



**Washington State  
Department of Transportation**

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# **Maintenance Accountability Process**

February 2022

Maintenance Operations

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## MAP Background

In 1996 the Washington State Department of Transportation embarked on an initiative to develop and employ outcome-based performance measures for evaluating the effectiveness of the Maintenance Program. The Maintenance Accountability Process, or MAP as it has become known, is a comprehensive planning, measuring, and managing process that provides a means for communicating to key customers the impacts of policy and budget decisions on program service delivery.

## Performance Measures

Performance measures provide the tools to link strategic planning, the budget, and maintenance service delivery. It essentially provides the means for evaluating the effectiveness of the program, and program accountability.

**Asset Condition:** This type of performance measure relies on the condition of highway assets as an indicator on how well the maintenance program is being delivered. Since WSDOT's Preservation and Improvement Programs also wield significant bearing on the condition of highway assets, the Maintenance Program is only partially responsible for the results of this performance measure. This measure is made up of a condition indicator, (deficiency or condition to be measured), outcome measure, (unit of measure), and thresholds for the five service levels for each MAP activity. A threshold is the range of allowable deficiencies or conditions for each service level. Operational Assessment deals with the operational side, such as number of repairs in relationship to number of systems in a given period of time. Condition Assessment data is collected using randomly chosen sites for Field Surveys. These surveys are based on random sampling procedures.

**Task Completion:** This type of performance measure focuses on the amount of work that is completed in a defined, optimal maintenance program. This can be viewed similarly to keeping up with the oil changes, tire rotations, and other maintenance tasks to keep one's car in good condition per the maintenance schedule in the owner's manual. The amount of work completed is simply measured and reported as the percent of required maintenance completed in a given timeframe. At the time of this printing, not all maintenance activities have been quantified. Reporting using the Task Completion component began in 2010, with 8 MAP activities. Task completion reporting has grown to 17 activities as of 2019

## MAP Priorities

One of the key MAP tools is the MAP Priority Matrix. The Matrix prioritizes maintenance activities by identifying how critical each activity is in helping the Maintenance Program achieve broad, policy objectives, which are consistent with the WSDOT Strategic Plan. This document is periodically reviewed and updated to ensure the reflection of current agency direction.

## MAP Today

MAP is transitioning as WSDOT moves forward with the emphasis of moving to department wide asset management plans, with different MAP activities becoming part of the department wide integrated system, to include not only maintenance but design and construction as well.

Maintenance is increasing the emphasis on task completion in the way we communicate. With this transition, the importance of having a complete inventory for assets will assist the department in developing Highway Asset Management Plans, as we have with pavements and bridges.

As referenced above, Pavements and Bridges have become more integrated across the agency in terms of how asset condition is assessed and reported. This includes the following three MAP activities:

**1A1 Pavement** is now part of an integrated approach using WSPMS condition rating, which reflects the outcomes of maintenance and preservation work completed and/or needed. The condition of pavements is reported as the percentage of pavements in fair or better condition.

**4A1 Bridge Deck Repair** and **4A2 Structural Bridge Repair** are now part of an integrated approach using bridge condition inspection ratings which reflect the outcomes of maintenance and preservation work completed and/or needed. The condition of bridges is reported as the percentage of bridges in fair or better condition.

In 2015 WSDOT Maintenance made the decision to move from asset condition level of service reports that are statistically valid at the region level, to level of service reports that are statistically valid only at the statewide level. This applies only to the 13 MAP activities for which the asset condition level of service is determined by the annual MAP field survey. This decision ties in with the emphasis of developing the department wide integrated asset management system as described above and task completion. This move to statewide reporting relies on the utilization of the various maintenance management systems, such as HATS (Highway Activity Tracking System) and the iPad launch for the use of data collection and record keeping.

In 2019 WSDOT Maintenance made the decision to centralize MAP field surveys from the HQ Maintenance office, using experienced WSDOT field personnel to complete surveys across the state.

The move to statewide reporting means less MAP Field surveys. In 2021 the number of surveys will be approximately 600 sites, utilizing highway features out of HATS as the basis of the site locations. These sites are based on a randomized GIS query.

The sites are generated thru a Random Site Generator used thru a GIS analysis process with HATS features integrated into the system for assisting in generating the MAP field site surveys.

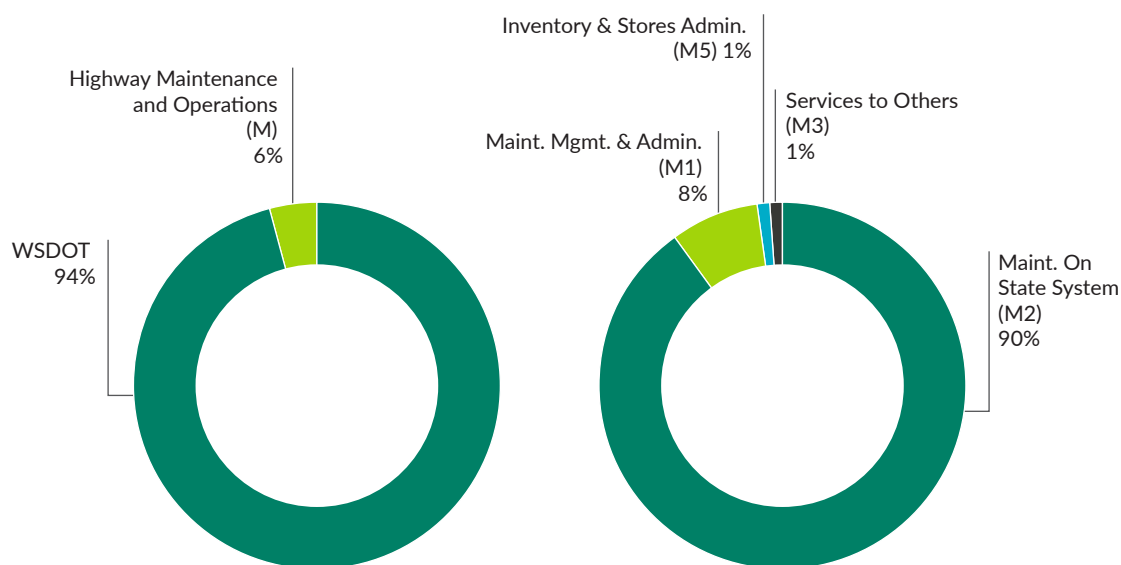
There are currently 36 MAP activities that are tracked through the budget and MAP assessments. Out of the 36 different MAP activities, 27 of these activities are tracked with set service level targets and service levels delivered.



## Program M – Highway Maintenance and Operations

The WSDOT Maintenance Division is responsible for operating and maintaining over 20,000 lane-miles of roadway, 3,500 bridges and structures, as well as over 800,000 individual features such as roadway stormwater systems, drainage, traffic barriers, and roadside vegetation. In addition, 47 safety rest areas are maintained year-round and ten major mountain passes are maintained throughout the winter months. The program’s primary mission is to maintain the highway infrastructure in good working order to keep people and goods moving.

The M Program is the Maintenance “piece of the pie”. In the 2019-2021 biennium, the M Program accounted for 6 percent of the total WSDOT budget.



This piece of pie is then divided into four subprograms, shown in the pie chart above and defined below:

### Subprograms

#### M1 – Maintenance Management and Administration (8% of M)

All expenditures of a management or administrative nature that are directly related to maintenance and operation of the highway system and cannot be directly distributed to specific maintenance activities.

#### M2 – Maintenance on State System (90% of M)

All expenditures for activities related to maintenance and operation of the highway system and associated facilities so that it substantially retains its original intended use and function.

### M3 – Maintenance – Sales and Services to Others (1% of M)

Provides for reimbursable maintenance of streets and roads and other services rendered to cities, counties, and other local entities.

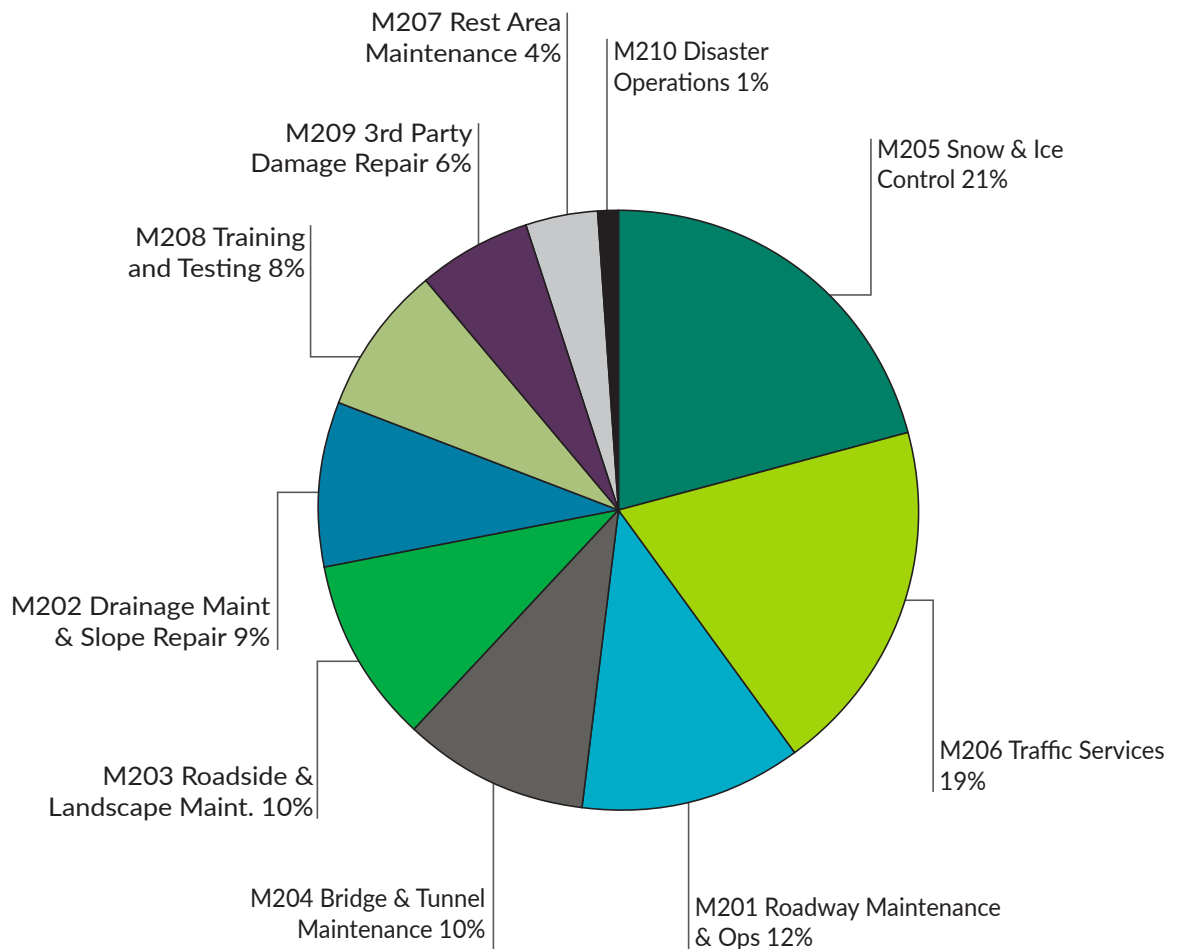
### M5 – Inventory and Stores Administration (1% of M)

All expenditures for management and administration of necessary materials and supplies for maintenance and operations of the highway and associated facilities. This includes ordering, receiving, storing, issuing, and disposing of items such as: signs, stockpiled sand and gravel, guardrail posts, traffic cones, and herbicides.

## M2 Subprogram – Maintenance on State System

The M2 Subprogram, Maintenance on State System, is the subprogram that MAP was developed for. It is divided into two components, distributed across nine basic work groups. Each group may contain activities pertaining to both Maintenance and Operations. The following chart indicates how M2 dollars were budgeted in the 2019-2021 biennium by Maintenance group.

