TAMP 2022

Transportation Asset Management Plan

Idaho Transportation Department

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Chapter 1 – Introduction

ITD completed the original 2018 Transportation Asset Management Plan in accordance with MAP-21 requirements. The federally required TAMP requires new Transportation Performance Measures and goals along with a framework that puts all transportation agencies on the same playing field using the same performance measures, terminology, and goal definitions. ITD supports the need to have a national way of looking at transportation asset management.

ITD subscribes to the AASTHO definition of Transportation Asset Management as "... a strategic and systematic process of operating, maintaining, upgrading, and expanding physical assets effectively throughout their lifecycle. It focuses on business and engineering practices for resource allocation and utilization, with the objective of better decision making based upon quality information and well-defined objectives."

Source: https://www.tamguide.com/subsection/1-1-2-definitions/

Objectives

At the highest level ITD balances Safety, Operations, System Expansion, and Asset Management. ITD Leadership works with the public, the governor, and the legislature to balance between the larger objectives. Within Asset Management, ITD balances between Capital Equipment, Facilities, Bridge, Pavement, and Supporting Infrastructure Assets. All of these are interrelated beyond funding.

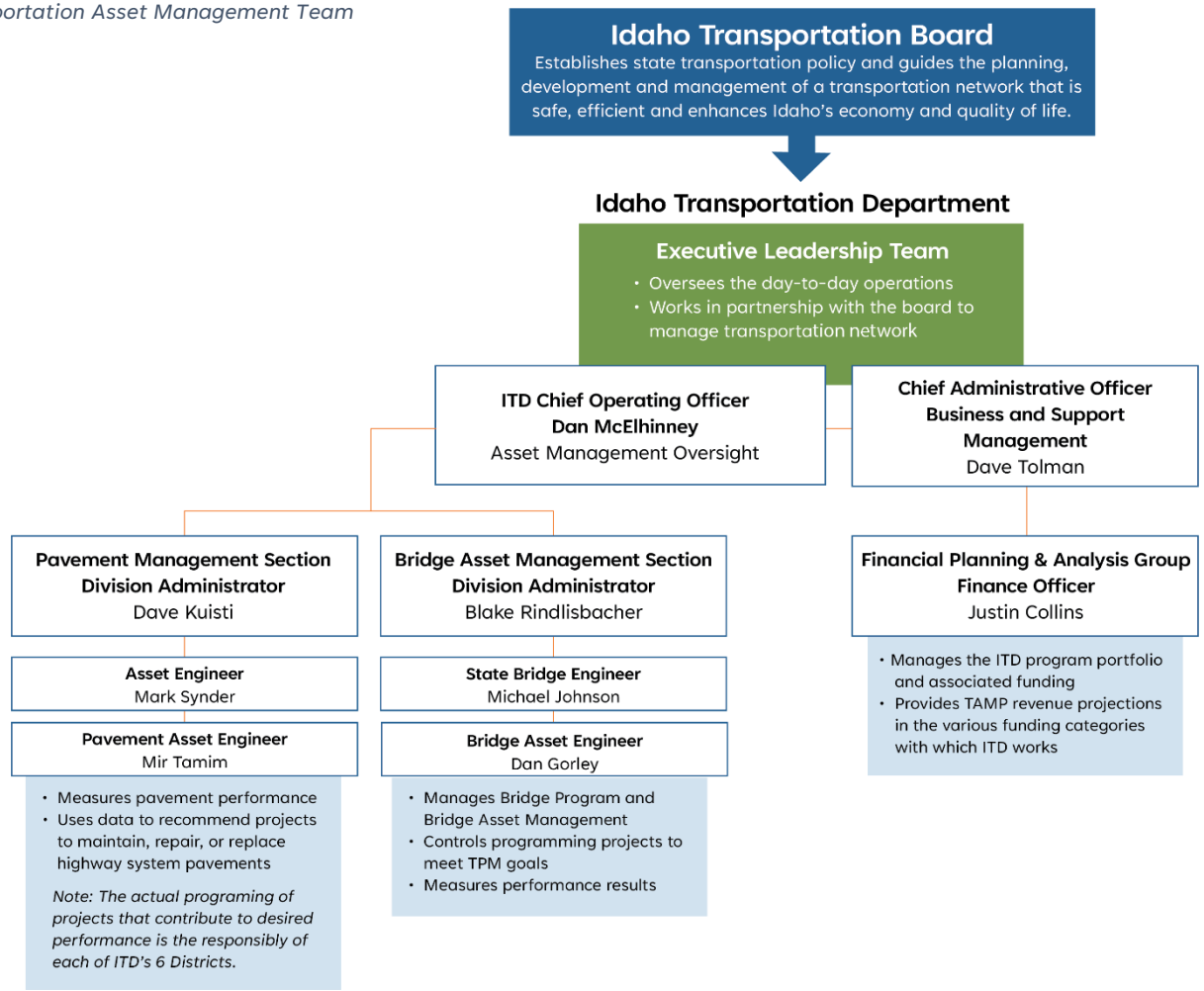
This new 2022 TAMP is focused on Pavement and Bridge. Pavement and Bridge assets are managed to achieve a State of Good Repair. The performance measures ITD uses to assess our success in achieving a State of Good Repair are described in more detail in Chapter 2.

ITD's overarching asset management goal is to manage our Bridge and Pavement assets to achieve our performance targets at the least practicable cost. Safety is a factor in every category beyond its individual focus.

Transportation Asset Management Team

The TAMP discusses several functions related to asset management. Various individuals and teams within ITD contribute to those functions as a part of their organizational responsibilities, as shown below in Figure 1-1. Collectively leadership balances the budgets and sets TPMs across ITD's assets with the goal of optimizing system performance with available funding.

Figure 1-1: Idaho Transportation Asset Management Team



Chapter 2 – Asset Measures and Targets

Performance measures and targets are integral to ITD's successful implementation of asset management. Measures and targets drive commitment to and focus on accountability for assets. FHWA defines measures as an expression based on a metric that is used to establish targets and to assess progress toward achieving the established target. Idaho's performance measures are similar in nature to FHWA's measures.

In other words, the measure is "what we are measuring" such as pavement smoothness or traffic crash rates. The target is the numeric level of desired performance for each measure. An example of a measure is pavement smoothness as measured by the International Roughness Index (IRI). The target could be that no more than 5% of the lane miles be "Poor" for the measure of roughness.

Idaho's internal performance measures for pavements and bridges are slightly different from FHWA's. In this chapter, the differences are explained and clarified. ITD recognized early on the value of using performance measures for asset management balanced by available funding and predicting future asset condition.

Idaho Measures and Performance Targets

Idaho Measures - Pavement

Idaho uses three measures to quantify performance; these are IRI, rutting depth, and Overall Condition Index (OCI). Developed as part of refinements to ITD's Transportation Asset Management System (TAMS), the OCI is unique to Idaho. Idaho collects pavement performance data on an annual basis.

The OCI provides an overall pavement serviceability measure and is the weighted average of many different pavement performance factors. There is flexibility to add other measures that are deemed relevant. The OCI varies between 100 representing the best possible pavement and zero (0) denoting the Poorest possible pavement.

Under the OCI method, pavement distresses are recorded and quantified. The distresses recorded are related to the pavement type being considered. Table 2-1 shows the various distresses utilized during analysis.

Table 2-1: OCI Distress Types

OCI Pavement Distress Types	
Flexible	**Rigid**
Fatigue Cracking	**Slab Cracking**
Edge Cracking	**Joint Seal Damage**
Transverse Cracking	**Joint Spalling**
Block Cracking	**Faulting**
Patch Deterioration	**Map Cracking**
Raveling	**Studded Tire Wear**

Quantification of distress type is based on extent and severity. These values are input, for each distress type, into an equation that yields an Individual Distress Index (IDI). When each individual distress type has been calculated, all IDI values are then input into the OCI formula to compute the OCI for the pavement section. For each pavement type, two additional indices are computed with the methodology. Rigid pavements have the Slab Index and the Joint Index computed, while flexible pavements have the Structural Distress Index and the Non-Structural Index computed. The main function of these values is to assist in PMS decision tree configuration and treatment selection. A copy of the AgileAssets Pavement Management System Engineering Configuration Document is available upon request.

Idaho has adopted the state level pavement performance measures shown in Table 2-2. Measures for IRI, rutting, and faulting are the same as federal measures. OCI is a useful index as it allows non-technical consumers of the data a quick and intuitive means to understand overall performance without needing to understand the details of the scores directly.

Photo 2-1: SH 7 Bridge over Clearwater River in Orofino

Table 2-2: Idaho Pavement Measures

FLEXIBLE PAVEMENTS

International Roughness Index (IRI)	
<95	Good
95-170	Fair
>170	Poor
Overall Condition Index (OCI)	
>=80	Good
79 - 60	Fair
< 60	Poor
Rutting Asphalt	
<0.20 inches	Good
0.20 - 0.40 inches	Fair
>0.40 inches	Poor

RIGID PAVEMENTS

International Roughness Index (IRI)	
<95	Good
95-170	Fair
>170	Poor
Overall Condition Index (OCI)	
>=80	Good
79 - 60	Fair
< 60	Poor
Faulting Concrete	
<0.10 inches	Good
0.10 – 0.15 inches	Fair
>0.15 inches	Poor

Idaho Performance Target - Pavement

For all State Highway System (SHS) routes, ITD maintains a pavement target of no more than 20% of lane miles in "Poor" condition. ITD believes that its own long-standing measures provide excellent insight into the distresses on each pavement, which allows more refined and timely identification of the proper pavement treatment. The non-NHS assets are not officially included in this asset management plan.

At present, on the entire SHS, including both NHS and non-NHS routes, 89% of all routes are in "Good" or "Fair" condition. ITD works to maintain Interstates to higher levels than all routes statewide. ITD uses a stricter standard for "Poor" pavement than FHWA. Idaho deems a pavement "Poor" if *one* of the state measures is rated "Poor", "Fair" if *one* or more measures are "Fair" with no "Poor" measures, and "Good" only if all three measures are in "Good" condition. Pavement condition long-term trends over the past 15 years have remained stable, maintaining more than 80% of the network in "Good" or "Fair" conditions by state metrics.

Idaho Measures - Bridge

ITD has successfully used bridge performance measures for over 10 years for the purposes of prioritizing and optimizing the selection of its bridge preservation, rehabilitation, and replacement projects.

The Idaho Performance Measure for Bridges is the square footage of deck area on all SHS bridges in "Good" condition. There are several key things to note with this measure. First, ITD defines a bridge as any structure, including culverts, having a span length of 10 feet or greater. Second, using this definition for a bridge, the SHS is composed of more than 1,800 bridges with 12,946,001 square feet of deck area. This is the deck area of all bridges longer than 10 feet on Interstate, U.S. routes, and State Highway routes in Idaho. Finally, ITD evaluates the primary components on each bridge: the deck, superstructure, and substructure, or culvert condition.

- **Bridge decks** are the horizontal portion of the bridge, usually made of concrete; the deck is above the superstructure and includes the traffic-carrying surface.
- **Bridge superstructure** is the portion of the bridge that supports the deck, spans the opening, and connects the substructure elements.
- **Bridge substructure** is the portions of the bridge including piers and abutments that transfer the load from the superstructure though the foundation to the ground.
- **Culvert** is a buried structure such as a large pipe or box carrying a roadway

ITD evaluates each of these components and assigns a numeric (0-9) scale for the condition of each component per the definitions in the National Bridge Inventory (NBI). Each number on the scale corresponds to a condition descriptor, with 9 indicating a component is in excellent or like new condition with no problems. The scale concludes at zero (0) indicating that component has failed and is no longer useable or able to perform its intended function. The full depiction of the 0-9 scale is shown in Table 2-3.

