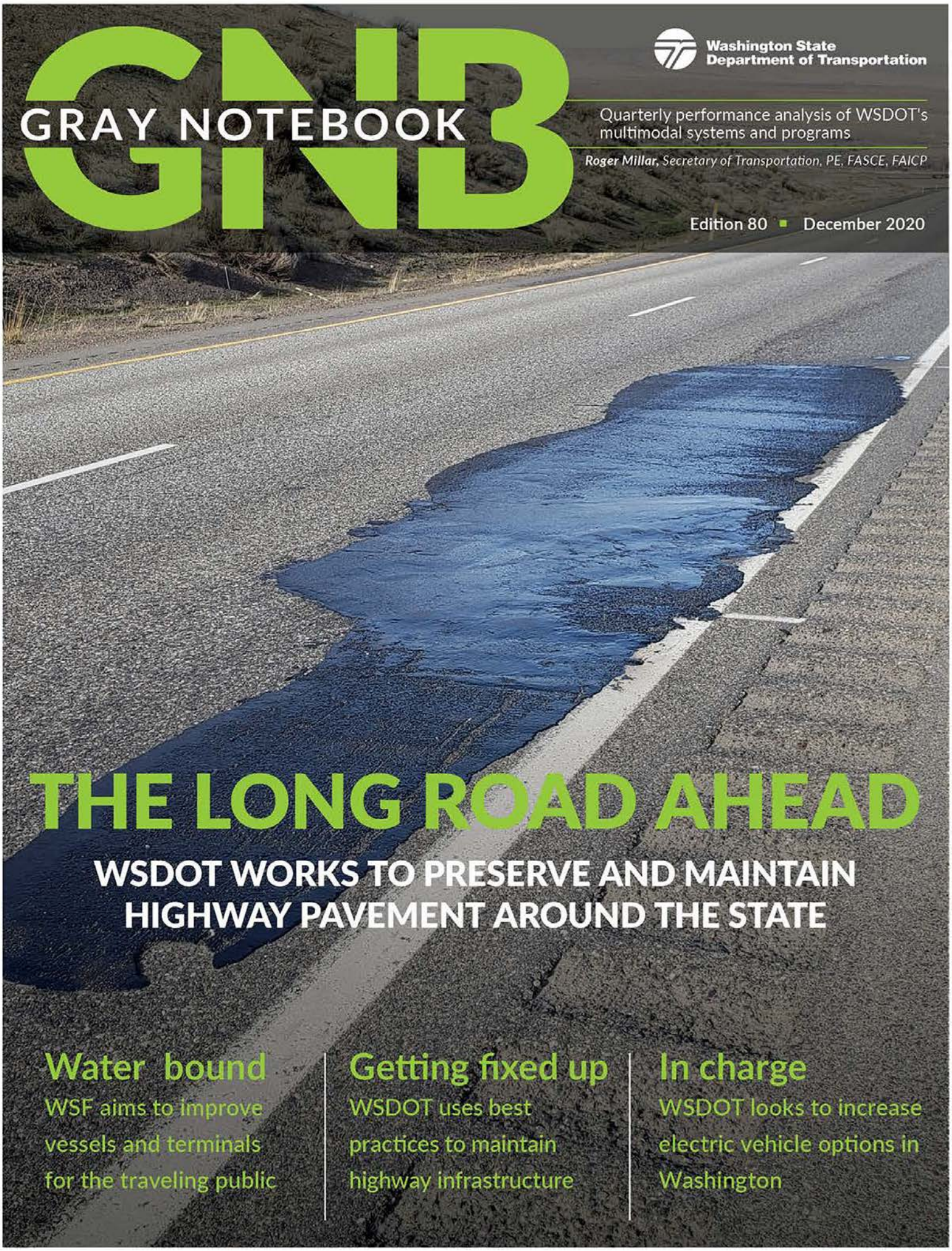
GRAY NOTEBOOK GNB

Washington State Department of Transportation

Quarterly performance analysis of WSDOT's multimodal systems and programs

Roger Millar, Secretary of Transportation, PE, FASCE, FAICP

Edition 80 ▪ December 2020



THE LONG ROAD AHEAD

WSDOT WORKS TO PRESERVE AND MAINTAIN HIGHWAY PAVEMENT AROUND THE STATE

Water bound

WSF aims to improve vessels and terminals for the traveling public

Getting fixed up

WSDOT uses best practices to maintain highway infrastructure

In charge

WSDOT looks to increase electric vehicle options in Washington

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The Gray Notebook team

WSDOT's Gray Notebook is produced by the Performance Management and Strategic Management offices of the Transportation Safety & Systems Analysis Division: Hide Aso, Elena Brunstein, Hui Dong, Sreenath Gangula, Helen Goldstein, Mani Gourdarzi, Joe Irwin, Dustin Motte and Yvette Wixson. TSSA is directed by John Milton.

Note: **1** Due to the pandemic's effects on statewide restrictions and travel, the GNB is using updated data that does not align with the quarter ending December 31, 2020.

On the cover: An asphalt patch on I-82 near Prosser in Benton County.

PERFORMANCE HIGHLIGHTS reported for the quarter ending December 31, 2020

Over the next 10 YEARS with current funding levels WSDOT will be unable to preserve pavement on ramps, lower-level freight corridors and roads with speed limits below 45 mph

1 **Connecting Washington** project completed during the sixth quarter of the 2019-2021 biennium

23 PERCENT of WSDOT's passenger vehicle fleet was **Electric Vehicles** in 2020

68 PERCENT of **highway maintenance** targets met in 2020

$19.6 MILLION in economic benefit provided by WSDOT's **Incident Response** teams clearing 10,000 incidents during the quarter

9 PERCENT decrease in **travel** volumes on state highways from 2019 due to response to the COVID-19 pandemic

80 COVID-19 EFFECTS ON STATE TRANSPORTATION AND WSDOT

Washington travel continues to trend up

Statewide travel is trending slightly up following Washington's slow move toward economic recovery from the COVID-19 pandemic. More recent restrictions by Gov. Jay Inslee (lasting from November 2020 to January 2021) have become less severe and once closed businesses (such as gyms and movie theatres) and take-out only restaurants are now able to operate at 25% capacity.

Most statewide travel modes increase since December 2020

Percentages from select dates compared to December 1, 2020 and March 1, 2021; Safety fatality rate per 100 million vehicle miles traveled

Transportation mode	Percent or rate low (date)[1]	Dec. 1, 2020[2]	March 1, 2021[2]
Highway travel	-63% (3/29)	-15%	-9%
Tolling	-80% (3/28)	-40%	-33%
WSF	-87% (3/29))	-45%	-38%
Transit	-77% (4/22)	-63%	-50%
Amtrak Cascades	-98% (4/19)	-89%	-79%
Freight			
Snohomish	-78% [3] (4/12)	-15%	-16%
King	-88% (4/5) [3]	-18%	-14%
Pierce	-89% [3] (4/5)	-10%	-7%
Thurston	-44% (4/12)	-3%	+3%
Lewis	-65% (4/4)	-9%	-1%
Clark	-71% [3] (4/4)	-11%	-9%
Benton	-57% (4/5)	-17%	-2%
Franklin	-62% (4/12)	-3%	-24%
Active Transportation			
Pedestrians	-58% (3/13)	+51%	+30%
Bicyclists	-60% (3/14)	+54%	+117%
Safety[4]	0.8[3] (Mar)	0.9 (Oct)	1.1 (Dec)
Aviation			
Domestic[5]	-93.1% (Apr)	-59.7% (Oct)	-65.2% (Dec)
International[5]	-97.1% (Apr)	-88.6% (Oct)	-84.1% (Dec)

Data source: WSDOT Transportation Safety & Systems Analysis.

Notes: **1** Dates compared to corresponding days in 2019. **2** Tuesday, December 1, 2020 compared to Tuesday, December 3, 2019. Monday, March 1, 2021 compared to Monday, March 4, 2019. Due to the pandemic's effects on statewide restrictions and travel, the GNB is using more recent data that does not align with the quarter ending December 2020. **3** Some percentages and numbers have been updated from GNB 77 and as a result, corresponding dates may have also changed. **4** Crash rate per 100 million vehicle miles traveled. **5** Total passengers.

Notable results

- *Highway travel has steadily increased as COVID-19 restrictions are lifted and was up to 9% below pre-pandemic levels in March 1, 2021, a six percentage point increase over December 1, 2020*
- *Washington State Ferries ridership was 38% below its prepandemic levels as of March 1, 2021, an increase of seven percentage points from December 1, 2020*

WSDOT's COVID-19 dashboard tracks state's multimodal changes

WSDOT tracks the effects of COVID-19 on multimodal transportation system performance through an interactive online dashboard. The dashboard is updated each weekday and shows changes to modes ranging from highway travel and Washington State Ferries to active transportation and aviation via interactive graphs, maps and tables.

Public elementary and junior high schools throughout Washington are admitting students on a part-time basis and plans are in the works to restart high school students in by mid-April on similar schedules.

Travel in Washington increasing across all modes

As of March 1, 2021, highway travel was 9% below 2019 levels, Washington State Ferries ridership was down 38% and public transit ridership at 10 of Washington's largest transit agencies was down an average of 50%. While use of these three travel modes was much higher than the extreme lows experienced in March and April 2020, all three were still below their March 1, 2019 levels. Amtrak Cascades ridership—at 79% below 2019 levels on March 1, 2021—was up 10 percentage points from December 1, 2020.

Early in the pandemic, active transportation experienced large increases in the percentages of people walking and bicycling, with both modes frequently up more than 100% from 2019 levels. Active modes remain well above 2019 levels, with pedestrian travel up 30% and bicycling up 117% as of March 1, 2021.

Both domestic and international air travel had mixed results for air travel compared to 2019 levels. December 2020 compared to October 2020 saw domestic air travel decreasing 5.5 percentage points and international air travel increasing 4.5 percentage points. Despite these changes, domestic air travel was 65.2% lower in December 2020 than in December 2019, and international air travel was 84.1% lower for the same period.

WSDOT continues to put health and safety first

WSDOT has been working closely with the state Department of Health, the Governor's Office, Labor and Industries and the state Emergency Management Division since the COVID-19 pandemic started.

Since April 2020—following direction from the Governor's Office—WSDOT began a safe restart to construction, ensuring that these workers, along with Washington State Ferries and maintenance employees in the field follow stringent safety guidelines, including temperature checks, handwashing, physical distancing and wearing of proper personal protective equipment, including masks.

All WSDOT employees who are able to telework have done so since March 2020; they recently were told to continue to do so for the foreseeable future. For more information on what WSDOT is doing to keep its employees and the traveling public safe during the pandemic see the Worker Safety article in this edition, see pp. 9-10.

Counties entering Phase 3 of state's recovery plan

Following Gov. Inslee's June 1, 2020 "Safe Start" plan, all modes of travel have been gradually trending up from early pandemic lows as businesses and activities began reopening in phases.

In January 2021, the Governor's office launched the "Healthy Washington – Roadmap to Recovery" plan. As outlined in the Governor's COVID-19 phased recovery plan, Washington has eight regions, which had to meet three of the following four metrics in order to move into Phase 2:

- Decreasing trend of 10% or more in two-week rate of COVID-19 cases per 100,000 population;
- Decreasing trend of 10% or more in two-week rate of new COVID-19 hospitalizations;
- Less than 90% Intensive Care Unit (ICU) occupancy; and,
- COVID-19 test positivity of less than 10%.

All 39 counties are in Phase 2 of four with Phase 4 indicating a return to pre-pandemic conditions. While Gov. Inslee paused all movement in the Roadmap to Recovery February 24, 2021, all regions are scheduled to enter Phase 3 on March 22.Phase 3 includes a return to spectator sports and states:

- For large counties to remain in Phase 3, defined as counties with more than 50,000 residents, they must keep a 14-day average of new COVID cases at or below 200 per 100,000 residents, and a seven-day average of new hospitalizations per 100,000 at five or fewer.
- Smaller counties, those with populations of 50,000 or less, must maintain a 14-day average of new cases at 30 or fewer, and a new seven-day hospitalization average at three or fewer.

80 WSDOT'S STRATEGIC PLAN

WSDOT's Strategic Plan has three goals, Inclusion, Practical Solutions and Workforce Development. This plan continues WSDOT's focus on how the agency makes investments and delivers projects with limited resources.

Under the strategic plan, WSDOT engages employees, communities and partners to collaboratively deliver its Inclusion goal. Practical Solutions allows WSDOT to leverage finite funding to get the most capacity and safety out of the entire multimodal transportation system. WSDOT's focus on Workforce Development ensures the agency attracts and retains a quality workforce to meet its legislative, regulatory, service and public expectations.

The agency's online interactive strategic plan dashboard contains leading indicators for the plan's 15 strategies—five for each goal—and details progress on the plan's work.

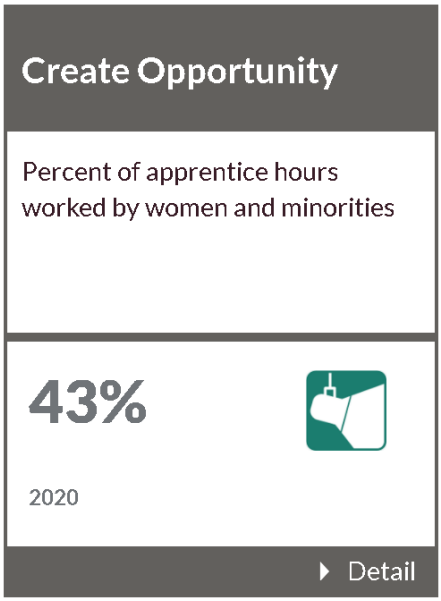
Inclusion: Create Opportunity

WSDOT is aiming to meet its Inclusion goal through the Capacity Building Mentorship Program, apprenticeship and pre-apprenticeship participation and by promoting opportunities. One way this is measured is by monitoring the number of apprenticeship hours worked by women and minorities.

WSDOT is working to create a diverse workforce both inside the agency and through the organizations with which it does business. To create career opportunities in the heavy highway construction industry for under-represented individuals, WSDOT strives to ensure its apprentices are representative of the communities in which projects occur.

In 2020, 43% of the agency's apprentices were minorities, women or other socially and economically disadvantaged individuals. WSDOT is currently evaluating information to establish benchmarks for upcoming federal fiscal years.

Select the box at right to learn more about WSDOT's "Create Opportunity" strategy, part of the agency's Inclusion Goal.



WSDOT's Vision

Washington travelers have a safe, sustainable and integrated multimodal transportation system.

WSDOT's Mission

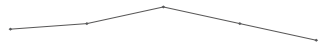
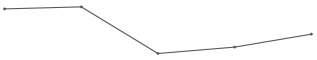
We provide safe, reliable and cost-effective transportation options to improve communities and economic vitality for people and businesses.

- **Inclusion Goal**
  Strengthen commitment to diversity and engagement in every aspect of our work.
- **Practical Solutions Goal**
  Prioritize innovative, timely and cost-effective decisions, with our stakeholders and partners.
- **Workforce Development Goal**
  Be an employer of choice by hiring, training and retaining skilled workers to meet Washington's transportation needs.

WSDOT's Values

- Safety
- Engagement
- Innovation
- Integrity
- Leadership
- Sustainability

80 STATEWIDE TRANSPORTATION POLICY GOALS DASHBOARD

Statewide policy goal/ WSDOT performance measure	Previous period	Current period	Goal	Goal met	Five-year trend (unless noted)	Desired trend
Safety						
Rate of **traffic fatalities** per 100 million vehicle miles traveled statewide[1] (Annual measure: calendar years 2018 & 2019)	0.87	0.84	<1.00	✓		↓
Rate of **recordable incidents** for every 100 full-time WSDOT workers (Annual measure: calendar years 2019 & 2020)	4.7	4.4	<5.0	✓		↓
Preservation						
Percentage of state **highway pavement** in fair or better condition by vehicle miles traveled (Annual measure: calendar years 2018 & 2019)	91.4%[2]	92.9%[2]	≥ 90%	✓		↑
Percentage of **state bridges** in fair or better condition by bridge deck area (Annual measure: fiscal years 2019 & 2020)	92.9%	93.8%	≥ 90%	✓		↑
Mobility[2] (congestion relief)						
Highways: Vehicle Miles Traveled **(VMT)** on state highways (Annual measure: calendar years 2018 & 2019)	35.4 billion	35.4 billion	*	N/A		Not applicable
Highways: Average **incident clearance times** for all Incident Response program responses (Calendar quarterly measure: Q4 2019 & Q4 2020)	14.0 minutes	15.8 minutes	*	N/A		↓
Ferries: Percentage of trips departing on time[3] (Fiscal quarterly measure: Q2 FY2020 & Q2 FY2021)	93.5%	88.2%	≥ 95%	—		↑
Rail: Amtrak Cascades on-time performance[4] (Annual measure: calendar years 2018 & 2019)[5]	50%	58%	≥ 88%	—		↑
Environment						
Number of WSDOT **stormwater management facilities** constructed (Annual measure: fiscal years 2019 & 2020)	66	106	*	N/A		Not applicable
Cumulative number of WSDOT **fish passage improvement projects** constructed (Annual measure: calendar years 2018 & 2019)	345	329	*	N/A		↑
Stewardship						
Cumulative number of Nickel and TPA **projects completed**[5] and **percentage on time**[6] (Biennial quarterly measure: Q5 2019-2021 & Q6 2019-2021, trendline for percentage on time)	383/ 86%	383/ 86%	≥ 90% on time	—	(Five-quarter trend)	↑
Cumulative number of Nickel and TPA **projects completed**[5] and **percentage on budget**[6] (Biennial quarterly measure: Q5 2019-2021 & Q6 2019-2021, trendline for percentage on budget)	383/ 91%	383/ 91%	≥ 90% on budget	✓	(Five-quarter trend)	↑
Variance of total project costs[5] compared to **budget expectations**[6] (Biennial quarterly measure: Q5 2019-2021 & Q6 2019-2021)	Under budget by 1.5%	Under budget by 1.5%	On or under budget	✓	(Five-quarter trend)	Not applicable

Data source: WSDOT Transportation Safety & Systems Analysis.

Notes: (*) = goal has not been set. Dash (—) = goal was not met in the reporting period. **1** The Statewide Transportation Policy Goal for this performance measure is different than the federal Transportation Performance Management goal for the same measure. The separate goals for reducing pedestrian/bicyclist fatalities to zero were not met (see p. 7 GNB 79) as the five-year rolling average trend line is moving upward even with some decline in 2019. **2** Excludes chip seal pavement. **3** Washington State Ferries' on-time departures include any trip recorded by automated tracking as leaving the terminal within 10 minutes of scheduled time. **4** Amtrak Cascades' on-time performance includes any trip arriving within 10 or 15 minutes, depending on the route, of scheduled arrival time. **5** Construction projects only. **6** Projects are on time if they are completed within the quarter planned in the last approved schedule, and on budget if costs are within 5% of the budget set in the last approved state transportation budget.

80 TRANSPORTATION PERFORMANCE MANAGEMENT

WSDOT reports its federally-mandated 2021 TPM highway safety baselines, targets

WSDOT reported its Transportation Performance Management (formerly MAP-21) highway safety baselines and targets for 2021 to the Federal Highway Administration on August 31, 2020.

FHWA previously determined WSDOT did not make significant progress toward achieving its 2019 targets for highway safety (also referred to as PM1). States that did not make significant progress on PM1 must develop a strategic Highway Safety Implementation Plan and obligate federal HSIP funds based on the previous year's allocations. WSDOT outlines how it will address these efforts in its 2020 HSIP.

Washington's Strategic Highway Safety Plan (Target Zero) aims to achieve the goal of zero fatalities and serious injuries by 2030, which differs from the federal TPM targets listed below.

WSDOT established its federally-required TPM baselines and targets for bridges and pavement (PM2), and highway system performance, freight, and Congestion Mitigation and Air Quality (PM3) on May 20, 2018. Like the PM1 targets, WSDOT is required to show significant progress toward meeting the PM2 and PM3 targets.

WSDOT and Metropolitan Planning Organizations collaborated to establish four-year targets for PM2 and PM3 and submitted them to FHWA on October 1, 2018. This began a four-year reporting cycle for PM2 and PM3 performance measures, which included WSDOT producing a Mid-Performance Period Progress Report (submitted October 1, 2020) as well as a Full-Performance Period Progress Report (due October 1, 2022).

TPM safety reporting on annual cycle

Targets for the highway safety rules (included in PM1) are on an annual reporting cycle, which differs from the two-year and four-year reporting cycles for PM2 and PM3. The safety targets established for 2021 represent the third annual reporting cycle since the initial reporting of TPM safety targets for 2018.

MAP-21 performance measures by program area	2015-2019 baseline	2021 target[1]	Penalty[2]
Highway Safety (PM1) 23 CFR Part 490 ID No. 2125-AF49			
Number of traffic fatalities on all public roads[3]	≤ 542.8	≤ 444.1	Yes
Rate of traffic fatalities per 100 million vehicle miles traveled (VMT) on all public roads[3]	≤ 0.885	≤ 0.724	Yes
Number of serious traffic injuries on all public roads[3]	≤ 2,208.6	≤ 1,807.0	Yes
Rate of serious traffic injuries per 100 million VMT on all public roads[3]	≤ 3.599	≤ 2.944	Yes
Number of non-motorist traffic fatalities plus serious injuries	≤ 577.0	≤ 472.1	Yes
MAP-21 Special Rules (Safety)			
Rate of per capita traffic fatalities for drivers and pedestrians 65 or older	Show yearly progress		No
Rate of fatalities on high-risk rural roads[3]	Show yearly progress		Yes
Highway-railway crossing fatalities[4]	Show yearly progress		No

Data source: WSDOT Transportation Safety & Systems Analysis.