#### M2 Groups



## Components

### Maintenance

This component consists of work that is performed to care for and maintain the highway and associated facilities so that it substantially retains its original intended use and function.

**Examples:**

1. Pavement patching and repairing potholes
2. Cleaning ditches and culverts so they retain design capacity for drainage
3. Controlling vegetation so it does not block signs or obstruct intersections
4. Painting stripes on the roadway surface

### Operations

This component covers activities performed to operate the highway and associated facilities. Generally, these activities affect the reliability of a direct service to customers using the highway, a facility, or a system.

**Examples:**

1. Rest area operations
2. Reversible lane gate, highway lighting and traffic signal system operation
3. Snow and ice control to keep highways operational during the winter storms
4. Disaster operations to keep highways or detours operational during a disaster

## Groups

Groups contained in the M2 Program are the maintenance functions needed to maintain the highway system. Each of these groups has associated MAP activities assigned according to which portion of the highway system they affect.

They consist of:

**Group 1 – Roadway Maintenance & Operations (12% of M2)**

**A – Roadway Maintenance**

- 1A1 – Pavement Patching, Repair & Crack Sealing
- 1A3 – Shoulder Maintenance
- 1A4 – Sweeping & Cleaning

**B – Roadway Operations**

- B1 – Safety Patrol

**Group 2 – Drainage Maintenance & Slope Repair (9% of M2)**

**A – Drainage Maintenance**

- 2A1 – Ditch Maintenance
- 2A2 – Culvert Maintenance
- 2A3 – Catch Basin & Inlet Maintenance
- 2A4 – Stormwater Facility Maintenance
- 2A5 – Slope Repair

**Group 3 – Roadside & Vegetation Management (10% of M2)****A – Roadside & Veg Mgmt. Maintenance**

- 3A1 – Litter Pickup
- 3A2 – Noxious Weed Control
- 3A3 – Nuisance Vegetation Control
- 3A4 –Vegetation Obstruction Control
- 3A5 – Landscape Maintenance

**Group 4 – Bridge & Urban Tunnel Maintenance & Operations (10% of M2)****A – Bridge & Tunnel Maintenance**

- 4A1 – Bridge Deck Repair
- 4A2 – Structural Bridge Repair
- 4A3 – Bridge Cleaning

**B – Bridge & Tunnel Operations**

- 4B1 – Special Bridge and Ferry Operation
- 4B3 – Urban Tunnel Systems Operation

**Group 5 – Snow & Ice Control Operations (21% of M2)****B – Snow & Ice Operations**

- 5B1 – Snow & Ice Control Operations

**Group 6 – Traffic Control Maintenance & Operations (19% of M2)****A – Traffic Control Maintenance**

- 6A1 – Pavement Striping Maintenance
- 6A2 – Raised/Recessed Pvmt Marker Maint
- 6A3 – Pavement Marking Maintenance
- 6A4 – Regulatory Sign Maintenance
- 6A5 – Guide Sign Maintenance
- 6A6 – Guidepost Maintenance
- 6A7 – Barrier Maintenance

**B – Traffic Control Operations**

- 6B1 – Traffic Signal Systems
- 6B2 – Highway Lighting Systems
- 6B3 – Intelligent Transportation Systems

**Group 7 – Rest Area Operations (4% of M2)****B – Rest Area Operations**

- 7B1 – Rest Area Operations

**Group 8 – Training & Testing (8% of M2)****B – Training & Testing (Operations)**

- 8B1 – Employee Technical & Safety Training
- 8B2 – Support & Testing

**Group 9 – 3rd Party Damages (6% of M2)****B – 3rd Party Damage Repair (Operations)**

- 9B1 – 3rd Party Damages

**Group 10 – Emergency Response (1% of M2)****B – Emergency (Operations)**

- 9B2 – Emergency Response

This chapter is all about the MAP activities and associated work operations. Each activity is defined and examples of tasks, crew size, equipment used, appropriate work operations and much more can be found here.

MAP Activity numbers indicate which component and group they are a part of. The first character signifies the group, the second signifies the component and the third is simply the order of activities within a particular group. For instance, let's look at 1A4, Sweeping and Cleaning Maintenance. The number 1 tells us this activity is in Group 1, Roadway Maintenance & Operations. The letter A informs us that this activity is considered part of the Maintenance component. Lastly, the number 4 indicates this was the fourth item in Group 1 (Crack Sealing was activity 1A2).

### **General Notes:**

1. The equipment identified for each activity varies. Different types of equipment may be selected, when in the judgment of trained maintenance personnel, it is determined that this equipment is necessary for safe, cost effective, and expeditious execution of the activity.
2. The crew size for maintenance activities can vary due to scope of work and additional traffic control may be needed to ensure a safe work site. Many activities require one or more buffer trucks with a truck mounted attenuator and arrow boards. Highways that have high traffic volumes, are in urban locations, or have extensive curves with low visibility will require additional workers for traffic control purposes.

## **Group 1 – Roadway Maintenance & Operations**

### **1A1 – Pavement Patching, Repair & Crack Sealing**

Activities required to fix pavement deficiencies such as potholes, alligator cracking, and rutting to extend the life of the pavement, both in the roadway lanes as well as the paved shoulders. Asphalt work on the shoulders is included under 1A1 starting with the beginning of 17\_19 biennium. Work may include digging out old broken pavement, any unstable base material, and placing and compacting new, free draining, base material and asphalt mix with mechanized equipment or hand tools depending on the size of the patch. For large areas of deficient pavement, an asphalt distributor spraying hot liquid asphalt or emulsified asphalt on the distressed pavement area and covering it with crushed rock and rolling the rock to compact and seat the stones together, or an overlay patch with hot-mix asphalt may be used. This activity also includes grading and repairing gravel roads, repairing broken curbs, and engineering services for special, roadway-related projects. Equipment may include dump trucks, front end loader, motor grader, paving machine, steel roller, rubber tire roller, chip spreader, oil tank trailer and/or an oil distributor.

This activity also includes crack sealing, which is repairing cracks in asphalt and concrete pavement to extend the life of the pavement. Random cracking will appear in pavements due to natural aging and traffic action. Cracks over 0.25 inches wide should be filled to prevent water from entering and weakening the underlying subgrade. Crack sealing is accomplished by pouring hot liquid asphalt in the cracks. Equipment may include dump trucks, compressor, and asphalt kettle.

There is not a MAP Activity for 1A2 Crack Sealing any longer. This MAP activity was integrated into 1A1.

### **1A3 – Shoulder Maintenance**

Activities required to repair deficiencies along the paved shoulder or gravel area adjacent to the edge of the pavement. Includes activities like grading the gravel to repair erosion or a drop-off developed by vehicles driving off the pavement edge, and removing shoulder buildup caused by vegetation growth, cleaning under guardrail, or sand left from winter work. Equipment may include a motor grader for the grading work, backhoe, and a sweeper for cleanup, or all the equipment listed for pavement patching and crack sealing.

Shoulder Maintenance is still a separate MAP activity that we track not only for edge build up and drop off, but for MAP LOS ratings. The MAP LOS for 1A3 still includes pavement deficiencies going into the 21-23 biennium.

### **1A4 – Sweeping & Cleaning**

Includes sweeping paved shoulders and paved islands either by hand or with a self-propelled mechanical sweeper. The work may include picking up all debris, hauling it to a nearby waste disposal site, and washing the pavement with a street flusher. Equipment may include dump trucks, sweepers and street flushers.

### **1B1– Safety Patrol**

Includes patrolling the highway to ensure that the roadway, shoulder, and right of way are free of hazards to the traveling public or hazards that may jeopardize the roadway or roadway prism. Work includes traveling the roadway to inspect for hazardous conditions or problems. Situations requiring immediate attention include rocks, debris, downed stop signs, or dead animals on the roadway. These are corrected without delay to minimize the traveling public's exposure to the hazard. Any conditions that require a crew or special equipment, such as damaged guardrail, a sign down, a rockslide, or wind-blown tree that has encroached on the roadway are reported to the area maintenance office for future scheduling of crews. Safety patrols are routinely accomplished in areas that commonly have problems, such as rockfall or slide areas, and high-volume roadways where there is more likelihood of damage occurring or having debris on the roadway.

This activity also includes responding to complaints from the public or the State Patrol about hazards reported to the area office. Each complaint/identified problem must be inspected to determine the severity of the problem and the appropriate remedy. Situations requiring immediate attention are corrected without delay to minimize the traveling public's exposure to the hazard. The work is normally accomplished by one person in a truck.

If, while carrying out Safety Patrol, maintenance personnel spend one or more cumulative hours in a given day conducting another activity for which there is a different work operation number, that time should be charged to that work operation number. Otherwise only use work operation code 1185 if spending less than an hour on any given maintenance action.

## Group 2 – Drainage Maintenance & Slope Repair

### 2A1– Ditch Maintenance

Includes all work necessary to remove silt, soil and rock that have built up over time to restore the flow capacity of ditches or channels. Work may include placing rock in ditches that have eroded to restore the original flow lines and control future erosion. Re-vegetation of the cleaned ditch may also be implemented to control future erosion. Material that is removed from the ditch must be hauled to a suitable disposal site. Equipment may include dump trucks, front end loader, motor grader, belt loader, excavator, or backhoe.

### 2A2 – Culvert Maintenance

Includes all work necessary to keep culverts that cross state highways and county road approaches free of debris and silt. Also includes removing debris build-up, beaver dams, or brush at culvert ends to insure they are free of obstructions. Equipment may include a culvert jet rodder, dump truck, backhoe, and hand tools.

### 2A3 – Catch Basin & Inlet Maintenance

Includes all work necessary to restore flow and storage capacity of inlets, catch basins, manholes, and connecting pipes. Work includes removing the lid and extracting built-up debris and silt. Equipment may include a vacuum truck, culvert jet rodder, water tank truck, dump truck, truck mounted attenuator, and hand tools.

### 2A4 – Stormwater Facility Maintenance

Includes all work necessary to maintain the original functionality of stormwater facilities to meet WSDOT Highway Runoff Manual Chapter 5-5 requirements. This work may consist of removing soil/silt buildup from stormwater treatment/flow control facilities and inlet/outlet pipes. Material that is removed must be properly managed. Work may also involve erosion repair, liner repair, beaver dam removal, tree removal and noxious and nuisance weed control within the confines of the storm water facility. Equipment may include dump trucks, front end loader, excavator, backhoe, or mowers.

### 2A5 – Slope Repair

Includes all work necessary to repair slope damage from slides, drifting sand or erosion. Work also includes repairing damage to riprap, cribbing, bulkheads, and dikes. For slide repair, the rock, mud, or dirt that that has slid into the ditch or on the roadway must be removed and the ditch returned to its original shape. Erosion repair will involve replacing the eroded material with rock, gravel, or other material to stabilize the slope and restore it to its original shape. It may also require removing the eroded material if it has caused damage to adjoining land. Re-vegetation of the slope may also be implemented to control future slope damage. Equipment may include dump trucks, front end loader, excavator, or backhoe.

## Group 3 – Roadside & Vegetation Management

### 3A1 – Litter Pickup

Includes all work necessary to remove litter, debris, and dead animal carcasses from the shoulder and roadside, and haul it to an appropriate disposal site. This work also includes Homeless Camp cleanup, as well as administration of the Adopt-A-Highway Litter Control Program including providing safety hats and vests, signs, and litter sacks to the groups and collecting the filled sacks and hauling to an appropriate disposal site. Work may require a small truck, dump truck or garbage compactor.

### 3A2 – Noxious Weed Control

Includes all work necessary to eradicate and prevent the spread of seed from weeds identified in WAC 16-750 as a Class A or B noxious weed and growing on highway rights of way. The work may involve the spraying of herbicides, mowing, hand pulling, or application of biological control agents (bugs or diseases). The work also includes preventive strategies such as seeding, planting, fertilizing, or liming to enhance desirable vegetation communities which will out-compete unwanted weeds. Work is accomplished by using spray equipment, manual methods, or mowers. A buffer truck may be necessary for traffic control and safety.

