily relates to staffing outside of maintenance activities. This category also includes signal retiming, the electric bill, and engineering services.

This survey effort resulted in a wide range of costs, which was expected given different capabilities and goals of various cities and counties with respect to how the transportation system is operated. Disparate responses were aggregated and a fill-in approach was developed based on VISION 2040 city types to calculate regional estimates of what it would cost to maintain existing traffic operations given current funding levels versus what it would cost under the optimal scenario. Ultimately, the scenario which maintained existing funding levels was selected as a key input to the financial strategy rather than the higher “optimal” level. This was primarily a reflection of a common understanding that additional resources are not currently available to support increased levels of system management given the revenue shortfalls experienced by cities and counties in the past four years.

Though the higher level of investment was not chosen for inclusion in the financial strategy, this new approach to collecting and synthesizing levels of investment has proved to be a valuable first step in developing a robust State of Good Repair program that allows for the analysis of tradeoffs. Additionally, Transportation 2040 now reflects a significantly more accurate estimate of what the costs of maintaining existing transportation operations are over time.

**Summary of Changes and Next Steps**

During the 2014 update to Transportation 2040, PSRC focused on three key areas of the State of Good Repair component of the financial strategy. This work has resulted in a net increase of approximately **$5.2 billion** in future city and county costs relative to the adopted plan and a more accurate reflection of costs necessary to maintain the transportation system in a state of good repair. New estimates reflect strengthened stormwater requirements facing cities and counties, an outcome-based approach to estimating future pavement preservation needs and local lifecycle analyses, and detailed thinking about the costs necessary to operate local signals and other traffic management devices.

The work described above represents the latest iteration of PSRC’s efforts to better capture State of Good Repair investment needs in the regional transportation plan. PSRC will continue to develop this program in ways that more accurately reflect the need for State of Good Repair investment, meet the needs of our stakeholders, and satisfy federal requirements. Next steps for the program include working with our transit partners to implement new MAP-21 requirements related to transit asset management, developing specific estimates of transit ITS maintenance and operations costs, developing a new approach for collecting city and county investment needs that are not based on historic expenditures (perhaps a survey tool), and further developing an in-house asset management and program. These elements, and more, are currently in PSRC’s work program in preparation for the 2018 plan update.