Table 2-3: Idaho Performance Measure for Bridges

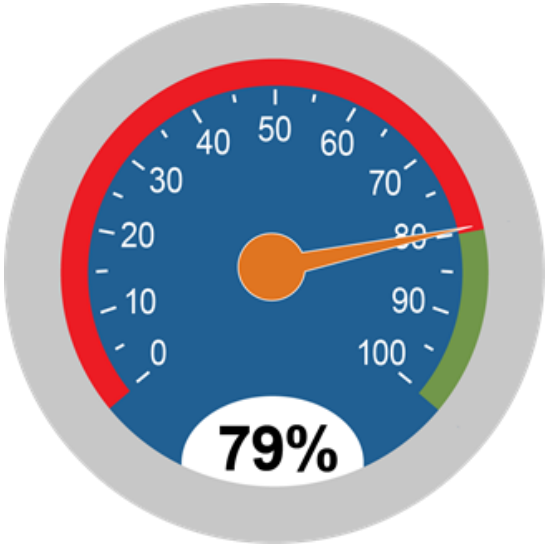
NBI Rating	Description	Condition
0	Failed	Not Good
1	Imminent Failure	
2	Critical	
3	Serious	
4	Poor	
5	Fair	
6	Satisfactory	Good
7	Good	
8	Very Good	
9	Excellent	

The lowest component rating for the deck, superstructure, and substructure or culvert sets the overall rating for the bridge. Any bridge with the deck, superstructure, and substructure or culvert all rated six or better is considered "Good" condition. Any bridge with any of these components rated less than satisfactory (six) is considered "Not Good." The total deck area of all bridges in "Good" condition is summed up and compared to the total deck area for all SHS bridges.

Idaho Performance Target - Bridge

The target for the Idaho Bridge Performance Measure is to achieve and maintain at least 80% of bridges in "Good" condition (six or better). Again, this is measured by deck area. As shown in Figure 2-1 for calendar year 2021, 79% of all of Idaho's bridge deck area on the interstate, U.S. routes and State Highway routes was in "Good" condition. Later chapters will discuss the desired target as well as strategies Idaho is taking to meet and maintain the target.

Figure 2-1: ITD Dashboard Showing Bridge Condition



Federal Measures and Performance Targets

In 2012, the Moving Ahead for Progress in the 21st Century Act, known as MAP-21, was signed into law. MAP-21 moved the Federal Highway program towards a performance-based focus. Included in the act were requirements to establish performance measures and to set performance targets. In addition, MAP-21 requires states to develop 10-year asset management plans for how they will sustain pavements and bridges in a State of Good Repair, or SOGR.

FHWA sets some performance measures, and it has set two minimum condition levels. One minimum level is that no more than 5% of Interstate Highway pavement lane miles can be in Poor condition. Furthermore, no more than 10% of NHS bridge deck area can be in Poor condition for three consecutive years.

The Federally required performance measures that each state must set are:

1. Pavements
    - Percentage of Interstate pavements in "Good" condition
    - Percentage of Interstate pavements in "Poor" condition
    - Percentage of pavements on the non-Interstate NHS in "Good" condition
    - Percentage of pavements on non-Interstate NHS in "Poor" condition.

2. Bridges
    - Percentage of NHS bridges in "Good" condition
    - Percentage of NHS bridges in "Poor" condition

Federal Performance Measure - Pavements

For pavements, FHWA has separate methods for assessing the conditions of asphalt and concrete pavements. For asphalt pavements, it requires measurement by:

- IRI, which is the International Roughness Index, or a measure of how smooth the pavement is.
  A sophisticated data-collection vehicle determines the amount of bounce or roughness per 0.1 mile.
- Cracking, or the percentage of cracks on each 0.1 mile of pavement.
- Rutting, or the amount of depression in the wheel path.

For concrete pavements, the metrics differ somewhat because concrete pavements do not rut but they do "fault", which means that the individual slabs rise or fall creating a "bump" between slabs. For concrete pavements, the measures are:

- IRI
- Cracking
- Faulting

Table 2-4 includes the measures and thresholds FHWA uses to determine if pavements are "Good," "Fair," or "Poor." If states have more than 5% of their Interstate pavements in Poor condition, they must increase investments in Interstate pavements until they reach the 5% level.

Table 2-4: Federal Measures for Asphalt and Concrete Pavements

Asphalt Pavements	
International Roughness Index (IRI)	
<95	Good
95-170	Fair
>170	Poor
Percent Cracking	
<5%	Good
5%-20%	Fair
>20%	Poor
Rutting	
<0.20 inches	Good
0.20 - 0.40 inches	Fair
>0.40 inches	Poor

Rigid Pavements	
International Roughness Index (IRI)	
<95	Good
95-170	Fair
>170	Poor
Percent Cracking	
<5%	Good
5%-15%	Fair
>15%	Poor
Faulting	
<0.10 inches	Good
0.10 – 0.15 inches	Fair
>0.15 inches	Poor

Based on the 2021 ITD HPMS pavement data (submitted in 2022), Table 2-5 indicates that ITD's interstate pavement conditions are better than the Federal condition level goal of 50% "Good" previously set by ITD and the current Interstate goal of 35% "Good." The performance of the non-interstate NHS is below the previously established "Good" performance target, but above a revised performance target of 20%.

Table 2-5: Idaho Interstate and Non-Interstate NHS Pavement Conditions, 2022 HPMS Submittal

Idaho Interstate Pavement Conditions	
57.8	Good
41.9	Fair
0.3	Poor

Non-Interstate NHS Pavement Conditions	
40.3	Good
59.1	Fair
0.7	Poor

However, as also noted in Table 2-5 the amount of "Poor" Interstate pavement condition is 0.3% which is well below the federal maximum level of no more than 5% "Poor." Chapter 4 presents further discussion of potential gaps and mitigation strategies when necessary. The federal metrics, measures and performance criteria are the basis of these performance measures.

Based on 2021 HPMS data, Table 2-6 shows both the performance of the Local NHS as well as the contribution to the overall NHS performance. In Chapter 3, examples are given of how ITD communicates system performance data.

Table 2-6: 2021 HPMS Local NHS Pavement Performance

NHS-Local	% Good	% Fair	% Poor	Not Collected
NHS-Local	34.8%	65.2%	0.0%	0.0%
Contribution NHS Overall Performance	0.26%	0.4%	0.0%	0.0%

It warrants emphasis that ITD uses federal measures for asphalt and concrete pavements as set forth by federal regulation for HPMS reporting. ITD will continue to utilize these metrics to report, assess and predict NHS performance. That said, ITD utilizes accepted internal metrics, measures and reporting criteria for system performance monitoring, and lifecycle planning at the state level. These measures are compared to the federal criteria at the end of the chapter.

Federal Performance Targets – Pavement

For this asset management plan, after significant review of data and performance trends, ITD sets the following pavement targets, summarized in Table 2-7.

Target for Interstate pavements:

For Interstate Highway System pavement, the target is that no more than 4% of lane miles will be in "Poor" condition, with "Poor" defined as per the Federal measure of two or more distresses in the "Poor" category. For the percentage of "Good" pavements, ITD has adopted an Interstate Highway target of 35% "Good."

Target for Non-Interstate NHS pavements:

For non-interstate NHS pavement, the target is that no more than 8% of NHS lane miles will be in "Poor" condition as per the Federal measures of two or more distresses in the "Poor" category. ITD targets at least 20% of the non-interstate NHS to be in "Good" condition.

Table 2-7: ITD Pavement Asset Federal Metric Performance Targets

System	% Good	% Poor
Interstate	35.0%	4.0%
NHS	20.0%	8.0%

Photo 2-2: Aerial Highway View from ITD District 2

Federal Performance Measure - Bridge

For the Federally required asset management plan and performance reporting for the NHS, ITD follows the criteria set by the FHWA for determining if bridges are in "Good," "Fair," or "Poor" condition. The Federal Performance Measure is similar to the Idaho Performance Measure, but also has a couple of notable differences:

- A bridge is any structure, including culverts, having a span length of greater than 20 feet.
- Only those bridges on the National Highway System (NHS) are considered for this measure. In Idaho, there are 830 bridges with 8,403,883 square feet of deck area on the NHS.
- The FHWA NHS performance measures have three ratings, "Good," "Fair," and "Poor," where "Good" are bridges with an overall rating of 7-9, "Fair" are bridges with an overall rating of 5 or 6, and "Poor" are bridges with an overall rating of 4 or below as shown in Table 2-8.

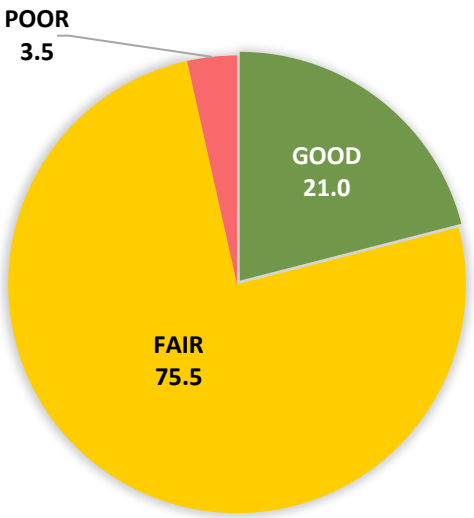
Like the Idaho Performance Measure for Bridges, the Federal Performance Measure evaluates the same four primary bridge components; the deck, superstructure, and substructure, or culvert condition using the same numeric (0-9) condition scale described previously. The lowest condition of any of the four components determines whether the overall bridge condition is "Good," "Fair," or "Poor."

Table 2-8: Federal Bridge Performance Measures

NBI Rating	Description	Condition
0	Failed	Poor
1	Imminent Failure	
2	Critical	
3	Serious	
4	Poor	
5	Fair	Fair
6	Satisfactory	
7	Good	Good
8	Very Good	
9	Excellent	

The total NHS deck area of all bridges in "Good" condition and "Poor" condition are summed up and compared to the total deck area for all NHS bridges. For Calendar Year 2021, the current conditions of all NHS bridges in Idaho are shown in Figure 2-2.

Figure 2-2: 2021 NHS Bridge Conditions



Federal Performance Target - Bridge

The target for the Federal Bridge Performance Measure is to achieve and maintain at least 19% of NHS bridges in "Good" condition and no more than 3.5% of NHS bridges in "Poor" condition. Again, this is measured by deck area. For calendar year 2021, 21% of all of Idaho's NHS bridge deck area were in "Good" condition and 3.5% of NHS bridge deck area were in "Poor" condition. Idaho exceeds the performance measure target for "Good" NHS deck area and meets target for "Poor" condition by deck area. Later chapters will discuss strategies Idaho is taking to maintain these performance measures for the TAMP analysis period.

Comparing the Idaho and Federal Performance Measures

Pavements

With respect to pavement condition reporting, Idaho's determination of "Good," "Fair," or "Poor" is different from the federal measure. The federal measure is based upon criteria of roughness, rutting, faulting, and percent cracking. The basis for determining roughness and rutting condition is similar between ITD and the federal measures. For pavement cracking, ITD measures the same pavement distresses but compiles them into a different index, the Overall Condition Index or OCI.

ITD emphasizes that this measure is consistent with ITD internal reporting purposes only: supplanting the federal crack measure is not the intent. The most fundamental difference lies not with the measures, but rather with the way measures are utilized to assign the performance condition. As shown in Figure 2-3 through Figure 2-6 and Table 2-9, the difference between ITD performance criteria to federal criteria is that the lowest measure (roughness, OCI, rutting) determines the pavement section's overall performance. This is analogous to the so-called, three leg stool model, which means that the stool will lean in the direction of the lowest of the three legs.

Federal performance requires two of the three criteria to be "Poor" for the section to be rated as "Poor." More specifically, the federal performance criteria require all three measures must be rated as Good for a pavement section to be classified as "Good" condition; "Poor" condition requires two measures to be "Poor." Everything else is "Fair" condition.

ITD reviewed past performance of the interstate and non-interstate NHS assets, according to the federal criteria, to establish the state and federal pavement performance targets. These targets are updated based on current and predicted performance. For all criteria reviewed, there is a difference between the FHWA target and performance values and the ITD values. This is the result of the difference in the approach to performance criteria given in Table 2-9.

Photo 2-3: US Route showing Guardrail End-Treatment

Table 2-9: Pavement Measures and Condition Crosswalk Table

FHWA	ITD
Performance Measures:	
International Roughness Index (IRI)	International Roughness Index (IRI)
Percent Cracking (Asphalt or Concrete)	Overall Condition Index (OCI)*
Rutting (Asphalt Only)	Rutting (Asphalt Only)
Faulting Rigid (Rigid Only)	
Performance Criteria:	
All performance measures "Good" = "Good"	Lowest of performance measures determines pavement performance. i.e., One performance measure falling into a Poor category results in a "Poor" rating for a pavement asset
Two Performance measures "Poor" = "Poor"	
All other combinations = "Fair"	

*The Overall Condition Index is a composite index (0-100) based on structural and non-structural pavement distresses determined by the manifestation of various crack types.
Good: OCI >80; Fair: OCI Between or equal to 60 & 80; Poor: OCI<60. A complete discussion on the computation and use of OCI is contained in the most current version of the "Pavement Management System Engineering Configuration Document" maintained by ITD Pavement Management.