### 3A3 – Nuisance Vegetation Control

Includes all work necessary to eradicate nuisance vegetation on the right of way that is not identified in WAC 16-750 as a Class A or B noxious weed, nor considered a safety hazard from a highway operational standpoint. This type of vegetation is either aesthetically unsightly or is troublesome. Scotch Broom and blackberries are two plants that typically fall into this category on the west side of the state. Morning Glory and Puncture vine are examples for the east side. This work includes general mowing of the roadside to improve neatness and appearance. The work may involve the spraying of herbicides, mowing, brushing with hand tools or power saws, pulling by hand, or application of biological control agents (bugs or diseases). Also includes application of soil residual herbicides to prevent vegetation from growing in the gravel at the edge of the pavement. Equipment may include dump trucks, bucket truck, power spray equipment, mowers, or Spyder with a brush head. A buffer truck may be necessary for traffic control and safety.

### 3A4 – Vegetation Obstruction Control

Includes all work necessary to eliminate vegetation on the right of way that is, or potentially will be, a safety hazard from an operational standpoint. This type of vegetation is either an obstruction to a vehicle leaving the highway that would cause damage if struck or is an obstruction to the vision of motorists using the highway and would prevent someone from seeing an upcoming hazard and not allow adequate time to prevent an accident. The work also includes keeping sight lines to signs open; removal of trees and brush that shade the roadway causing icing conditions during the winter; removal of vegetation that is a potential fire hazard; and removal of trees that exhibit structural flaws which increase potential for failure and falling on the roadway. Also includes removal of trees that have fallen on the road after a snow or windstorm.

Obstructions can include hazard trees, trees 4 inches in diameter or larger in the clear zone, and vegetation blocking regulatory, warning, and advisory signs. Other hazards included in this work group are vegetation blocking sight lines to ditch lines, guardrail, guideposts, and



private approaches. Potential obstructions are seedling trees that are not large enough to be a hazard but will be so in the future.

The work may involve the spraying of herbicides, mowing, brushing with hand tools or power saws, or pulling by hand. This group does not include preventive strategies such as seeding and fertilizing. Equipment may include dump trucks, bucket truck, power spray equipment, mowers, Spyder with a brush head, chipper, chain saw, pole saw, or hand tools.

### **3A5 – Landscape Maintenance**

Includes all activities related to the care of formal, ornamental landscape plantings along the highway and interchanges. Work includes weed prevention and eradication; operation and repair of irrigation systems; fertilizing, liming, pruning, trimming, and mowing of lawns. Equipment may include backhoe, truck, herbicide and insecticide spray equipment, chain saw, hand tools, and fertilizer spreader.

## **Group 4 – Bridge & Urban Tunnel Maintenance & Operations**

### **4A1 – Bridge Deck Repair**

Includes all work necessary to repair scaling, spalling, cracks, and exposed reinforcing steel on bridge decks. The work includes saw cutting and removal of broken asphalt or concrete from the damaged area and patching it with an appropriate mix or compound such as asphalt, epoxy, or concrete. Deck Sealing can be applied to extend service life of a concrete deck. A light application of a penetrating sealer or an epoxy can be applied. Equipment may include air compressor, jackhammer, concrete saw, front end loader, shot blaster, sweeper, and trucks. A buffer truck may be necessary for traffic control and safety.

### **4A2 – Structural Bridge Repair**

Includes all work necessary to repair deficiencies that affect the structural support systems of a bridge or tunnel. This includes a wide variety of work including repairing piers or girders, replacing bearing pads, replacing damaged or deteriorated truss members, replacing or repairing expansion joints, repairing scour around piers, and removing debris build-up against piers, bulkheads, or pilings. This may also include tunnel interior maintenance, maintenance of non-structural portions of the bridge (bridge rail, traffic gates, navigation lights, etc.), and payments to other states for inter-state bridge maintenance activities. Equipment may include an air compressor, jackhammer, concrete saw, under-bridge bucket truck, backhoe, and dump trucks. A buffer truck may be necessary for traffic control and safety.

### **4A3 – Bridge Cleaning**

Includes all work necessary to clean bridge surfaces, sidewalks, and drains to remove sand and debris build-up, provide proper drainage, and an aesthetically clean appearance. Work includes sweeping and washing decks and sidewalks, power washing or sand blasting rust, moss, bird guano, or dirt from surfaces, and cleaning plugged drains and grates so water flows through them freely. This activity also includes painting steel structures to prevent rusting and present an aesthetically pleasant appearance. Equipment may include an air compressor, power washer, sweeper, vactor truck, flusher truck, bucket truck, front end loader, and dump trucks. A buffer truck may be necessary for traffic control and safety.

## **4B1 – Special Bridge and Ferry Operation**

Coast Guard regulations require that certain waterways be always open to navigation. Highway bridges that cross these waterways must either be high enough to allow ships and boats to pass underneath or have the ability to move the span so ships and boats can pass on demand. This activity includes all work necessary to maintain and operate moving and floating bridges that are not covered in the activities listed above. Work includes maintenance of all mechanical and electrical working parts so the bridges can be opened and closed when needed. The activity includes the work operation of opening and closing the bridge span. Also includes work to operate floating bridges including pumping water out of pontoons and adjusting anchor cable tension. This work is necessary to keep the bridges operational, afloat, and in proper alignment. Tools may include a variety of specialized electrical and mechanical equipment.

This activity also includes all work necessary to perform preventive maintenance tasks on mechanical and electrical bridge systems, as identified by the manufacturer, or contained in the O&M Manual. These systems can be very complex and require preventive maintenance to ensure the longest lifecycle possible. Tasks are identified and scheduled for completion in MPET (Maintenance Productivity Enhancement Tool). Tools may include a variety of specialized electrical and mechanical equipment.

In 2015 the Keller Ferry was added to MAP activity 4B1. This includes all work necessary to operate the Keller Ferry which crosses Franklin D. Roosevelt Lake (slack water behind Grand Coulee Dam) and is a vital transportation link for agricultural commerce on SR 21 between the communities of Republic and Wilbur. The ferry (the “Sanpoil”) is a diesel- powered barge-type boat that navigates the 1 1/2 miles, 18 hours a day, 365 days a year. The ferry is typically operated by a two-person crew that must be licensed by the U.S. Coast Guard.

## **4B3 – Urban Tunnel System Operation**

Urban tunnels, primarily in the Seattle area, contain several safety and operational systems that are deployed during high traffic periods to ventilate the tunnels, or apply fire suppressants in the event of a fire. These systems require periodic testing and operation. This activity includes all work necessary to insure all the mechanical, electrical, and electronic equipment such as exhaust fans, fire protection systems, carbon dioxide monitoring equipment, lighting, radio systems, and all other equipment including the computer control system is operational at all times. This activity also includes all work necessary to perform preventive maintenance tasks as identified by the manufacturer or contained in the O&M Manual for Urban Tunnel systems. These systems can be very complex and require preventive maintenance to ensure peak performance. Tasks are identified and scheduled for completion in MPET (Maintenance Productivity Enhancement Tool). This work requires technically trained personnel with specialized skills such as those found in the professions of electricians, plumbers/pipefitters, millwrights, and electronics technicians.

## Group 5 – Snow & Ice Control Operations

### 5B1 – Snow & Ice Control

During winter months from November through March, the primary focus of highway maintenance is keeping the highways operational by the removal of snow and ice, and the routine patrolling of the roadway for early detection of slides, icing, and other winter hazards. This includes 10 mountain passes that remain open year-round. On Snoqualmie and Stevens Passes, avalanche crews monitor and control potential avalanches before they are a hazard to the traveling public. Over the past several years, the Snow & Ice Program has moved toward a chemical program, using anti-icing chemicals or deicers more, and sand less. With better technology and better weather forecasting, the appropriate use of chemicals provides the means to keep highways clearer than plowing alone. Sand continues to be used when appropriate. Between snowstorms, the crews in some areas may sweep up accumulated sand to reduce dust and minimize resulting air quality impacts. Highways are prioritized for snow and ice control based primarily on traffic volumes and functional class. Interstate and principal arterial highways with the highest average daily traffic within a given maintenance area, will normally receive the first attention. Since winter storms may occur at any time, during any day, with varying intensity, staffing schedules are adjusted to provide a broader coverage and offer better response to storm events. Typical equipment may include dump trucks with a sander and a plow, motor grader, deicer tanker/truck, pickup truck, front end loader, or snow blower.

## Group 6 – Traffic Control Maintenance & Operations

### 6A1 – Pavement Striping Maintenance

All highways have lines that delineate the travel lane for motorists. On multi-lane and two-lane roadways this normally consists of a continuous edge stripe closest to the outside shoulder on each side, and a dashed centerline down the middle, to separate the roadway from oncoming traffic. On hilly and curved roads additional yellow stripes will define “No Passing” Zones. The combination of traffic, sand, dirt, and debris can wear these stripes away over time and they must routinely be replaced. The stripes may last anywhere from a month during the winter season to more than one calendar year depending on a combination of these factors. Stripes can be painted on the roadway or be composed of thermoplastic or methyl methacrylate materials. Equipment may include a paint truck, flatbed truck, van, and 1 or more trucks with a mounted attenuator.

### 6A2 – Raised/Recessed Pavement Markers (Buttons) Maintenance

On many highways, the lines that delineate the traffic lanes and other pavement markings are made up of individual pavement markers (RPM's) or buttons. Across the state, there has been an increase of recessed pavement markings, the placement of the buttons varies whether they are placed on centerline, gores, etc. The pavement is ground out with tapers in and out, sealed, and pavement markings are placed and set with an epoxy. RPM's are also used to supplement painted lines. Traffic dislodges the RPM's over time and they must routinely be replaced. Additionally, the reflectivity of RPM's decreases due to exposure to traffic and new RPM's must be installed even though the old ones are still in place. The RPM's are normally glued in place with a bituminous adhesive. Equipment may include a pickup truck, air compressor, grinder, sweeper, and 1 or more trucks with a mounted attenuator.

### **6A3 – Pavement Marking Maintenance**

There are a variety of markings on the highway to advise and direct motorists. Crosswalks, stop bars, directional arrows, HOV diamond, and railroad crossings are just a few. The combination of traffic, sand, dirt, and debris can wear these markings away over time and they must routinely be replaced. Many markings are painted on the roadway, but thermoplastic or methyl methacrylate materials are also used. Equipment may include a paint truck, flatbed truck, van, and changeable message sign mounted on a truck or trailer, and one or more truck mounted attenuators or buffers.

### **6A4 & 5 – Regulatory/Warning & Guide Sign Maintenance**

There are a variety of signs placed on the highway to regulate, warn, guide, and inform motorists. Regulatory signs inform motorists of a law, regulation, or legal requirement such as stop signs, speed limit signs, or yield signs. Warning signs alert the motorist of a condition that may be hazardous on or adjacent to the roadway such as “Curve Ahead 35 MPH” or “Crossroad Ahead”. Guide signs provide directional or navigational information to the motorists such as “Seattle Next Right” or distance to the next interchange or community. Informational signs provide motorists with information about facilities, services, and attractions such as “FOOD, GAS, and LODGING” or which “Adopt-a-Highway” group is responsible for a given section of highway. These signs periodically get knocked down, are damaged in some manner, eventually lose their reflective properties and readability due to fading from exposure to the elements, or just get dirty. Equipment may include a flatbed truck, bucket truck, or a boom truck with a posthole digger.

### **6A6 – Guidepost Maintenance**

Guideposts and delineators are placed along the edge of the highway to advise and guide motorists at intersections and on curves. These markers are a reflective indicator on a flexible post used to aid driving at night or during inclement weather such as snow, rain, or fog. Guideposts periodically get damaged in some manner, eventually lose their reflective properties due to fading from exposure to the elements, or just get dirty. In the past, some maintenance areas will paint marks on the asphalt, making it easier and faster to identify locations for replacement of missing guideposts. This will be instituted over time, with some marking done by contractors or inspectors on new pavement, some being done by maintenance crews as they go about their daily tasks. Equipment may include a flatbed truck, pickup truck with hand tools, bucket truck, air compressor, or a boom truck. A buffer truck may be necessary for traffic control safety.