Notes: The PM1 targets for 2021 were submitted on August 31, 2020, using the five-year rolling average of 2015-2019 for current baseline data. **1** The Strategic Highway Safety Plan for Washington (Target Zero) aims to achieve the goal of zero fatalities and serious injuries by 2030. **2** Penalties will not be assessed if WSDOT shows significant progress on four of five PM1 targets. Significant progress is achieved if the five-year rolling average is less than or equal to the target or less than or equal to the baseline level. **3** Performance metric includes all individuals (for example, pedestrians and bicyclists) who died or were seriously injured as a result of a crash with a motorist in Washington. **4** Includes bicyclists and pedestrians.

The 2020 mid-performance period progress report on PM2 and PM3 included updates on two-year condition/performance and investment strategy discussions as well as target adjustment discussions. WSDOT had the option to adjust four-year targets at that time but determined they did not need adjusting and should remain unchanged.

In 2022, FHWA will use the full-performance period progress report to determine whether WSDOT has made significant progress toward its PM2 and PM3 targets. Not showing significant progress toward targets requires an explanation to FHWA of what WSDOT will do to make progress in the future, and may also trigger a financial penalty if targets are not met (see table below). These penalties require redistributing federal monies to help ensure significant progress toward specific targets in the future.

TPM folios helping stakeholders

WSDOT has developed informational folios to ensure the agency and its partners are aligned as TPM work progresses.

MAP-21 performance measures by program area	Current data/ 2-year actuals	2-year target[1,2]	4-year target[1,2]	Penalty
Pavement and Bridges (PM2) 23 CFR Part 490 ID No. 2125-AF53				
Pavement				
Percent of Interstate pavement on the NHS in good condition	39.8%[3]	N/A	30%	No
Percent of Interstate pavement on the NHS in poor condition	1.7%[3]	N/A	4%[4]	Yes
Percent of non-Interstate pavement on the NHS in good condition	45.2%[3]	45%	18%	No
Percent of non-Interstate pavement on the NHS in poor condition	17.4%[3]	21%	5%	No
Bridges				
Percent of NHS bridges classified in good condition (weighted by deck area)	34.7%	30%	30%	No
Percent of NHS bridges classified in poor condition (weighted by deck area)	6.4%	10%	10%[4]	Yes
Highway System Performance, Freight, and Congestion Mitigation & Air Quality (PM3) 23 CFR Part 490 ID No. 2125-AF54				
Highway System Performance (Congestion)				
Percent of person-miles traveled on the Interstate System that are reliable	77%	70%	68%	No
Percent of person-miles traveled on the Non-Interstate NHS System that are reliable	80.8%	N/A	61%	No
National Freight Movement Program				
Truck Travel Time Reliability (TTTR) Index	1.54	1.70	1.75	No
Congestion Mitigation & Air Quality Program				
Non-Single Occupancy Vehicle (SOV) travel in Seattle urbanized area (NHS)	33.1%	32.8%	33.2%	No
Peak hours of Excessive Delay per capita in Seattle urbanized area (NHS)	23.2	N/A	28	No
All Pollutants (kg/day)[2]	1,222.870	366.285	658.300	No
Carbon Monoxide (CO) (kg/day)[2]	714.710	309.000	309.060	No
Particulate Matter less than 10 microns (PM_{10}) (kg/day)[2]	274.640	0.305	224.000	No
Particulate Matter less than 2.5 microns ($PM_{2.5}$) (kg/day)[2]	56.750	2.100	8.700	No
Nitrogen Oxides (NOX) (kg/day)[2]	176.770	54.880	116.540	No

Data sources: WSDOT Pavement Office, WSDOT Bridge and Structures Office, WSDOT Transportation Safety & Systems Analysis, WSDOT Rail, Freight, and Ports Division, WSDOT Environmental Services Office.

Notes: Federal rule allows state and MPOs to adjust four-year targets during the mid-performance period progress report. **1** Two-year and four-year reports for PM2 and PM3 are due October 1, 2020, and October 1, 2022. **2** Base emissions are for the four-year period 2013-2016 as reported in the CMAQ Public Access System. **3** Current data refers to 2019. **4** The National Highway Performance Program (NHPP) targets require the percentage of Interstate pavement on the NHS in poor condition not exceed 5% and the percentage of NHS bridges classified in poor condition (weighted by deck area) not exceed 10%. **5** Current data refers to 2-year actuals.

80 WORKER SAFETY ANNUAL REPORT

Notable results

- *From 2019 to 2020, WSDOT's agency-wide recordable incident rate improved 6.4%*
- *From 2019 to 2020, WSDOT's agency-wide days away, restricted or transferred rate improved 3.6%*
- *Agency-wide between 2016 and 2020, the RIR improved by 4.3% while the DART rate worsened by 22.7%*

WSDOT safely steps up during the pandemic

In response to the statewide "Stay Home, Stay Healthy" order in March 2020—which shut down WSDOT's construction and maintenance activities—WSDOT implemented COVID-19 training to ensure the agency was using the most reliable information in response to the pandemic. The widely-available training ensured WSDOT employees recognized the hazards of COVID-19 and how to protect themselves. It also helped employees stay current on safety training requirements.

As the state moved into different phases of reopening, WSDOT developed plans to comply with the governor's orders, providing a safe work environment for employees. Even with these plans in place, WSDOT continues to troubleshoot and communicate any changes to policies and procedures to best ensure the continued safety of its employees and the public. Read more about how the agency moved projects forward during the pandemic on the WSDOT Blog.

WSDOT's agency-wide recordable incident rate improves slightly from 2019 to 2020

WSDOT's agency-wide recordable incident rate improved 6.4% from 4.7 recordable injuries per 100 workers at agency worksites in 2019 to 4.4 in 2020. The agency-wide "days away, restricted or transferred" rate improved approximately 3.6% from 2.8 in 2019 to 2.7 in 2020. The DART rate is a subset of the RIR and includes only those injuries that resulted in days away from work, restricted work activities or a transfer of job duties.

Between 2016 and 2020, the agency-wide RIR improved by about 4.3%, while the DART rate worsened by 22.7% (percentage increases and decreases are based on rates being rounded to the nearest 10th).

Washington State Ferries, which has a marine work environment, has experienced more substantial five-year changes to its injury rates than WSDOT has as a whole. Between 2019 and 2020, the RIR for WSF improved 1.4% from 7.1 to 7.0, and its DART rate worsened by 2.1% from 4.8 to 4.9. Between 2016 and 2020 the RIR for WSF worsened by 29.6% and its DART rate worsened by 36.1%. In addition to an aging workforce, WSF attributes these worsening rates to advancements in its reporting methods and how it captures incidents through its database as well as new resources dedicated to more accurate incident reporting. See p. 10 for more details about WSF safety efforts and its COVID-19 response.

WSDOT as a whole continues to focus on safety improvement efforts like new signage, an updated hearing conservation program, more frequent

WSDOT's agency-wide RIR and DART rates improve between 2019 and 2020

2016 through 2020; Recordable incident rate and days away, restricted or transferred rate for every 100 full-time employees per year

Recordable Incident rate[1]	2016	2017	2018	2019	2020	1-year % change[2]	5-year % change[2]
WSDOT	4.3	4.3	4.3	3.8	3.5	-10.5%	-20.9%
WSF[3]	5.4	5.9	7.0	7.1	7.0	-1.4%	+29.6%
Agency-wide[3]	4.6	4.7	5.0	4.7	4.4	-6.4%	-4.3%
DART rate[1]							
WSDOT	1.6	1.7	2.4	2.1	1.9	-9.5%	+18.8%
WSF[3]	3.6	3.7	5.1	4.8	4.9	+2.1%	+36.1%
Agency-wide[3]	2.2	2.3	3.1	2.8	2.7	-3.6%	+22.7%

Data source: WSDOT Office of Human Resources and Safety.

Notes: Rates and percentages are rounded to the nearest 10th. **1** The recordable incident rate is calculated as the number of recordable incidents multiplied by 200,000 hours and divided by the total hours worked. The "days away, restricted or transferred" or DART rate is the count of recordable incidents involving days away, restricted duty, or job transfer, multiplied by 200,000 hours, and divided by the total hours worked. **2** Rates: (-%) = improve; (+%) = worsen. **3** Washington State Ferries is reported separately due to its marine work environment; agency-wide includes WSF and the rest of WSDOT.

communications about safety awareness, and stretch and flex exercises focused both on telecommuters and employees who work in the field to reduce sprain and strain injuries.

WSF takes extra safety steps during pandemic

Washington State Ferries employees on vessels and at terminals experience a fairly high exposure to the public, something which adds risk during the COVID-19 pandemic.

WSF responded by making changes to better protect both its employees in these positions as well as the traveling public who rely on ferries.

To reduce potential exposure to COVID-19, Washington State Ferries:

Fauntleroy toll booth ticket seller employee Lawrence Grohall wears a face mask behind sneeze guard extends selfie stick credit card reader to a customer. WSF Eagle Harbor Maintenance Facility staff built and installed customized Plexiglas sneeze guards for all ferry tollbooths and WSF information technology team designed and implemented the self-swipe credit card reader attached to a selfie stick. Read more about [WSF's COVID-19 response on the WSDOT Blog](#).

- Implemented an innovative approach to deliver hearing conservation counseling electronically instead of in-person. This led to a 700% increase in throughput for employees who were able to use the counseling compared to those who could be assisted prior to the pandemic. Hearing conservation counseling is a mitigation effort to initiate protective follow-up measures aimed at avoiding severe or permanent hearing loss.
- Applied new protocols to protect against COVID-19, including improvements to the annual fit-testing requirement for employees who wear filtering facepiece respirators for high and extremely high-risk tasks to protect themselves. In addition to successfully fit testing all new employees in 2020, WSF sourced approved disinfectants, fabricated plexiglass barriers, and implemented new fit testing policies aboard the M/V *Elwha*.
- Restarted an approach in which gas meter replacements are mailed directly to the engine rooms on vessels using interoffice mail. This method reduced contact between engine room staff and outside persons and as well as the possibility of viral transmission. At the same time, it also saved WSF travel time, and fuel compared to the previous method of hand delivering these meters to the boats directly.
- Developed multiple-phased plans for maintaining continuity of operations along with restarting work in areas that Gov. Jay Inslee paused or stopped due to the pandemic. In addition, WSF outlined key business functions, applied risk mitigation and infection control measures, developed workplace policies, established COVID-19 communication protocols, initiated training for employees to carry out essential workplace functions. WSF will also continuously assess workplace exposure risks.
- Led WSF's efforts to protect passengers during the pandemic by collaborating with multiple divisions to focus on mitigation strategies. WSF's adjusting operations prioritized customer safety and encouraged personal preparedness by providing personal protective equipment, increasing messaging and signage, using a vigorous sanitation and cleanliness protocol, and maintaining continuity of operations.

By John Gancel, Jesse Labalan, Joe Irwin and Yvette Wixson

80 PAVEMENT ANNUAL REPORT

Given current funding levels, WSDOT expects a future of deteriorating roadways

Preservation and maintenance of Washington's transportation system, including WSDOT-owned pavement, has been underfunded for decades. Given the current backlogs, it would cost $1.8 billion each year to meet all of WSDOT's maintenance and preservation needs, but the agency receives less than half of those funds. Over the last 15 years, WSDOT's approach to pavement preservation has focused on extending the amount of time all of its pavement assets remain in fair or better condition. Due to the chronic underfunding of preservation, this strategy is no longer sustainable, and the agency must now stop preserving some sections of pavement.

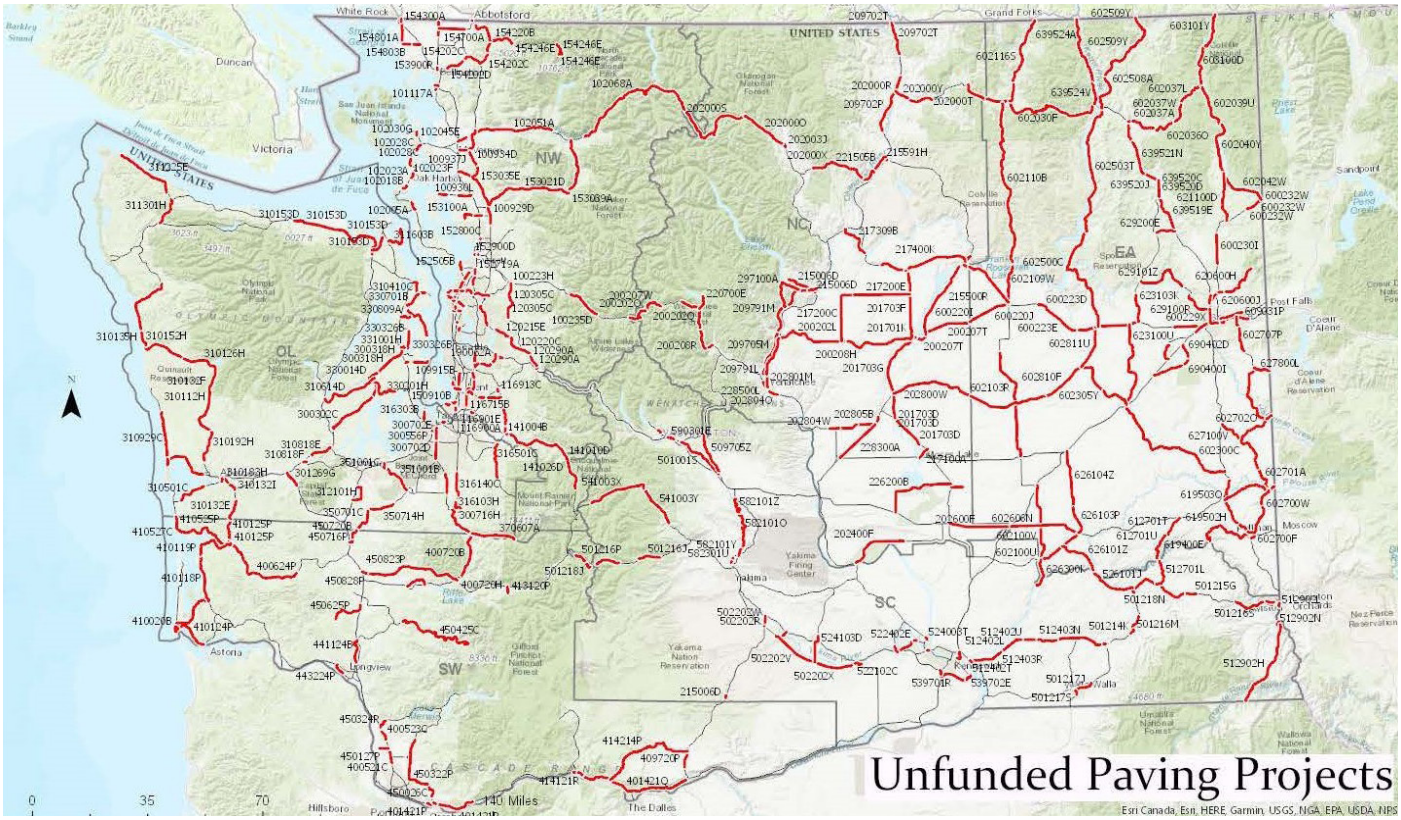
WSDOT to stop preserving pavement on ramps, roads with speed limits below 45 mph due to expected funding levels

Due to projected levels of preservation funding, WSDOT expects that it will have to cease pavement preservation work on roads in a number of categories, including ramps and shoulders, T-3, T-4, and T-5 freight corridors (see box on p. 12) and sections of road with speed limits below 45 mph. The

Notable results

- *WSDOT expects to stop preserving pavement on ramps, roads with speed limits below 45 mph, and lower-level freight corridors due to projected funding levels.*
- *Washington is expected to meet federally-mandated TPM targets for NHS pavement condition in 2022, but miss them by 2028.*
- *WSDOT pavement lane miles in fair or better condition improved from 91.4% in 2018 to 93.2% in 2019 due to the completion of several multi-year concrete projects and the inclusion of chip seal pavement condition data*

WSDOT expects unfunded pavement preservation projects based on projected 10-year funding levels



This map shows the locations of the majority of unfunded pavement projects (ramp projects are not shown) identified in WSDOT's 10-year pavement preservation plan. The map is representative, but not definitive; WSDOT updates the pavement program annually, and changes can and will occur.

Strategic Freight Corridor Classifications

WSDOT classifies highway segments, or corridors, by how much freight travels on them. T-1 freight corridors are the most heavily traveled and see over 10 million tons of truck freight per year. Corridors that see between 4 million and 10 million tons of truck freight annually are T-2 corridors and corridors that see between 300,000 and 4 million tons of truck freight annually are T-3 corridors. Both T-1 and T-2 corridors are considered strategic freight corridors under the definition established in **RCW 47.06A.020**.

For additional information, see: https://wsdot.wa.gov/freight/fgts

map on p. 11 shows an approximation of the pavement sections that WSDOT expects to have unfunded preservation needs over the next 10 years given current funding levels (unfunded pavement preservation projects located on ramps are not shown).

WSDOT has developed a list of proposed pavement preservation projects for the 10-year period that ends with the 2027-2029 biennium. The agency reviewed each project on this list to ensure it was both cost-effective and necessary in the next 10 years. Using projected funding levels, WSDOT determined that it could expect to complete projects in the categories listed und "Priority projects (currently funded)" below, but not those that fell into the categories listed under "Backlog of unfunded projects."

Priority projects (currently funded):

- Projects on interstate mainlines (not ramps or shoulders), all of which are T-1 Freight Corridors (see box at left)
- Projects on non-interstate T-1 Freight Corridors
- Projects on T-2 Freight Corridors that are also freeways
- Some projects on T-2 Freight Corridors that are not freeways

Backlog of unfunded projects:

- The remaining projects on T-2 Freight Corridors that are not freeways
- Projects on Freight Corridors classified as T-3 and lower
- Projects on sections of road with speed limits below 45 mph, even if they meet the criteria under "What's in"
- Projects on ramps
- Activities that lower long-term life cycle cost but have higher costs in the short-term, such as reconstruction and chip seal resurfacing (see Gray Notebook 76 p. 12)
- Shoulder preservation (unless necessary for safety reasons)

As shown in the map on p. 11, the unfunded mainline projects are located all over the state. In addition to the projects shown in the map, WSDOT does not expect to complete preservation work on any ramps. Over the next 10 years, travelers will begin to notice pavement at these locations deteriorating into poor condition (see graphic on p. 14).

Additionally, allowing pavement to deteriorate into poor condition before rehabilitating or reconstructing it substantially increases long-term costs. For example, repairing a section of asphalt pavement that has deteriorated into very poor condition can cost up to five times as much as repairing the same section of pavement when it was in fair condition and could have been rehabilitated at the lowest life-cycle cost. Such delays can also increase the amount of maintenance work needed (see p. 25).

Pavement conditions improve between 2018 and 2019

In 2019, 93.2% of all WSDOT-managed pavement lane miles were in fair or better condition, up from 91.4% in 2018 (see table below). Several multi-year concrete paving projects became substantially complete in 2019, which contributed to the improvement, as did the inclusion of data on the condition of chip seal pavement for the first time in several years. Annual condition data on chip seal pavement was either not collected or not analyzed from 2010 through 2018 due to continuous budget cuts.

The agency evaluates the condition of asphalt and concrete pavement on state-owned roadways annually using three indicators: surface cracking (an indicator of structural deterioration); rutting (which is monitored for safety and structural reasons); and smoothness (measured using the International Roughness Index). These criteria are used to classify pavement conditions into four categories: good/very good, fair, poor and very poor (as seen in chart on p. 14).

COVID-19 will impact future reports

Due to COVID-19, WSDOT was only able to collect data on the condition of interstate roadways and other roadways that were required for FHWA reporting purposes in 2020. WSDOT typically collects data on the condition of all non-interstate roadways as well, but will not have this data available in 2021 when 2020 data is reported.

All WSDOT pavement performance measures improve from 2018 to 2019
2018 and 2019; Annual pavement performance measures

	ANNUAL PAVEMENT PERFORMANCE MEASURES[1,2]		2018	2019		Agency Target	Target[3]	Trend	Desired trend
Short term	**Percent of pavement in fair or better condition** Measured for asphalt and concrete pavement in 2018, and for asphalt, concrete and chip seal pavement in 2019. Chip seal data for 2018 was not collected.Condition is shown by lane miles and by vehicle miles traveled to reflect road use.		Without chip seal[4]	Without chip seal[4]	With chip seal[4]				
		Lane Miles	91.4%	92.9%	93.2%	90.0%	✓	↑	↑
		VMT[4]	91.2%	94.0%	94.1%				
Long term	**Asset Sustainability Ratio[5]** Years of pavement service life added to the pavement network through rehabilitation in a given year divided by the service life consumed in that year.		0.61	1.01		0.90 to 1.10	✓	↑	↑
	Remaining Service Life[5] Average percentage of original total useful life remaining before rehabilitation or replacement is needed; average years remaining before rehabilitation or replacement is needed.		46.9% (7.6 yrs)	48.0% (7.8 yrs)		45% to 55%	✓	↑	↑
	Deferred Preservation Liability (backlog) An estimate of the accumulated cost (in current dollars) to fund the backlog of past-due (deferred) pavement rehabilitation work.		$420 million	$352 million		$0	–	↓	↓

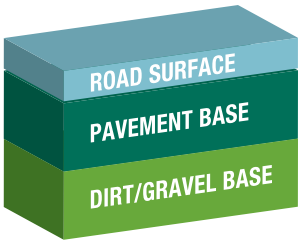
Data source: WSDOT Pavement Office.

Notes: **1** Calculations for all measures, excluding percent of pavement in fair or better condition in 2018, include all pavement types (asphalt, chip seal and concrete). **2** See p.16 for additional discussion of long-term measures. **3** Check indicates target met, dash indicates target not met. **4** 2018 short-term condition information for chip seal pavement was not collected due to funding constraints; 2019 short-term condition information is shown both without chip seal (to allow comparisons with 2019) and with it. **5** VMT = vehicle miles traveled. **6** Measure is weighted by vehicle miles traveled to better capture the typical road user's experience.