Figure 2-3 through Figure 2-6 compare the results of the Federal and ITD criteria as applied to the network data. *Note that data collection was incomplete in 2018 and 2019 and these numbers are not entirely representative.* 2017, 2020 and 2021 are full datasets.

Figure 2-3: Percentage Good Interstate Pavement Performance Crosswalk

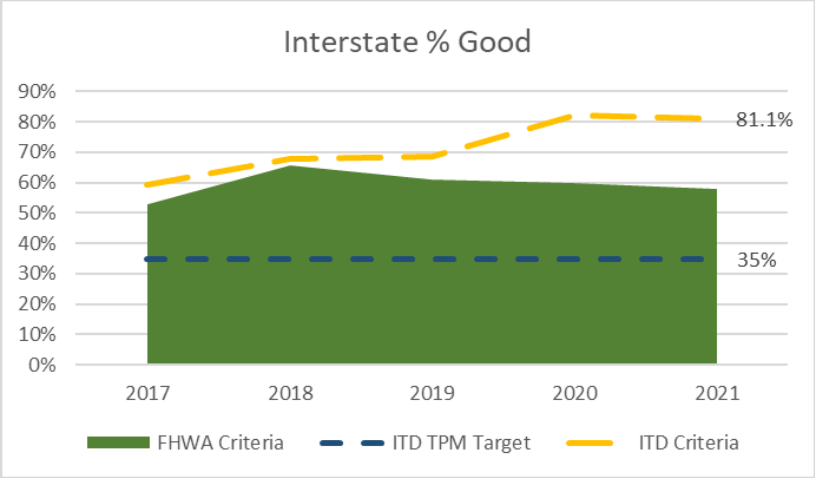


Figure 2-4: Percentage Poor Interstate Pavement Performance Crosswalk

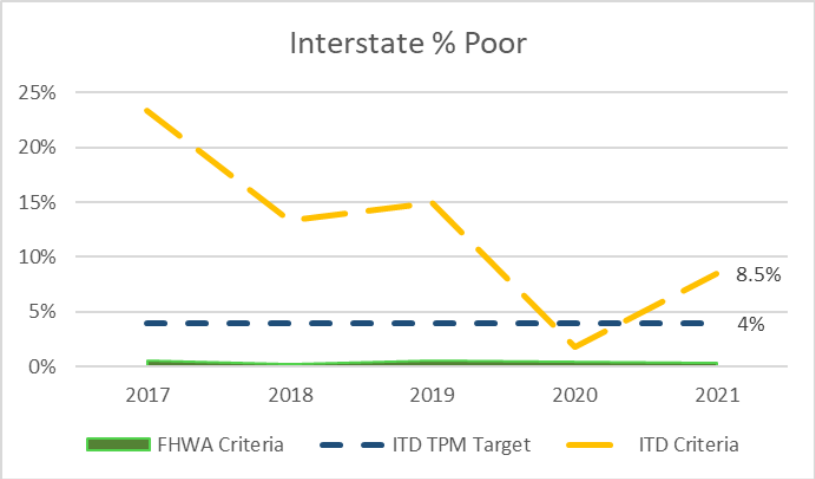


Figure 2-5: Percentage Good Non-Interstate NHS Pavement Performance Crosswalk

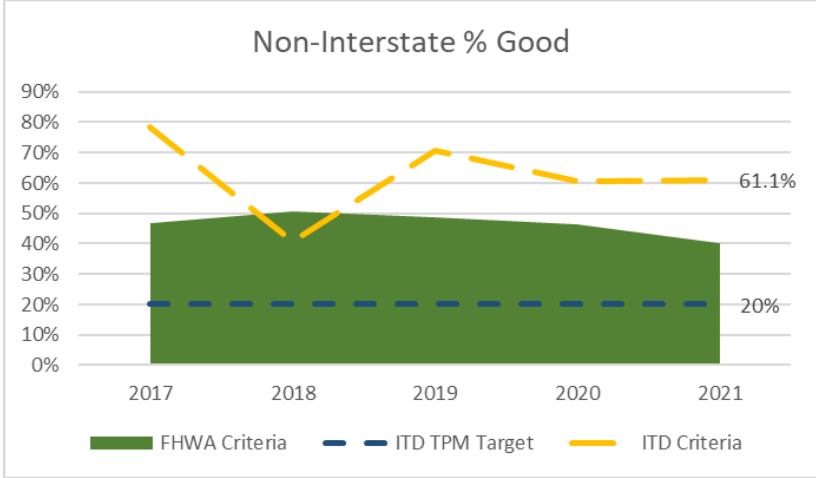
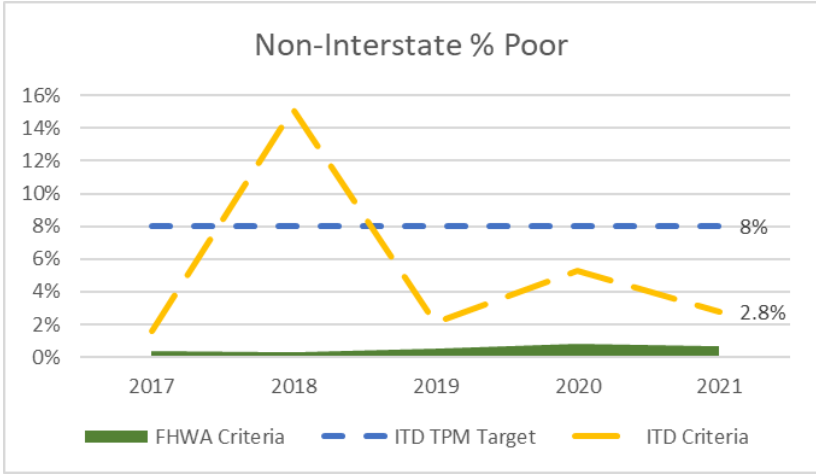


Figure 2-6: Percentage Poor Non-Interstate NHS Pavement Performance Crosswalk



Differences between state measures for pavements and the Federal measures is common among almost all states. States developed measures of pavement conditions independently years before FHWA developed its standard, nationwide measures.

Bridge

When comparing the Idaho and Federal Performance Measures it is important to note that the Idaho Performance Measure distinguishes between "Not Good" and "Good" whereas the Federal Performance Measure uses three categories, "Poor," "Fair" and "Good." ITD utilizes this approach as it is simpler and is particularly helpful when talking with the public and our Idaho State Legislature. Table 2-10 presents a crosswalk between the Idaho and Federal Performance Measures.

Table 2-10: Comparison between Idaho and Federal Performance Measures

NBI Rating	Condition	Idaho Performance Measure	Federal Performance Measure
0	Failed	Not Good	Poor
1	Imminent Failure		
2	Critical		
3	Serious		
4	Poor		
5	Fair		Fair
6	Satisfactory	Good	
7	Good		Good
8	Very Good		
9	Excellent		

Conclusion and State of Good Repair

ITD uses the FHWA performance measures as its measures for the asset management plan and for the required FHWA performance reporting. ITD has set two- and four-year targets as shown in Table 2-11. ITD maintains its own internal performance measures for analysis and planning purposes with an intent to explore a future focus on FHWA peformance measure targets. Idaho determines it's long-term State of Good Repair, or SOGR, based on *state targets and expectations.* For both bridge and pavements, this means maintaining 80% of the entire state highway system in Good or Fair condition, not only NHS facilities.

Figure 3-8 on page 33 indicates projected ITD statewide pavement metrics for the next decade will steadily decline prior to stabilizing. Thus, ITD is inclined to maintain federal metrics at the values set during the most recent TPM 2 and 4 year target period.

Photo 2-4: Highway 21 Bridge

Table 2-11: Performance Measures and Targets Crosswalk

Performance Measure	Federal Measure	Federal 2 & 4 Year Targets	ITD Measure	ITD 2 & 4 Year Targets	Long-term State of Good Repair (SOGR*)
Pavement	Interstate NHS Percent Good	35%	SHS Percent Good or Fair	80%	80%
	Interstate NHS Percent Poor	4%			
	Non-Interstate NHS Percent Good	20%			
	Non-Interstate NHS Percent Poor	8%			
Bridge	NHS Bridge Percent Good	19%	SHS Bridges Percent Good	80%	80%
	NHS Bridge Percent Poor	3.5%			

*Note that SOGR covers the entire state highway system, not just the NHS routes.

Chapter 3 – Summary Description of Assets

ITD manages a State Highway System (SHS) of approximately 5,000 centerline miles, or over 12,000 lane miles, plus more than 1,800 bridges (including all structures with a span length of 10 feet or greater). The entire Idaho Transportation Network is more than 60,000 miles with local governments owning the large majority. ITD's routes carry 55% of the state vehicle miles of travel (VMT) with 25% of all VMT being on the Interstate Highway System network. Within Idaho there are more than 4,000 bridges, of these 1835 bridges are managed by ITD. There are 830 bridges and culverts greater than 20-foot in length on the NHS (with an area of 8,403,883 sq. ft.). Of these, 805 are on the State Highway System (with a deck area of 8,089,343 sq. ft.) and there are 25 local bridges and culverts greater than 20 feet in length on the NHS (with an area of 314,540 sq. ft.).

Photo 3-1: The I. B. Perrine Bridge, US 93, over the Snake River Canyon, Twin Falls, Idaho

Photo 3-2: US 93 in Idaho, One of the Many Rural Roads so Important in the State

ITD Highway Classes

An integral part to ITD being effective in life cycle planning, and by association, asset management, is segregating our highways into different classes. This enables ITD to tailor and prioritize the life cycle cost processes based on performance indicators defined for each highway class.

ITD recognizes the following highway classes within the Idaho Transportation Network:

- State Highway System (SHS)
- Local (non-SHS) roads
- NHS
- State Highways
- NHS Bridges
- NHS Local Bridges
- Non-NHS Bridges

Sub-Classes recognized are:

- Interstate
- State Jurisdictional NHS
- Local Jurisdictional NHS

Figure 3-1 is a graphical representation of this taxonomy.

Figure 3-1: Idaho Transportation Network Asset Classes

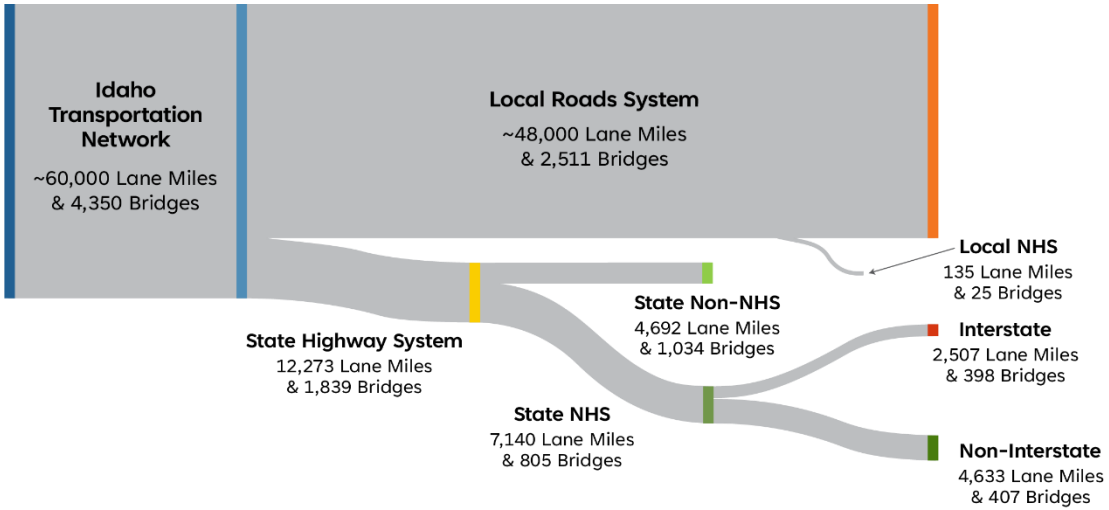
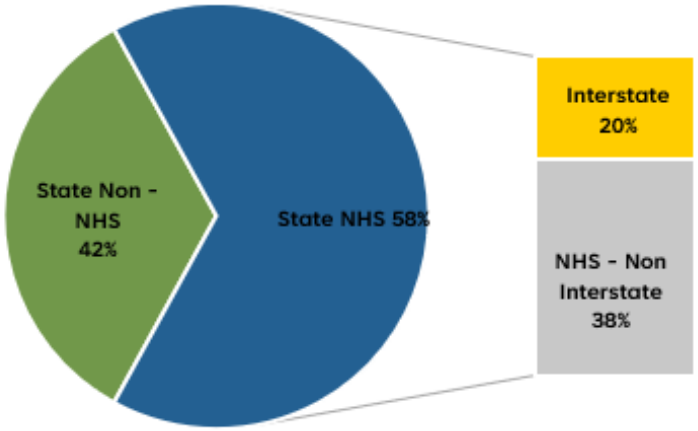