### **6A7 – Barrier Maintenance**

Barrier (beam, cable or jersey barrier) is placed at the edge of the pavement to prevent vehicles from striking hazardous obstacles, oncoming traffic, or going down steep slopes. The purpose of the guardrail or cable barrier is to redirect errant vehicles and keep them on the road. Barrier that is damaged must be repaired in order for it to maintain its functionality. Equipment may include flatbed truck, backhoe, posthole digger, auger truck, and a dump truck. A buffer truck may be necessary for traffic control safety.

## **6B1 – Traffic Signal Systems**

Traffic signals control the flow and direction of traffic at major intersections. This highly technical equipment must always operate to insure safe movement of vehicles through the intersection. Periodically bulbs burn out, poles are damaged or knocked down, control units malfunction and electrical wiring or services short out or are lost due to power failure. This activity (6B1) encompasses all traffic signal system repairs and also includes performing identified preventive maintenance tasks necessary to keep traffic signal systems operating at optimal performance to extend the longevity of the system. Technically skilled electricians are required to perform PM's, repairs, or replacement of signal fixtures. Essential equipment includes a truck, boom truck, bucket truck, and other specialized equipment. Also included in 6B1 are the costs of paying for electricity to power the traffic signals.

## **6B2 – Highway Lighting Systems**

Highway luminaires provide light at major intersections, interchange ramps, rest areas and along high-volume highways to improve visibility and safety at night. Major signs are also lighted to improve visibility and readability. Periodically bulbs burn out, light poles are damaged or knocked down, or electrical wiring or services malfunction. This activity includes all repairs; replacement; and performance of identified preventive maintenance tasks necessary to keep illumination systems operating at optimal performance and extend the longevity of the system. Repair, replacement, or PM of lighting fixtures requires technically skilled electricians, a truck, boom truck, bucket truck, and other specialized equipment. Operation of lighting includes paying for electricity to power the lights.

## **6B3 – Intelligent Transportation Systems (ITS)**

Intelligent Transportation System equipment covers a broad variety of highly specialized equipment on the highway that is used to control and regulate the flow of traffic and inform motorists. Examples of ITS for traffic control include ramp meters, reversible lane gates and signs, and variable speed limit signs. Informational equipment includes video cameras, highway advisory radio, and variable message signs. In some cases, this equipment is part of a network that is operated through a central command center using telecommunications for operating and controlling the equipment. All such highly technical equipment requires preventive maintenance and repairs to remain at optimal performance. Preventive maintenance tasks, and the frequency for completion, have been identified for this equipment (see work operation codes). Skilled electronics technicians use a variety of specialized equipment to maintain and operate the system. Operation of Intelligent Traffic Systems includes paying for electricity to power the systems.

## Group 7 – Rest Area Operations

### **7B1 – Rest Area Operations**

There are 47 major rest areas in operation on the state highway system. The rest areas are small, park-like sites that offer a place for motorists to stop, use a rest room facility, rest, relax, obtain limited refreshments, and generally refresh themselves before continuing their journey. All rest areas have rest rooms that must be cleaned, sanitized, and litter receptacles emptied daily, and parking areas that must be cared for. Many rest areas have picnic tables, landscaping, and sidewalks to maintain. These sites also have water and sewer systems that must meet public health regulations for operation. At some locations, site work is done by separate crews on an as-needed basis. Two of the rest areas are maintained cooperatively by WSDOT and another entity.

## Group 8 – Training and Testing

### **8B1 – Employee Technical & Safety Training**

Training employees is critical to having a proficient and skilled work force. Much of the equipment that maintenance uses are very technical and requires periodic training to stay current. Many jobs require special licenses that can only be renewed through a continuing education program and obtaining a minimum number of training credits each year.

### **8B2 – Support and Testing**

This activity covers a variety of miscellaneous things that are necessary for a maintenance organization to operate efficiently and effectively. Activities include field supervision, administrative/clerical support, organizing and inventorying stockpile sites, drug and alcohol testing, managing storerooms, and having a radio dispatcher.

## Group 9 – 3rd Party Damages

### **9B1 – 3rd Party Damages**

Whenever an errant vehicle damages part of the highway facility such as guardrail or a light pole, the driver is financially responsible for the repair or replacement. When a maintenance crew repairs such damage, they charge their work to this activity so the cost of the repair can be accounted for and recovered.

## Group 10 – Emergency Operations

### 9B2 – Emergency Response

Whenever a disaster, such as earthquake, flood, or fire damage restricts highway operation and the event is proclaimed a disaster by state or federal authorities, the cost for returning the facility to operation may be recoverable through disaster relief funding. This may also include the cost of personnel setting up temporary traffic control, detours, or road closures, and any other work related to operating the roadway during these disasters. When maintenance personnel are involved in any disaster-related work, they charge their work to this activity so the cost can be accounted for and recovered.

## Work Operations

Work Operation Numbers (also called Work Operation Codes) are numbers used to track the cost of specific activities. These are entered on timesheets, stores orders, etc. along with a work order and group. Once these numbers are entered into the systems, reports can then be run showing how much a particular work order cost, how much was spent on a single work operation in a specified date range, how much was spent on a particular MAP activity, and numerous other things. The paragraphs and links below contain information about work operations and their relationship to MAP activities.

One MAP activity will have several work operation codes connected to it, but each work operation code is connected to only one MAP activity.

Work operation code lists can be found in the Chart of Accounts and is available upon request by emailing: [WSDOTMaintenanceOperations@wsdot.wa.gov](mailto:WSDOTMaintenanceOperations@wsdot.wa.gov). This list contains all the work operation codes for every Program and Sub Program associated with WSDOT.

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## **Chapter 4                      Performance Measures**

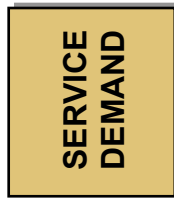
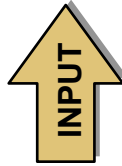
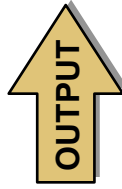
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The Maintenance Accountability Process utilizes outcome-based performance measures with a rating scale of A (best) to F (worst) for reporting the level of service provided. Outcome based refers to the results of tasks accomplished by Maintenance personnel.

A performance measure is made up of a condition indicator, (deficiency or condition to be measured), outcome measure, (unit of measure), and thresholds for the five service levels for each MAP activity. A threshold is the range of allowable deficiencies or conditions for each service level.

The following pages define each of the performance measures. Included with each performance measure is information on timing (when the information is gathered and reported), the level of reporting is at the statewide level beginning 2016, plus clarifying comments and the source of the data.

# Measuring Performance



**Results**  
Service Level Achieved  
Condition of pavement  
Condition of culverts  
Condition of roadside

**Quantity of Work Done**  
Feet of cracks sealed  
Number of culverts cleaned

**Level Of Delivery Maintenance Activities**

**Re\$ource\$**  
Labor  
Equipment  
Materials  
Information

**Workload**  
Pavement cracks & potholes  
Plugged culverts  
Litter on roadside

## Performance Measures:



**MAP Measures Outcomes**

**Outcomes - Measure the result (outcome)**

- Examples:
- Service level rating
  - Sq. ft. of deficient pavement per shoulder
  - Per cent of culverts plugged
  - Amount of litter per system mile of highway

**Outputs - Measure the quantity of work done.**

- Examples:
- System Shoulder miles maintained
  - Feet of crack sealed
  - Number of culverts cleaned
  - Cubic Yards of litter picked up

<b>Activity Number:</b>	<b>1A1</b>	<b>Priority Rank</b>			<b>3</b>
<b>Activity Name:</b>	Pavement Patching, Repair & Crack Sealing*				
<b>Survey Period:</b>		<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Pavement deficiencies.				
<b>Outcome Measure:</b>	Percent of pavement in fair or better condition, as reported by WSMPS.				
<b>Outcome Unit:</b>					
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
<b>Comments:</b>					
<b>Data Source:</b>	WSDOT relies on an integrated approach using WSPMS condition rating, which takes into account all maintenance and preservation work completed and/or needed.				

<b>Activity Number:</b>	<b>1A3</b>	<b>Priority Rank</b>			<b>16</b>
<b>Activity Name:</b>	Shoulder Maintenance				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Paved shoulder with deficiencies.				
<b>Outcome Measure:</b>	Percent of paved shoulder area with deficiencies.				
<b>Outcome Unit:</b>	% SF				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 2%	2.1% - 4%	4.1% - 8%	8.1% - 15%	> 15%
<b>Comments:</b>	All deficiencies are rolled up to include shoulder potholes, alligator cracking, longitudinal and transverse shoulder cracking, humps and sags, edge raveling, and edge drop-off.				
<b>Data Source:</b>	Field Surveys				

<b>Activity Number:</b>	<b>1A4</b>	<b>Priority Rank</b>			<b>20</b>
<b>Activity Name:</b>	Sweeping and Cleaning				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Sand, rocks, and debris on paved shoulder.				
<b>Outcome Measure:</b>	Percent of paved shoulder area with debris.				
<b>Outcome Unit:</b>	% SF				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 5%	5.1% - 10%	10.1% - 20%	20.1% - 40%	> 40%
<b>Comments:</b>					
<b>Data Source:</b>	Field Surveys				

<b>Activity Number:</b>	<b>2A1</b>	<b>Priority Rank</b>			<b>18</b>
<b>Activity Name:</b>	Ditch Maintenance				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Ditches with sediment build-up, unable to carry design flow.				
<b>Outcome Measure:</b>	Percent of ditches greater than 50% filled with sediment/debris.				
<b>Outcome Unit:</b>	% Full				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 1%	1.1% - 5%	5.1% - 10%	10.1% - 15%	>15%
<b>Comments:</b>					
<b>Data Source:</b>	Field Surveys				

<b>Activity Number:</b>	<b>2A2</b>	<b>Priority Rank</b>			<b>15</b>
<b>Activity Name:</b>	Culvert Maintenance				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Cross culverts and county road approaches plugged with dirt and/or debris, unable to carry design flow.				
<b>Outcome Measure:</b>	Percent of pipes/culverts greater than 50% filled, or otherwise deficient.				
<b>Outcome Unit:</b>	% Deficient				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 2%	2.1% - 5%	5.1% - 10%	10.1% - 20%	>20%
<b>Comments:</b>					
<b>Data Source:</b>	Field Surveys				

<b>Activity Number:</b>	<b>2A3</b>	<b>Priority Rank</b>			<b>6</b>
<b>Activity Name:</b>	Catch Basin and Inlet Maintenance				
<b>Survey Period:</b>	Yearly	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Catch basins/inlets that have incomplete inspections and/or have remaining pending activities in HATS for cleanings and repairs.				
<b>Outcome Measure:</b>	Catch basins/inlets that have remaining inspections. Catch basins/inlets that have remaining cleaning and repairs identified during inspection that are outside the 6-month window that is allowed to complete the work.				
<b>Outcome Unit:</b>	% Deficient				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 to 5%	5.1% - 10%	10.1% - 15%	15.1% - 30%	>30%
<b>Comments:</b>	See Highway Runoff Manual for all specific criteria that shall be considered a deficiency. Reporting time is from July 1 ___ to June 30 ___. Service Levels aligned with NPDES Permit				
<b>Data Source:</b>	HATS-Headquarters NPDES Areas Only number of inspections required number of inspections completed number of facilities requiring maintenance number of facilities maintained **number of facilities that remain deficient outside the 6-month window that is allowed to complete cleanings and repairs based on the NPDES permit.				