Percentage of WSDOT's pavement in very poor condition decreases between 2015 and 2019

Actual values for 2015 and 2019; Characteristics of pavement at each condition; Percentage of lane miles and vehicle miles traveled (VMT) by condition category

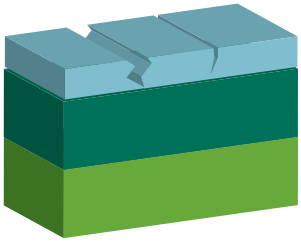
WHAT DRIVERS SEE	WHAT IS HAPPENING	2015	2019	Trend[1]	Desired trend
GOOD/VERY GOOD	By lane miles	76.4%	75.5%	↓	↑
	By VMT[2]	75.2%	76.3%	↑	



This pavement is in good condition with minimal deterioration

Road users experience a smooth road with minimal cracks, ruts or potholes

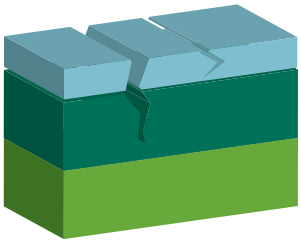
FAIR	By lane miles	16.7%	17.5%	↑	N/A[3]
	By VMT[2]	17.8%	17.7%	↓	



It is most cost-effective to resurface or repair a road when it is in fair condition. The surface of pavement in fair condition shows wear, but the underlying structure is undamaged

Preventive preservation (maintenance and rehabilitation) repairs at this stage can maximize the road's service life

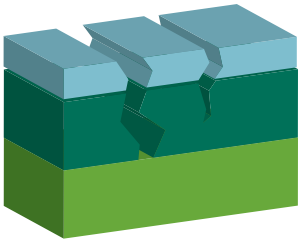
POOR	By lane miles	5.1%	5.3%	↑	↓
	By VMT[2]	5.4%	4.7%	↓	



Restoring a road in poor condition to good condition costs 1.5 to 2 times more than restoring a road in fair condition to good condition because of the damage to the pavement's underlying structure

Roads in poor condition cause morewear on vehicles and higher fuel use

VERY POOR	By lane miles	1.8%	1.8%	–	↓
	By VMT[2]	1.6%	1.3%	↓	



Repairing pavement in poor condition costs 3 to 5 times as much as repairing pavement in fair condition, because deep pavement failure requires reconstruction

Roads in very poor condition require reactive repairs to hold them together until reconstruction, which is not a good strategy for minimizing costs over the life of the pavement

Data source: WSDOT Materials Lab, WSDOT Capital Program Development and Management.

Notes: Percentages may not add to 100 due to rounding. WSDOT collects data on the condition of pavement annually using a van equipped with lasers, cameras and other equipment (see Gray Notebook 68, p. 21). Condition figures for 2019 include chip seal pavement, also known as Bituminous Surface Treatment. Condition figures for 2015 do not include chip seal pavement, which was not evaluated from 2010 through 2016 due to budget restrictions. Chip seal data for 2017 and 2018 was collected, but has not yet been processed. **1** Trends are based on observed condition trends between 2015 and 2019. Arrows indicate trends by lane mile. **2** When pavement condition is weighted by VMT, roadways with more traffic are weighted more heavily than less traveled roads. Weighting pavement condition by VMT better accounts for the higher costs to maintain and preserve roads with more traffic. **3** N/A = Not Applicable. Because pavement in fair condition may have entered that category by either improving from poor condition or deteriorating from good condition, WSDOT does not have a desired trend for the percentage of pavement in fair condition.

Pavement performance improves from 2018 to 2019

Asset sustainability ratio improves, five-year average still unsustainably low

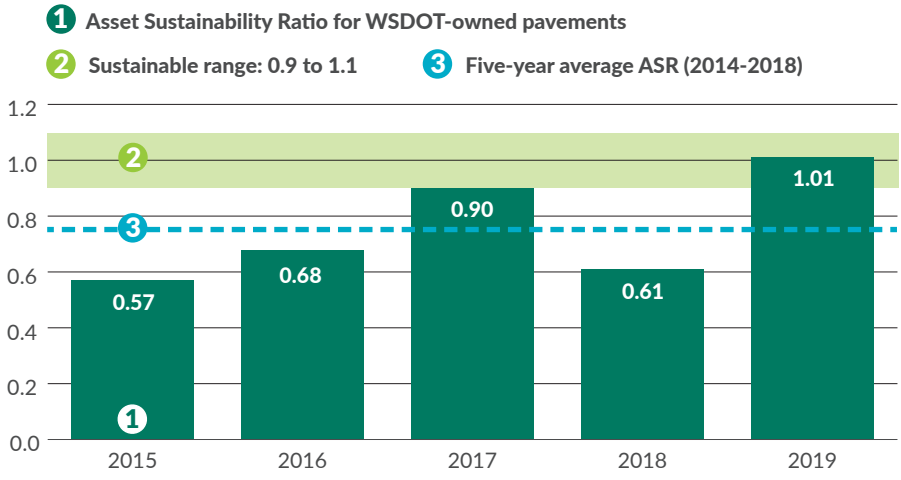
The Asset Sustainability Ratio is the ratio between years of pavement life added to the pavement network in a given year and years of pavement life the network lost through aging in that same year.

The ASR for WSDOT's pavement network was 1.01 in 2019, reaching its target of being between 0.90 and 1.1, and surpassing 1.0 for the first time since the measure was first calculated in 2011. This ratio indicates that for each year of pavement life used up in 2019, 1.01 years of pavement life were added. While the ASR improved substantially from 2018 (when it was 0.61), the improvement was caused by the completion of several multi-year concrete paving projects. As a result, the 2019 ASR is less indicative of the sustainability of WSDOT's level of investment in pavement preservation than the five-year average.

The ASR measures the sustainability of WSDOT's annual level of investment in the pavement network. If the ASR is below 1.0 for a particular year, then fewer years of service life were added to the pavement network than were consumed. A sustainable level of investment would yield an ASR that averaged 1.0, but varied between 0.9 and 1.1 in any given year. From 2015 through 2019, WSDOT's average ASR was 0.75—indicating an unsustainably low average level of investment over those five years (see chart below).

Pavement Asset Sustainability Ratio enters sustainable range in 2019

2015 through 2019



Data source: WSDOT Materials Lab.

Notes: The Asset Sustainability Ratio is calculated by dividing the years of pavement service life added to the network in a given year by the years of pavement service life consumed in that same year.

Long-term pavement performance measures

WSDOT's long-term pavement performance measures (the Asset Sustainability Ratio, Remaining Service Life and Deferred Preservation Liability) supplement the information provided by condition ratings (see chart on p. 14), informing the agency about long-term trends and capturing long-term impacts on the pavement network.

For example, resurfacing a section of asphalt pavement with new asphalt would take it from fair or poor to very good condition, as would resurfacing it with chip seal. However, while chip seal can increase service life by an average of nine years, resurfacing with new asphalt typically adds about 17 years. Long-term indicators capture this difference, with asphalt resurfacing resulting in larger increases in RSL and ASR than chip seal resurfacing.

Remaining Service Life improves

The Remaining Service Life of state-owned pavement increased between 2018 and 2019, going from 46.9% to 48.0%. The RSL remained within WSDOT's target range of 45% to 55%, as it did for all of the five-year period 2015-2019 (see chart at right).

RSL indicates how much of its original life span an average section of WSDOT-owned pavement has left before it will need rehabilitation work. In 2019, an average section of WSDOT-owned pavement had 48.0% of its life span—or 7.8 years—remaining before it was expected to need rehabilitation.

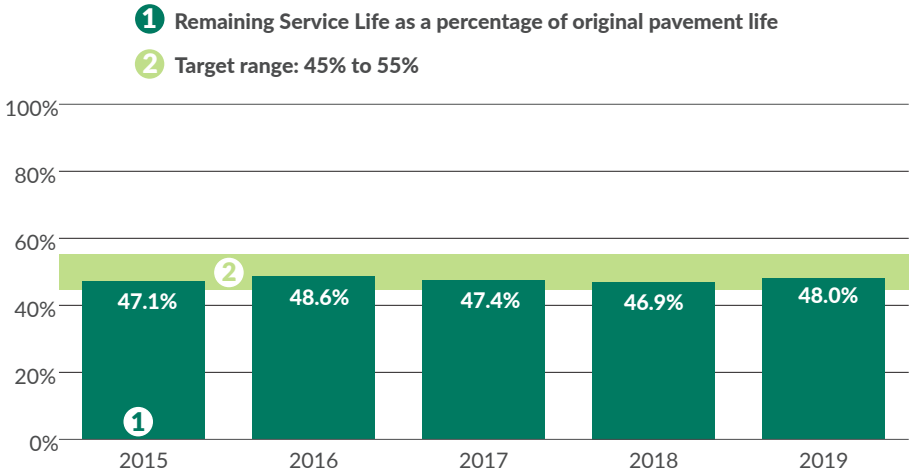
The RSL for each section of pavement is calculated by first estimating the number of years remaining before the condition of that section is expected to become unacceptable (poor or very poor), and then dividing by that pavement section's total expected life span. This number is calculated separately for each section of pavement in WSDOT's network, and then averaged to yield the statewide RSL.

Preservation backlog falls in 2019

WSDOT's pavement Deferred Preservation Liability (also known as the pavement preservation backlog) decreased by $68 million (16.2%) from $420 million in 2018 to $352 million in 2019 (see chart at right). Despite this improvement, the backlog of past-due pavement preservation work remains large, and given current funding levels for preservation, WSDOT expects it to grow in the future. WSDOT uses DPL to track how much investment is needed to restore the entire pavement network to fair or better condition. The agency's goal is to have a DPL of $0.

WSDOT pavements' Remaining Service Life stays in target range in 2019

2015 through 2019; Remaining Service Life shown as a percent of original pavement life

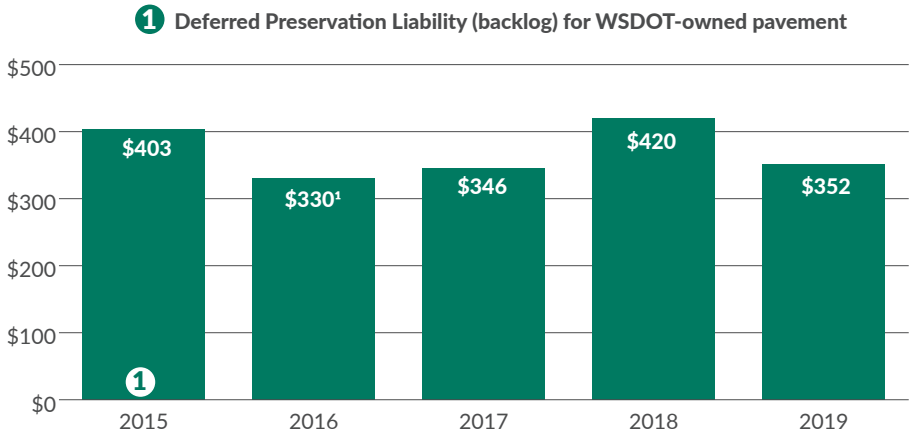


Data source: WSDOT Materials Lab.

Notes: For 2019, the Remaining Service Life of 48.0% is equivalent to an average of 7.8 years remaining before rehabilitation is needed.

WSDOT's Pavement Deferred Preservation Liability falls by $68 million in 2019

2015 through 2019; Dollars in millions



Data source: WSDOT Materials Lab.

Notes: Deferred Preservation Liability is defined as the funding necessary to address past due pavement rehabilitation for all pavement types. WSDOT's goal is to have $0 in Deferred Preservation Liability. **1** The 2016 reduction in the Deferred Preservation Liability was due partly to the completion of a large project on Interstate 405 and partly to an increase in preservation funding as a result of the 2015 Connecting Washington funding package.

State expected to miss federal pavement performance target by 2028

In 2018, WSDOT analyzed the impact of four potential funding scenarios on the condition of state-owned pavement on the National Highway System (see box at right) in 2022 (a four-year estimate) and in 2028 (a 10-year estimate). None of the four scenarios allow Washington to meet its 2028 federally-mandated Transportation Performance Management targets (see p. 7). WSDOT's TPM pavement performance targets are to have:

- No more than 4% of interstate NHS pavement in poor condition in 2022;
- No more than 5% of non-interstate NHS pavement in poor condition in 2022; and
- No more than 5% of interstate NHS pavement in poor condition at any time.

WSDOT completed these scenario analyses as part of its 2019 Transportation Asset Management Plan, which communicates how WSDOT preserves bridge and pavement networks to meet targets under TPM.

WSDOT, contractor win multiple awards for use of rut-resistant asphalt on I-90

WSDOT and its paving contractor, Central Washington Asphalt, won multiple Washington Asphalt Pavement Association awards for using a special type of rut-resistant asphalt on I-90 between SR 21 and Ritzville in 2019. These awards include the First Place Quality Award, the Smoothness Award for the east side of the state, and the Carl Minor Award, which is given to the best project in the state.

WSDOT and the contractor won these awards for their use of a special type of asphalt called stone matrix asphalt to combat rutting and create a high-quality asphalt overlay that will last longer than WSDOT's typical hot-mix asphalt. SMA is known for its long-lasting benefits, it has high rutting and cracking resistance due to the stone-on-stone contact and rich mortar created by the high amount of fines, mineral filler and binder. The benefit of using this type of mix is the extension of service life and the lower overall life cycle cost of the roadway.

WSDOT has used SMA on its roadways five times. The agency's first SMA project, on SR 524 in Lynnwood, was completed in 1999 and is still in place 22 years later. WSDOT's average asphalt pavement life is 15-17 years, indicating that SMA can extend the service life of an overlay by at least four years.

The National Highway System (NHS)

The National Highway System (NHS) is a network of strategic highways in the United States, and includes both state and local highways as well as roads serving major airports, ports, rail and/or truck terminals, and other transport facilities. Washington's NHS network includes 14,759 lane miles of pavement, of which 77% is state-owned roadway and 23% is owned by local agencies. Pavement TPM performance targets (see p. 7) apply specifically to pavement on the NHS.

WSDOT receives sixth Perpetual Pavement Award

In November 2020, WSDOT received a Perpetual Pavement Award from the Asphalt Pavement Alliance for a 7.13-mile section of State Route 12 in Lewis County. The 2020 award was WSDOT's sixth Perpetual Pavement Award.

To qualify for a Perpetual Pavement Award, a pavement must be at least 35 years old and have never suffered a structural failure. It must also demonstrate excellence in design, quality construction and high value to taxpayers.

WSDOT's first crack, seat and overlay concrete reconstruction project performing well at eight-year mark

In 2011, WSDOT completed its first project using the crack, seat and asphalt overlay method (see box at right) on Interstate 5 in Skagit County (first reported in Gray Notebook 48, p. 15). This project restored 12.5 miles of divided highway from Joe Leary Slough to Nulle Road. The project saved more than 38% in initial construction costs and is expected to save at least 23% in life-cycle costs over a 50-year period compared to a conventional concrete replacement or asphalt replacement (see box at right).

Prior to the crack, seat and overlay, this section of I-5 was performing poorly. The joints in the concrete pavement were uneven, causing a rough ride. In 1993, the original rough concrete pavement was overlaid with hot mix asphalt to restore the smoothness of the surface. After only a few years in service, cracks and joints in the concrete reflected through the new HMA overlay and the roughness began to increase once again.

In contrast to the original HMA overlay, the crack and seat with asphalt overlay pavement was still in very good condition after eight years of service. As of 2019, reflective cracking had not reappeared, and the pavement was very smooth. The success of this project ensures that the pavement on this section of Interstate 5 will remain smooth and that future preservation costs can be kept low.

Contributors include Kyler Carlson, Jianhua Li, Mark Russell, Tim Rydholm, Kim Schofield, Jeff Uhlmeyer, Helen Goldstein and Joe Irwin

Concrete reconstruction methods at WSDOT

- **Crack and Seat with Asphalt Overlay**
  Cost: $900,000 per lane mile
  Longevity: 15 to 20 years
  Fractures existing concrete pavement, turning it into a stable base for a thick layer of new asphalt pavement

- **Asphalt Replacement**
  Cost: $1.3 million per lane mile
  Longevity: 15 to 20 years
  Removes the concrete slab and subbase, and lays new asphalt pavement

- **Unbonded Concrete Overlay**
  Cost: $1.5-$2 million per lane mile
  Longevity: 50 years
  Places a thin layer of asphalt on top of the existing roadway, followed by a full-depth concrete overlay on top of the new asphalt

- **Concrete Replacement**
  Cost: $2.5-$3.5 million per lane mile
  Longevity: 50 years
  Removes the existing concrete slab and subbase, and replaces it with a new, thicker slab. Used when an existing decades-old slab is not thick enough for current traffic levels

Note: Cost and longevity are approximations.

80 WASHINGTON STATE FERRIES VESSELS & TERMINALS ANNUAL REPORT

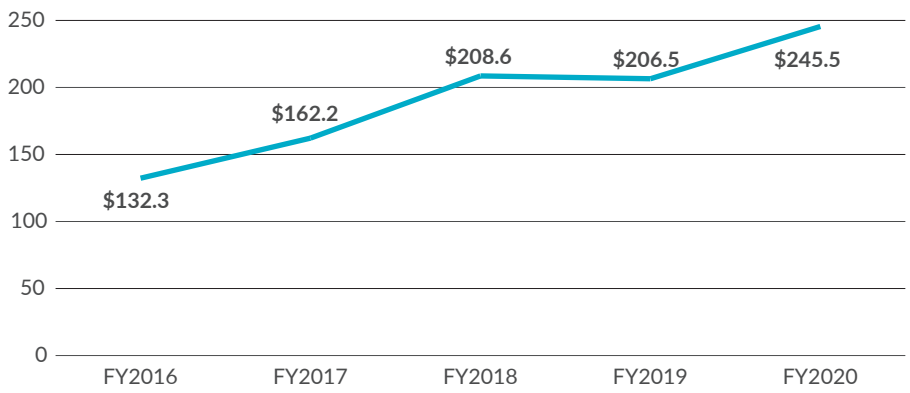
Washington State Ferries vessel preservation backlog increases by $39 million in fiscal year 2020

Washington State Ferries' vessel preservation backlog was $245.5 million in fiscal year 2020, up $39 million (18.9%) from $206.5 million in FY2019. WSF decommissioned the Motor/Vessel *Elwha* in FY2020, which removed $33.1 million from the total vessels backlog but reduced the fleet to 21 vessels. If the FY2019 backlog is adjusted to exclude the M/V *Elwha*, the change in backlog between the two years becomes $72.0 million or an increase of 41.5% ($173.5 million adjusted backlog in FY2019 compared to $245.5 million in FY2020).

In FY2019, the 52-year-old M/V *Elwha* accounted for approximately 16% of the vessel preservation backlog, but its removal was not enough to offset the continued backlog increase due to a constrained preservation budget combined with an aging fleet. As a result of this combination, the vessels preservation backlog has increased 85.6% in the past five years; from $132.3 million in FY2016 to $245.5 million in FY2020.

Preservation backlog for WSF vessels increases in FY2020

Fiscal years 2016 through 2020; Dollars in millions



Data source: Washington State Ferries.
Notes: Values have been rounded.

Twenty-nine percent of WSF's fleet not in State of Good Repair; annual preservation gap projected to increase

In FY2020, six (29%) of the 21 vessels in the WSF fleet missed the target for State of Good Repair (having fewer than 20% of vessel systems overdue for replacement or rehabilitation). Of the remaining 15 vessels in the fleet, eight (38%) had 10%-20% of systems overdue, and seven (33%) had less than 10% of systems overdue (see chart on p. 17).

WSF's average annual gap between preservation needs and funding for vessel preservation is expected to be $71.6 million per fiscal year for the 10-year period from 2021 to 2030. This is the average amount that the preservation backlog will increase each year assuming aging vessels are not decommissioned and replaced. WSF faces challenges in keeping pace with

Notable results

- *The WSF vessel preservation backlog increased by $39 million between FY2019 and FY2020*
- *WSF determined that six of 21 vessels did not meet the target for state of good repair in FY2020*
- *WSF had 94.9% of terminal assets in a state of good repair in FY2020*
- *WSF estimates a funding gap of $81 million for terminal preservation needs over the next 10 years*

Olympic Class vessel contract extended

The Washington State Legislature has authorized the extension of the existing Olympic Class Vessel contract for up to five additional vessels. The new vessels will be powered by hybrid-electric propulsion systems. Construction was originally scheduled to begin in December 2020, but is now planned for December 2021. Delays were the result of several factors, including contract negotiations, unanticipated design challenges, and changes in both shipyard leadership and WSF staff.

preservation requirements due to limited capital funding, an insufficient number of spare vessels (to relieve vessels taken out of service for preservation), and a limited number of shipyards available to complete ferry maintenance in the region.

Vessels asset management plan highlights preservation

WSF operated 10 routes and transported 19.4 million riders in FY2020, down from 24.3 million riders on 10 routes in FY2019 due to COVID-19. Vessels require ongoing maintenance and preservation to sustain a State of Good Repair (see chart on p. 21) and provide safe, reliable and cost-effective public transportation. WSF developed its vessel asset management plan to manage capital asset performance, risks and costs. The plan lays the foundation for sustained system reliability at WSF and meets the asset management plan requirements of the Federal Highway Administration, Federal Transit Administration, and the Revised Code of Washington.

WSF operates 21 vessels that range in age from two to 61 years and are primarily grouped by size (see table at right). Between 17 and 19 of these vessels must be in operation for up to 20 hours per day in order to meet service requirements.

Even with such a heavy operation schedule, each vessel has an expected service life of 60 years—but this expectation is not supported as underfunded vessel preservation has continued for decades.