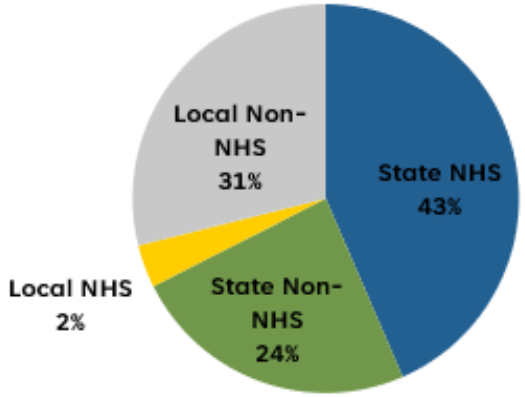
Figure 3-2 summarizes the distribution of lane miles based on the asset classes recognized by ITD. As indicated, the majority of the State Highway System, 58%, is comprised of NHS facilities. Non-Interstate roadways comprise two-thirds of the Idaho NHS system.

Figure 3-2: SHS Lane Miles Distribution



With respect to bridges, Figure 3-3 shows the distribution of total deck area and highlights that 45% of the total deck area is located on the NHS, with just 2% of that belonging to local jurisdictions. While the number of NHS bridges in Idaho is approximately 18% of the total number of highway bridges, they make up 45% of the deck area. Idaho's NHS bridges are larger structures on NHS routes that carry a significant amount of traffic in the state.

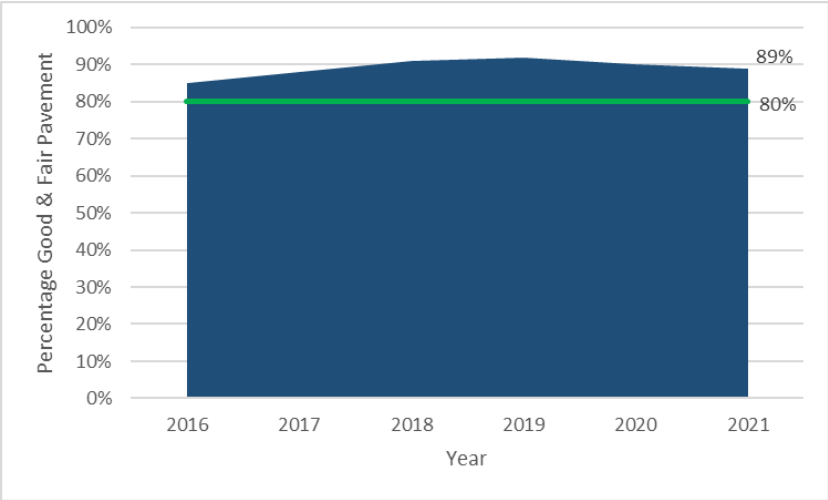
Figure 3-3: Distribution of Total Bridge Deck Area in Idaho



Condition and Trends

ITD produces reports that summarizes performance and targets for pavements, bridges, safety, and other performance areas. These reports make the ITD condition trends transparent. As seen in Figure 3-4, pavement conditions generally have improved, and statewide conditions remain above the ITD target of 80% of pavements in "Good" or "Fair" condition. As discussed in Chapter 2, this chart is based on the ITD defined performance criteria.

Figure 3-4: Idaho SHS Pavement Condition Trends (ITD Criteria)



According to the 0.1-mile Federal Measure pavement data ITD reported to the Highway Performance Management System, 57.8% of the 2,530 Interstate lane miles are in "Good" condition, 41.9% are "Fair" and only 0.3% are "Poor." For the NHS (non-Interstate) as of 2021, out of 4,797 lane miles, 40.3% are "Good," 59 % are "Fair," and 0.7% are "Poor."

Another aspect of pavement condition performance that is important to review is how the statewide pavement conditions are changing year over year. For instance, it would be very telling to see large changes between "Good" and "Fair" pavement in a given year, which is indicative that large portions of the network are deteriorating at the same time. ITD asset management has an established process to monitor year over year changes in performance. Figure 3-5, Figure 3-6 and Figure 3-7 show the percentage change between 2017 through 2021 within the NHS. These charts show that there has been movement of pavement conditions from the "Good" category to the "Fair" category as computed according to Federal Criteria.

Photo 3-3: Highway 21 in Snow Conditions

Figure 3-5: All NHS Pavement Performance Percent Change 2017-2021 (Federal Measures)

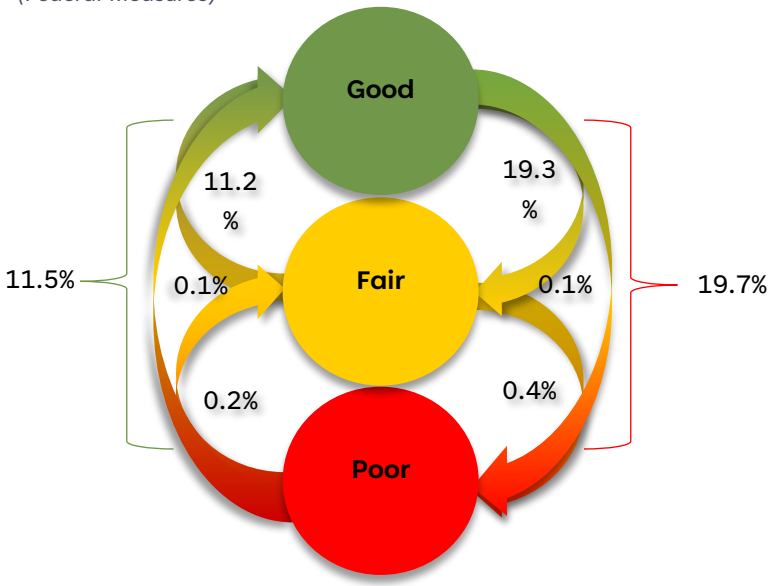


Figure 3-7: NHS Interstate Pavement Performance Percent Change 2017-2021 (Federal Measures)

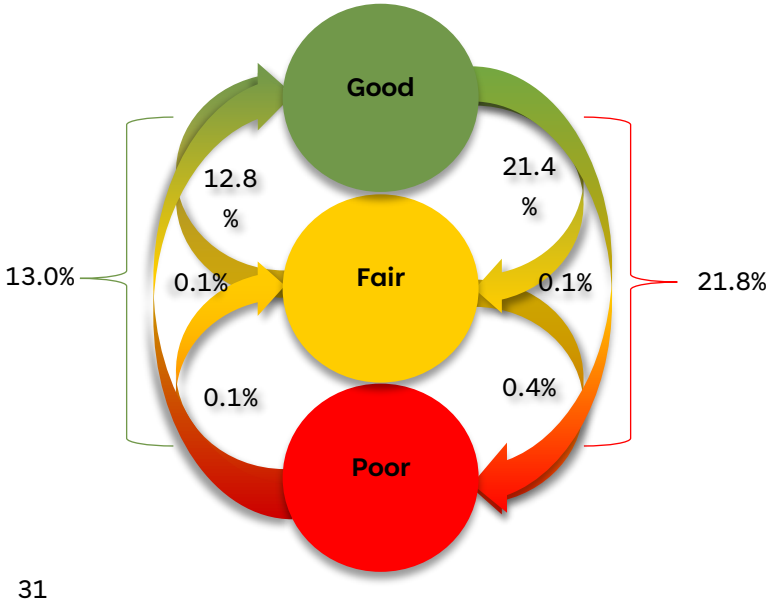
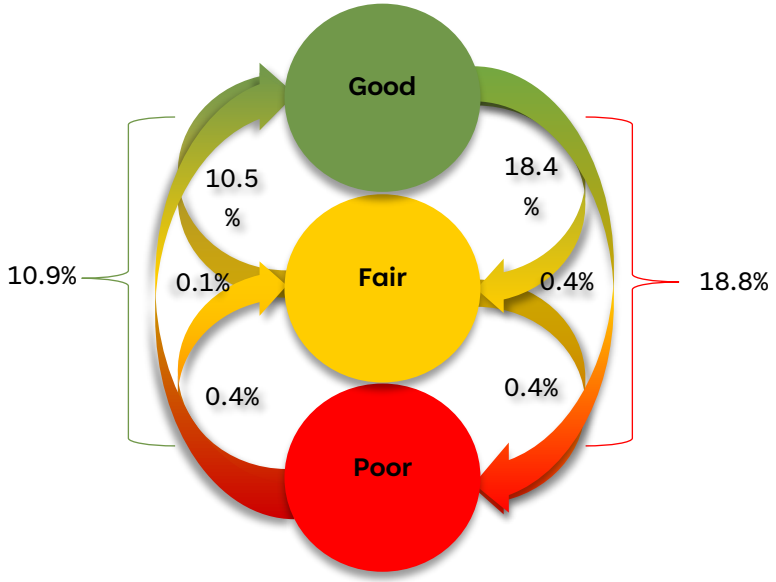


Figure 3-6: NHS Non-Interstate Pavement Performance Percent Change 2017-2021 (Federal Measures)



Pavement Measurement and Management Process

The intent of the ITD performance standard is to identify and mitigate deficient pavements. This section briefly describes the analysis methods, measures, and results of ITD's pavement management process. Greater detail regarding the system configuration is provided in Chapter 5 and in ITD's TAMS Configuration documentation.

ITD uses a commercial Pavement Management solution from AgileAssets. The PMS includes inventories, calibrated deterioration curves, decision trees, performance models, and an optimization analysis engine.

ITD uses the Pavement Management System at a network level to recommend how funds should be invested in pavements to achieve the department's targets, and how the funds should be split between preservation and rehabilitation or replacement. Project level outputs, with location, are provided to ITD Districts via a project candidate file. The use of the project level outputs is not required. In addition, network analysis is broken down by district, and the analysis is used to allocate a percentage of annual paving funds to the districts.

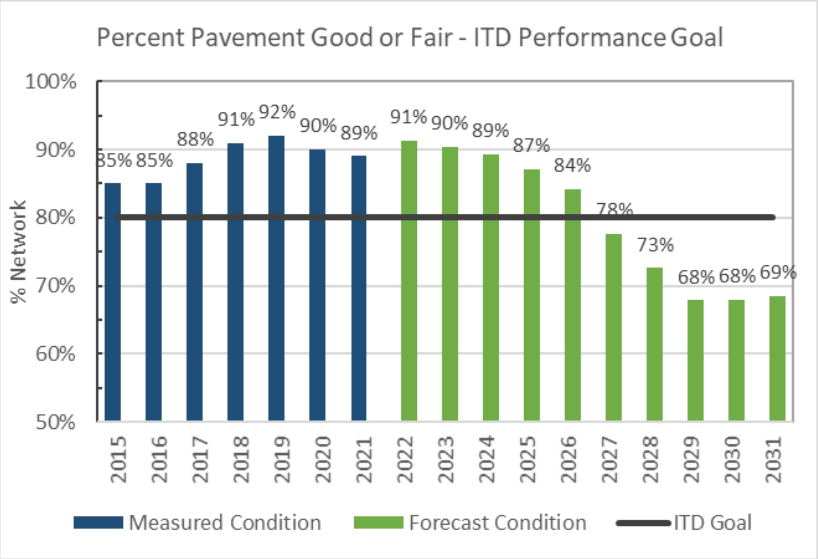
Once districts receive their pavement allocations, they identify projects based partially on the PMS information. Often, district engineers' final choice in projects is based upon local conditions, pavement condition reports, engineering judgment, and local coordination and needs. ITD has pavement-design manuals, which help material engineers design treatments to maximize the pavement's lifecycle performance. In addition, the districts have a preservation budget to work with which they also can use to improve the life-cycle performance of pavements. The district-identified pavement projects are uploaded into the pavement management system and ITD includes the projects in PMS analysis scenarios. The analysis uses the deterioration curves and programmed projects to calculate how the program will impact the pavement network.