<b>Activity Number:</b>	<b>2A4</b>	<b>Priority Rank</b>			<b>12</b>
<b>Activity Name:</b>	Stormwater Facility Maintenance				
<b>Survey Period:</b>	Yearly	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Stormwater facilities that have incomplete inspections and/or have remaining pending activities in HATS for typical and non-typical maintenance.				
<b>Outcome Measure:</b>	Stormwater Facilities that have remaining inspections. Stormwater Facilities that have remaining typical and non-typical maintenance, outside the 1-year window for typical maintenance and 2 years for non-typical maintenance.				
<b>Outcome Unit:</b>	% Deficient				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 to 5%	5.1% - 10%	10.1% - 15%	15.1% - 30%	>30%
<b>Comments:</b>	See Highway Runoff Manual for all specific criteria that shall be considered a deficiency. Reporting time is from July 1 ___ to June 30 ___. Service Levels aligned with NPDES Permit				
<b>Data Source:</b>	HATS -Headquarters NPDES Areas Only number of inspections required number of inspections completed number of facilities requiring maintenance number of facilities maintained *Stormwater Facilities that have remaining typical and non-typical maintenance, outside the 1-year window for typical maintenance and 2 years for non-typical maintenance, based on the NPDES permit.				

<b>Activity Number:</b>	<b>2A5</b>	<b>Priority Rank</b>			<b>21</b>
<b>Activity Name:</b>	Slope Repair				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Unrepaired erosion or slides encroaching on or undermining the shoulder or traveled lane.				
<b>Outcome Measure:</b>	Percent of centerline miles with slides or erosion encroaching on or undermining the shoulder or traveled way.				
<b>Outcome Unit:</b>	% CLM				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 2%	2.1% - 4%	4.1% - 7%	7.1% - 10%	>10%
<b>Comments:</b>	Presence of one or more slope failures reported as a yes or no.				
<b>Data Source:</b>	Field surveys				

<b>Activity Number:</b>	<b>3A1</b>	<b>Priority Rank</b>			<b>27</b>
<b>Activity Name:</b>	Litter Pickup				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Presence of litter on the roadside.				
<b>Outcome Measure:</b>	Number of 4"x4" sized or larger objects present per centerline mile.				
<b>Outcome Unit:</b>	EA/CLM				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 125	126 - 250	251 - 500	501 - 1000	>1000
<b>Comments:</b>					
<b>Data Source:</b>	Field Surveys				

<b>Activity Number:</b>	<b>3A2</b>	<b>Priority Rank</b>			<b>26</b>
<b>Activity Name:</b>	Noxious Weed Control				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Presence of noxious weeds on the roadside.				
<b>Outcome Measure:</b>	Percent of roadside area with legally designated noxious weeds present.				
<b>Outcome Unit:</b>	% Roadside				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 1%	1.1% - 2.5%	2.6% - 5%	5.1% - 15%	>15%
<b>Comments:</b>	This data is to be collected by persons qualified to identify noxious weeds. Current IVM weed lists can be found online.				
<b>Data Source:</b>	Field Surveys				

<b>Activity Number:</b>	<b>3A3</b>	<b>Priority Rank</b>			<b>29</b>
<b>Activity Name:</b>	Nuisance Vegetation Control				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Presence of nuisance vegetation on the roadside.				
<b>Outcome Measure:</b>	Percent of roadside area with nuisance vegetation present.				
<b>Outcome Unit:</b>	% Roadside				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 2.5%	2.6% - 5%	5.1% - 10%	10.1% - 20%	>20%
<b>Comments:</b>	This data is to be collected by persons qualified to identify noxious weeds. Current IVM weed lists can be found online.				
<b>Data Source:</b>	Field Surveys				

<b>Activity Number:</b>	<b>3A4</b>	<b>Priority Rank</b>			<b>23</b>
<b>Activity Name:</b>	Vegetation Obstruction Control				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Presence of vegetation blocking site lines to intersections or signs.				
<b>Outcome Measure:</b>	Percent of centerline miles with instances of vegetation obstructions.				
<b>Outcome Unit:</b>	% CLM				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 0.5%	0.6% - 1.5%	1.6% - 3.5%	3.6% - 6%	>6%
<b>Comments:</b>	Presence of one or more vegetation obstructions reported as a yes or no.				
<b>Data Source:</b>	Field Surveys				

<b>Activity Number:</b>	<b>3A5</b>	<b>Priority Rank</b>			<b>30</b>
<b>Activity Name:</b>	Landscape Maintenance				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Appearance and health of landscaped roadside areas.				
<b>Outcome Measure:</b>	Condition score. Sum of Weed Control, Plant Health, and Trimming/Pruning/Planting condition ratings. See MAP Landscape Survey Matrix.				
<b>Outcome Unit:</b>	Score				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	3	4	5 - 6	7 - 8	9
<b>Comments:</b>	Regions will update landscape locations as needed, each year.				
<b>Data Source:</b>	Landscape Field surveys completed by HQ., unless designated to be completed by Regions See Chapter 4-Appendix for further description for Landscape Surveys				

<b>Activity Number:</b>	<b>4A1</b>	<b>Priority Rank</b>			<b>11</b>
<b>Activity Name:</b>	Bridge Deck Repair				
<b>Survey Period:</b>		<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Bridge deficiencies.				
<b>Outcome Measure:</b>	Percentage of Bridges in fair or better condition, as reported by BPO (Bridge Preservation Office).				
<b>Outcome Unit:</b>					
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
<b>Comments:</b>	Effective in 2014 WSDOT has transitioned to an integrated approach with the Bridge Preservation office on condition-based assessments.				
<b>Data Source:</b>	Bridge inspection reports, via BPO Data source is the Quarterly Reports supplied and verified by the Regions.				

<b>Activity Number:</b>	<b>4A2</b>	<b>Priority Rank</b>			<b>2</b>
<b>Activity Name:</b>	Structural Bridge Repair				
<b>Survey Period:</b>		<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Priority 1 deficiencies identified on bridges.				
<b>Outcome Measure:</b>	Percentage of Bridges in fair or better condition, as reported by BPO (Bridge Preservation Office).				
<b>Outcome Unit:</b>					
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
<b>Comments:</b>	Effective in 2014 WSDOT has transitioned to an integrated approach with the Bridge Preservation Office on condition-based assessments. Reporting Time for task completion is July 1 ___ to June 30 .				
<b>Data Source:</b>	Bridge Repair List and Regional emergent repair lists. Bridge inspection reports, via BPO				

<b>Activity Number:</b>	<b>4A3</b>	<b>Priority Rank</b>			<b>13</b>
<b>Activity Name:</b>	Bridge Cleaning				
<b>Survey Period:</b>	Fiscal Year	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Percentage of total bridges clean or cleaned versus the actual number of bridges that are Fracture Critical and permitted for cleaning over waterways. Number of bridges to be confirmed yearly as inventory gets updated through coordination with BPO office.				
<b>Outcome Measure:</b>	Percent of bridges clean or cleaned.				
<b>Outcome Unit:</b>	% clean or cleaned				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	>90%	80-89.9%	70-79.9%	60-69.9%	<59.9%
<b>Comments:</b>	BPO list of fracture critical for inventory and Regions are the source for completed work. Reporting period is July 1 ___ through June 30 ___.				
<b>Data Source:</b>	Regions- Develop a work plan for completed work and record completed work in MPET. Plan would be coordinated through the Regional Analyst and be recorded in the Quarterly spreadsheet on the M&O SharePoint site.				

<b>Activity Number:</b>	<b>4B1</b>	<b>Priority Rank</b>			<b>1</b>
<b>Activity Name:</b>	Special Bridge and Ferry Operation				
<b>Survey Period:</b>	Fiscal Year	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Delayed opening, closing and trips due to mechanical malfunction. Keller Ferry is days with trip delays due to mechanical malfunction.				
<b>Outcome Measure:</b>	Percent openings/closings delayed due to mechanical malfunction, and percentage of days with trip delays due to mechanical malfunction (Keller Ferry).				
<b>Outcome Unit:</b>	% Delayed				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 2%	2.1% - 5%	5.1% -10%	10.1% 20%	> 20%
<b>Comments:</b>	Keller Ferry was added to Moveable and Floating bridge operations in 2015. Methodology: Bridge openings are recorded in MPET in OL and SC regions, in logbooks in NW region. The total number of openings/closings attempted and the associated number of delays due to mechanical failure are reported to HQ. Keller Ferry trips are recorded in assorted logs maintained on the boat. A trip delay of more than one hour due to a mechanical or electrical malfunction will be counted as one day of delay; there can be more than one delay within that day. The delays shall be calculated with a baseline of 365 days per year. Total number of days with delays will be reported to HQ.				
<b>Data Source:</b>	NW, OL, SC, EA regions provide data.				



<b>Activity Number:</b>	<b>4B3</b>	<b>Priority Rank</b>			<b>7</b>
<b>Activity Name:</b>	Urban Tunnel Systems Operation				
<b>Survey Period:</b>	Fiscal Year	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Tunnel Condition rating for Mechanical, Electrical, and Structural for urban tunnels in NW Region represented by SR 99 and I-90 Tunnels.				
<b>Outcome Measure:</b>	Overall condition score for tunnel elements identified on tunnel inspection reports for mechanical and electrical reported every two years. Structural ratings are reported annually, based on a condition state (CS) of 1 thru 4				
<b>Outcome Unit:</b>	Condition score based on a gradient scale of 1 through 8, with Mechanical and Electrical rated on a numerical rating condition and Structural based on a condition state of CS1 thru CS4 utilizing a graduated scale for CS1 thru CS4.				
<b>Outcome Threshold:</b>	Score	<b>Service Level</b>			
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	8.0-7.0	6.99-6.00	5.99-5.00	4.99-4.00	>4.00
<b>Comments:</b>	Reporting period is July 1 ___ through June 30 ___.				
<b>Data Source:</b>	BPO Reports conducted by licensed inspectors.				

<b>Activity Number:</b>	<b>5B1</b>	<b>Priority Rank</b>			<b>4</b>
<b>Activity Name:</b>	Snow and Ice Control Operations				
<b>Survey Period:</b>	Yearly	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Snow and ice operation performance is measured by the response to a storm event. The measured result is the time it takes crews to respond to an “event” as identified by regional priority or treatment level roads.				
<b>Outcome Measure:</b>	Average score of all LOS ratings based on identification of a storm event and the utilization of trucks that are equipped with AVL systems. Scores are based off of 4 factors: Response time, material used, pre-wet material, and vehicle speed.				
<b>Outcome Unit:</b>	Score				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	4.00 - 3.00	2.99 -2.00	1.99 -1.00	0.99-0.01	<0.01
<b>Comments:</b>					
<b>Data Source:</b>	Statewide Snow and Ice Plan				

<b>Activity Number:</b>	<b>6A1</b>	<b>Priority Rank</b>			<b>10</b>
<b>Activity Name:</b>	Pavement Striping Maintenance				
<b>Survey Period:</b>	Yearly	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Striping that is not repainted annually. The assumption is that all stripes will be repainted each year.				
<b>Outcome Measure:</b>	Percentage of total painted line miles completed, that are represented by completion of paint stripe line miles >90 Res or RL readings and excluding any line miles not completed due to construction.				
<b>Outcome Unit:</b>	% Complete				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	> = 90%	89.9 - 80%	79.9 - 70%	69.9 - 60%	<59.9%
<b>Comments:</b>	Data is collected by striping crew prior to striping and forwarded to M&O MAP personnel during striping season. Spring/Summer/ Fall of calendar year				
<b>Data Source:</b>	Regions/Skipline Regions to supply an inventory of line miles. Assumption is all line miles will be painted every year.				