WSF vessel preservation backlog increases in FY2020
Fiscal year 2019 and FY2020; Age in 2020; Percent of systems past due for investment in FY2020; Dollars in millions

Vessel classes and vessels	Age	Systems past due in FY2020[1]	Preservation backlog FY2019	Preservation backlog FY2020	Change in backlog
Jumbo Mark II Class (202-vehicle)					
M/V *Tacoma*	23	14%	$13.1	$17.0	$3.9
M/V *Wenatchee*	22	21%	$33.6	$36.0	$2.4
M/V *Puyallup*	22	17%	$23.3	$28.0	$4.7
Jumbo Class (188-vehicle)					
M/V *Spokane*	47	15%	$10.9	$11.7	$0.8
M/V *Walla Walla*	47	18%	$11.9	$14.8	$2.9
Super Class (144-vehicle)					
M/V *Kaleetan*	53	10%	$1.6	$1.6	$0
M/V *Yakima*	53	12%	$9.8	$14.0	$4.2
Olympic Class (144-vehicle)					
M/V *Tokitae*	6	0%	$0	$0	$0
M/V *Samish*	5	0%	$0	$0	$0
M/V *Chimacum*	3	0%	$0	$0	$0
M/V *Suquamish*	2	0%	$0	$0	$0
Issaquah Class (124-vehicle)					
M/V *Issaquah*	41	23%	$8.8	$17.0	$8.2
M/V *Kitsap*	40	20%	$4.0	$10.0	$6.0
M/V *Kittitas*	40	18%	$8.0	$16.0	$8.0
M/V *Cathlamet*	39	21%	$10.0	$15.0	$5.0
M/V *Chelan*	39	14%	$3.4	$14.5	$11.1
M/V *Sealth*[2]	38	23%	$9.8	$14.8	$5.0
Evergreen State Class (87-vehicle)					
M/V *Tillikum*	61	20%	$14.6	$20.0	$5.4
Kwa-di Tabil Class (64-vehicle)					
M/V *Chetzemoka*	10	7%	$4.5	$6.0	$1.5
M/V *Salish*	9	6%	$3.4	$5.8	$2.4
M/V *Kennewick*	8	1%	$2.8	$3.3	$0.5
Fleet-wide	**Avg. 29**	**12%**	**Total $206.5[3]**	**Total $245.5**	**Net Change $39.0[3]**

Data source: Washington State Ferries.
Notes: Numbers may not add perfectly due to rounding. **1** Vessel condition is reported as a percent of systems included in WSF's vessel Life Cycle Cost Model past due for investment. A vessel is considered in a state of good repair if fewer than 20% of LCCM systems are past due. **2** The M/V *Sealth* is a 90-vehicle vessel in the Issaquah Class. **3** This calculation includes the $33.1 million backlog of the M/V *Elwha*, which was decommissioned in FY2020.

New vessel construction continues, but lags behind projected needs, which results in an increasing risk to service reliability through 2040. WSF's vessel asset management plan documents this and other performance risks, along with plans to mitigate the risks.

WSF's investment strategy focuses on preservation. This strategy relies on sufficient capital funding (which consistently falls short of vessel needs), as well as adequate industrial resources and vessel out-of-service time to carry out preservation activities. WSF is challenged in each of these areas.

Vessel capital investment falls 14% short of the need

Washington State Ferries' financially constrained vessels capital budget request includes $210.4 million for vessel preservation in the 2021-2023 biennium. This investment falls 14% short of the documented preservation need of $245.5 million. Currently, 15 of 21 vessels (71%) meet WSF's preservation target for State of Good Repair. This misses the agency goal of at least 90% of vessels being in a State of Good Repair.

Over the next six years, WSF will continue to maintain as many vessels as possible in a State of Good Repair with available funding, prioritizing preservation over improvement. Funding will be used first to keep all 21 vessels within regulatory compliance. Any remaining preservation funding will be directed toward vessels at the mid-point of their service lives (Issaquah, Jumbo and Jumbo Mark II class vessels).

WSDOT defines state of good repair metrics for vessels

Metric definition, reporting cycle and target

Metric	Definition	Cycle	Target
Vessel Replacement	Age as a percentage of Useful Life Benchmark (60 years)	Annual	<100%
Vessel Preservation	Percentage of vessel Lifecycle Cost Model (LCCM) inventory items past due for investment based on inspection	Quarterly & Annual	<20%
Vessel Maintenance	Percentage of recurring preventative maintenance completed	Quarterly & Annual	>80%
Vessel Functionality (prior fiscal year)	Planned availability less unplanned maintenance, preservation, repairs (including contract extensions).	Annual	>95%
Vessel Safety	Number of outstanding U.S. Coast Guard violations attributed to lack of maintenance or preservation.	Quarterly & Annual	0
Vessel Comfort & Reliability	Percentage of survey respondents dissatisfied.	Quarterly & Annual	<10%

Data source: Washington State Ferries.

Vessel asset managers do not plan to direct discretionary funding to newer Olympic and Kwa-di Tabil classes of vessels, which will result in the preservation backlog for those vessels increasing. Additionally, WSF does not plan to direct discretionary funding to the oldest vessels (Evergreen and Super class vessels). As a result, unforeseen deficiencies that arise on these vessels could necessitate removal from service pending re-allocation of agency funding.

WSF pursues vessel electrification

WSF is working to electrify its fleet to meet the legislative requirements for greenhouse gas reduction, including a 2030 goal of being 45% below 2005 GHG levels for state agencies. Ongoing efforts include completing a System-wide Electrification Plan, converting the 202-vehicle Jumbo Mark II vessels to hybrid electric propulsion, and constructing a hybrid electric Olympic class of vessels.

The WSF System-wide Electrification Plan is nearing completion and will include:

- Technology assessment;
- Vessel requirements and feasibility analysis;
- Terminal requirements and feasibility analysis;
- Construction project schedule;
- Workforce assessment;
- Financial model; and
- Emissions impact estimate.

Jumbo Mark II class electrification

The M/V *Wenatchee*, a Jumbo Mark II class vessel, will undergo an extensive conversion to hybrid-electric propulsion during the 2021-2023 biennium. This project is funded by a $35 million grant from Washington State Department of Ecology and $8 million in federal grants. It will establish WSF as a leader in sustainable marine transportation.

The project replaces two of the four diesel generators with two lithium-Ion battery banks. The design was completed in the 2019-2021 biennium and construction is scheduled for December 2021 through May 2022.

Initially, the vessel will operate in hybrid-electric mode and achieve a reduction in fuel consumption of approximately 25%. WSF is also planning to electrify terminals; once terminal electrification is complete, the vessel will operate in full battery mode, with a fuel consumption savings of approximately 95%.

WSF will continue to seek funding to electrify the other Jumbo MK II vessels: M/V *Tacoma* and M/V *Puyallup*. Once all three vessels are converted, WSF estimates it will save nearly five million gallons of fuel per year, with a corresponding reduction in CO2, NOx and other pollutants. The preliminary life cycle cost analysis projects a net savings of $60 million over the remaining 40-year service life of these vessels.

Hybrid electric vessel construction

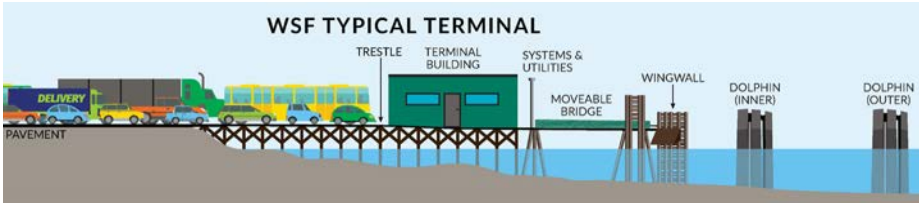
The legislature authorized an extension of the Olympic class vessel construction contract for up to five Hybrid Electric Olympic class vessels and has appropriated funding for the first vessel.

Construction was originally scheduled to begin in December 2020, but is now planned for December 2021. Delays were the result of several factors, including contract negotiations, unanticipated design challenges, and changes in both shipyard leadership and WSF staff. The final vessel price has not been established.

Washington State Ferries keeps 94.9% of terminal assets in a State of Good Repair in fiscal year 2020

As of July 2020, 94.9% of WSDOT's 722 terminal assets were in a State of Good Repair, up from July 2019 when 93.4% of the agency's 755 terminal assets were in good condition. The number of WSDOT's terminal assets declined from July 2019 to July 2020 because ongoing preservation work required several assets at the Seattle terminal to be out of operation in July 2020.

A total of 36% of passenger-only ferry facilities were not in a State of Good Repair as of July 2020—the largest percentage of any asset category.



WSF identifies state of good repair values for terminal assets

Facility or system type	Number of systems	In SOGR	Not in SOGR	Not rated
Buildings[1]	127	97.4%	2.6%	0.0%
Landing aids[2]	174	99.1%	0.9%	0.0%
Overhead loading systems[3]	58	91.9%	8.1%	0.0%
Passenger-only ferry facilities[3,4]	9	64.0%	36.0%	0.0%
Pavement	84	90.6%	9.4%	0.0%
Trestles and bulkheads	65	96.5%	3.5%	0.0%
Vehicle movable bridge systems[3]	205	90.4%	9.6%	0.0%
Total/average FY2020	**722**	**94.9%**	**5.1%**	**0.0%**

Data source: Washington State Ferries.

Notes: Percentages are weighted by replacement cost. Percentages may not add to 100 due to rounding. In previous Gray Notebooks, WSF reported on condition of terminal assets only. WSF now reports on state of good repair. **1** Buildings include terminal buildings, agent buildings, storage buildings, maintenance buildings, and toll booths. **2** Landing aids ensure the ferry vessels are aligned correctly at the terminals, and include wingwalls and dolphins. **3** Systems include foundation supports, movable bridge span, electrical parts, and mechanical parts. **4** Passenger-only ferry systems are located at the Eagle Harbor maintenance facility and are only used for maintenance functions.

How WSF defines State of Good Repair

WSF is currently transitioning from condition-based life cycle cost analysis to risk-based life cycle cost analysis to determine State of Good Repair.

The new analysis is based on the risks of operational failure and the economic consequences of these failures. Under risk-based life cycle cost analysis, a system with risk cost (excluding seismic risk) below the annualized cost of installing and operating a new system is considered to be in a SOGR; a system with risk cost (excluding seismic risk) above the annualized cost of installing and operating a new system is considered not in a SOGR.

The terminals at Bainbridge Island, Fauntleroy, Mukilteo, and Orcas Island have the greatest value of assets not in SOGR. WSF is updating the asset inventory for the newly-constructed Mukilteo terminal. The percentage of assets not in a SOGR at Mukilteo terminal will decrease to zero upon completion of the update. Preservation projects are planned at the other three terminals, including the Bainbridge Island Overhead Loading project, the Fauntleroy Trestle Preservation project and the Orcas Island Vehicle Transfer Span Preservation project. Upon completion, these projects will significantly improve the SOGR at these terminals.

The terminals at Clinton, Kingston, Shaw Island, Tahlequah and Vashon Island have the least value of systems not in a SOGR. The Clinton terminal is relatively new because most assets were renewed in 2000.

Many assets comprising the Kingston, Shaw Island, Tahlequah and Vashon Island terminals are expected to not be in a SOGR in the coming decade. Preservation projects are planned at all of these terminals to address these needs.

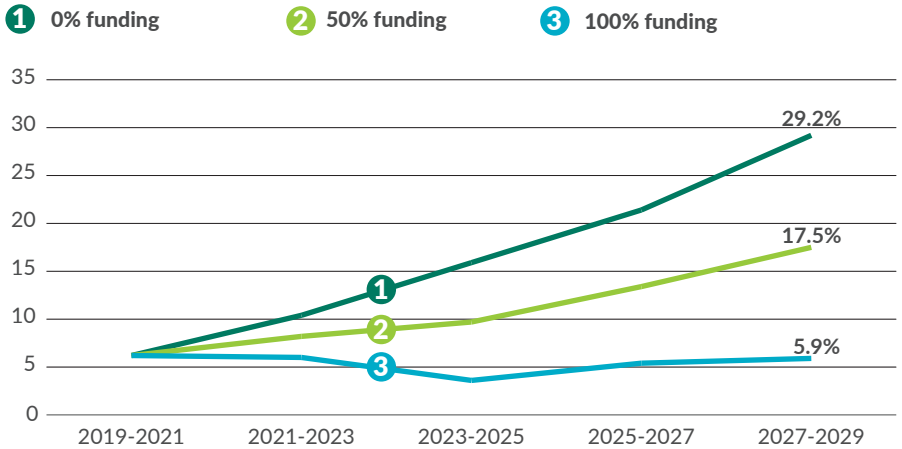
WSF develops terminal preservation backlog projections

WSF's terminal preservation backlog is projected to be equivalent to 6.2% of the cost of replacing all 722 of the agency's terminal systems by the end of FY2021. At funding levels in the 2021 budget submittal, WSF's backlog is projected to decrease to 3.6% by the end of the FY2025, then increase to 5.9% by the end of the FY2029 (see graph below). Risk-based life cycle cost analysis balances the use of capital preservation funding and maintenance funding to maintain the assets in a SOGR at the least possible cost.

WSF recently replaced an aging ferry terminal at Mukilteo, and another major project is under construction at Seattle terminal that

Projected preservation backlog for terminal assets dependent upon funding

2019-2021 biennium through 2027-2029 biennium; Projected percent of assets not in a state of good repair based on possible funding scenarios



Data source: Washington State Ferries.

is scheduled for completion in 2023. Upon completion, the terminal preservation backlog will decrease to its lowest projected level over the upcoming 10-year period.

If the funding levels are reduced by 50%, the backlog percentages are predicted to increase steadily to 17.5% by the end of the FY2029. If WSF's terminals funding is reduced, there will likely be a reduction in service reliability and an increase in maintenance costs. WSF is currently working to illustrate the impacts of funding shortfalls and the strategic approaches it plans to take to provide a safe and reliable transportation system.

WSF terminals asset management plan shows $81 million preservation gap

WSF's terminal asset management plan estimates the unfunded terminal preservation needs to be approximately $81 million for the next 10 years. This estimate is in addition to the $685 million already approved for preservation during the 2020 Washington legislative session.

In accordance with requirements from the Federal Highway Administration, Federal Transit Administration and the state legislature, WSF will update its terminal asset management plan in 2021.

WSF updates existing risks and challenges for terminals

As part of a risk management process, WSF identified enterprise- and program-level risks, analyzed and qualitatively evaluated the impact of those risks, and developed a risk response plan. Recent updates to the results of this risk evaluation process include:

- The seismic risk to WSF terminal systems is high. WSF is continuing to identify critical routes for seismic resiliency, and includes seismic risk in its prioritization of capital projects. WSF's 16-year budget includes several preservation projects that would also upgrade terminal structures to the latest seismic code.
- WSF is continuing to develop a training plan for crews to learn to operate movable loading/unloading bridges as well as a refresher training plan to avoid operator errors. WSF needs additional training resources to fully execute this response plan.
- WSF is in the process of developing and implementing collision prevention training plans for vessel crews, improving vessel operations to reduce propeller wash and continuing with federally-required scour inspections. WSF anticipates a need for additional training resources to fully execute the response plan.
- WSF is beginning to incorporate climate change effects in the design of new capital projects. State revenue reductions have resulted in a delay in the agency's efforts to study the effects of climate change on terminal facilities. The goal is to quantify the cost of climate change and associated risk on all terminal assets and incorporate the results into design standards.

WSF terminals face challenges due to COVID-19

WSF terminals are experiencing challenges during the COVID-19 pandemic, including the following:

- Funding uncertainty associated with changing revenue projections and potential funding constraints. This uncertainty has required some adjustment of priorities in project planning.
- Restrictions and/or delays of workforce hiring leading to lack of personnel to deliver the program plan.
- Delays in design delivery and construction, and change orders associated with mandatory state requirements.

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80 HIGHWAY MAINTENANCE ANNUAL REPORT

WSDOT maintenance faces tough trade-offs

WSDOT continues to face tough maintenance decisions as the backlog of maintenance and preservation work grows and affects state infrastructure. Rougher roads and aging bridges coupled with frequent emergency repairs and closures are becoming more visible and apparent to those traveling on Washington's multimodal system. WSDOT Highway Maintenance is no longer able to hold the system together until additional funding for preservation becomes available.

Maintenance work maintains the condition of transportation system assets and restores assets to a functional state of operation in-between preservation projects. Maintenance activities go hand in hand with preservation work to keep infrastructure in good working order.

WSDOT's roadway maintenance funding is approximately $442 million less for the next 10 years than is needed to accomplish all the assigned tasks (not including other maintenance and preservation needs throughout the agency). While funding available for highway maintenance activities has remained relatively consistent, it has not kept pace with system additions (new projects, structures) from construction as well as material cost increases, inflation, and other unavoidable costs. This means deferring activities and reducing levels of service, which forces the agency to miss performance targets, leading to larger and more costly emergency repairs or full replacements.

The state's overall preservation needs were underfunded by approximately $865 million per year as of December 2020. For highway preservation alone, the annual shortfall is estimated to be $380 million per year. Highway preservation includes resurfacing roadways, bridge rehabilitation and painting and preserving other highway infrastructure including signal systems, slopes and drainage systems. This work is planned and performed to improve or sustain the condition of the transportation facility in a state of good repair or minimally acceptable condition.

With limited funds, preservation projects are often delayed, forcing more extensive and costly maintenance work and resulting in the need for extensive reconstruction. If not addressed, WSDOT will be forced to post signs warning travelers of rough roadways, reduced speed limits and possibly closed lanes and bridges.

WSDOT meets 17 of 25 maintenance targets in 2020

WSDOT met 68% (17 of 25) of its highway Maintenance Accountability Process targets for 2020—down nine percentage points from 77% in 2019. WSDOT was unable to complete two of the 27 MAP activities (Regulatory/ Warning Sign and Guide Sign Maintenance) due to COVID-19 and carpooling restrictions. The missed targets were primarily due to COVID-19 restrictions, work furloughs, personnel shortages due to hiring freezes and continued budget shortfalls.

Notable results

- *WSDOT met 68% of its highway maintenance asset condition targets in 2020, down from 77% in 2019*
- *WSDOT processed 176,995 maintenance records in 2020 using HATS (Highway Activities Tracking System)*
- *WSDOT was unable to assess the condition of guardrail in 2020 due to COVID-19 restrictions and staffing shortfalls*

Level of Service scores

LOS is reported on a scale of "A" through "F." The general definition of each LOS is as follows:

- "A" - The assets are in excellent condition and all systems are operational.
- "B" - The assets are in good condition and all systems are operational.
- "C" - The assets are in fair condition and systems may occasionally be inoperable.
- "D" - The assets are in poor condition and system failures could occur.
- "F" - The assets are in poor and failing condition and system failures are likely.

WSDOT measures the annual performance of 27 (25 in 2020) maintenance activities. Annual performance is measured using two metrics:

- **Asset condition Level of Service** is measured for each asset using data collected from site surveys or operational assessments that evaluate the performance of the asset.
- **Task completion** is an evaluation of planned maintenance tasks for a specific activity compared to how many of those tasks were completed.

Level of Service scores use a letter grading scale, with A being the highest and F being the lowest (see box on p. 25). Of the 25 maintenance activities measured in 2020, the following activities missed LOS targets:

- Catch Basin and Inlet Maintenance
- Pavement Striping
- Stormwater Facility Maintenance
- Bridge Cleaning
- Sweeping and Cleaning
- Slope Repair
- Noxious Weed Control
- Roadside Cleanup

The agency has made many investments in expanding the state's transportation system in recent years, but the funds provided to maintain the expanded system have not kept up with needs, leading to an increasing backlog. Much of the state's gas tax (83.8%) goes toward

WSDOT meets 68% of highway maintenance asset condition targets

2018-2020; Funded Level of Service asset condition targets and scores achieved

Category	Funded level (LOS target)	2019 results	2020 results
Special Bridge and Ferry Operations	A	A	A
Snow and Ice Control Operations	A	A	A
Traffic Signal System Operations	C	C	B
Catch Basin and Inlet Maintenance	A	A	B
Urban Tunnel System Operations	B	N/A[1]	B
Regulatory/Warning Sign Maintenance	C	D	N/A[2]
Barrier Maintenance	B	B	B
Pavement Striping Maintenance	B	B	F
Stormwater Facility Maintenance	A	A	B
Bridge Cleaning	B	B	F
Intelligent Transportation Systems	A	A	A
Culvert Maintenance	D	D	D
Shoulder Maintenance	C	C	C
Rest Area Operations	B	B	B
Ditch Maintenance	B	B	B
Raised/Recessed Pavement Marker Maintenance	C	C	C
Sweeping and Cleaning	A	B	B
Slope Repair	B	D	F
Pavement Marking Maintenance	D	D	D
Vegetation Obstruction Control	C	C	C
Guidepost Maintenance	D	F	D
Highway Lighting Systems	B	B	B
Noxious Weed Control	B	B	C
Roadside Cleanup	D	F	F
Guide Sign Maintenance	C	D	N/A[2]
Nuisance Vegetation Control	D	D	D
Landscape Maintenance	D	C	C
Percent of targets achieved or exceeded		**77%**	**68%**
Percent of targets missed		**23%**	**32%**

Data source: WSDOT Maintenance Office.

Notes: The 27 maintenance activities are listed in prioritized order. Highlighted boxes indicate failing scores. Asset condition Level of Service is affected by maintenance activity, rehabilitation/reconstruction of highway infrastructure, third party damage, disaster events and new construction projects. LOS assessments occur throughout the reporting year, and scores are based on the asset condition at the time of assessment. **1** All facilities in the Urban Tunnel Systems Operations category were under construction during the reporting periods, so the category was not included in calculations of targets achieved. **2** WSDOT was unable to complete condition assessments for Regulatory/Warning Sign Maintenance and Guide Sign Maintenance due to COVID-19 and carpooling restrictions.

debt service on new investments, leaving 16.2% of collected gas tax for everything else—including maintenance and preservation.