ITD's pavement data collection and analysis capabilities allow staff to analyze pavement conditions from many perspectives to assess overall performance. ITD is not only concerned about pavement smoothness but also analyzes rutting which, when excessive, can contribute to crashes because of water laying in the wheel path depressions. Cracking can also be analyzed to determine what types of treatments a pavement requires, or how long a pavement will perform. ITD provides detailed pavement distress data to its districts for them to further analyze their pavement conditions and needed treatments.

ITD conducts analyses to project future condition based on anticipated funding. Historic and expected pavement performance for the entire SHS in Good or Fair condition *for ITD state metrics* is shown in Figure 3-8.

Photo 3-4: Highway 75 and 20 Junction

Figure 3-8: State Highway System (SHS) Pavement Long Term Trend and Forecast (State Criteria)



ITD vs. Federal Pavement Measurement

As noted in Chapter 2, The ITD standard of considering a pavement to be rated as "Poor" if one criteria is "Poor" is more stringent than the Federal standard. FHWA metrics consider a pavement to be "Poor" only if it is "Poor" in two of the three criteria. Although ITD uses its own criteria for measuring its pavements and qualifying pavement performance and conditions, when ITD measures its pavements by the Federal standards it shows very little Poor pavement. Figure 2-4 demonstrate that when measured by the Federal criteria, only 0.7% of the 2021 State Highway System was in what FHWA could classify as "Poor" condition. By the Federal measure, 46.6% was "Good" in 2021 and 52.8% was "Fair."

ITD reports the Federal 0.1-mile pavement data to FHWA to satisfy the Federal regulations, ITD also utilizes this information to monitor the different aspects of pavement performance. Examples of these charts are provided on the following pages in Figure 3-9 through Figure 3-12.

ITD will continue using its state performance criteria for reporting pavement performance to its Board, the public, and to its District Offices and to drive pavement optimization analysis

Photo 3-5: ITD I-90 Aerial Picture

Figure 3-9: Federal 0.1-mile IRI Conditions on the NHS

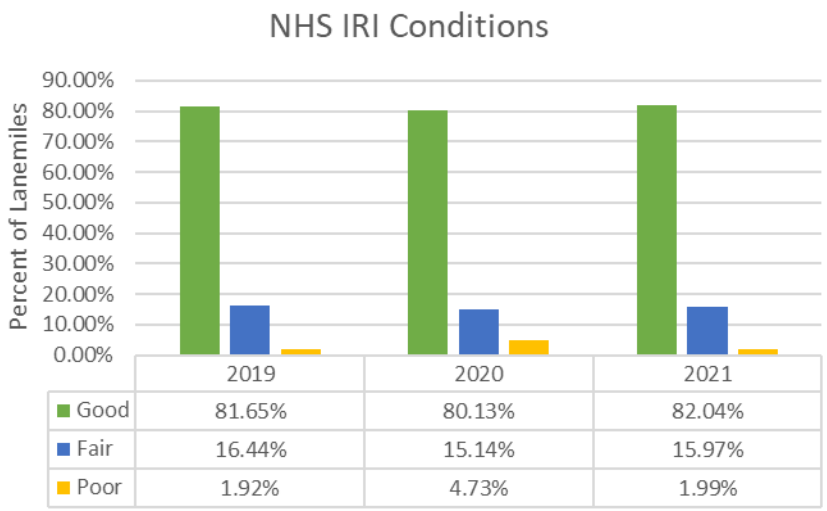


Figure 3-10: Federal 0.1-mile Rutting Conditions on the NHS

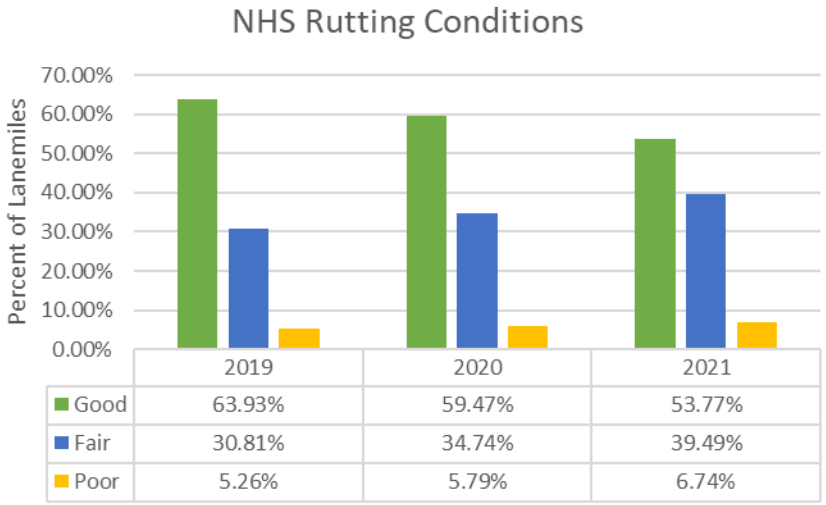


Figure 3-11: Federal 0.1-mile Measure Faulting Conditions on the NHS

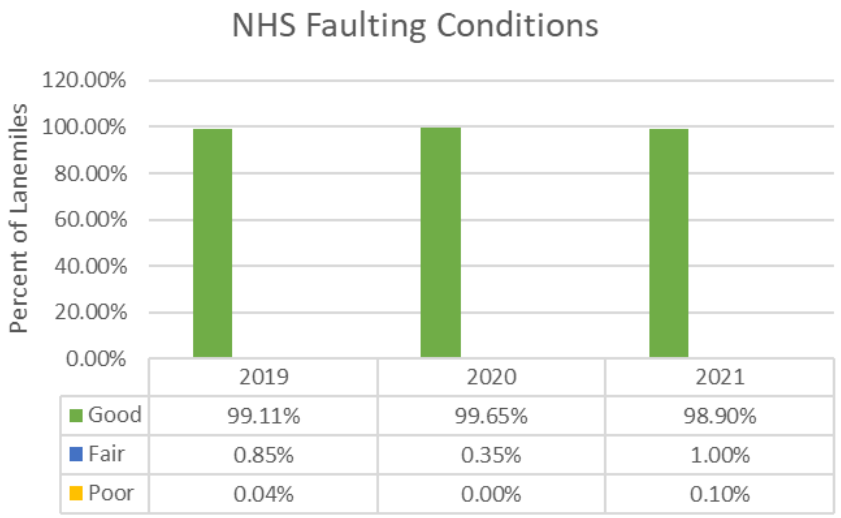
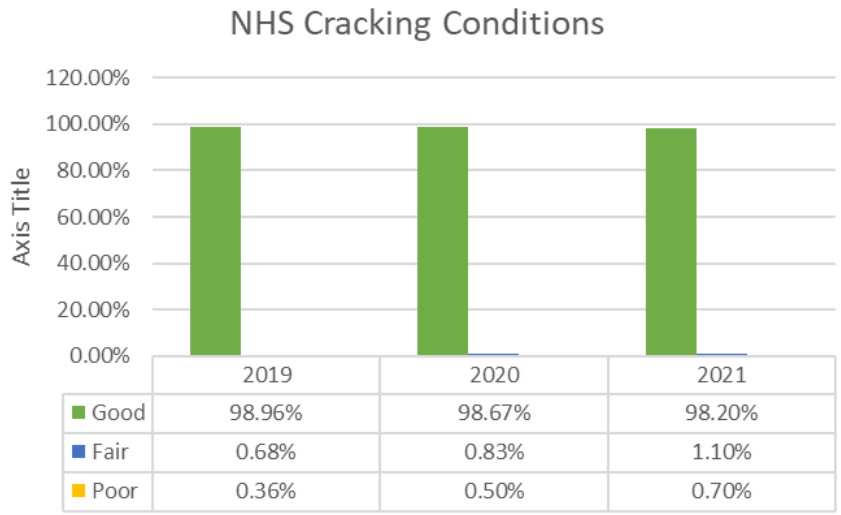


Figure 3-12: Federal 0.1-mile NHS Cracking Percentage



Bridge

There are 4,346 bridges within the State of Idaho owned by State and local governments. These include bridges that are greater than 10 feet in length on the State system and greater than 20 feet in length on the Local system. A description of bridge assets, their conditions and trends will be presented in a similar manner as the performance measures and targets presented in Chapter 2. For the ITD Bridge Performance Measure, bridge data for the State Highway System (SHS) will be presented. For the Federal Bridge Performance Measure, bridge data for the NHS will be presented.

Idaho SHS Description of Assets

ITD owns and manages the State Highway System (SHS). The SHS includes all interstate, U.S. (FHWA NBI coding Guide Item 5B), and State Highway routes. On all these routes, there are 1,839 bridges greater than 10 feet in length and they comprise 12,946,001 square feet of deck area, seen in Table 3-1. Figure 3-13 shows percentages of bridges in each highway functional classification.

Photo 3-6: ITD Bridge Workzone

Figure 3-13: SHS Functional Classification Percentages

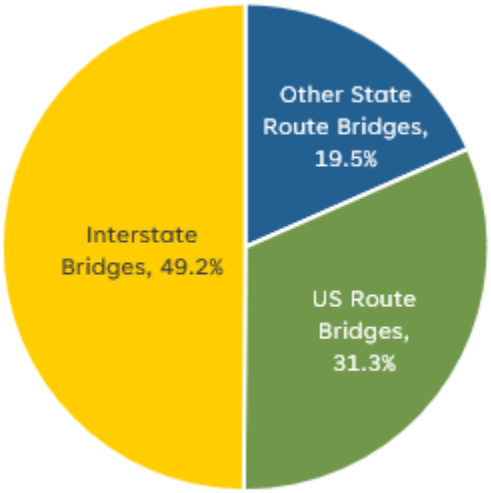


Table 3-1: SHS Bridge Distribution

SHS Bridges*	Count	Deck Area
Interstate Bridges	705	6,362,368 sq. ft.
US Route Bridges	575	4,056,061 sq. ft.
Other State Route Bridges	559	2,527,572 sq. ft.
Total State Highway System (SHS) Bridges	**1839**	**12,946,001sq. ft.**

**Includes bridges with spans between 10' to 20'*

Idaho SHS Conditions and Trends

ITD's condition goal for the SHS is 80% "Good" using their unique performance measure where structures are in "Good" condition when the overall NBI condition rating is 6 (satisfactory) or better.