<b>Activity Number:</b>	<b>6A2</b>	<b>Priority Rank</b>			<b>19</b>
<b>Activity Name:</b>	Raised/Recessed Pavement Marker Maintenance				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Missing or damaged pavement markers (buttons).				
<b>Outcome Measure:</b>	Percent of pavement markers damaged or missing.				
<b>Outcome Unit:</b>	% Deficient				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 5%	5.1% - 10%	10.1% - 20%	20.1% - 30%	> 30%
<b>Comments:</b>					
<b>Data Source:</b>	Field Surveys				

<b>Activity Number:</b>	<b>6A3</b>	<b>Priority Rank</b>			<b>22</b>
<b>Activity Name:</b>	Pavement Marking Maintenance				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Stop bars, arrows, crosswalks, etc., having more than 25% of marking worn or missing.				
<b>Outcome Measure:</b>	Percent of pavement markings with more than 25% worn or missing.				
<b>Outcome Unit:</b>	% Deficient				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 2%	2.1% - 10%	10.1% - 20%	20.1% - 30%	> 30%
<b>Comments:</b>					
<b>Data Source:</b>	Field Surveys				

<b>Activity Number:</b>	<b>6A4</b>	<b>Priority Rank</b>			<b>8</b>
<b>Activity Name:</b>	Regulatory Sign Maintenance				
<b>Survey Period:</b>	Fiscal Year	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Regulatory signs that are unreadable at night.				
<b>Outcome Measure:</b>	Percent of regulatory signs that are unreadable at night.				
<b>Outcome Unit:</b>	% Deficient				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 1%	1.1% - 2%	2.1% - 5%	5.1% - 10%	> 10%
<b>Comments:</b>	In accordance with Title 23, United States Code, Section 109(d) and Title 23, Code of Federal Regulations, Part 655.603, and is approved as the national standard for designing, applying, and planning traffic control devices the MUTCD is the national standard control devices. The MUTCD requires public agencies to have an assessment or management method to maintain sign retro reflectivity. To fulfill this requirement, the department reviews half of the signs each year at night, and results are inputted into the Traffic Sign Management System (TSMS) database.				
<b>Data Source:</b>	HQ Traffic sign database Reporting period July 1 ___ to June 30 ___.				

<b>Activity Number:</b>	<b>6A5</b>	<b>Priority Rank</b>			<b>28</b>
<b>Activity Name:</b>	Guide Sign Maintenance				
<b>Survey Period:</b>	Fiscal Year	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Guide signs that are unreadable at night.				
<b>Outcome Measure:</b>	Percent of guide signs that are unreadable at night.				
<b>Outcome Unit:</b>	% Deficient				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 2%	2.1% - 5%	5.1% - 10%	10.1% - 15%	>15%
<b>Comments:</b>	In accordance with Title 23, United States Code, Section 109(d) and Title 23, Code of Federal Regulations, Part 655.603, and is approved as the national standard for designing, applying, and planning traffic control devices the MUTCD is the national standard control devices. The MUTCD requires public agencies to have an assessment or management method to maintain sign retro reflectivity. To fulfill this requirement, the department reviews half of the signs each year at night, and results are inputted into the Traffic Sign Management System (TSMS) database.				
<b>Data Source:</b>	HQ Traffic sign database Reporting period July 1 ___ to June 30 ___.				

<b>Activity Number:</b>	<b>6A6</b>	<b>Priority Rank</b>			<b>24</b>
<b>Activity Name:</b>	Guidepost Maintenance				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Missing or broken guideposts.				
<b>Outcome Measure:</b>	Percent of guideposts that are broken or missing; including reflectors.				
<b>Outcome Unit:</b>	% Deficient				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 1%	1.1% - 5%	5.1% - 10%	10.1% - 20%	> 20%
<b>Comments:</b>					
<b>Data Source:</b>	Field Surveys				

<b>Activity Number:</b>	<b>6A7</b>	<b>Priority Rank</b>			<b>9</b>
<b>Activity Name:</b>	Barrier Maintenance				
<b>Survey Period:</b>	Summer	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Damaged or defective barrier.				
<b>Outcome Measure:</b>	Percent of barrier that is damaged or missing.				
<b>Outcome Unit:</b>	% Deficient				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	0 - 1%	1.1% - 3%	3.1% - 5%	5.1% - 10%	> 10%
<b>Comments:</b>	Surveys indicate type of barrier, i.e. beam or jersey barrier. All barrier types including cable barrier will be collected under field surveys separately.				
<b>Data Source:</b>	Field Surveys				

<b>Activity Number:</b>	<b>6B1</b>	<b>Priority Rank</b>			<b>5</b>
<b>Activity Name:</b>	Traffic Signal Systems				
<b>Survey Period:</b>	Fiscal Year	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Traffic signals at an intersection flashing, with burned out bulbs, or with a control system malfunction.				
<b>Outcome Measure:</b>	Total number of repairs for a percentage of malfunctions against the total inventory of signal systems. Preventive maintenance is NOT included.				
<b>Outcome Unit:</b>	Rep./Sig./Yr.				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	1 per 2 years	1 per year	2 per year	3 per year	4 per year
<b>Comments:</b>	Reporting period is July 1 ___ through June 30 ___. Do not include 3rd party damages or lightning strikes as these are not an indicator of the asset condition.				
<b>Data Source:</b>	SIMMS database, with regional concurrence.				

<b>Activity Number:</b>	<b>6B2</b>	<b>Priority Rank</b>			<b>25</b>
<b>Activity Name:</b>	Highway Lighting Systems				
<b>Survey Period:</b>	Fiscal Year	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Malfunctions in Highway Lighting Systems that result in non-working or cycling highway lights.				
<b>Outcome Measure:</b>	Number of repairs per Highway Lighting System required for this type of malfunction. Repairs to highway lighting systems.				
<b>Outcome Unit:</b>	Rep./Light/Yr.				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	1 per 2 years	1 per year	2 per year	3 per year	4 per year
<b>Comments:</b>	Reporting period is July 1 ___ through June 30 ___. Do not include 3rd party damages or lightning strikes as these are not an indicator of the asset condition.				
<b>Data Source:</b>	SIMMS database with regional concurrence				

<b>Activity Number:</b>	<b>6B3</b>	<b>Priority Rank</b>			<b>14</b>
<b>Activity Name:</b>	Intelligent Transportation Systems				
<b>Survey Period:</b>	Fiscal Year	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Malfunctioning ramp meters, reversible lane gates, signs, cameras, etc.				
<b>Outcome Measure:</b>	Total number of repairs for a percentage of malfunctions against the total inventory of Intelligent Transportation Systems. Preventative maintenance is NOT included.				
<b>Outcome Unit:</b>	Rep./ITS/Yr.				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	1 per 2 years	1 per year	2 per year	3 per year	4 per year
<b>Comments:</b>	Reporting period is July 1 ___ through June 30 ___. Do not include 3rd party damages or lightning strikes as these are not an indicator of the asset condition.				
<b>Data Source:</b>	SIMMS database, with regional concurrence.				

<b>Activity Number:</b>	<b>7B1</b>	<b>Priority Rank</b>			<b>17</b>
<b>Activity Name:</b>	Rest Area Operations				
<b>Survey Period:</b>	Yearly	<b>Detail Level:</b>			Statewide
<b>Indicator:</b>	Cleanliness of building, non-functional building/utility systems (hand dryer, soap dispenser, RV dump station), appearance of landscaped areas, and sidewalks and pavement.				
<b>Outcome Measure:</b>	Condition score. See MAP Rest Area Survey Form.				
<b>Outcome Unit:</b>	Score				
<b>Outcome Threshold:</b>	<b>Service Level</b>				
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>F</b>
	<5	6 - 9	10 - 13	14 - 17	>17
<b>Comments:</b>	Reporting Time				
<b>Data Source:</b>	HQ Rest Area Field Surveys-calendar year				

## Appendix 4A      **Group 3 - Roadside and Landscape Maintenance**

**Landscape Maintenance Condition Description Matrix**

<b>Weed Control</b>	<b>Plant Health</b>	<b>Trimming, Pruning and Planting</b>
<b>Condition 1</b> Planting beds with less than 5% visible weeds.	Plants healthy and lush. Less than 5% of the plants exhibit visible stress or disease. Ground cover has 100% coverage. Lawns contain less than 5% visible weeds and dry spots.	All plants exhibit appropriate shape and character. Lawns mowed and trimmed regularly, 5% voids in plant beds. Plants have not overgrown their location.
<b>Condition 2</b> Planting beds with less than 15% visible weeds.	Less than 15% of plants exhibiting some stress or disease. Ground cover has no less than 90% coverage. Less than 15% of lawn area contains visible weeds or dry spots.	No more than 15% of all plants exhibit sprouting or contain a few dead or dying branches. Lawns mowed but not trimmed regularly. Less than 15% voids in plant beds. Plants have not overgrown their location.
<b>Condition 3</b> Planting beds with greater than 15% visible weeds.	Greater than 15% of plants exhibiting some stress or disease. Ground cover has less than 90% coverage. Greater than 15% of lawn area contains visible weeds, dry spots, and are allowed to go dormant in the summer.	More than 15% of all plants may exhibit sprouting or contain dead or dying branches. Lawns mowed until dormant but not trimmed. Greater than 15% voids in plant beds. Greater than 15% of plants have overgrown their location.

**Condition Total = Weed Control Condition + Plant Health Condition + Trimming, Pruning Planting Condition**

<b>Service Level</b>	<b>Condition Total</b>
A	3
B	4
C	5 to 6
D	7 to 8
F	9

The Maintenance Accountability Process (MAP) utilizes a simple scale that rates the outcomes of key maintenance activities based on the following criteria:

### **Service Level A (Best)**

This is a very high service level in which the roadway and associated features are in excellent condition. All systems are operational, and users experience no delays.

At this maintenance service level, very few deficiencies are present, and the overall appearance is pleasing. Preventive maintenance is practiced in all maintenance activities resulting in overall low life-cycle costs and pleasing appearance.

Routine activities take place on a regular basis, requiring minimal corrective maintenance activities.

### **Service Level B**

This is a high maintenance service level in which the roadway and associated features are in good condition. All systems are operational. Users may experience occasional delays.

At this maintenance service level, very few deficiencies are present in safety and investment protection activities, but moderate deficiencies exist in all other areas.

Preventive maintenance is practiced for safety-related work, is deferred in other areas, resulting in additional routine and corrective maintenance measures. Corrective maintenance of all elements is handled in a timely manner. Life-cycle costs for maintenance activities are generally low.

### **Service Level C**

This is a medium maintenance service level in which the roadway and associated features are in fair condition. Systems may occasionally be inoperable and not available to users. Short term delays may be experienced when repairs are being made but would not be excessive.

At this maintenance service level, very few deficiencies are present in safety related activities, but moderate deficiencies exist for investment protection activities and significant aesthetic related deficiencies. Preventive maintenance is deferred for most activities except safety-critical work. More emphasis is placed on routine maintenance activities, and corrective maintenance occurs as necessary. A backlog of deficiencies begins to build up that will have to be dealt with eventually, at a higher cost. Some roadway structural problems begin to appear due to the long-term deterioration of the system. There is a noticeable decrease in appearance.

### Service Level D

This is a low maintenance service level in which the roadway and associated features are kept in generally poor condition. Systems failures occur regularly because it is impossible to react in a timely manner to all problems. Occasionally delays may be significant.

At this maintenance service level, moderate deficiencies are present in safety related activities, and significant deficiencies exist for all other activities. Little preventive maintenance is accomplished. Maintenance has become very reactionary and places emphasis on correcting problems as they occur. A significant backlog of deficiencies will begin to build up that will have to be dealt with eventually, at a much higher cost. Safety problems begin to appear that increase risk and liability, and significant roadway structural deficiencies exist that accelerate the long-term deterioration of the system. The overall appearance is very poor.

### Service Level F (Worst)

This is a very low service level in which the roadway and associated features are kept in poor and failing condition. A backlog of systems failures would occur because it is impossible to react in a timely manner to all problems. Significant delays occur on a regular basis.