MAP pilot project success of 2019 continues into 2020

In 2019, WSDOT piloted a project that centralized the MAP field assessment process, the results of which are used to obtain Level of Service scores for specific maintenance activities. The process was centralized through the creation of two teams of two people that completed MAP assessments statewide. After the success of the 2019 Pilot Program, the statewide MAP team was reestablished to complete the field assessments in 2020. As a result, the 2020 MAP team produced a sustainable approach to working conditions during the COVID-19 pandemic, which resulted in efficiently completed work tasks.

COVID-19 impacts maintenance activities

The COVID-19 pandemic significantly affected all WSDOT maintenance activities and operations. Due to the Governor's Stay Home, Stay Healthy order starting in March 2020, maintenance crews had to pause planned work activities and shift to items including online training in a telework capacity. Missing the key work window of early spring/summer exacerbated the backlog of needed maintenance activities. Once safety procedures were developed to return to work, crews returned slowly to ensure everyone's safety and to adhere to new guidelines. The ongoing safety guidelines and personal protective equipment are vital, but also increase the time it takes crews to complete certain jobs.

Emergency crews continued to respond during the Stay Home

WSDOT Highway Maintenance—always answering the call

When the pandemic hit Washington, WSDOT safety rest area crews kept working in the field as essential workers to provide facilities for freight haulers, essential workers and other travelers. They increased the frequency of their cleaning to help keep travelers safe. This meant cleaning all 45 year-round state rest areas at least twice a day. At the most heavily used sites along I-5, I-90 and I-82, all touch points (door handles, faucets, handrails, etc.) were cleaned every two hours. Crews also worked repairing the rest areas to keep them open and in good working order.

The state chapter of the American Public Works Association honored this dedication with their "Empowering Teams Award," announced during their fall conference. Gov. Jay Inslee also recognized rest area crew contributions.

Right: Crews increased the frequency of rest area cleaning during the Stay Home orders to ensure rest areas were open and safe for freight haulers, essential workers and other travelers throughout the state.

HATS data collection down 18% in 2020

WSDOT continues to develop and enhance HATS, at tool that documents work activities in the field with 1,200 iPads used by frontline maintenance staff each day. Since the launch of HATS in 2008, and a major update in 2015, the agency has developed a clearer understanding of the condition of assets in the field, along with maintenance tasks performed. The system helps WSDOT better manage the funding it receives each biennium.

Maintenance technicians added 7,606 assets to the HATS inventory and completed 176,995 records of work activities in 2020. This averages to 485 HATS record entries per day, an 18% decrease from 2019.

order, and often had to be creative in crewing and equipment to keep themselves and others safe. Powered Air Purifying Respirators, normally used for grinding or cutting concrete on bridge desks or asbestos inspections, were used by general maintenance crews who could not stay six feet away from each other while completing tasks. The battery-powered devices provide clean air to workers and a higher degree of air filtration than a typical N95 mask.

Throughout the pandemic, frontline maintenance crews did additional cleaning and sanitizing at safety rest areas, knowing how vital they are to the freight community.

These efforts resulted in state safety rest area workers receiving the American Public Works Association excellence award.

A hiring freeze due to pandemic-related revenue decreases left WSDOT unable to hire summer temporary crews as well as fill open permanent positions. Mandatory furloughs beginning in July 2020 further restricted the amount and scope of work that could be accomplished. As a result, some time-specific work was not completed during these months.

Roadside trash pickup and homeless encampment cleanups were also reduced as WSDOT had to prioritize emergency and safety-focused work first.

Impacts on 2020-21 winter service

While safety remains the agency's top priority, the heightened need to be strategic with both overtime hours and materials may mean that roads and passes are closed more frequently during large storms, and that those closures may last longer. Tire chains may also be required more often as reduced crews may be able to keep roads open but not completely clear of snow or ice. Lower priority roads might also go untreated for longer periods of time while available crews focus on high priority, more heavily traveled routes. For the safety of crews and travelers, roads that cannot be maintained will be closed until the weather situation is resolved.

A Bailey bridge being moved at the Sanpoil River in 2019.

WSDOT uses Bailey bridges to keep traffic moving during projects

WSDOT bridge and maintenance crews recently helped place temporary Bailey bridges to keep traffic moving at two projects (State Route 21 Sanpoil Bridge replacement and Walla Walla County Seven Mile Bridge replacement). WSDOT has used the Bailey bridge system five times in the last nine years (2012-2020) compared to 10 times in the 52 years prior (1959-2011). The increased use of Bailey bridges is a good indicator of the need for preservation funding, as it is a result of aging infrastructure.

WSDOT State Route 21, Sanpoil Bridge replacement

A new bridge was needed after a major support on the West Branch Sanpoil Bridge partially washed out during extreme spring runoff flooding in April 2017. The bridge is located approximately 15 miles south of Republic in Ferry County.

Because the emergency funding needed to replace such bridges can take some time to arrive, a temporary Bailey bridge was put in place to keep traffic moving through the area. A new bridge was constructed and opened in fall of 2020, and the Bailey bridge was then removed.

Walla Walla County, 7 Mile Road bridge replacement

When a county bridge over Mill Creek on 7 Mile Road in Walla Walla County was damaged by floods in 2020, WSDOT again assisted, helping to end more than eight months of travelers having to take a five-mile detour around the site. The detour was on a steep, gravel road that likely would have had to be closed during winter weather.

Floods eroded the foundation of one of the bridge's piers, making it unsafe for travel and leading to its closure in February 2020. In October, WSDOT installed an agency-owned Bailey bridge while the county continued its work on a permanent replacement.

The Bailey bridge is expected to be in place over Mill Creek until 2024, with construction of the replacement bridge starting in 2023.

A Bailey bridge being moved to a temporary location at the Sanpoil River in 2019, which allowed WSDOT to build a new bridge at the location.

Why Bailey bridges are important to WSDOT

Bailey bridges are portable, pre-fabricated truss bridges that do not require special tools or equipment to assemble and can be easily lifted and set in place, especially in areas without much room to maneuver large pieces of equipment. WSDOT keeps a supply of bridge pieces to construct Bailey bridges as needed, often using them for more than one Bailey bridge project over several years.

WSDOT uses its Bailey bridges to keep traffic moving after a bridge has failed or needs to be removed for replacement. Although they often require some restrictions on amount or weight of traffic, these temporary bridges allow most local travelers to avoid longer detours until a permanent replacement structure is built. Bailey bridges serve an emergency function, but their frequent use is also a symptom of a lack of preservation and maintenance funding.

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80 ACTIVE TRANSPORTATION MOBILITY & ACCESSIBILITY ANNUAL REPORT

Notable results

- *In five of the nine counties for which data is available, pedestrian and bicyclist trips increased from 2018 to 2019*
- *WSDOT's 2021 Active Transportation Plan will include performance metrics and equity checks*
- *Washington State Ferries provided access to 6,961,490 walk-on passengers in 2019, a decrease of 4.1% from 7,262,396 walk-on passengers in 2018*

WSDOT continues to expand bicyclist and pedestrian permanent counter program

As of September 2020, WSDOT had installed 65 permanent bicyclist and pedestrian counters near trails and transit centers in 14 counties across the state, a 16% increase from 56 in 2019. Many of the existing counters were installed after 2018. As a result, the chart below reflects only the 29 counters that recorded full-year data for both 2018 and 2019: 15 counters in King County, three each in Benton and Spokane counties, two each in Clark and Kittitas counties, and one each in Clallam, Douglas, Franklin and Kitsap counties.

Between 2018 and 2019, the number of active transportation trips increased in five of the nine counties with permanent bicyclist and pedestrian counters, and decreased in the other four (see table below). These changes ranged from -46.4% (Clallam County) to 321.7% (Kittitas County).

WSDOT continues to develop methodologies for understanding when and where people are currently bicycling and walking. This type of information supplements the network analysis conducted for the Active Transportation Plan, which identifies locations where system improvements could fill gaps and support increased usage in the future (see p. 31).

In five of the nine counties with available data, active transportation trips increase from 2018 to 2019

Bicyclist, pedestrian and all active trips recorded by WSDOT permanant bicyclist and pedestrian counters in thousands; By county

County (number of counters)	Bicyclist trips *in thousands*			Pedestrian trips *in thousands*			All active trips *in thousands*		
	2018	2019	% Change	2018	2019	% Change	2018	2019	% Change
Benton (3)	98.0	94.2	-3.8%	139.9	139.1	-0.5%	237.8	233.4	-1.8%
Clallam (1)	37.8	18.5	-51.0%	136.9	75.1	-45.2%	174.7	93.6	-46.4%
Clark (2)	89.5	126.6	41.6%	179.3	296.1	65.1%	268.7	422.7	57.3%
Douglas (1)	71.9	69.8	-3.0%	72.2	213.7	196.1%	144.1	283.5	96.7%
Franklin (1)[1]	20.8	18.8	-9.9%	N/A	N/A	N/A	20.8	18.8	-9.9%
King (15)[2]	1,758.5	1,103.2	-37.3%	3,534.2	3,857.9	9.16%	5,585.7[3]	5,130.2[3]	-8.2%[3]
Kitsap (1)[1]	38.7	37.2	-3.9%	N/A	N/A	N/A	38.7	37.2	-3.9%
Kittitas (2)	9.2	12.6	36.8%	43.1	20.8	-51.7%	52.3	220.4	321.7%
Spokane (3)	93.8	85.7	-8.7%	211.7	222.2	5.0%	305.6	307.9	0.8%

Data source: WSDOT Active Transportation Division.

Notes: Includes only counters that recorded full years of data in both 2018 and 2019. Numbers have been rounded and may not add to totals. **1** Bicycle counter only **2** Data from one of the two permanent counters located at the UW Transit Center indicates very large differences between 2018 and 2019. Because similar differences are not seen in any of the nearby counters, data from this counter is excluded. **3** Data will not be the sum of the corresponding pedestrian and bicycle data, because it includes data from the SR 520 Trail (West bridge approach) counter, which reports only combined bicyclist and pedestrian data.

WSDOT 2021 Active Transportation Plan to replace 2008 Bicycle Transportation and Pedestrian Walkways Plan

WSDOT's 2021 Washington State Active Transportation Plan will replace the 2008 Bicycle Transportation and Pedestrian Walkways Plan. The ATP, which is expected to be completed in 2021, will provide information that decision makers can use in making policy and investment recommendations within a larger context. The first part of the plan identifies the purpose and need of statewide active transportation, benefits of active transportation use, as well as the methodology and results of a statewide needs assessment. The second part of the plan will cover active transportation policies, performance metrics, and next steps.

Performance metrics in the ATP will track improvements to facilities, participation in active transportation, and societal and environmental benefits. WSDOT selected metrics to align with state and federal policy goals, as well as existing performance measures.

Active Transportation Plan metrics include equity checks

Each performance metric will include an equity analysis to help identify and address active transportation needs in disadvantaged communities. The metrics will focus attention on locations that lack infrastructure for walking and bicycling, have higher numbers of fatal and serious crashes, and lower rates of vehicle ownership. The intent is to report on differences in access, usage, and outcomes to enable transportation investments that help provide safe, accessible multimodal/active transportation options to all Washingtonians.

ATP Performance Metrics

WSDOT's 2021 Active Transportation Plan will include measures of the following characteristics and qualities:

- **Network completeness and quality**, including facility length, reductions in gaps and level of traffic stress (see box at right);
- **Safety**, including total number of people killed or seriously injured in crashes involving bicyclists and/or pedestrians;
- **Opportunity**, including measuring whether certain populations are at higher risk for death or serious injury while using active transportation modes, network performance in communities of concern, and greenhouse gas emissions avoided by walking and bicycling;
- **Participation**, including the number of trips made by walking or bicycling, of children walking and/or bicycling to school, of ferry walk-on and bicycle-on passengers, and of transit access by mode; and
- **Partnerships**, including the percentage of jurisdictions with active transportation plans that include measurable goals, the percentage of the population covered by such plans and Washington's national rankings in America's Health Report, Bicycle-Friendly State and the Safe Routes to School Report Card.

Level of Traffic Stress

Level of Traffic Stress is a methodology for assessing how well a roadway meets the needs of bicyclists and pedestrians of all ages and abilities.

Using a combination of roadway characteristics, motor vehicle traffic speed and volume, geographic location, and surrounding land use, it rates roads from LTS 1 (lowest level of stress) to LTS 4 (highest level of stress). LTS is calculated separately for bicyclists and pedestrians. For an in-depth description of LTS methodology, see Gray Notebook 71, p. 31.

WSDOT's need for sidewalk data

WSDOT has been exploring new methods, such as Level of Traffic Stress (see box on p. 31), to help identify active transportation needs associated with state routes. The Level of Traffic Stress tool uses roadway characteristics to indicate where pedestrians and bicyclists will experience more challenges with the roadway network. For pedestrians, the availability of sidewalk facilities is a key input. However, sidewalk data has not been readily available.

Route Directness Index

The Route Directness Index is a tool that communicates the difference between direct, "as the crow flies" distance between an origin and a destination, and the distance a person must actually travel to make that trip. An RDI of 1 means that these two distances are the same, while an RDI of 2 means that a person must travel twice the direct distance in order to make the trip.

In general, higher RDI values are associated with increased physical effort, travel time, and exposure to weather for bicyclists and pedestrians, all of which can reduce the efficiency and appeal of walking or bicycling.

WSDOT staff evaluate sidewalks from home

WSDOT staff began working from home in March 2020 to help reduce the spread of COVID-19. While this limited the agency's ability to perform certain tasks, it provided an opportunity to address the agency's sidewalk data deficiency. WSDOT staff used Google map imagery and tools available on the internet to help identify and measure existing sidewalks. WSDOT's Transportation Data GIS and Modeling office took the project a step further, refining the early data collected and improving ongoing collection methodology.

There is still work remaining before WSDOT's sidewalk data can be considered a true asset inventory. However, the data collected has already been helpful in refining Level of Traffic Stress-based need estimates and in answering information requests from WSDOT planners.

So far, the data collection effort has focused on finding sidewalks on state highways in population centers, which includes cities, towns and Census Designated Places. There were 539 such places identified and over half of the state route miles within them have been scanned for the presence of sidewalks.

There are limitations to this method of collecting sidewalk data. In particular, the condition and ADA compatibility of existing facilities remains unknown. However, having a better understanding of where sidewalk gaps exist on the state system is an important first step in closing pedestrian network gaps.

WSDOT concludes multimodal permeability pilot study

WSDOT has concluded a Multimodal Permeability Pilot that explored the availability of state highway crossings for pedestrians and bicyclists.

The pilot study was based on FHWA guidance and used the Route Directness Index tool (see box at left) to determine how far out of their way bicyclists and pedestrians must travel when making trips that cross state highways. In general, the pilot study found that active travelers experience a relatively high burden of out-of-the-way travel in Washington, with trips crossing state highways in population centers having an average RDI of 6.64, and trips crossing state highways in rural areas having an average RDI of 9.67.

WSF walk-on passenger numbers decline in 2019

Washington State Ferries provided access to 6,961,490 walk-on passengers in 2019, a decrease of approximately 4.1% from the 7,262,396 walk-on passengers in 2018. Due to reporting constraints at WSF, accurate data for bicyclists traveling on ferry vessels is not available and those numbers are included in walk-on passenger totals.

Contributors include Barb Chamberlain, Charlotte Claybrooke, Brian Wood and Helen Goldstein

80 INCIDENT RESPONSE QUARTERLY UPDATE

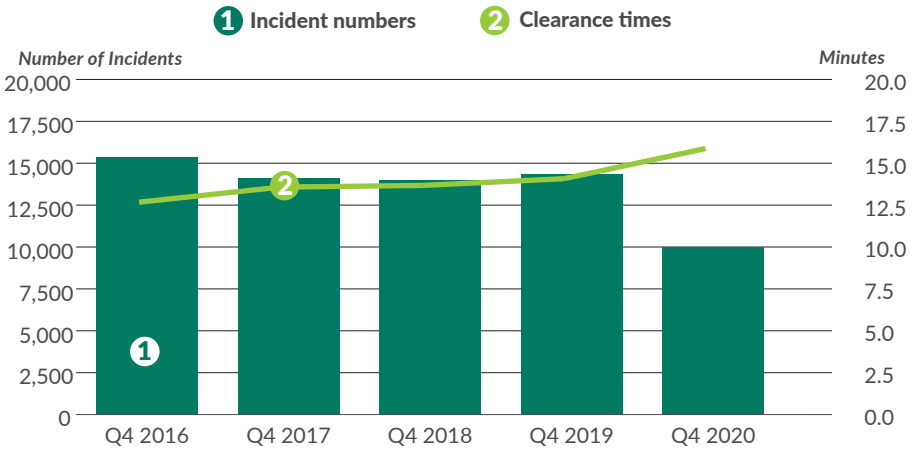
WSDOT Incident Response teams help improve driver safety at 10,000 incidents

WSDOT's Incident Response teams assisted at 10,000 incidents during the fourth quarter (October through December) of 2020. On average, IR teams responded to an incident scene every 13 minutes and 15 seconds during the quarter. Statewide travel continues to decrease in response to COVID-19 and as a result, there were 4,335 (30.2%) fewer incidents during the fourth quarter of 2020 compared to the same quarter in 2019 (14,335).

On average, IR teams cleared each of the 10,000 incidents in 15 minutes and 48 seconds. This is one minute and 48 seconds (12.9%) slower than the average incident clearance time for the same quarter in 2019. This is likely attributed to IR teams following COVID-19 safety protocol to protect drivers and team members.

Of the 10,000 total incidents, 7,055 (70.6%) lasted less than 15 minutes, 2,772 (27.7%) lasted 15-90 minutes and 173 (1.7%) incidents lasted more than 90 minutes (see chart on right). During the fourth quarter of 2020, there was a 4.8% decrease in incidents lasting more than 90 minutes, while there were 22.7% fewer incidents lasting 15-90 minutes and 33.4% fewer incidents lasting less than 15 minutes, compared to the same quarter in 2019.

Average clearance times increase slightly over the past five years
Fourth quarters; 2016 through 2020; Number of incident responses; Clearance times in minutes



Data source: Washington Incident Tracking System.

Notes: The data above only accounts for incidents to which an IR unit responded. IR data reported for the current quarter (Q4 2020) is considered preliminary. In the previous quarter (Q3 2020), WSDOT responded to 11,254 incidents, clearing them in an average of 14.6 minutes. These numbers have been confirmed and are now finalized.

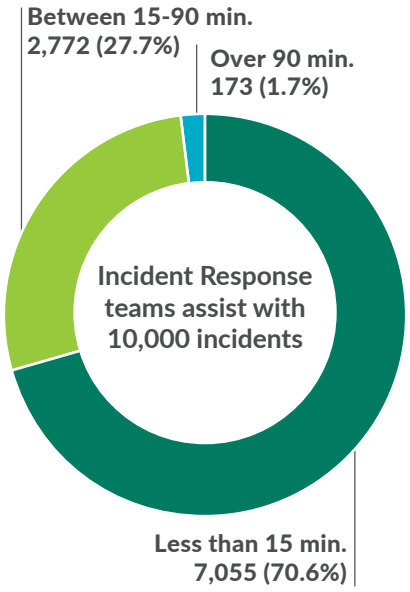
WSDOT teams respond to 173 over-90-minute incidents

IR teams provided assistance at the scene of 173 incidents that lasted more than 90 minutes during the fourth quarter of 2020. This was eight more incidents—a 4.8% increase—than the same quarter in 2019. While these

Notable results

- *WSDOT responded to 10,000 incidents during the fourth quarter of 2020, 4,335 (30.2%) fewer than during the same quarter in 2019*
- *WSDOT cleared incident scenes in an average of 15 minutes and 48 seconds during the fourth quarter of 2020, one minute and 48 seconds (12.9%) slower than the same quarter in 2019*
- *In the fourth quarter of 2020, IR teams provided an estimated $19.6 million in economic benefit by reducing the effects of incidents on drivers*
- *Based on WSDOT's budget for IR, every $1 spent on the program provided drivers roughly $13.07 in economic benefit*

WSDOT clears majority of traffic incidents in 15 minutes or less
Fourth quarter 2020; Times to clear incidents; Number and percentage of incidents



Data source: Washington Incident Tracking System.

over-90-minute incidents accounted for 1.7% of all incidents, they resulted in 22.1% of all incident-related delay costs (see chart on next page).

Ten of the 173 over-90-minute incidents took six hours or more to clear (referred to as extraordinary incidents). This was two fewer extraordinary incidents than the same quarter in 2019. The 10 extraordinary incidents took an average of 10 hours and 30 minutes to clear, accounting for 4.1% of all incident-induced delay costs for the quarter.

The average incident clearance time for all over-90-minute incidents was two hours and 56 minutes. This was about 21 minutes (10.6%) faster than the same quarter in 2019. Excluding the 10 extraordinary incidents, WSDOT's average clearance time for over-90-minute incidents was two hours and 29 minutes.

WSDOT focuses on safety when clearing incidents, working to reduce incident-induced delay as well as the potential for secondary incidents. Secondary incidents occur in the congestion resulting from a prior incident and may be caused by distracted driving, unexpected slowdowns or debris in the roadway.

Incident Response provides economic benefit to travelers

The Incident Response teams help alert drivers to incidents and clear roadways to reduce the likelihood of new incidents. WSDOT's assistance at incident scenes provided an estimated $19.6 million in economic benefit during the fourth quarter of 2020 by reducing the impacts of incidents on drivers. This benefit is provided in two ways:

- WSDOT reduces the time and fuel motorists waste in incident-induced traffic delay by clearing incidents quickly. About $11.1 million of IR's economic benefit for the quarter resulted from reduced traffic delay.
- WSDOT helps prevent secondary incidents by proactively managing traffic at incident scenes. About $8.5 million of IR's economic benefit for the quarter resulted from preventing an estimated 1,880 secondary incidents and resulting delay. This figure is based on Federal Highway Administration data that indicates 20% of all incidents are secondary incidents.