Figure 3-14: SHS Bridge Condition Distribution

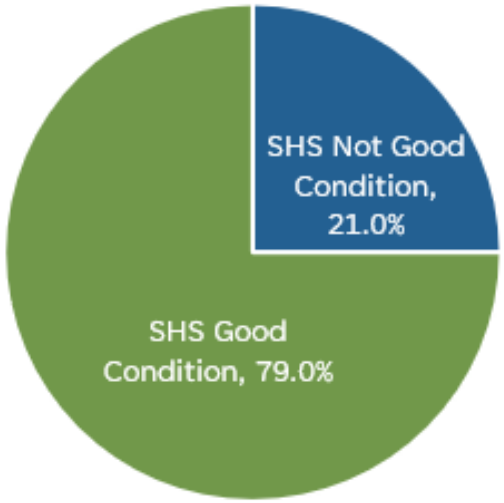


Table 3-2: SHS Bridge Condition Summary

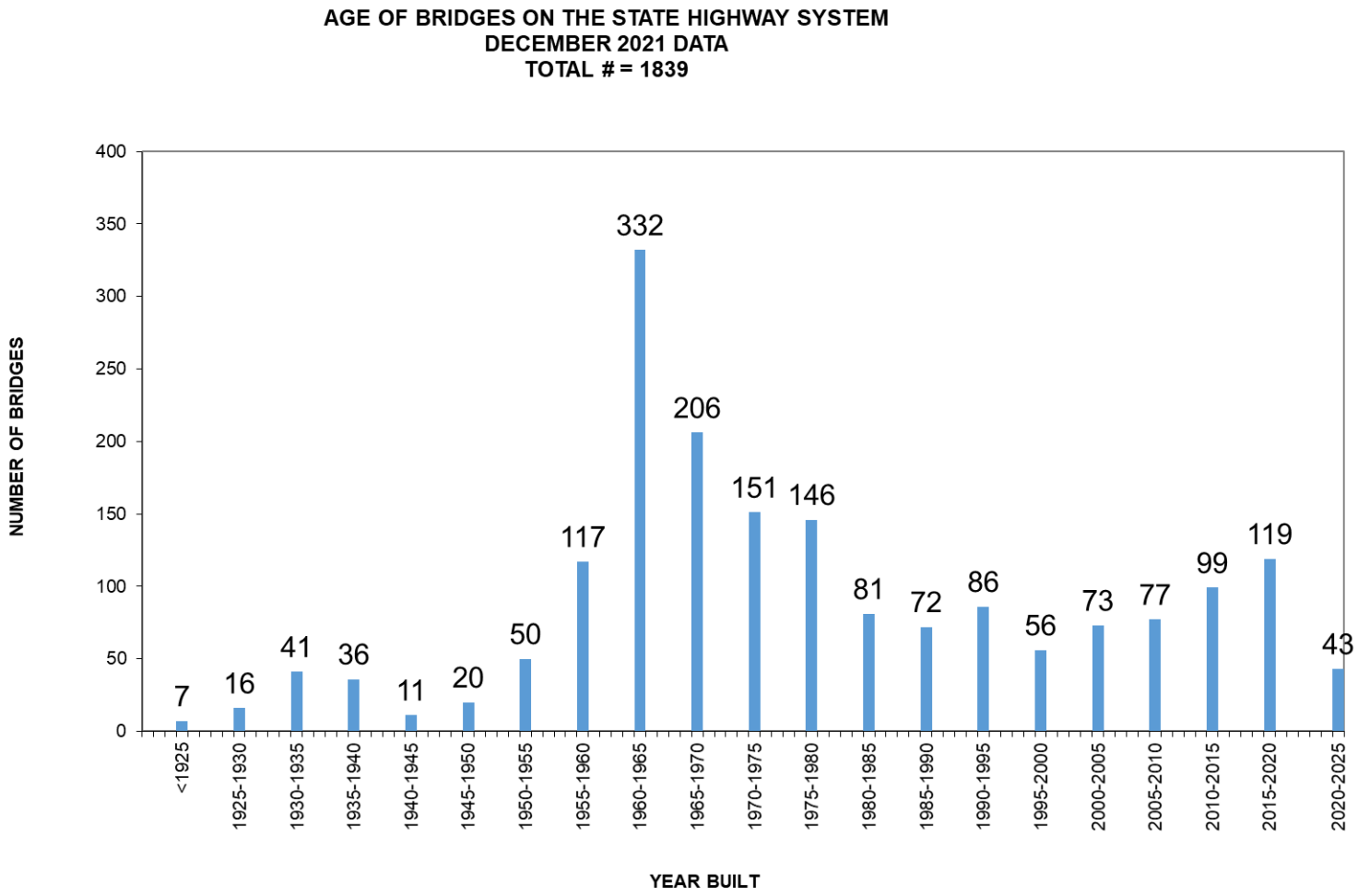
	NBI Rating	# of Bridges	Deck Area (SqFt)	Deck Area (SqFt) Percent	Percent Good or Not
Not Good	0 - Failed	1	6,248	<0.0	21%
	1 – Imminent Failure	0	0	0.0	
	2 - Critical	1	631	<0.0	
	3 - Serious	4	24,235	0.2	
	4 - Poor	43	352,345	2.7	
	5 - Fair	305	2,374,664	18.3	
Good	6 - Satisfactory	941	6,924,091	53.5	79%
	7 - Good	372	2,416,420	18.7	
	8 – Very Good	113	482,843	3.7	
	9 - Excellent	59	364,5214	2.8	
	Total	**1839**	**12,946,001**	**100**	

As shown in Figure 3-14 Figure and Table 3-2, 79% (by deck area) of Idaho's SHS bridge assets are in "Good" condition. Approximately 21% of the SHS bridge assets are in "Not Good" condition. Often, these "Not Good" bridges are some of Idaho's oldest bridge assets and are ones that have the lowest strength capacities that restrict heavy commercial truck traffic. Bridge age and restrictions to freight/truck traffic are important factors to ITD as it manages the SHS bridges.

Figure 3-15 shows a histogram of SHS bridge age. While there are not performance measures and targets associated with bridge age, older bridges were built to earlier standards that sometimes effect functional ability of the bridge, such as load carrying capacity, and age is an important consideration used to prioritize and manage ITD assets. In 2021, there were 69 Commerce Restricted Bridges on the State Highway System. These are bridges that are posted for reduced truck load

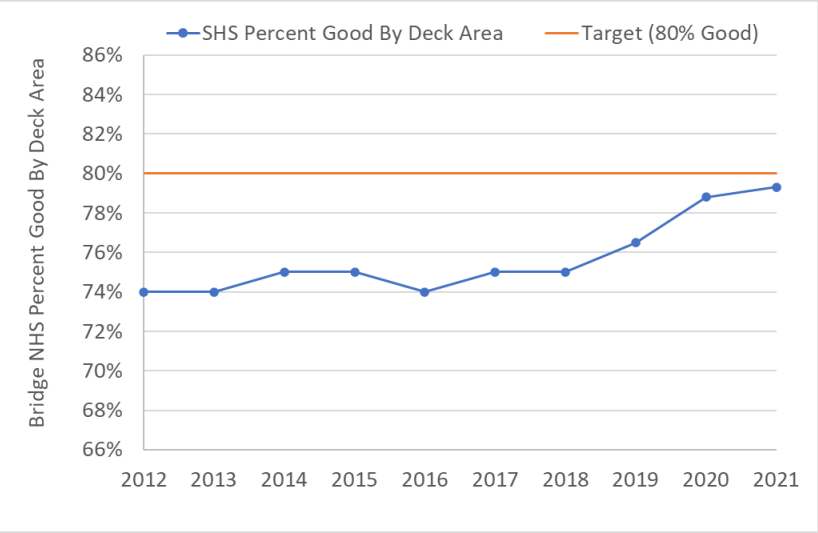
(weight of vehicle) that affects movement of commerce. Restricted bridges include deteriorated conditions reducing capacity or older designs not designed to today's standards. This restriction primarily was due to an antiquated design truck used when the bridges were designed. About 14 of these bridges are in the Idaho Transportation Improvement Plan (ITIP) scheduled for replacement over the next seven years.

Figure 3-15: SHS Bridge Age Histogram



ITD monitors not only the current performance of the SHS bridge assets but also how that performance is changing over time. Figure 3-16 shows the past 10 years of SHS performance. ITD is striving to raise the percentage of SHS bridge assets in "Good" condition to 80%, and we have been making steady progress towards that goal. Currently Idaho's SHS bridges are at 79% "Good" condition, and based upon current funding levels, ITD is predicting to reach its target for SHS bridge performance in about calendar year 2023 (discussed further in Chapter 8). This assumes current funding levels remain in place and no significant unexpected events/damage occur.

Figure 3-16: ITD SHS Bridge Condition – Percent Good



Idaho NHS Description of Assets

There are 830 Bridges on the NHS in the State of Idaho. Consistent with the Federal definition of a bridge and as stated in Chapter 2, these are bridges, including culverts, which are longer than 20 feet in length. ITD owns and manages the vast majority of NHS bridges in the State at 96%, but not all of the NHS bridges are state owned. Local governments in Idaho own a small portion of the NHS at about 4% of total deck area. The Federal Bridge Performance Measure as presented in Chapter 2 includes all NHS bridges. Table 3-3 shows the portions of the NHS that are owned by the State and local governments in Idaho.

Table 3-3: Bridge Ownership

Bridge Asset Class	Bridge Count	Deck Area	
		Sq. Ft.	Percent
State owned NHS Bridges	805	8,089,343	96.3%
Local owned NHS Bridges	25	314,540	3.7%
Total NHS System	830	8,403,883	100.0%

Note: Includes bridges and culverts > 20-foot in length
State Owned includes Border Bridges

Idaho NHS Conditions and Trends

Of the 830 bridges, and over 8.4 million square feet of deck area, 21.0%, 75.5%, and 3.5% of Idaho's NHS bridges are in "Good," "Fair," and "Poor" condition, respectively. Table 3-4 shows the breakdown of NHS bridge assets in "Good," "Fair," and "Poor "condition as well as the portions owned by the State and the local governments. This table is based on the end of Calendar Year 2021 data.

Table 3-4: Bridge Ownership and Performance

Bridge Asset Class	Federal Condition Criteria			
	Good	Fair	Poor	Total
State NHS Bridges	200 bridges with 1,727,270 SF of deck area 16.9% by deck area	582 bridges with 6,105,003 SF of deck area 72.6% by deck area	23 bridges with 257,070 SF of deck area 3.1% by deck area	**805 bridges with** **8,089,343 SF of deck area** **96.3% by deck area**
Local NHS Bridges	6 bridges with 33,493 SF of deck area 0.4% by deck area	18 bridges with 241,551 SF of deck area 2.8% by deck area	1 bridge with 39,496SF of deck area <0.5% by deck area	**25 bridges with** **314,540 SF of deck area** **3.7% by deck area**
Total NHS System	**206 bridges with** **1,760,763 SF of deck area 21.0% by deck area**	**600 bridges with** **6,346,554 SF of deck area** **75.5% by deck area**	**24 bridges with** **296,566 SF of deck area** **3.5% by deck area**	**830 bridges with** **8,403,883SF deck area** **100% by deck area**

Note: Includes bridges and culverts > 20-foot in length

ITD monitors the change in condition ratings over time. Two examples of this are shown below. As illustrated in Figure 3-17, for the years 2018-2021, approximately 6.8% of Idaho's NHS bridge deck area declined in condition. This decline in condition is largely attributable to normal wear and tear on bridges from vehicular traffic, normal deterioration from weather and exposure to the elements, as well as damage caused by unexpected events whether that be human caused or natural disasters. Through the transportation investments that ITD and the locals made in the NHS bridge assets, approximately 7.4 % of NHS bridge deck area improved in condition. These investments came in the form of replacing worn out bridges, repairing bridges, and preserving those bridges that were in "Good" and "Fair" condition.

Figure 3-17: 2018 to 2021 Idaho NHS Condition Trend Bridge Performance (Percent Deck Area)

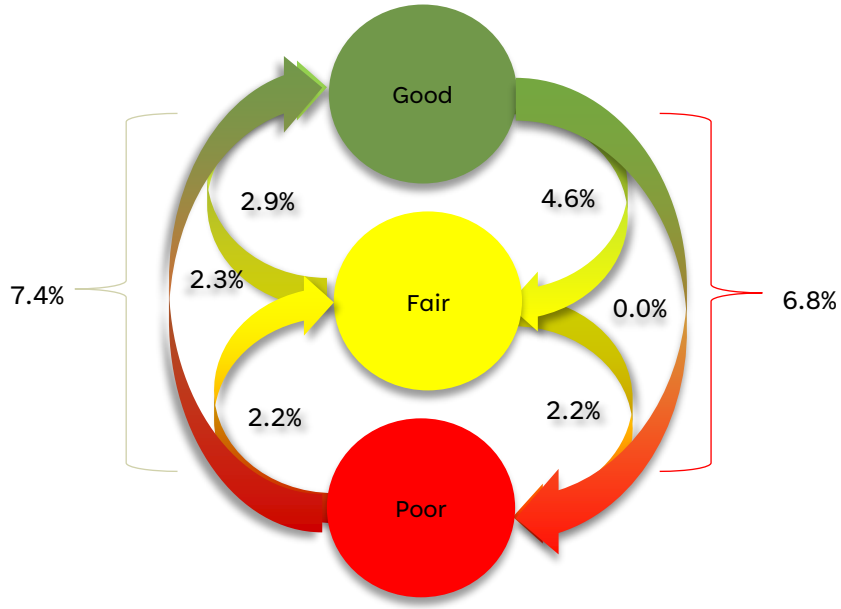


Figure 3-18 and Figure 3-19 show the ten-year trend of Idaho's NHS "Good" and "Poor" bridges respectively. ITD is striving to meet or exceed the target of 19% of NHS bridge assets in "Good" condition and 3.5% in "Poor" condition by deck area. Currently Idaho's NHS bridge deck area is at 21.0% in "Good" condition and 3.5% in "poor" condition, meeting or exceeding both targets.