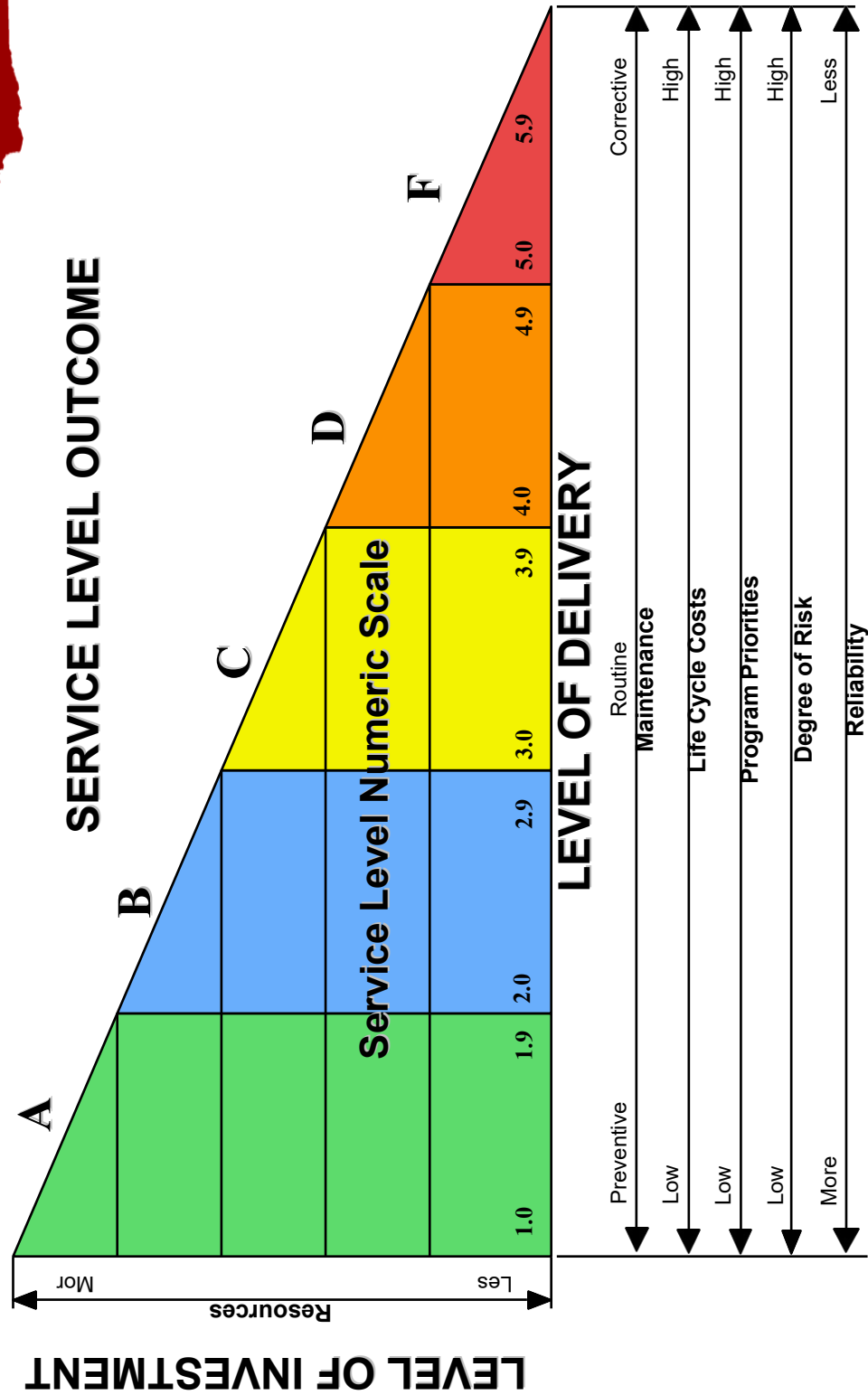
At this maintenance service level, significant deficiencies are present in all maintenance activities. The overall appearance is not aesthetically pleasing. Preventive maintenance is not practiced for any maintenance activities. Maintenance is totally reactive, and places emphasis on correcting problems after they occur. Significant backlogs of maintenance deficiencies exist. Excessive safety problems occur. Road conditions are such that maintenance treatments are not enough to correct the deficiencies that exist, necessitating additional high-cost remedial construction preservation projects in the future. Overall maintenance operations are at their highest life-cycle costs.

The chart on the following page gives a pictorial view of the relationship between the level of investment, level of delivery and service level outcome. Level of investment means how much money is budgeted. This budget pays for the resources (labor, equipment and materials) required to achieve our goals. More money equals more resources equals a higher LOS; less money equals fewer resources equals a lower LOS.

Following the chart, pictures and narration provide examples of service levels for each group of activities.



# Service Level Effectiveness Model



## GROUP 1 – Roadway Maintenance and Operations

## Service Level - A



Pavement with few unrepaired potholes, ruts, or unsealed cracks. No drop-off at the pavement edge. The shoulder is generally clean and free of debris.

## Service Level - B



Pavement has a minor amount of unrepaired potholes, ruts, or unsealed cracks. A minor amount of drop-off and minor erosion is at the pavement edge. The paved shoulder contains a small amount of debris build-up at the edge.

## Service Level - C



Pavement has a moderate amount of unrepaired potholes, ruts, or unsealed cracks. A moderate amount of drop-off has developed from at the pavement edge with some erosion. The paved shoulder contains a noticeable debris build-up that may be unsightly.

## Service Level - D



Pavement has a significant amount of unrepaired potholes, ruts or unsealed cracks. A significant drop-off has developed at the pavement edge with noticeable erosion. The paved shoulder contains significant debris that would restrict bicycle or pedestrian use and be unsightly.

## Service Level - F



Pavement has an extensive amount of unrepaired potholes, ruts, or unsealed cracks. Extensive erosion or drop-off has developed at the pavement edge. The paved shoulder contains debris build-up that would prevent bicycle and pedestrian use, be a hazard to vehicles, and be unsightly.

**GROUP 2 – Drainage Maintenance and Slope Repair**

**Service Level - A**



Ditches and culverts flow freely. Storm drains are free of blockages, and slopes are stable. No standing water on pavement.

**Service Level - B**



Ditches and culverts have minor silt and debris build-up. Storm drains have minor blockages. Minor puddling may occur during normal storm events.

**Service Level - C**



Ditches and culverts have moderate silt and debris build-up. Storm drains have moderate blockages and slopes have moderate erosion or slides. There may be some standing water on shoulder and in ditches during major storm events.

**Service Level - D**








Ditches and culverts have significant silt and debris build-up. Storm drains have significant blockages. Erosion or slides may encroach or threaten the roadway. Standing water in traveled lane during normal storm event.

**Service Level - F**



Ditches and culverts have extensive silt and debris build-up. Drains are blocked. Erosion and slides threaten roadway. Water will be over the roadway during normal storm events.

**GROUP 3 – Roadside and Landscape Maintenance**

Service Level - A	Service Level - B	Service Level - C
 <p>Roadside has minimal visible litter, no noxious weeds, nuisance vegetation, or vegetation obstructions. Ditch lines, guardrail, signs and sight lines are completely visible.</p>	 <p>Roadside has a minor amount of visible litter, noxious weeds, nuisance vegetation, or vegetation obstructions. Ditch lines, guardrail, signs, and sight lines are slightly obscured by encroaching vegetation.</p>	 <p>Roadside has a moderate amount of visible litter, noxious weeds, nuisance vegetation, or vegetation obstructions. Vegetation is starting to encroach on the pavement edge, moderately obscuring ditch lines, guardrail, signs, and sight lines.</p>
Service Level - D	Service Level - F	
 <p>Roadside has a significant amount of visible litter, noxious weeds, nuisance vegetation, or vegetation obstructions. Vegetation is encroaching on the pavement edge, significantly obscuring ditch lines, guardrail, signs, and sight lines.</p>	 <p>Roadside has an extensive amount of visible litter, noxious weeds, nuisance vegetation, or vegetation obstructions. Vegetation has encroached on the pavement, extensively obscuring ditch lines, guardrail, signs, and sight lines.</p>	

**GROUP 4 – Bridge and Urban Tunnel Maintenance & Operations**

**Typical Priority – 1 Bridge and Tunnel Repairs**



Concrete is chipping off the deck and portions of the expansion joint are missing.



Drift debris build-up at bridge pier. This can cause undermining of footings.



Concrete is chipping and flaking off girders and piers.



Rotted timbers of the support structure.



Damage to tunnel ceiling.

## Expected Road Condition after Treatment Completed

A to B

Snow or ice buildup encountered rarely. Bare pavement attained as soon as possible. Travel delays rarely experienced.



B to C

Snow or ice buildup encountered at times but infrequent. Travel at times may experience some isolated delays with roads having patches of black ice, slush, or packed snow.



C to D

Snow or ice buildup encountered regularly. Travel likely to experience some delays with road having black ice or packed snow with only the wheel track bare.



D to F

Compact snow buildup encountered regularly. Traveler will experience delays and slow travel.



**GROUP 6 – Traffic Control Maintenance & Operations**

Service Level - A	Service Level - B	Service Level - C
		
<p>All stripes, signs and delineators are highly visible at night. All traffic signal, lighting, and other traffic operations systems are fully functional. Guardrail is sound and functional.</p>	<p>Minor amount of stripes, signs and delineators have lost some night reflectivity, are worn or missing. Some traffic signal, lighting and other traffic operation systems experience minimal outages or down time. Guardrail has sustained minor visible damage, but is functionally sound.</p>	<p>Moderate amount of stripes, signs and delineators have lost some night reflectivity, are worn or missing. Some traffic signal, lighting and other traffic operations systems experience moderate outages or down time. Guardrail is functionally sound but sustained moderate visible damage and some structural deterioration.</p>
Service Level - D	Service Level - F	
		
<p>Significant amount of stripes, signs and delineators have lost night reflectivity, are worn or missing. Some traffic signal, lighting and other traffic operations system must be turned off or shut down. Guardrail has sustained significant visible damage and moderate structural deterioration.</p>	<p>Extensive amount of stripes, signs and delineators have lost night reflectivity, are worn or missing. Significant traffic signal, lighting, and other traffic operations systems must be turned off or shut down. Guardrail has sustained extensive visible and structure damage.</p>	

GROUP 7 – Rest Area Operations

Service Level - A



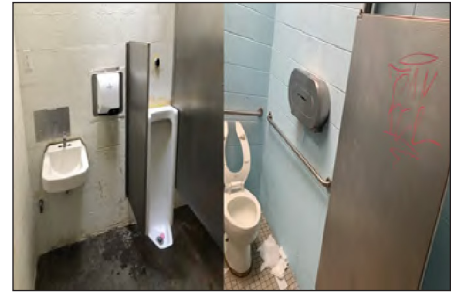
Rest rooms cleaned regularly to meet the highest standard for cleanliness. Water and sewer systems comply with current codes. All building facilities are functional, painted and free of graffiti. Site is free of litter. Grounds are neat and manicured.

Service Level - B



Rest rooms cleaned regularly as much as 2-3 times a day to meet most standards for cleanliness. Water and sewer systems comply with current codes. Buildings contain minor functional damage and some graffiti. Site contains a minor amount of litter. Grounds are clean but exhibits minor wear and damage.

Service Level - C



Rest rooms are cleaned regularly 1-2 times a day to meet moderate standards for cleanliness except in rest areas that receive the highest use. Water and sewer systems comply with current codes but experience some breakdowns due to aging and wear. Buildings contain moderate functional damage and graffiti. Site contains a moderate amount of litter. Grounds exhibit moderate wear and damage.

Service Level - D



Rest rooms are cleaned only once a day to meet minimal standards for cleanliness except in rest areas that receive the highest use. Water and sewer systems comply with current codes but experience frequent breakdowns forcing short term rest area closures. Buildings contain significant functional damage and graffiti. Site contains a significant amount of litter. Grounds exhibit significant wear and damage.

Service Level - F



Due to building, water or sewer system deficiencies, some rest areas are closed for extended periods. Portable toilets may be the only service provided. Grounds contain significant defects and extensive litter.



### Maintenance Activity Priorities

Maintenance activities are prioritized according to their contribution to helping the program achieve specific policy objectives. These objectives are aligned with goals of the WSDOT Strategic Plan as follows:

\*Safety: Reduce number of fatal and serious injuries (Goal 2) System Operation: Optimize highway system capacity (Goals 2 and 6)

Environmental Stewardship (Goal 3)

Maintain Highway Assets: Strategic Investment for Preservation and Maintenance (Goal 1)

Address Legal Mandates and Obligations (Goals 1, 3, and 5) Comfort and Aesthetics (Goal 5)

\*The priority matrix is currently under review to align with the departments updated goals.