Based on WSDOT's budget for IR, every $1 spent on the program during the fourth quarter of 2020 provided drivers roughly $13.07 in economic benefit.

WSDOT's Incident Response teams provide an estimated $19.6 million in economic benefit

Fourth quarter 2020; Incidents by duration in minutes; Time in minutes; Costs and benefits in millions of dollars

Incident duration	Number of incidents[1]	Percent blocking[2]	Average incident clearance time[3] (all incidents)	Cost of incident-induced delay	Economic benefits from IR program[4]
Less than 15 min.	7,055	19.4%	5.0	$8.9	$4.1
Between 15 and 90 min.	2,772	55.0%	32.4	$25.8	$11.3
Over 90 min.	173	84.3%	176.9	$9.8	$4.2
Total	10,000	30.5%	15.8	$44.5	$19.6
Percent change from the fourth quarter of 2019	**↓30.2%**	**↑3.7%**	**↑12.9%**	**↓21.7%**	**↓21.7%**

Data source: Washington Incident Tracking System.

Notes: Some numbers do not add up to 100% due to rounding.

1 Teams were unable to locate 602 of the 10,000 incidents. Because an IR team attempted to respond, these incidents are included in the total incident count. Other performance measures do not include the incidents that, IR teams were unable to locate.
2 An incident is considered blocking when it shuts down one or more lanes of travel.
3 Incident clearance time is the time between an IR team's first awareness of an incident and when the last responder has left the scene.
4 Estimated economic benefits include benefits from delay reduction and prevented secondary incidents. See WSDOT's Handbook for Corridor Capacity Evaluation, 2nd edition, pp. 45-47 for WSDOT's methods to calculate IR benefits.

Incident numbers do not always directly influence the cost of incident induced delay

The 10,000 incidents during the quarter had a total incident-induced delay cost of $44.5 million. The majority of these incidents were less than 15 minutes. The cost of these 7,055 incidents, which comprised 70.6% of all incidents, was $8.9 million (19.9% of the total cost). There were 2,772 incidents lasting 15-90 minutes, which accounted for 27.7% of all incidents, and cost $25.8 million (58% of the total cost). Incidents lasting more than 90 minutes made up 1.7% (173) of all incidents during the quarter, but accounted for 22% ($9.8 million) of the total cost of incident induced delay.

Performance data reported in this article is from WSDOT's Washington Incident Tracking System, which tracks incidents to which a WSDOT IR team responded.

For more information on how WSDOT calculates these figures and all IR performance metrics, see WSDOT's Handbook for Corridor Capacity Evaluation, 2nd edition, pp. 45-47.

Governor declares November 9-15, 2020 Traffic Incident Response Awareness Week in Washington state

On November 5, 2020, Gov. Jay Inslee signed a proclamation declaring Washington's Traffic Incident Response Awareness Week (November 9-15, 2020). The proclamation was a joint request from WSDOT, the Washington State Patrol, the Washington Fire Chiefs and the Towing and Recovery Association of Washington. It honors the Traffic Incident Management work of many organizations and strengthens the existing tradition of Traffic Incident Response Awareness Week.

The State of Washington

Proclamation

WHEREAS, highway crashes and blocking incidents in Washington state cause congestion, secondary crashes and impede commuter and business traffic; and

WHEREAS, these incidents and additional challenges on freeways necessitate a coordinated multi-agency response, referred to in the public safety and transportation professions as Traffic Incident Management (TIM); and

WHEREAS, TIM stakeholders include: law enforcement, fire and rescue emergency medical services, transportation agencies (state, county local), towing and recovery, emergency managers, hazardous materials responders, medical examiners and/or coroners, elected and appointed officials, traffic media, freight haulers and the traveling public; and

WHEREAS, As of Sept. 8, 2020, Washington state responders have trained 5,419 TIM responders, including 277 train-the-trainer sessions to increase training opportunities; and

WHEREAS, the safety of the traveling public and response personnel at incident scenes is of paramount concern;

NOW, THEREFORE, I, Jay Inslee, Governor of the state of Washington, do hereby proclaim November 9-15, 2020, as

Traffic Incident Response Awareness Week

in Washington, and I encourage all people in our state to join me in this special observance.

Signed this 5th day of November, 2020

Governor Jay Inslee

At WSDOT, TIM responders include the Incident Response Teams, the Traffic Management Centers, Maintenance workers and many more who work together on incident response. Their work—and the partnerships they've built with partner agencies—is seen every day in clearing crashes and collisions and pays huge dividends during major events and closures. Read about Incident Response Teams on the WSDOT Blog.

Contributors include Vince Fairhurst, Tony Leingang, Michele Villnave, Dustin Motte and Takahide Aso

Customer feedback:

- "What an asset to WSDOT Aaron is. Very professional. He calmed me down, explained everything, and got me on my way. Kudos to Aaron!"
- "Brian was a great help and a great relief. He stayed with my son until a tow truck arrived. Thank you!!"
- "Shane was a wonderful help. I am grateful for his help. Thank you for having Incident response program. They are awesome!! Thank you."

Incident Response helps reduce congestion

The mission of WSDOT's Incident Response program is to clear traffic incidents safely and quickly, minimizing congestion and the risk of secondary incidents. The statewide program has a biennial budget of $12 million, about 59 full-time equivalent positions and 69 dedicated vehicles. Teams are on-call 24/7 and actively patrol approximately 1,300 centerline miles (3,400 lane miles) of highway on major corridors around the state during peak traffic hours. This covers approximately 18% of all state-owned centerline miles statewide.

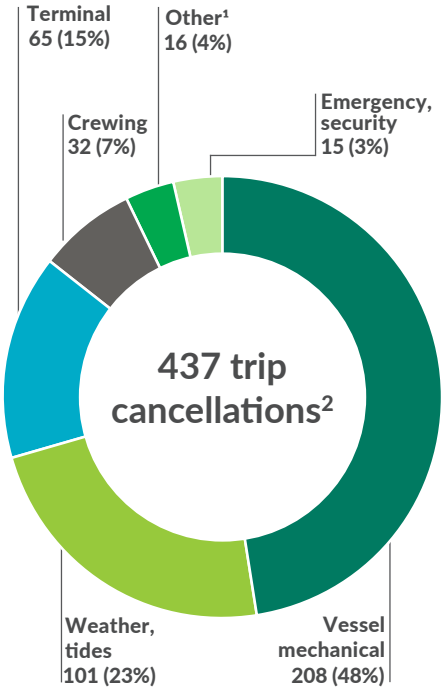
80 WASHINGTON STATE FERRIES QUARTERLY UPDATE

Notable results

- *WSF completed 36,288 (98.9%) of its 36,690 regularly scheduled trips in the second quarter of fiscal year 2021*
- *WSF ridership was approximately 3.26 million in the second quarter of fiscal year 2021, which was 2.2 million (40.3%) fewer than the corresponding quarter in FY2020*

WSF vessel issues cause most cancellations for the quarter

Second quarter (October-December) FY2021



Data source: Washington State Ferries.

Notes: Fiscal years run from July 1 through June 30. As a result, October through December 2020 represents the second quarter of FY2021.
1 The category for "Other" includes events like disabled vehicles, environmental reasons and non-vessel related incidents that can impact operations.
2 WSF replaced 35 of the 437 canceled trips for a total of 402 net missed trips.

WSF service reliability at 98.9% for the quarter

There were 36,690 regularly scheduled ferry trips during the second quarter of fiscal year 2021 (October through December 2020). Washington State Ferries completed 98.9% (36,288) of these trips. This percentage narrowly missed the annual service reliability performance goal of 99%, and was a decrease of 0.7 percentage points compared to the same quarter in FY2020.

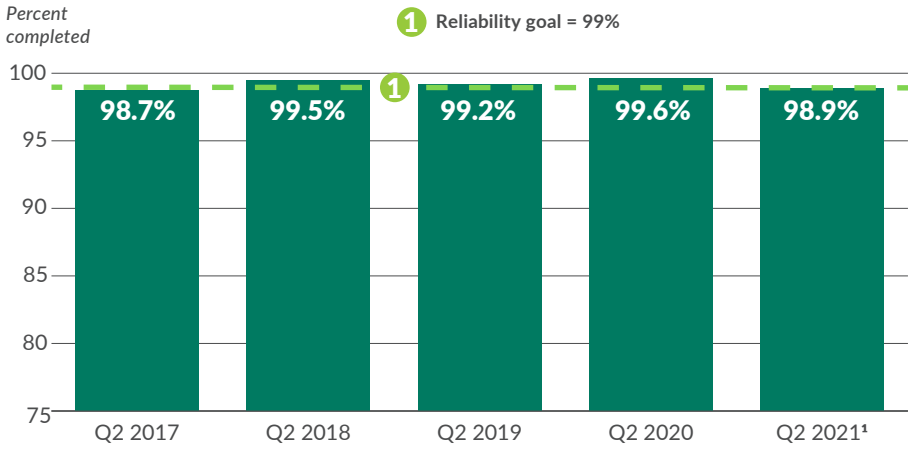
In the second quarter of FY2021, WSF canceled 437 trips but was able to replace 35 of them, resulting in 402 net missed trips (see chart at left). This was 230 more net missed trips compared to the same quarter in FY2020. Due to the reduction in passengers during the COVID-19 pandemic, WSF remained on a modified winter schedule, which resulted in approximately 10% (4,067) fewer sailings scheduled than in the same quarter last year when there were 40,757. There were no scheduled trips on the Anacortes/Friday Harbor/Sidney, B.C. route because the border between the United States and Canada remained closed to non-essential travelers due to COVID-19, which accounted for 184 of all reduced scheduled trips during the quarter.

The majority of missed trips (208) were related to vessels. During routine maintenance in November, a hole was discovered on the vehicle deck of the M/V *Spokane*, which is assigned to the Seattle/Bremerton route. The vessel was taken out of service, and because there was no replacement vessel available, 71 cancellations occurred. In October, a lightning strike disabled the navigation system on the M/V *Puyallup*, resulting in 39 cancelled trips on the Edmonds-Kingston route. High winds and fog resulted in 60 cancellations and tides added an additional 41.

In December 2020, the new Mukilteo terminal opened. This required WSF to relocate the slip from the old terminal to the new one, which led to 52 cancellations on December 29.

WSF trip reliability decreases during the pandemic

Second quarters; Fiscal years 2017 through 2021; Percent of scheduled ferry trips completed



Data source: Washington State Ferries.

Notes: Fiscal year = July 1 through June 30. As a result, October through December 2020 represents the second quarter of FY2021. **1** During Q2 FY2021, WSF operated on a modified winter schedule.

On-time performance still down during pandemic

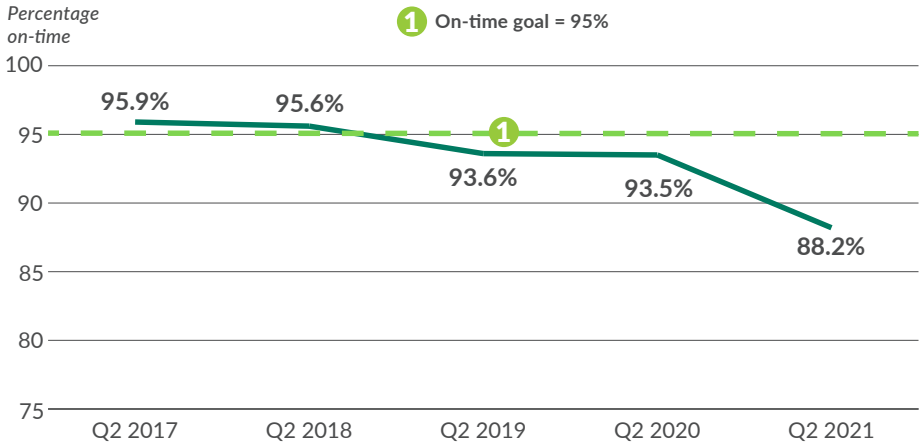
On-time performance decreased to 88.2% during the second quarter of FY2021 compared to 93.5% for the same quarter in FY2020. The quarterly rate was below WSF's annual on-time performance goal of 95%.

The San Juan Domestic route—which had on time performance of 53.6%—pulled down the system-wide average for the quarter, which would have been 95.4% otherwise. On-time performance decreased on four of nine routes compared to the second quarter of FY2020. The San Juan domestic route had the largest decrease (-29.9%) in on-time performance compared to the same quarter last year.

WSF continued to operate on a modified winter schedule, which provides less dwell time for vessel loading and unloading. Some routes, including the domestic San Juan route, are experiencing higher ridership than what they have historically experienced during a normal winter schedule. These higher volumes on some routes resulted in longer loading and unloading times and adversely affected on-time performance.

On-time performance for WSF continues downward five-year trend

Second quarters; Fiscal years 2017 through 2021; Percentage of ferry trips reported as on-time[1]



Data source: Washington State Ferries.

Notes: Fiscal year = July 1 through June 30. As a result, October through December 2020 represents the second quarter of FY2021. **1** A trip is considered delayed when a vessel leaves the terminal more than 10 minutes after the scheduled departure time.

WSF on-time performance and reliability down in the second quarter of fiscal year 2021

Second quarters (October through December) FY2020 and FY2021; Annual on-time goal = 95%; Annual service reliability goal = 99%

	On-time performance (second quarter)				Trip reliability (second quarter)			
Route	**FY2020**	**FY2021**	**Status**	**Trend**	**FY2020**	**FY2021**	**Status**	**Trend**
San Juan Domestic	83.5%	53.6%	-29.9%	↓	100%	99.1%	-0.9%	↓
Anacortes/Friday Harbor – Sidney, B.C.[1]	87.7%	N/A	N/A	N/A	70.7%	N/A	N/A	N/A
Edmonds – Kingston	98.4%	98.4%	0.0%	↔	99.9%	98.5%	-1.4%	↓
Fauntleroy – Vashon – Southworth	93.7%	90.8%	-2.9%	↓	98.9%	99.8%	0.9%	↑
Port Townsend – Coupeville	97.9%	96.3%	-1.5%	↓	97.3%	94.5%	-2.8%	↓
Mukilteo – Clinton	96.9%	96.2%	-0.7%	↓	100%	99.1%	-0.9%	↓
Point Defiance – Tahlequah	98.7%	98.8%	0.1%	↑	99.9%	99.8%	-0.1%	↓
Seattle – Bainbridge Island	91.9%	95.9%	4.0%	↑	99.9%	99.7%	0.2%	↓
Seattle – Bremerton	94.4%	97.7%	3.3%	↑	99.8%	96.3%	3.5%	↓
Total system	**93.5%**	**88.2%**	**-5.3%**	↓	**99.6%**	**98.9%**	**-0.7%**	↓

Data source: Washington State Ferries.

Notes: FY = fiscal year (July 1 through June 30). As a result, October through December 2020 represents the second quarter of FY2021. A trip is considered delayed when a vessel leaves the terminal more than 10 minutes after the scheduled departure time. WSF operates 10 routes but combines the Anacortes – Friday Harbor route with the San Juan Interisland route as the San Juan Domestic for on-time performance and service reliability. Due to unique fare collection methods in the San Juan Islands, and similar origin and destination legs on both routes, some statistics cannot be separated between the two routes. Numbers shown in the table have been rounded to the tenth and may not add to 100%.
1 The International route was closed during the quarter due to COVID-19.

The Seattle/Bainbridge route showed a 4.0 percentage point improvement in on-time performance compared to the same quarter last year (see table on p. 37). Even though construction continued on the terminal at Colman Dock in Seattle, both routes that use the terminal (Seattle/Bainbridge and Seattle/Bremerton) had improved on-time performance over the same quarter last year.

On average in the second quarter of FY2021, 45 out of 382 (11.8%) daily trips did not leave the terminal within 10 minutes of the scheduled departure time, increasing from an average of 28 out of 435 trips (6.5%) for the same quarter in FY2020.

Ridership decreases in the second quarter of FY2021

WSF ridership was approximately 3.26 million during the second quarter of FY2021, which was approximately 2.2 million (40.3%) fewer than the same quarter in FY2020, and 14.5% below projections. Ridership decreased on all routes compared to the same quarter in FY2020 because fewer people are traveling during the COVID-19 pandemic.

The Seattle/Bremerton route had the largest ridership decrease (69.7%) as 165,050 people traveled this route compared to the same quarter in FY2020 when 545,462. This decrease was partly due to WSF operating one vessel instead of two on this route for most of the second quarter when the M/V *Spokane* was taken out of service for unscheduled maintenance.

The domestic San Juan route experienced the smallest decrease in ridership (13.4%) as 340,797 people traveled the route compared to 393,473 during the second quarter of FY2020.

Farebox revenue down in second quarter of FY2021

WSF farebox revenue was $31.3 million for the second quarter of FY2021, about $10.6 million (25.3%) less than the same quarter in FY2020 ($41.9 million). The revenue decrease is less than the ridership decrease because more people are driving on the ferry, which is more expensive than passenger fares (walk-ons, etc.). Fare collection was about $759,000 (2.4%) below WSF projections for the quarter.

Passenger injuries decrease, employee injuries increase

The rate of passenger injuries per million riders was 1.54 in the second quarter of FY2021, down 24% from 2.02 in the same quarter of FY2020. Passenger injuries are defined by the National Transit Database reporting system as any injury that results in transport to a medical facility. The passenger rate during the quarter was 1.54 above the WSF goal of 1.0 injury or fewer per million riders.

The rate of employee injuries reportable to the Occupational Safety and Health Administration in the second quarter of FY2021 was 11.4 per 10,000 revenue service hours, an increase from 9.5 per 10,000 revenue service hours in the same quarter last year. This represents two more injuries than the same quarter in FY2020. The employee injury rate (11.4) was above WSF annual goal of having fewer than 7.6 employee injuries per 10,000 revenue service hours.

Rate of passenger complaints increases

There were 277 complaints during the second quarter of FY2021, compared to 378 complaints in the same quarter last year. Expressed as a ratio related to ridership, there were 8.51 complaints per million riders in FY2021 and 6.93 in FY2020.

Contributors include Matt Hanbey, Donna Thomas, Joe Irwin and Dustin Motte

The online version of this article links to an interactive map at bit.ly/GNBferriesmap.

WSF helps keep the Puget Sound safe

Since July (FY2021), WSF crew members performed 11 lifesaving events. Ferry crews have rescued boaters and other people who became stranded in the water, boarded a private vessel to provide life-sustaining care during a medical emergency, and assisted passengers in distress onboard ferries. Crew members responded to each situation with care and expertise. As part of U.S. Coast Guard mandated training, crew members are certified in first aid, CPR, and using an automated external defibrillator. They truly save lives, and each crew member directly involved in a rescue received the Life Ring Award for their efforts. Read more about WSF's rescue work on the WSDOT Blog.

80 PLUG-IN ELECTRIC VEHICLES ANNUAL REPORT

Washington sees approximately 19% increase in electric vehicle registrations from 2019

Washington state is second in the nation in terms of electric vehicle (EV) market share, with more than 28 EVs per 1,000 registered vehicles. Washington state had 63,259 plug-in EV registrations as of December 31, 2020. This is approximately a 19% increase in EV registrations from 53,307 in 2019 and a 188% increase from 21,997 in 2016.

The total EV count in Washington includes 45,292 battery electric vehicles (BEVs) and 17,967 plug-in hybrid electric vehicles (PHEVs). Washington has maintained a ratio of approximately two BEVs for every PHEV since 2015 (see table below). For a county by county perspective, see map on p. 40.

Plug-in electric vehicle registrations surge upward in Washington

2016 through 2020; Number of plug-in electric vehicle registrations by vehicles type; Includes battery electric vehicles and plug-in hybrid electric vehicles

Vehicle type	2016	2017	2018	2019	2020
BEV	14,573	20,010	27,853	36,129	45,292
PHEV	7,424	10,015	15,025	17,178	17,967
EV totals	21,997	30,025	42,878	53,307	63,259

Data source: Washington State Department of Licensing.

Notes: BEV = Battery electric vehicles. PHEV = Plug-in hybrid electric vehicles. EV = Electric vehicles.

To help ensure these vehicles have ready access to power when needed, Washington has worked with its EV partners to increase the number of EV charging stations and ports. The state has:

- 1,262 Level 2 electric vehicle supply equipment units with 2,528 ports, and
- 181 Direct Current fast chargers with 591 ports

In the past five years, the total number of charging ports (both Level 2 and DC fast chargers) has increased 133% from 1,337 to 3,119.

Because not all electric vehicles use the same type of fast charger to plug in and recharge, WSDOT works with partners to ensure a wide variety is offered at locations across the state. Increased EV adoption is expected to help the state progress toward its goals of reducing greenhouse gases, protecting public health and the environment, and promoting economic growth.