Later chapters will discuss how ITD is managing its NHS bridge assets and the strategies it is using to maintain performance of the NHS bridges.

Figure 3-18: NHS 10-Year Bridge Performance – Percent Good By Deck Area

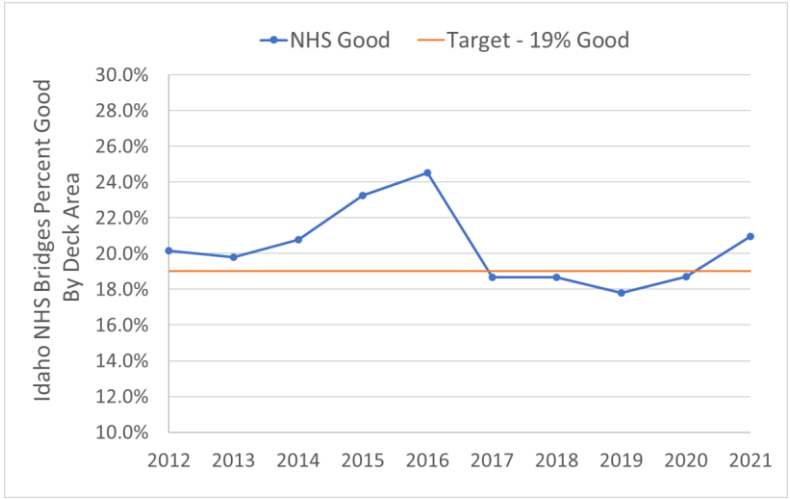
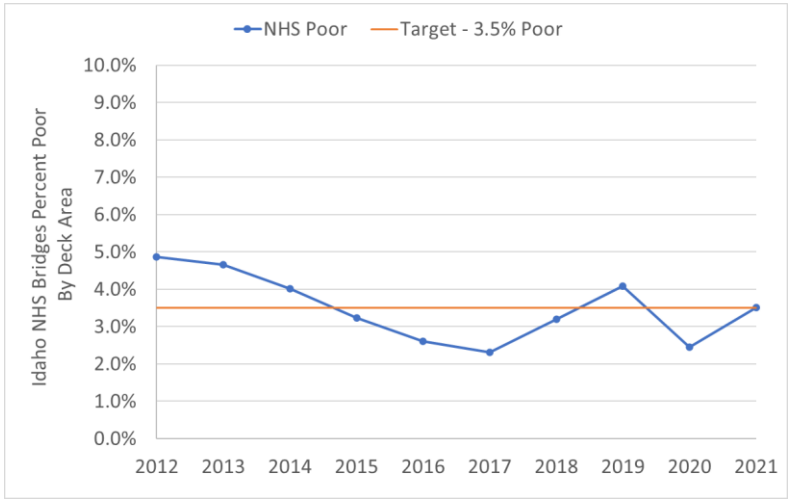


Figure 3-19: NHS 10-Year Bridge Performance – Percent Poor By Deck Area

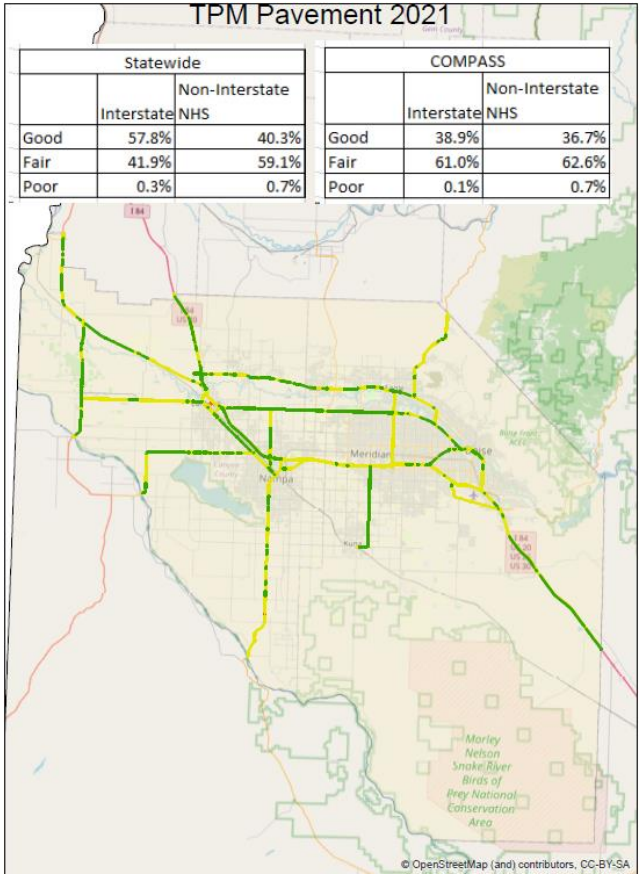


Obtaining Data from Local NHS Owners

FHWA requires that States develop processes for obtaining data on locally owned NHS pavements and bridges. ITD collects pavement condition annually on the entire NHS, including both State and Local routes. ITD also inspects all the bridges on the NHS. Therefore, ITD continues to acquire condition and performance data on the entire NHS network. ITD communicates condition information to the various jurisdictions owning NHS assets along with any project suggestions from ITD's internal models. ITD also obtains information on planned projects on NHS roads from each of the jurisdictions which are incorporated into any model runs.

Communicating the performance data is equally important to collection and analysis. To facilitate compiling, synthesizing and communication of performance data, ITD has made significant investments to incorporate geographical information systems (GIS) within the asset management framework. An example is shown in Figure 3-20 that includes data shown from a local MPO.

Figure 3-20: 2021 HPMS Pavement Conditions Based on 2020 data Local NHS Performance Reporting



Chapter 4 – Gap Analysis Process

FHWA regulations require the asset management plan to include a performance gap analysis which FHWA defines as the gaps between the current asset conditions and the targets for asset conditions. In addition, gaps could be issues in which asset conditions prevent the transportation system from operating effectively because of "Poor" conditions.

ITD currently exceeds its revised pavement performance targets and will continue its focus on Interstate and NHS pavements to maintain and achieve the desired percent "Good" target level, while not exceeding its threshold for "Poor" conditions.

ITD currently exceeds the NHS bridge conditions target for good bridges of 19% "Good", and they meet the target for poor NHS bridge deck area of 3.5% "Poor." ITD will focus preservation projects to sustain their percent good target and will rehabilitate and replace poor bridges as needed to continue to meet and exceed the percent "poor" target for NHS bridge deck area.

Photo 4-1: View of typical Secondary Road

Steps in the Gap Analysis Process

In preparation for developing and updating the Idaho Transportation Investment Program (ITIP) and for demonstrating asset management plan implementation, ITD conducts annual reviews of updated pavement and bridge condition data. ITD staff compares the results of the annual condition data with the forecasted values for bridge and pavement conditions. From these results, ITD identifies gaps between actual and forecasted conditions for both the State and Federal Performance Measures and targets.

Gap Analysis Requirements

The asset management clause in Sec. 515.7 (a) states, "A State DOT shall establish a process for conducting performance gap analysis to identify deficiencies hindering progress toward improving or preserving the NHS and achieving and sustaining the desired state of Good repair." The asset management rule describes performance gaps as "the gaps between the current asset condition and State DOT targets for asset condition, and the gaps in system performance effectiveness that are best addressed by improving the physical assets." FHWA's guidance to its divisions that will be certifying TAMPs instructs them to look for the following required elements. "The TAMP must describe a methodology, with regard to the *physical condition* of the assets, for:

- Identifying gaps affecting the State DOT targets for the condition of NHS pavements and bridges as established pursuant to 23 U.S.C. 150(d).
- Identifying deficiencies hindering progress toward achieving and sustaining the desired state of Good repair (as defined by the State DOT).
- Developing alternative strategies that will close or address the identified gaps.

The TAMP must describe a methodology for analyzing gaps in the *performance* of the NHS that affect NHS bridges and pavements regardless of their physical condition that will:

- Identify deficiencies in the effectiveness of the NHS in providing safe and efficient movement of people and Goods. (23 CFR 515.7(a)(2)
- Identify strategies to close or address the identified gaps. (23 CFR 515.7(a)(3))"

Table 4-1 and Table 4-2 show the previously discussed performance measures and targets identified in Chapter 2, along with the current conditions and gaps. These tables exhibit ITD's current gaps at the beginning of the analysis period. The gaps shaded in green are meeting the target, while those in yellow do not meet the target but represent a small gap to the target. If any significant or large gaps between condition and target were present, they would be shaded in red.

Table 4-1: State Performance Measures and Targets for Pavements and Bridges

Asset Class	Idaho Performance Measure	2 & 4 Year Targets	Current Condition	Current Gap
Pavement *	SHS Percent Good or Fair	>80%	89%	+9.0% (Target Met)
Bridge	SHS Bridge Percent Good	>80%	79%	- 1.0%

*As calculated from the ITD TAMS based on 2021 roadway data collection.

Table 4-2: Federal Performance Measures, Targets, and Gaps for NHS Pavements and Bridges

Asset Class	Federal Performance Measure	2 & 4 Year Targets	Current Condition	Current Gap
Pavement*	Interstate NHS Percent Good	35%	57.8%	+22.8% (Target Met)
	Interstate NHS Percent Poor	4%	0.3%	-3.7% (Target Met)
	Non-Interstate NHS Percent Good	20%	40.3%	20.3% (Target Met)
	Non-Interstate NHS Percent Poor	8%	0.7%	-7.3% (Target Met)
Bridge	NHS Bridge Percent Good	19.0%	21.0%	+2.0% (Target Met)
	NHS Bridge Percent Poor	3.5%	3.5%	0.0% (Target Met)

**Based on HPMS Pavement report card for 2021 data.*

As shown in Table 4-1 above, there is a small gap in the "Not Good" percentage in the SHS bridge condition. Moreover, since more than 96% of NHS bridges are a part of the SHS, there is only one process and set of strategies discussed in this chapter for analyzing and closing the performance gap on Idaho's bridges. That process and its strategies are being utilized to close the gap on all SHS bridges that ITD manages.

The ITD gap analysis for both pavements and bridges consists of the following steps:

Step 1: Identify current and forecasted gaps between conditions and targets. Gaps are identified for both state and federal measures.

Step 2: Quantify the amount of infrastructure improvements needed to close the gap(s), such as bridge deck area that needs replacing or lane miles that need rehabilitating.

Step 3: Prepare high-level financial estimate(s) to close these gaps. Financial needs are estimated by applying the average unit cost data to estimate investment level(s) that are needed for replacing, rehabilitating, repairing and preserving. Share these estimates in the Department's periodic performance management reports.

Step 4: Summarize and categorize functional class, NHS versus Non-NHS, for gaps and quantification of needs. Allocate the financial estimates from step two to these route systems.

Step 5: Develop alternative investment strategies and assess results relative to our performance targets:

- Run several iterations of bridge and pavement investment strategy scenarios using the bridge and pavement models. These iterations will be run to ensure optimal balances between asset classes are achieved.

- Analyze several investment scenarios. These scenarios could include varying levels of increasing investments in assets and tradeoffs between asset classes.
  - Additional scenarios could also be run to address specific concerns. For example, ITD would analyze the effects of increasing bridge investments if posted structures were found to be restricting freight movement on NHS connectors or other key routes.
- Review maintenance strategies to determine if any of the gaps could be alleviated through a shift in maintenance forces and resources.
- Promote adoption of new or different materials or treatments when applicable. For example, sometimes new materials emerge that are superior to conventional methods and practices.
- Review and adjust targets as appropriate. There are times it is not feasible or practical for ITD to pursue previously set targets. In such cases, alternative targets are recommended by the asset teams, if necessary, with accompanying evidence to support the change.

Step 6 Present gaps to ITD Leadership and recommend alternative strategies, targets, or investment levels to address gaps. This includes discussing the implications related to funding, tradeoffs with other asset classes, and/or their impact on system performance. Formulate a strategy with the Board to close gaps. This may require implementing strategies over multiple years to align with funding, resource, or economic constraints. At the direction of the Idaho Transportation Board, the approved strategies will be implemented to address the performance of the SHS and NHS and to close performance gaps.