A 0 to 9 scale (9 being highest impact) is used to rate the impact of each maintenance activity on each policy objective. Each policy objective is represented by a multiplier. When the math is done, a numerical priority value is obtained. Priorities are set using these values, highest to lowest.

This priority matrix is typically not used solely to make decisions about budget and program delivery decisions. However, it is a valuable tool when used in concert with various other tools/information in making such decisions.

The 2021-2023 Priority Matrix can be found at:

<https://wsdot.wa.gov/maintenance/accountability-process>

### Data Collection and Reporting

Data is collected in many different ways, depending on which activity is involved. See Chapter 4 for details about each activity, including the data source and when it is collected.

## Field Surveys

Field condition surveys are conducted once a year, during the summer months, collecting data for 13 MAP activities. This data is used to assess the maintenance service levels regarding condition of highway assets that exist at a given point in time. Teams will collect data according to the criteria in the Field Data Collection Guide.

Prior to 2016, we surveyed a number of randomly selected locations sufficient to generate statistically valid Level of Service reports for individual regions as well as our statewide program. In 2016, the number of locations was reduced so only a Level of Service report for the statewide program would be valid. This change was made to conserve resources as well as support the concept of focusing region performance measurement on the metric of task completion and relying on the asset condition metric to reflect the outcomes of maintenance work completed in concert with improvement and preservation work completed across the entire system. In 2021 there were approximately 600 sites across the state randomly picked through a GIS program. The GIS model is based on the following:

Sites are based on HATS features that are along the interstate or highway system; starting in 2021 culverts, barrier, and pavement markings were the features used. Sites remain 528 LF. in length and all data is collected in accordance with aforementioned Field Data Collection Guide.

## Quality Control/Quality Assurance

“QA/QC” surveys are performed by HQ personnel, as they conduct their surveys. Field surveys will be completed with each team to help answer any questions and to increase the accuracy and consistency of data collection. The “QA/QC” process will then continue to be completed as data is collected.

HQ personnel will continue to review and process data looking for any discrepancies during processing. QA/QC will then continue with Regional crews (superintendents, assistant superintendents) being involved with reviewing data collected in their area. Any discrepancies can then be reviewed and updated through coordination with HQ personnel.

Once field survey processing and review is completed and vetted with the regional areas, all findings will be conveyed through regional superintendent meetings and/or the year end Maintenance Engineers meeting.

## Data Input

An iPad application has been developed for MAP and is the only option for data collection. The device is used in the field and downloaded once the surveyors return to the office. Use of the iPad and options for reviewing after download will be covered in the training sessions.

## Targets

In the early years of MAP, targets were established based on initial levels of service achieved. Decisions to adjust targets up or down were made at the discretion of the Regional Maintenance Engineers and the State Maintenance Engineer, working together on these decisions, once again, based on history and level of service achieved. This was changed during the 2007 Legislative Session. Legislators fine-tuned the targets and included them in LEAP Transportation Document 2007-C, thereby writing the targets for the 07-09 biennium into “legislation”. In the 09-11 biennium the Secretary of WSDOT lowered some MAP targets in response to budget constraints. The 2019-2021 targets are on the next page. The MAP targets are now out of the Legislative Leap document and are once again, at the discretion of the Regional Maintenance Engineers and the State Maintenance Engineer.

### Maintenance Accountability Process Activity Level Targets CY 2020 - Statewide

Activity	A	B	C	D	F
<b>Group - 1 Roadway Maintenance and Operations</b>					
1A3 Shoulder Maintenance			⊙		
1A4 Sweeping and Cleaning	⊙				
<b>Group - 2 Drainage Maintenance and Slope Repair</b>					
2A1 Ditch Maintenance		⊙			
2A2 Culvert Maintenance				⊙	
2A3 Catch Basin and Inlet Maintenance	⊙				
2A4 Stormwater Facility Maintenance	⊙				
2A5 Slope Repair		⊙			
<b>Group - 3 Roadside and Vegetation Management</b>					
3A1 Roadside Cleanup				⊙	
3A2 Noxious Weed Control		⊙			
3A3 Nuisance Vegetation Control				⊙	
3A4 Vegetation Obstruction Control			⊙		
3A5 Landscape Maintenance				⊙	
<b>Group - 4 Bridge and Urban Tunnel Maintenance and Operations</b>					
4A3 Bridge Cleaning		⊙			
4B1 Special Bridge and Ferry Operation	⊙				
4B3 Urban Tunnel Systems Operation		⊙			
<b>Group - 5 Snow and Ice Control Operations</b>					
5B1 Snow and Ice Control Operations	⊙				
<b>Group - 6 Traffic Control Maintenance and Operations</b>					
6A1 Pavement Striping Maintenance		⊙			
6A2 Raised/Recessed Pavement Marker Maintenance			⊙		
6A3 Pavement Marking Maintenance				⊙	
6A4 Regulatory Sign Maintenance			⊙		
6A5 Guide Sign Maintenance			⊙		
6A6 Guidepost Maintenance				⊙	
6A7 Barrier Maintenance		⊙			
6B1 Traffic Signal Systems			⊙		
6B2 Highway Lighting Systems		⊙			
6B3 Intelligent Transportation Systems	⊙				
<b>Group - 7 Rest Area Operations</b>					
7B1 Rest Area Operations		⊙			

Key ⊙ Projected Delivery

## Service Level Rating

Once all data is collected from the field surveys and other sources, it is processed by HQ MAP personnel. This involves gathering all data from all sources, validating the data (example: numbers deficient cannot exceed total on site), importing all data into the MAP database and performing all calculations to arrive at the outcome unit (i.e. % deficient, linear feet of deficiencies per lane mile – see MAP activities in Chapter Four for more detail). After the outcome unit is achieved, further calculations are performed to arrive at a numerical score, which then equates to a letter score (an example is shown on the following chart). Prior to 2015 the letter grades had pluses and minuses with the service level ratings. For example the highest score obtained could be an “A+” going down to the lowest available rating of an “F-”.

Service Level					
Letter Rating	A	B	C	D	F
Numeric Rating	1.0-1.99	2.0-2.99	3.0-3.99	4.0-4.99	5.0-5.99

Beginning in 2015, a coarser level of service was implemented for MAP activities. The pluses and minuses were removed from the letter grades. With all of this now happening on the web, data will be input, and scores will be immediately available, based on the data in the database. Queries will be available to peruse specific data to see why the scores are what they are. Links for this process will be located at the link supplied below, as soon as the system is available.

[Maintenance Accountability Homepage](#)

## Reporting

Reports are created using the numeric and alpha scores created from the gathered data. Preliminary reports will be available as soon as any data is in the new MAP database. Report can be found at the Maintenance Accountability homepage.

Reports compiled and data collected are used in conjunction with the Priority Matrix for the budgeting and planning of required maintenance activities. This process is a continual one that identifies what needs to be done and what the cost will be, balanced with priorities and allocated funds, then comes full circle back around to data collection and processing, to report the level of service provided within the priorities set and dollars allocated.

### Maintenance Accountability Process Activity Level Targets CY 2020 - Statewide

Activity	A	B	C	D	F
<b>Group - 1 Roadway Maintenance and Operations</b>					
1A3 Shoulder Maintenance			✓⊙		
1A4 Sweeping and Cleaning	⊙	✓			
<b>Group - 2 Drainage Maintenance and Slope Repair</b>					
2A1 Ditch Maintenance		✓⊙			
2A2 Culvert Maintenance				✓⊙	
2A3 Catch Basin and Inlet Maintenance	⊙	✓			
2A4 Stormwater Facility Maintenance	⊙	✓			
2A5 Slope Repair		⊙			✓
<b>Group - 3 Roadside and Vegetation Management</b>					
3A1 Roadside Cleanup				⊙	✓
3A2 Noxious Weed Control		⊙	✓		
3A3 Nuisance Vegetation Control				✓⊙	
3A4 Vegetation Obstruction Control			✓⊙		
3A5 Landscape Maintenance			✓	⊙	
<b>Group - 4 Bridge and Urban Tunnel Maintenance and Operations</b>					
4A3 Bridge Cleaning		⊙			✓
4B1 Special Bridge and Ferry Operation	✓⊙				
4B3 Urban Tunnel Systems Operation		✓⊙			
<b>Group - 5 Snow and Ice Control Operations</b>					
5B1 Snow and Ice Control Operations	✓⊙				
<b>Group - 6 Traffic Control Maintenance and Operations</b>					
6A1 Pavement Striping Maintenance		⊙			✓
6A2 Raised/Recessed Pavement Marker Maintenance			✓⊙		
6A3 Pavement Marking Maintenance				✓⊙	
6A4 Regulatory Sign Maintenance			⊙		
6A5 Guide Sign Maintenance			⊙		
6A6 Guidepost Maintenance				✓⊙	
6A7 Barrier Maintenance		✓⊙			
6B1 Traffic Signal Systems		✓	⊙		
6B2 Highway Lighting Systems		✓⊙			
6B3 Intelligent Transportation Systems	✓⊙				
<b>Group - 7 Rest Area Operations</b>					
7B1 Rest Area Operations		✓⊙			

Key  
 ⊙ Projected Delivery  
 ✓ Service Level Delivered  
 ⊙ Missed Target

October 12 2021

## Inventories and Databases

As the MAP has evolved, it has become apparent that inventories should play a major role in planning and execution of this process. Unfortunately, a complete inventory of all WSDOT features does not exist at this time. Existing data sources used for MAP are:

### Data Sources

**Signal Maintenance Management System (SIMMS)** – contains all location, preventive maintenance and repair information for Signals, Intelligent Transportation Systems (ITS) and Illumination.

**Traffic Sign Management System (TSMS)** – contains sign location info, sign description info, sign materials, post materials, and maintenance history (reasons and actions).

**Maintenance Productivity Enhancement Tool (MPET)** – contains all information for Urban Tunnels, all movable bridges, plus the two Tacoma Narrows Bridges, per the Operating Manual for each bridge, including schedules and completion of preventive maintenance tasks and all repairs. Also, four regions have added their fixed bridges, with three regions using MPET for all of their bridges data needs.

**Bridge Preservation Office (BPO)** has a database containing information (location, type of structure, BPO inspections, maintenance reports and much more) for all bridges statewide.

**Bridge Engineering Information System (BEIS)** – provides access to bridge inventory data, plans, inspection reports, photographs, and related files for bridge structures in the WSDOT bridge inventory.

**HATS** – is an application designed to be a tool for managing Maintenance activities by asset and/or roadway section. The system connects to Highway Features (HF) where the asset information of the agency is stored (ex. Asset ID, Name and location). Maintenance Technicians, using an iPad, will use this program to document their work, while building/maintaining the inventory in HATS at the same time. When doing an inspection on an asset, they will have the capability to add the asset, and/or generate a pending activity, recording deficiencies which require action to be taken. The action could be anything from making a specific repair, cleaning, or making a recommendation for a larger repair. The system will track when, where and what was inspected; if a pending activity was generated from the inspection, when the pending activity was completed, or if it remains to be completed.

The system will also track multiple work activities within a section of roadway. An example of this is Safety Patrol, where multiple activities are done on a given section of roadway. The system will create a pending repair for those items that cannot be completed at the time of the safety patrol.

**SKIPLINE** – uses a data logger on board the paint stripe trucks to report work completed, locations of work, and the application rates.

## MAP Team

MAP is generally a 6-month (April thru Oct) temporary role that is a statewide traveling and telework position. This is an HQ Maintenance & Operations position that goes through an application process. The qualified applicants that are hired within WSDOT will have reversion rights to previous duty station. In 2021 a full time Performance Measure Lead position was acquired in order to assist in program delivery. Current permanent members of the HQ MAP Team are:

[Kelly Shields](#) - Performance Measure Manager

[Bruce Castillo](#)- Performance Measure Lead

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