Notable results

- *Plug-in electric vehicle registrations in Washington increased 188% between 2016 and 2020*
- *WSDOT decreased its passenger vehicle fleet by 5% between 2016 and 2020, and increased the percentage of electric vehicles in its fleet from 6% to 23%*
- *Public charging ports for EVs in Washington state increased 133% between 2016 and 2020*

Electric vehicle terms

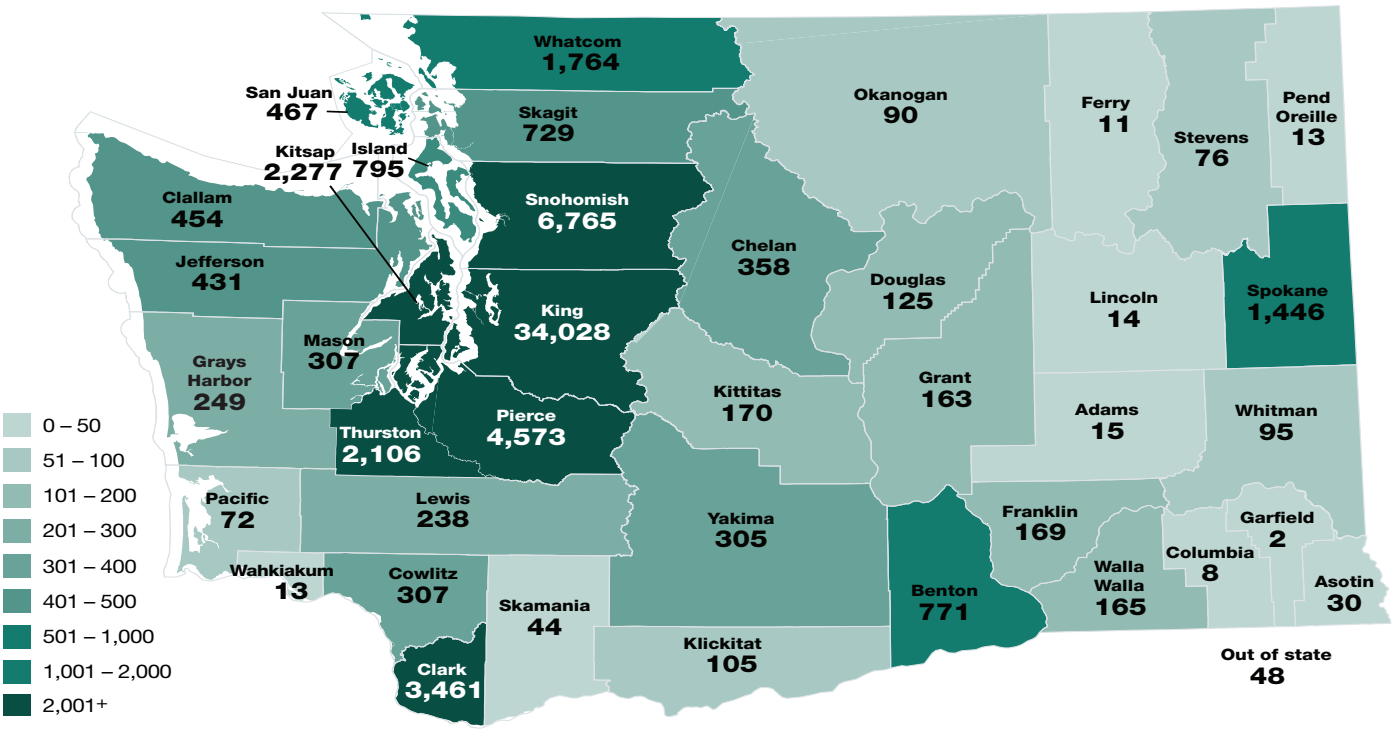
Plug-in electric vehicles (EVs) are cars and trucks that use an electric battery as part or all of their fuel source. These vehicles need to be plugged into an electrical outlet to charge their battery. EVs include both battery electric vehicles and plug-in hybrid electric vehicles:

- **Battery electric vehicles (BEVs)** are fully electric vehicles that have a battery as their sole energy source.
- **Plug-in hybrid electric vehicles (PHEVs)** have both a battery and an internal combustion engine. PHEVs run off the battery but can switch to the conventional engine when necessary.

Hybrid vehicles that have both a battery and an internal combustion engine, but do not plug into an external power source to recharge the battery, are not considered EVs.

Washington's total registered plug-in electric vehicles top 63,000

Number of plug-in electric vehicle registrations by county; As of December 31, 2020



Data source: Washington State Department of Licensing.

Notes: Map includes all plug-in electric vehicles produced by major auto makers since 2011. It does not include cars converted to EVs by their owners, neighborhood EVs, or motorcycles. "Out of state" vehicles are registered in the state of Washington, but the registered owner's address is out of state.

WSDOT increases its EV fleet while expanding EV infrastructure

WSDOT increased the percentage of electric vehicles in its passenger vehicle fleet from 6% to 23% between 2016 and 2020.

WSDOT plans to purchase more EVs for its passenger vehicle fleet and continue to reduce its environmental footprint. The agency has increased the number of EVs in its passenger fleet from 66 in 2018 to 89 in 2020, WSDOT has also reduced the total number of vehicles in its statewide passenger vehicle fleet by 5% from 409 in 2016 to 390 in 2020.

Volkswagen grant brings additional electric vehicle funds to WSDOT

To further develop WSDOT's electric vehicle charging infrastructure and increase the number of plug-in electric vehicles, WSDOT negotiated a Volkswagen grant agreement with the Washington State Department of Ecology. This provides funds for WSDOT to purchase 20 plug-in electric vehicles by June 30, 2021. As part of this grant, WSDOT agreed to purchase and install electric vehicle charging stations to support WSDOT's electric vehicles.

These efforts stalled in April through the end of 2020 due to Legislative budget reductions associated with COVID-19, which froze new equipment purchases. WSDOT's Assistant Secretaries Review Board provided a special approval to allow the purchase of 10 Level 2 dual-head charger and one DC fast charger in 2020 using matching funds. In addition, five Level 2 EV chargers were installed in 2020.

To connect eastern and western Washington along the I-90 corridor with EV charging access, a DC fast charger was installed in the Spokane WSDOT Region Headquarters in December 2020 and was functional as of January 2021. This fast charging station provides access to EV charging for across the state travel between Spokane, Cle Elum and Seattle/Olympia for WSDOT EVs.

WSDOT collaborated with the Department of Corrections and Edna L. Goodrich building landlord, Wright Runstad & Company to install a bank of 10 Level 2, dual-head chargers and a DC fast charger at ELG by using the 2016 Volkswagen settlement funding that stemmed from that car company violating the United State's Clean Air Act. Installation is expected to start in 2021.

WSDOT has installed 15 Level 2 EV chargers and two DC fast chargers (in Cle Elum and Spokane) with this VW funding since 2018.

Department of Enterprise Services provides electric vehicle options

The Department of Enterprise Services—working with the State Efficiency and Environmental Performance Governing Council (SEEP)—received $1 million to install electric vehicle charging stations as additional infrastructure is required to support the state's electric vehicle goals.

WSDOT finalized a memorandum of understanding with DES in December 2020 for $250,000 in EV infrastructure funding. Through this agreement, DES will reimburse WSDOT for funds that have been allocated to installing:

- Six Level 2 dual-head chargers and one Level 3 fast charger at WSDOT Corson Shop in Seattle ($150,000).
- Eleven additional Level 2 dual-head chargers to accommodate WSDOT and Ecology vehicles after the remodel of WSDOT Dayton Avenue Facility in Shoreline ($100,000).

WSDOT seeing success through its Nuts for Bolts program

WSDOT created the “Nuts for Bolts” program to support Gov. Jay Inslee's updated EV Fleets Initiative, which mandates that at least 50% of new state passenger vehicle purchases be electric vehicles. The “Nuts for Bolts” program encourages offices to volunteer to trade their state-owned gas vehicles for all-electric Chevrolet Bolts.

As part of the program, electric vehicle charging stations were installed at WSDOT facilities to support the new Bolts if a charger was not already available. Since early 2018, 21 internal combustion engine vehicles have been replaced with Bolts at WSDOT facilities including Union Gap, Aberdeen, Port Angeles, and Everett.

Contributors include Tonia Buell, Georgina Willner, Joe Irwin and Yvette Wixson

WSDOT's electrification plan moves forward

WSDOT is actively working to reduce agency greenhouse gas emissions by electrifying its energy use and improving its energy efficiency. WSDOT's plan (PDF, 197 kb) has the agency on the right path to meet the Washington State Legislature's goal by dramatically reducing GHG emissions by 2030, but it is largely unfunded.

80 FREIGHT SEMI-ANNUAL REPORT

Notable results

- *As of December 31, 2020, 42 WSDOT-administered projects to improve freight rail structures and freight movement were underway*
- *Construction on WSDOT's Washington Rural Rail Rehabilitation project began in 2020*

WSDOT administers grants and loans funding 42 freight rail projects underway in 2020

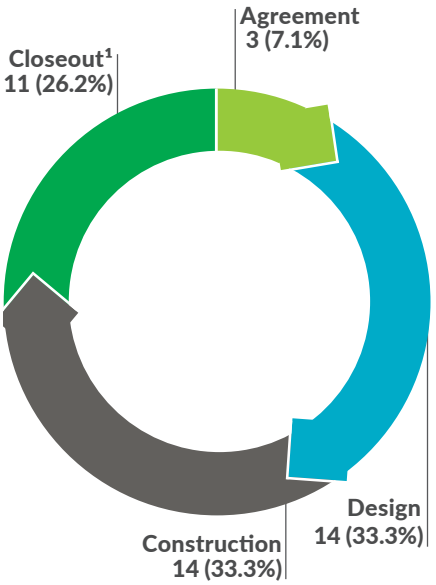
A total of 42 WSDOT-administered projects to improve freight rail infrastructure and freight mobility were underway as of December 31, 2020. The work, which will continue in upcoming years, includes projects funded by the Connecting Washington transportation package, state and federal freight rail grants, and a state freight rail loan program.

Of these 42 freight rail projects, three (7.1%) were in the agreement stage, 14 (33.3%) were being designed, 14 (33.3%) were under construction, and 11 (26.2%) were in the final closeout phase (see chart at left).

The legislature approved 29 of these projects as part of the 2019-2021 biennial transportation budget, while the remaining 13 projects were approved in previous biennia (see chart below).

Eleven of 42 freight rail projects reach final closeout stage in 2020

As of December, 31 2020



Data: WSDOT Rail, Freight, and Ports Division.

Notes: Percentages may not add to 100 percent due to rounding. Projects include those funded through the Freight Rail Assistance Program and the Freight Rail Investment Bank, as well as any freight rail projects funded federally or through Connecting Washington. **1** Closeout includes capturing final records and closing the corresponding work orders.

Twenty-nine of 42 rail projects underway were approved in 2019-2021

Projects underway as of December 31, 2020

Biennium originally approved	Projects
2015-2017	12
2017-2019	1
2019-2021	29
Total	**42**

Data source: WSDOT Rail, Freight, and Ports Division.

Notes: Projects include those funded through the Freight Rail Assistance Program and the Freight Rail Investment Bank, as well as any rail projects funded federally or through the Connecting Washington funding package.

Connecting Washington funds 15 freight rail projects underway in 2020

As of December 31, 2020, 15 freight rail improvement projects funded through the Connecting Washington transportation package were underway. These CW projects were all approved by the Legislature as part of the 2017-2019 or 2019-2021 transportation budgets. They include rail interchange improvements, rail infrastructure work at several ports, landslide mitigation along railroad tracks and rehabilitation of existing rail lines.

Two of the 2017-2019 biennium CW projects were in closeout phase, one was in construction and two others were in design. The remaining 11 projects were funded in the 2019-2021 biennium and were in the design or construction phases as of December 31, 2020.

Three FRAP projects in closeout or operationally complete

As of December 31, 2020

Project Status	Number of Projects	Amount awarded
Agreement	1	$874,000
Design	1	$312,000
Construction	8	$6,782,000
***Operationally complete*[1]**	*2*	*$2,184,000*
Closeout	1	$1,467,000
All	**11**	**$9,435,000**

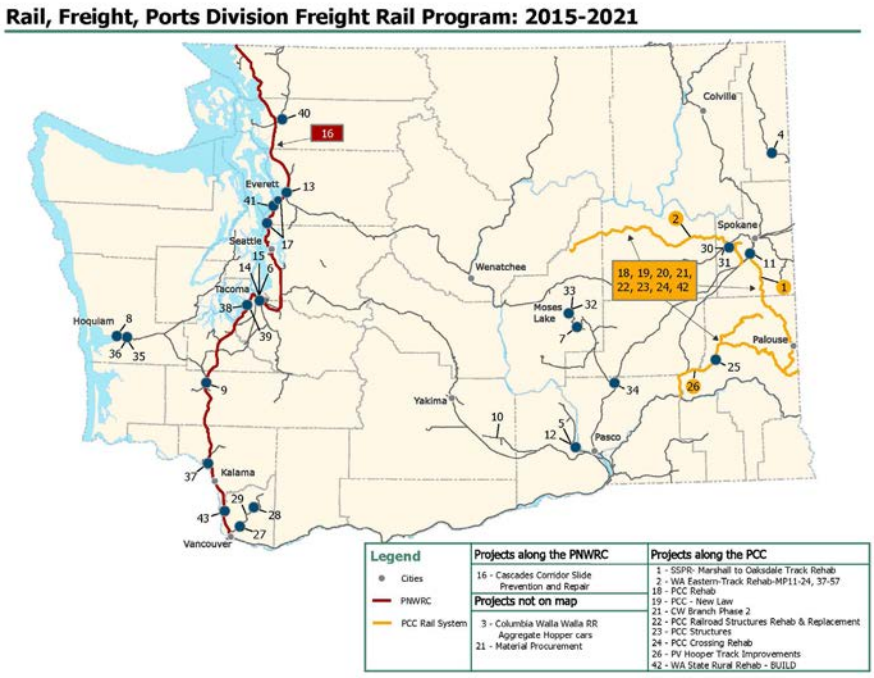
Data source: WSDOT Rail, Freight, and Ports Division.

Notes: **1** Operationally complete projects are a subset of projects in the construction phase.

Freight Rail Assistance Program funds 11 projects underway in 2020

Approximately $9.4 million in Freight Rail Assistance Program funds supported 11 state freight rail grant projects that were underway in 2020. These projects include rail and tie replacements, rail safety improvements, bridge replacements, new sidings (short segments of track that allow a train to pull off the main line so another train can pass), crossing improvements, tunnel repairs, noise abatement and preservation.

Of the 11 FRAP projects, three were either operationally complete (constructed enough to be used for their intended purpose) or in closeout as of December 31, 2020 (see table above).



Click anywhere on the image to view a larger version of this map

Freight Rail Investment Bank loan program assists four projects in 2020

A total of four projects financed using state Freight Rail Investment Bank loans were underway in 2020. WSDOT awarded four FRIB loans totaling over $7 million for the 2019-2021 biennium. These include financing for two Tacoma Rail projects, one for the Port of Benton in Benton County and one for the Port of Everett in Snohomish County.

The Legislature funds the FRIB loan program to help deliver projects that improve the state's long-term economic vitality by improving freight movement. Past loan repayments have all been made on time, with 37 loans currently being repaid under 10-year or 15-year terms.

Palouse River and Coulee City Rail System

The PCC is the largest short line freight rail system in Washington, serving five eastern Washington counties: Grant, Lincoln, Spokane, Adams, and Whitman. The WSDOT-owned system allows farmers and growers to ship their agricultural products via rail from their more remote locations, thus connecting them with larger railroads, barges and container ships for distribution throughout the world.

WSDOT leverages state and private funds to obtain federal freight rail grants

In 2018, WSDOT's Washington State Rural Rail Rehabilitation project was awarded a $5.6 million Better Utilizing Investments to Leverage Development (BUILD) grant from the U.S. Department of Transportation. Construction began in 2020 and is expected to be completed in 2021.

This WSDOT project will improve strategically significant sections of the 298-mile state-owned Palouse River and Coulee City short line rail system in eastern Washington (see box at left). State and local funds are matching the federal grant monies, providing a total of $11.2 million for capital improvements.

WSDOT and BNSF match federal funds for landslide mitigation

WSDOT and BNSF Railway are matching a 2018 federal Consolidated Rail Infrastructure and Safety Improvements grant to support a more than $10.9 million investment to reduce the risk of landslides at six landslide-prone sites along railroad tracks between Seattle and Everett. Four projects funded with this grant have been completed and two are expected to begin construction in summer 2021. Work includes walls to stop debris from reaching tracks, slope stabilization and drainage improvements, and slide warning fences.

WSDOT awards federal funds for new Ridgefield freight rail overpass

In December 2019, WSDOT awarded the construction contract for a $900,000 federally-funded project for a new freight rail overpass in Ridgefield, which will provide waterfront access for motorists and pedestrians. The project is currently under construction in Clark County.

Contributors include Cameron Harper, Janet Matkin, Cara Motte, Mark Nickerson and Helen Goldstein

80 CAPITAL PROJECT DELIVERY PROGRAMS QUARTERLY UPDATES

City of Richland completes one Connecting Washington project during the sixth quarter

The City of Richland led work on the one Connecting Washington project contract that was completed during the sixth quarter (October to December 2020) of the 2019-2021 biennium (see p. 47 for additional information).

While WSDOT did not complete any Nickel or Transportation Partnership Account projects during the quarter, it has completed a total of 383 of the original Nickel and TPA construction projects since July 2003—with 86% on time and 91% on budget. The cost at completion for the 383 Nickel and TPA construction projects (which are included in the original 421 Nickel and TPA projects) was approximately $10.3 billion, 1.5% less than the baseline cost of $10.5 billion. The agency currently has four Nickel and TPA projects underway (see p. 49 for additional information).

Nickel and Transportation Partnership Account funding continues to be lower than original projections

Fuel tax collections show 2003 and 2005 revenue forecasts, which were used to determine project lists, could not anticipate how the economic recession that began in 2007 would affect fuel tax revenues. These forecasts also could not anticipate how the response to the ongoing COVID-19 pandemic would affect transportation and travel throughout Washington. The 2003 Nickel and 2005 TPA gas taxes that fund projects are based on a fixed tax rate per gallon. As such, reduced gasoline and diesel consumption and sales lead to reduced tax revenue.

Fuel tax funding from the 2005 TPA package has been lower than the original March 2005 projection. The original projection for the TPA account was $4.9 billion over a 16-year period from 2005 through 2021. Current TPA projections through 2021 are estimated to be $4.0 billion, approximately $973 million (19.7%) less than the original 2005 projection.

The 2003 Nickel transportation package was originally a 10-year plan, with revenues forecasted to total $1.9 billion from 2003 through 2013. Fuel tax revenues collected during this period were 10.2% lower than the original March 2003 projection.

Nickel and TPA gas tax revenues are used to pay the debt on the bonds sold to finance planned projects. Once all the bonds are sold, revenues collected will be used to pay the debt.

Contributors include Nguyen Dang, Mike Ellis, Penny Haeger, Thanh Nguyen, Aaron Ward, Dan Wilder, and Joe Irwin

Notable results

- *One Connecting Washington project was completed during the sixth quarter of the 2019-2021 biennium*
- *WSDOT advertised 45 of 78 Pre-existing Funds projects during the sixth quarter of the 2019-2021 biennium*
- *WSDOT has completed 383 Nickel and TPA projects since 2003, with 86% on time and 91% on budget*

WSDOT's Watch List projects available online:

To streamline work and ensure accuracy and consistency, the Watch List is no longer featured in the quarterly Gray Notebook. This change helps the Gray Notebook better align with WSDOT's Capital Program Development and Management Office and its monthly online Watch List of projects that have or may have significant changes in scope, schedule or budget.

80 CURRENT LEGISLATIVE EVALUATION & ACCOUNTABILITY PROGRAM QUARTERLY UPDATE

Combined Nickel & Transportation Partnership Account Status of projects to date; 2003 through December 31, 2020; Dollars in millions	Number of Projects	Value of Program
Subtotal of completed construction projects[1]	**383**	**$10,485.5**
Non-construction projects that have been completed or otherwise removed from Nickel/TPA lists[2,3]	*9*	*$205.0*
Projects included in the current transportation budget but not yet complete	11	$4,989.7
Projects that have been deferred indefinitely or deleted and removed from Nickel/TPA lists[3,4]	*13*	*$499.2*
Projects now funded by Connecting Washington and removed from Nickel/TPA lists (see GNB 63, p. 35)	*5*	*$103.3*
Total number of projects[4] in improvement and preservation budget	421	$16,282.7
Schedule and budget summary Nickel & TPA combined: Results of completed construction projects in the current Legislative Transportation Budget and prior budgets; Dollars in millions	**Completed in 2019- 2021 Biennium Budget**	**Cumulative Program**
Total number of projects completed	1	383
Percent completed early or on time	*0%*	*86%*
Percent completed under or on budget	*100%*	*91%*
Baseline cost at completion	$564.9	$10,485.5
Current cost at completion	$564.5	$10,330.3
Percent of total program over or under budget	0.1% under	1.5% under
Advertisement record: Results of projects entering the construction phase or under construction	**Combined Nickel & TPA**	
Total current number of projects in construction phase as of December 31, 2020	4	
Percent advertised early or on time	*100%*	
Total number of projects advertised for construction during the 2019-2021 biennium (July 1, 2019 through June 30, 2021)	1	
Percent advertised early or on time	*0%*	
Projects to be advertised: Results of projects now being advertised for construction or planned to be advertised	**Combined Nickel & TPA**	
Projects being advertised for construction (July 1, 2020 through December 31, 2020)	0	
Percent on target for advertisement on schedule or early	0%	
Budget status for the 2019-2021 biennium; Dollars in millions	**WSDOT biennial budget**	
Budget amount for 2019-2021 biennium	$714.6	
Actual expenditures in 2019-2021 biennium to date	$364.5	
Total 2003 Transportation Funding Package (Nickel) expenditures	*$21.6*	
Total 2005 Transportation Partnership Account expenditures	*$244.6*	
Total Pre-existing Funds expenditures	*$98.3*	

Data source: WSDOT Capital Program Development and Management.
Notes: Numbers have been rounded. This chart was updated in GNB 63 to reflect reconciled Nickel and TPA project counts, and as a result it does not exactly match Current Legislative Evaluation and Accountability Program charts from editions prior to GNB 63. **1** Cumulative projects completed from July 1, 2003 to December 31, 2020. **2** Non-construction projects include commitments for engineering and right of way work. **3** Projects that have been deferred indefinitely or deleted include projects that have no funding available, projects that have been halted by the Legislature and those for which other entities (e.g., cities and counties) are now serving as the lead agency. **4** The project total has been updated to show "unbundled" projects which may have been previously reported in programmatic construction groupings (such as Roadside Safety Improvements or Bridge Seismic Retrofit). See Gray Notebook 38, p. 55 for more details.

80 COMPLETED PROJECTS & CONTRACTS

City of Richland completes Connecting Washington project during the quarter

The City of Richland completed one WSDOT-supported Connecting Washington project during the sixth quarter of the 2019-2021 biennium (October through December 2020).

SR 240/Duportail Road Intersection Improvements

(Benton County)

Completed: December 16, 2020 (On time)

The City of Richland was the lead on construction to improve the Duportail Bridge and its connections in Benton County. The project widened and extended Duportail Road over the Yakima River—providing multimodal connectivity between central Richland and the Queensgate area—while improving the SR 240/Duportail Road intersection to connect the new corridor to SR 240.

Budget: The project was completed for approximately $1.9 million, which was about 24% less than the last legislatively-approved of $2.5 million.

The City of Richland utilized other fund sources that reduced the total need for WSDOT's contribution. The $600,700 savings were transferred to support another Connecting Washington project to improve SR 240 through Richland.

Schedule: The SR 240/Duportail Road Intersection Improvements project was delayed in response to the initial passage of I-976 and Gov. Jay Inslee's direction to WSDOT to postpone certain projects not yet underway. In March 2020, the project was further delayed due to the Governor's COVID-19 stay at home order.

In late April 2020, Gov. Inslee directed WSDOT to move forward with projects that were originally paused. The project was completed on time, having been finished within the same quarter originally planned.

Notable results

- *The City of Richland completed one Connecting Washington project during the sixth quarter of the 2019-2021 biennium*

GNB reporting on projects and contracts

The Gray Notebook differentiates completed projects from completed contracts. Larger projects frequently include smaller contracts (e.g. pavement replacement on a section of I-5 that is part of a larger concrete rehabilitation project). Completing contracts does not mean that these larger projects are finished. For example, a project can involve three contracts total and have two contracts finished. The project would be complete when the third and final contract is done.

80 ADVERTISEMENT RECORD QUARTERLY UPDATE

Connecting Washington Account projects in construction[1] Through December 31, 2020; (County); Dollars in millions	Schedule status	Completion date	Total project cost
I-5/Joint Base Lewis-McChord Corridor Improvements (Pierce)			
I-5/Steilacoom-DuPont Rd. to Thorne Ln. - Corridor Improvements	Delayed	Aug-2021	$243.1
SR 167/SR 509 Puget Sound Gateway (multiple counties)			
SR 509/SeaTac Stage 1 Elements (WSDOT Contribution)	Advanced	Nov-2022	$48.8
SR 167/I-5 to SR 509 - Stage 1A	On schedule	Jun-2021	$57.4
SR 509/I-5 & SR 516 I/C[2] to 28th/24th Ave. South - SR 509 Completion Stage 1	Delayed	Jun-2025	$488.5
I-405/Renton to Bellevue - Corridor Widening (King)			
I-405/Renton to Bellevue - Corridor Widening & ETL[3] (Stage 2)	Delayed	Dec-2024	$790.0
I-405/Toll Vendor for Renton to Bellevue - Toll System	On schedule	Sep-2024	$44.5
Land Mobile Radio Upgrade (multiple counties)			
Wireless Communication	Delayed	Nov-2021	$37.0
SR 520 Seattle Corridor Improvements - West End (King)			
SR 520/Montlake to Lake Washington - I/C and Bridge Replacement	Delayed	Apr-2023	$628.1
SR 520/I-5 to Lake Washington - Bridge Replacement - Mitigation	On schedule	Jun-2024	$26.3
US 395 North Spokane Corridor (Spokane)			
US 395/North Spokane Corridor BNSF - Second Railroad Alignment	Delayed	Oct-2021	$81.2
US 395/NSC Wellesley Ave. Improvements	On schedule	Oct-2022	$36.7
US 395/NSC Spokane River to Columbia	On schedule	Oct-2022	$50.0
US 395/NSC Spokane River to Columbia - Shared Use Path	On schedule	Jun-2022	$13.3
US 395/NSC Sprague Ave. to Spokane River	Delayed	Sep-2026	$334.2
I-5/Marvin Road/SR 510 Interchange (Thurston)			
I-5/SR 510 I/C - Reconstruct I/C	Delayed	May-2021	$45.9
SR 107/Chehalis River Bridge (S. Montesano Bridge) Approach & Rail Repair (Grays Harbor)			
SR 107/Chehalis River Bridge - Structural Rehabilitation	Delayed	Jun-2021	$21.8
I-90/Medical Lake & Geiger Interchanges (Spokane)			
I-90/Medical Lake I/C to Geiger Field I/C - Reconstruction	Delayed	May-2021	$15.9
I-90/Eastgate to SR 900 - Corridor Improvements (King)			
I-90/Eastgate to SR 900 - Corridor Improvements	Delayed	Oct-2021	$73.0
US 12/Walla Walla Corridor Improvements (Walla Walla)			
US 12/Nine Mile Hill to Frenchtown Vicinity - Build New Highway	Delayed	Jul-2023	$160.4
I-90 Snoqualmie Pass - Widen to Easton (Kittitas)			
I-90/Easton Hill to W. Easton I/C Westbound - Replace Bridge/Build Detour	Delayed	Sep-2021	$14.5
I-90/Barker to Harvard - Improve Interchanges & Local Roads (Spokane)			
I-90/Barker to Harvard - Westbound On-Ramp Improvement	On schedule	Jun-2021	$2.1
I-90/Barker to Harvard - Add Lane Harvard Rd. Bridge	Delayed	Jun-2021	$3.3
SR 305 Construction - Safety Mobility Improvements (Kitsap)			
SR 305/Johnson Rd. - Roundabout	On schedule	Sep-2021	$5.9

Data source: WSDOT Capital Program Development and Management.

Note: **1** Connecting Washington advertisements show projects currently in construction, and do not represent a comprehensive list of completed Connecting Washington projects. **2** I/C = Interchange **3** ETL = Electronic Toll Lanes.

Nickel & TPA projects in construction Through December 31, 2020; (County); Dollars in millions	Fund type	Advertised on time	Ad date	Operationally complete date	Award amount
SR 99 Alaskan Way Viaduct Replacement (King)	**Nickel/ TPA**				
SR 99/South King Street Vicinity to Roy Street – Viaduct Replacement	Nickel/ TPA	√	May-2010	Sep-2022	$1,089.7
The SR 99 Tunnel opened to traffic in February 2019. The award amount is for the SR 99 Tunnel contract. The Viaduct Demolition, Battery Street Tunnel Decommissioning and Surface Street Improvements are in process.					
SR 99/Alaskan Way and Elliot Ave Surface Street Restoration	Nickel/ TPA	√	Nov-2018	Jan-2023	$153.0
The City of Seattle is the lead on this project.					
I-5/Tacoma HOV Improvements (Pierce)	**Nickel/ TPA**				
I-5/Portland Ave to Port of Tacoma Rd. - Northbound/Southbound HOV	Nickel/ TPA	Late	Jan-2018	Oct-2023	$152.6
I-90/Concrete Rehabilitation (multiple counties)	**Nickel**				
I-90/Bullfrog Rd. Vicinity to Cle Elum Vicinity - Replace/Rehabilitate Concrete	Nickel	N/A	Jan-2019	Jun-2021	$8.2
SR 290/Spokane River E. Trent Bridge - Replace Bridge (Spokane)	**TPA**				
SR 290/Spokane River E Trent Bridge - Replace Bridge	TPA	Late	Dec-2019	Oct-2022	$20.1

Data source: WSDOT Capital Program Development and Management.

WSDOT has five change orders of $500,000 or more during the quarter

WSDOT had five change orders of $500,000 or more during the quarter ending December 30, 2020. **1)** Practical design solutions on the I-405, Renton to Bellevue Widening and Express project that reduced associated work and scope decreased overall costs by more than $4.2 million. **2)** Demolition and disposal of seismic retrofit material that were not identified in the original SR 520, Montlake to Lake Washington Interchange and Bridge project contract increased costs by $1 million. **3)** Differing site conditions encountered during shaft construction added 15 days to the Lacamas Creek Bridge Replacement project and increased costs by more than $673,800. **4)** Delays and a coordinated response associated with COVID-19 on the SR 99, AWV Demolition Decommissioning & Surface Street project increased costs by more than $812,700. **5)** Issues, including equipment damage, that occurred during Cement Deep Soil Mixing work on the Bagley and Siebert Creeks-Remove Fish Barriers project increased costs by more than $1.9 million.

After extensive reviews—which can involve subject matter experts, contract specialists and other outside stakeholders—WSDOT sometimes changes its engineers' original plans and specifications in order to complete projects. When this occurs, WSDOT issues a formal modification (or change order) to the contract containing a description of the change and details about how or if the contractor may be compensated for it. Each month, WSDOT posts all change orders estimated to cost $500,000 or more online at http://bit.ly/WSDOTchangeorders.

80 PRE-EXISTING FUNDS QUARTERLY UPDATE

WSDOT advertises 45 Pre-existing Funds projects in the sixth quarter of the biennium

WSDOT advertised 45 of 78 Pre-existing Funds projects in the sixth quarter of the 2019-2021 biennium (October through December 2020). Of the 45 total projects advertised, nine were advanced, 16 were on time, 12 were emergent, and eight were late. Of the remaining 33 projects—originally scheduled to be advertised during the quarter—18 were delayed within the biennium, 12 were deferred out of the biennium, and three were deleted.

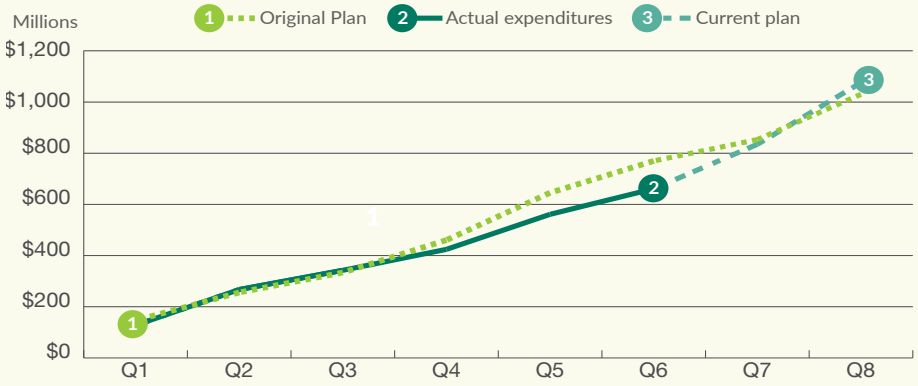
As of December 31, 2020, WSDOT's current cost to complete the 219 PEF projects advertised through the sixth quarter of the 2019-2021 biennium was about $722.2 million, approximately $132.2 million (22.4%) more than the original value of $590.0 million (see chart at right).

Cash flows currently lower than original projections

WSDOT originally planned to have $769.8 million in cumulative combined PEF improvement and preservation cash flows at the end of the sixth quarter of the 2019-2021 biennium, but had $661.1 million (approximately $108.7 million, 14.1% less). Current cash flows can vary from originally planned cash flows due to a number of reasons. For example, emergent projects may add cash flow to the current reporting quarter, whereas project deletions can remove cash flow. The original plan—which is the 2019 delivery plan—does not change during the first four quarters of the biennium but may be updated in the fifth quarter to reflect any revisions to the original 2020 delivery plan. As the biennium continues, the agency uses these original plans as goals to achieve while working to meet projections set forth in the current plan. The current plan is more fluid and reflects quarterly changes due to projects being emergent, delayed, deferred, advanced or deleted.

Cumulative Pre-existing Funds improvement and preservation combined cash flows during the 2019-2021 biennium lower than planned

2019-2021 biennium; Quarter ending December 31, 2020; Planned vs. actual expenditures and current plan; Dollars in millions



Data source: WSDOT Capital Program Development and Management.

Note: Q6 refers to the sixth quarter (October through December 2020) of the 2019-2021 biennium, which runs from July 2019 through June 2021.

Current cost to complete PEF advertisements $132.2 million more than original value

2019-2021 biennium (July 2019 through June 2021); Sixth quarter (ending December 31, 2020); Dollars in millions

	Number of projects	Original value	Current cost to complete
Planned PEF advertisements for the 2019-2021 biennium	276	$1,671.5	$1,677.8
Actual PEF advertisements through the sixth quarter	219	$590.0	$722.2

Data source: WSDOT Capital Program Development and Management.

WSDOT advertises 199 PEF projects during the 2019-2021 biennium

Advertisement status	Quarter[1]	Cumulative[2]
Advanced[3]	9	14
On time	16	104
Emergent[4]	12	46
Late	8	35
Total projects advertised	**45**	**199**
Early[5]	0	4
Delayed within the biennium	18	89
Deferred out of the biennium	12	14
Deleted	3	8

Data source: WSDOT Capital Program Development and Management.

Notes: **1** Quarter refers to October through December 2020. **2** Cumulative refers to July 2019 through June 2021. **3** Advanced projects were moved up from future quarters. **4** Emergent projects include emergency or unanticipated projects. **5** Early projects are planned for the quarter but advertised in a previous quarter.

WSDOT advertises 45 Pre-existing Funds projects during the sixth quarter of the 2019-2021 biennium

October through December 2020

Advanced (9)	
I-90/George East - Paving	I-90/Ryegrass to Vantage - Paving
SR 167/SR 410 to SR 18 - Northbound Congestion Management	SR 223/Indian Church Rd. to Emerald Rd. - Chip Seal
US 12/Lewiston Rd. to Coppei Creek - Chip Seal	SR 26/Laurel Rd. to Washtucna - Chip Seal
US 12/Messner Rd. Vicinity to Tucannon River - Chip Seal	SR 274/SR 27 to Idaho State Line - Chip Seal
SR 22/US 97 to SR 223 - Chip Seal	
On time (16)	
US 101/S of Shar Ln. to N of Bourgault Rd. - Chip Seal	SR 19/SR 104 to S of W Valley Rd. - Chip Seal
SR 9/Unnamed Tributary to Landingstrip Creek - Fish Passage	US 101/SR 104 to Quilcene River Bridge - Chip Seal
I-90/Westbound I-5 Overcrossing, West-South Ramp - Expansion Joint Replacement	I-5/Southbound S Spokane St. to I-90 Vicinity - Deck Overlay & Expansion Joint
US 2/Wenatchee Area - Paving	SR 300/Belfair State Park to SR 3 - Paving
US 2/Wenatchee Area Bridge Deck Preservation	US 197/The Dalles Bridge Deck Replacement
US 2/Ninth Street - Curb Ramp Upgrades	I-90/Stevens Rd. Vicinity to Ryegrass Vicinity Westbound - Paving
SR 17/S of Rd. M SE - Railroad Crossing Improvements	I-90/Tokio to Lincoln County Line - Paving
US 97/Eastside Oroville Rd. - Railroad Crossing Improvements	US 195/SR 27 Junction - Flasher Replacement
Emergent (12)	
Northwest Region Tree Mitigation Agreements	US 101/SR 109 Grays Harbor/Jefferson/Clallam - Remove Fish Barriers
SR 99/Southbound SR 509 Duwamish River Bridge - Bridge Repair	SR 8/E of Summit Lake Rd. to West of Old Olympic Hwy. - Stormwater Retrofit
I-90/0.4 Miles West of Avalanche Bridge Westbound - Emergency Rockfall Repair	SR 507/Skookumchuck River Bridge to South of 184th Ave. - Stormwater Retrofit
I-405/SR 522 to SR 527 - Demolition	SR 504/2.1 Miles East of SR 505 - Emergency Rockfall
US 2 Et Al North Central Region Strategic Pavement Preservation 2021	US 12/Whetstone Rd./Turner Rd. - Intersection Improvements
SR 17/Et Al Emergency Roadside Safety Features Repair	SR 203/SB North of Harris Creek - Horizontal Drains
Late (8)	
SR 164/Pussyfoot Creek - Fish Passage	US 12/Whetstone Creek Bridge - Replace Bridge
SR 203/Eugene St. Vicinity to Carnation City Line - Paving (City Lead)	I-90/Canyon Rd. Interchange - EB Ramp Terminal Improvements
US 101/Sol Duc River to Bear Creek - Special Repair	SR 397/E Bruneau Ave. - Railroad Crossing Improvements
US 101/SE of Johnson Rd. to West of Indian Creek - Chip Seal	SR 524/48th Ave. W Vicinity to I-5 Interchange Vic - Paving (City Lead)

Data source: WSDOT Capital Program Development and Management.

WSDOT advertises 45 Pre-existing Funds projects during the sixth quarter of the 2019-2021 biennium

October through December 2020

Delayed (18)	
US 2/Sultan to Gold Bar Vicinity - Virtual Weigh in Motion	US 97A/South of Entiat - Site 3- Rock Slope Scaling
SR 9/South Lake Stevens Rd. - Intersection Improvements	US 12/ Wishkah River Bridge - Mechanical Rehabilitation
SR 9/Tributary to Lake McMurray and Norway Park Creek - Fish Passage	SR 16/Purdy Creek - Remove Fish Barrier
SR 20/Fish Creek & Lorenzan Creek - Fish Passage	US 101/May Creek in Vicinity of Dowans Creek Rd. - Remove Fish Barrier
SR 202/Snoqualmie Falls Park to Boalch Ave. NW Vicinity - Paving	SR 109/Grass Creek Bridge to Conner Creek Bridge - Chip Seal
SR 202/SE Snoqualmie Pkwy. to Meadowbrook Way SE - ADA Compliance	SR 302 (Spur)/SR 302 to North of 154th St. NW - Paving
I-405/BNRR Bridge to Pedestrian Trail Bridge - Seismic Retrofit	SR 302 (Spur)/Purdy Creek - Remove Fish Barrier
SR 538/Logan Creek - Fish Passage	US 97/W Wapato Rd. Vicinity to Wapato Canal Northbound - Paving
US 97/South of Tonasket - Paving	SR 20/Sherman Pass Road & Weather Information System Housing and Generator Rebuild
Deferred (12)	
SR 96/North Creek - Fish Passage	US 101/Chehalis River Bridge - Expansion Joint Repairs
SR 516 Barnes Creek - Fish Passage	SR 108/Mason County Line to Railroad Crossing - Chip Seal
SR 534/Unnamed Tributary to Carpenter Creek - Fish Passage	I-90/S Cle Elum Rd. Bridge Eastbound - Deck Rehabilitation
SR 542/Squalicum Creek to Bellingham Bay - Fish Passage	US 730/3.0 Miles North of Oregon Border - Rockfall Prevention
SR 3/SR 304 to SR 303 - Paving	US 730/4.1 Miles North of Oregon Border - Rockfall Prevention
US 101/Grays Harbor County Line to South of Lund Rd. - Chip Seal	US 730/4.4 Miles North of Oregon Border - Rockfall Prevention
Deleted (3)	
I-5/Nisqually River Bridge - Expansion Joint Repairs	SR 300/Belfair State Park to SR 3 - ADA Compliance
US 101/Old Mill Rd. - ADA Compliance	

Data source: WSDOT Capital Program Development and Management.

80 STATEWIDE TRANSPORTATION POLICY GOALS & GRAY NOTEBOOK INFORMATION GUIDE

Statewide transportation policy goals

Laws enacted in 2007 established policy goals for transportation agencies in Washington (RCW 47.04.280). Throughout its editions, WSDOT's Gray Notebook reports on progress toward the six statewide transportation policy goals that include:

- **Safety:** To provide for and improve the safety and security of transportation customers and the transportation system;
- **Preservation:** To maintain, preserve, and extend the life and utility of prior investments in transportation systems and services;
- **Mobility:** To improve the predictable movement of goods and people throughout Washington, including congestion relief and improved freight mobility;
- **Environment:** To enhance Washington's quality of life through transportation investments that promote energy conservation, enhance healthy communities, and protect the environment;
- **Economic Vitality:** To promote and develop transportation systems that stimulate, support, and enhance the movement of people and goods to ensure a prosperous economy; and
- **Stewardship:** To continuously improve the quality, effectiveness, and efficiency of the transportation system.

Gray Notebook edition archives available online

Readers can access past GNB editions online. The GNB archives include every GNB published to date. Online versions might include corrections and may not exactly match print versions.

GNB reporting periods

WSDOT programs report their performance data during different periods to best fit the work they do. For example, a program that receives substantial federal funds may report performance based on the federal fiscal year (see charts below).

Calendar, state fiscal and federal fiscal quarters

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	GNB 77			GNB 78			GNB 79			**GNB 80**		
Calendar	Q1 2020			Q2 2020			Q3 2020			**Q4 2020**		
State Fiscal	Q3 FY2020			Q4 FY2020			Q1 FY2021			**Q2 FY2021**		
Fed. Fiscal	Q2 FFY2020			Q3 FFY2020			Q4 FFY2020			**Q1 FFY2021**		

2019-2021 biennial quarters (used by Legislature)

Period	Quarter	Period	Quarter
Jul – Sep 2019	Q1	Jul – Sep 2020	Q5
Oct – Dec 2019	Q2	**Oct – Dec 2020**	**Q6**
Jan – Mar 2020	Q3	Jan – Mar 2021	Q7
Apr – Jun 2020	Q4	Apr – Jun 2021	Q8

GNB credits

The GNB is developed and produced by members of the WSDOT Transportation Safety & Systems Analysis Division's Performance Management and Strategic Management offices, and articles feature bylines indicating key contributors from dozens of WSDOT programs. This edition of the GNB was completed entirely by staff members who were teleworking to help reduce the spread of COVID-19 in Washington. WSDOT's Headquarters Graphics Division (Marci Mill, Erica Mulherin and Steve Riddle) provides creative assistance, and WSDOT program staff and communicators take the photographs in each edition.

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