Step 7: Work with District staff to prioritize needs on the NHS, SHS, and other systems. Working from route system level needs described in step three, the Department will formulate buildable projects and program those projects which improve the overall system performance the most. This step is also captured in Chapter 3 as part of the management process.

Step 8: Vet projects through the ITIP development process. Once approved, develop and build the projects.

Step 9: Work with the Idaho State Legislature to increase transportation revenue and work with other stakeholders to identify alternative sources of funding such as public-private partnerships as needed.

Coordination of Asset Management and Long-Range Planning for System Performance

ITD's 2040 Long-Range Transportation shares the same planning perspective of incorporating ITD's mission of safety and mobility by reaffirming those themes in our long-term goals:

- Commit to providing the safest transportation system possible.
- Provide a mobility-focused transportation system that drives economic opportunity.
- Become the best organization by continually developing employees and implementing innovative business practices.

ITD's 2040 Long-Range Transportation Plan incorporates the importance of asset management as part of the planning process. Planning and analysis make use of life cycle curves that account for growth by updating conditions and traffic information on a regular basis.

For non-asset management project selection of highway projects, ITD has multiple other programs that fund projects that enhance both safety and capacity of ITD's highways. The projects that are constructed from these programs contribute to physical asset management by resetting life cycle curves to new or rehabilitated conditions.

The Long Range Transportation Plan and other documents produced within ITD assess and address system performance effectiveness. The TAMP does not directly assess system performance effectiveness but includes the resulting pavement and bridge projects identified from other plans in the management system analyses. The programs addressing system performance effectiveness are described below:

- The Long-Range Transportation Plan provides a broad picture of ITD's multi modal system efforts across the asset development, maintenance, and operations spectrum.
- The ITD Statewide Freight Strategic Plan addresses the flow of goods and services on the highways system. The freight program along with the 129,000lb routes effort serves to assess the state of freight on the system as well as to improve the system via the Freight Formula Projects and a process to assess and designate 129,000lb routes.
- The Highway Safety Corridor Analysis maps show the safety needs of the state highway system. The Highways Safety Improvement Program targets data informed safety infrastructure projects consistent with the Strategic Highway Safety Plan. The Strategic Highway Safety Plan covers the "4 E's" of safety – engineering, education, enforcement, and emergency medical services.
- The GARVEE and subsequently the TECM programs provide bonding authority for identified high priority corridors for system expansion to meet system needs.
- The Travel Demand Model and TREDIS benefit cost tool are used for assessing projects proposed for the Safety and Capacity Program to ensure they support goals related to congestion, expansion, and safety.

ITD asset management staff are always collaborating across the organization including:

- Pavement and Bridge subject matter experts
- Materials and Pavement Engineers
- District construction staff and personnel
- ITD staff who develop the Highway Safety Improvement plan
- Those who issue truck size and weight permits
- MPO and ITD travel demand modelers who assess travel time across the highway network, particularly in urban areas
- Agency leadership to innovate and find ways to stretch limited transportation revenues further

Finally, ITD asset management staff coordinate externally with the MPOs through the "Three C" planning process (continuing, cooperative, comprehensive). The recent planning rule, Sec.

450.314(h), requires that States, MPOs, and operators of public transportation jointly agree upon and develop specific written provisions for cooperatively developing and sharing information related to transportation performance data, the selection and reporting of performance targets, and the collection of NHS data for the State asset management plan. As part of this joint, collaborative process, ITD requests from the regional planners and operators of transit agencies any identified gaps that impede achievement of the safe and efficient movement of goods or people on the NHS.

Completed and Ongoing Process Improvements

These specific system enhancements have been completed and implemented in the Pavement Management System (TAMS) as of 2022:

1. Revision of analysis capabilities to comply with FHWA requirement to report and forecast performance on 1/10-mile interval out to the required 10-year horizon.
2. ITD developed and incorporated a process to model and forecast the FHWA specified performance measures.
3. ITD TAMS Database was modified to better track and report out ITD targets for each asset class or asset sub-group into the LCA.

Even with current asset management systems in place and performance management well integrated into the culture of ITD, the Department continues to take steps to enhance several asset management processes. These enhancements will improve the accuracy of future asset management plans and further optimize the Department's management of its road and bridge assets. Planned enhancements include:

ITD will continue enhancing the BrM Bridge Management System. ITD has been using the AASHTO Bridge Management Software known as "BrM" for many years to house current and historical condition data for bridge assets. While condition data collection and storage are well engrained at ITD, the bridge deterioration forecasting, modeling of future conditions, and investment scenario optimization modules show continued improvements over the last couple of years. ITD has worked diligently with the software vendor to produce forecasts of bridge condition, and optimize division of spending across Bridge preservation, rehabilitation, and replacement projects. ITD is currently implementing these additional modules of BrM to complement the multi-objective optimization processes that ITD has been using for many years. The multi-objective process is discussed in Chapter 5. ITD will continue to implement the deterioration forecasting, modeling, and scenario optimization modules in BrM to enhance its bridge asset management processes.

Assess the Long-Term Needs of ITD's Largest Bridge Structures. ITD's ten (10) largest bridges by deck area have an average age of 34 years old and comprise 1,501,934 square feet of deck area. Just these 10 bridges out of the 1,839 represent 12% of all bridge deck area on the SHS. These bridges are on key routes carrying some of the highest traffic volumes in the State and often are key crossings with long and costly detours around them if one or more were closed or restricted to traffic. Several of them have current conditions in the Fair range and are expected to decline due to normal wear and tear as they continue to age. Within the next 20 years, several of them will need major rehabilitation, which will create inordinately high costs for ITD.

Photo 4-2: Bennet Bay Bridge

To plan for these costly investments, ITD developed individual Bridge Asset Management Plans for eight of their high-cost replacement bridges, and they are in the process of implementing the plans. Most of these bridges are on the NHS. Individual asset management plans developed for each bridge contain a detailed management strategy specific to that bridge. The following is a list of bridges where Bridge Asset Management Plans were created:

- Bridge Key 10035 US 2 over Moyie River (milepost 70.054). Replacement cost bridge only ~$29,000,000.
- Bridge Key 18715 US 95 over Pend Oreille River (milepost 471.729). Replacement cost bridge only ~$132,000,000.
- Bridge Key 16896 I-90 over Bennett Bay (milepost 17.650). Replacement cost bridge only ~$73,000,000 to $158,000,000.
- Bridge Key 16905/16910 I-90 EBL/WBL over Blue Cr Bay (milepost 20.280/20.281). Replacement cost bridge only ~$130,000,000.
- Bridge Key 17247 I-90 Wallace Viaduct (milepost 61.236). Replacement cost bridge only ~$105,000,000 to $116,000,000.
- Bridge Key 12815 SH21 over Mores Creek, Lucky Peak Reservoir (milepost 17.160). Replacement cost bridge only ~$35,000,000.
- Bridge Key 18365, US 95 over Whitebird Creek (milepost 223.661). Replacement cost bridge only ~$30,000,000.
- Bridge Key 17850 US 93 over Snake River, Perrine (milepost 50.039). Replacement cost bridge only ~ $108,000,000

Each bridge's asset management plan outlines the optimal schedule of bridge preservation and rehabilitation activities to extend these bridges' service lives to as far as 100 years. In addition, the plans provide strategies for the ultimate and very expensive replacement action that will eventually be needed when each of these bridges reach the end of their service lives. Nearly all the asset management plan's recommended preservation projects have been programmed in the ITIP.

These individual asset management plans help ITD manage these assets, which are larger, more complex, and costly than the typical assets in ITD's bridge inventory. The information helps ITD to analyze future funding scenarios and investment tradeoffs to ultimately pay for replacing these expensive assets. **ITD is defining processes and modifying required systems to**

forecast and report financial investments on the NHS for all five work types as well as defining basis of unit costs for work types.

Although Chapter 8 includes funding forecasts across applicable work types as defined in 23 CFR 515.5, ITD will continue to develop, document, and refine the processes employed to determine work type unit costs for NHS pavements and bridges. Specific improvements will include the following:

- ITD is continuing to define and document the five federal work types as well as the activities that are applicable to each work type (ITD work types of maintenance, preservation, repair, rehabilitation, and replacement will be mapped appropriately to federal work types of maintenance, preservation, rehabilitation and reconstruction)
- Define and document a process ITD uses to estimate maintenance and work type expenditure for NHS bridges and pavements and develop a process for determination of average annual work type costs for these facilities
- Work with executive management to refine programing categories on the STIP to refine funding categories as to eliminate confusion with work types
- Develop capability to report actual and programed NHS expenditures by work types

Chapter 5 – Life Cycle Planning Process

The federal asset management regulation says that each state must have a process for managing the life cycle of the assets included in the asset management plan.

FHWA provides several definitions relevant to how it wants states to approach Life Cycle Cost Analysis (LCCA) and Life Cycle Planning (LCP). Life Cycle Cost Analysis means the cost of managing an asset class or asset sub-group for its whole life, from initial construction to its replacement. Life Cycle Planning means a process to estimate the cost of managing an asset class, or asset sub-group over its whole life with consideration for minimizing cost while preserving or improving the condition.

FHWA wants the state to document how pavements and bridges are managed to reduce the total life cycle cost through the timely and appropriate application of maintenance, preservation, rehabilitation, and reconstruction. Life Cycle Cost terminology is defined in 23 CFR Section 515.5. Pavement and Bridge Management Systems play a key role in meeting life cycle costs by optimizing treatment selection over time.

Data and Management System Requirements

FHWA regulations require that states use their bridge and pavement management systems to analyze the condition of NHS pavements and bridges and to develop and implement the asset management plan. The regulations set six major requirements for what the management systems provide. Furthermore, FHWA regulations require that states document that they use the “best available data” when developing their asset management plans.

This section explains ITD's:

- Approach to Life Cycle Planning Process
- Use of management systems to develop and implement its life cycle analysis and asset management plan, and
- Use of the best available data to develop its asset management plan.

ITD has established processes for data collection, monitoring, and reporting for system performance across each asset class.

With respect to pavement Life Cycle Planning, the ITD PMS utilizes a slightly different classification schema, which is based on the given taxonomy shown in Figure 3-2. Specifically, ITD defines four network facility types, interstate, statewide, regional, and district. As discussed further in this chapter, ITD utilizes these classifications to prioritize treatments to the higher functional classified routes. Lower class routes are not excluded from consideration, but performance criteria are more stringent for the higher-class facilities.

Life Cycle Planning Requirements

The asset management rule states in Sec. 515.7 (b)

"A State DOT shall establish a process for conducting life-cycle planning for an asset class or asset subgroup at the network level (network to be defined by the State DOT). As a State DOT develops its life-cycle planning process, the State DOT should include future changes in demand; information on current and future environmental conditions including extreme weather events, climate change, and seismic activity; and other factors that could impact whole of life costs of assets. The State DOT may propose excluding one or more asset sub-groups from its lifecycle planning if the State DOT can demonstrate to FHWA the exclusion of the asset sub-group would have no material adverse effect on the development of sound investment strategies due to the limited number of assets in the asset sub-group, the low level of cost associated with managing the assets in that asset sub-group, or other justifiable reasons. A life-cycle planning process shall, at a minimum, include the following:

- The State DOT targets for asset condition for each asset class or asset sub-group;
- Identification of deterioration models for each asset class or asset subgroup, provided that identification of deterioration models for assets other than NHS pavements and bridges is optional;
- Potential work types across the whole life of each asset class or asset sub-group with their relative unit cost; and
- A strategy for managing each asset class or asset sub-group by minimizing its life-cycle costs, while achieving the State DOT targets for asset condition for NHS pavements and bridges under 23 U.S.C. 150(d).

Overview of Life Cycle Planning

Life Cycle Planning has been in practice for many years at ITD. For instance, construction decisions that only consider immediate costs of a project, and fail to consider long-term preservation and operations cost, do not provide the best value for an asset.

Following that rationale, consider the following example: most of the small, fixed bridges are built using concrete and not timber, even though the initial cost of a timber bridge would be a fraction of a concrete bridge cost. However, timber bridges have limited load capabilities, can wear out quickly, and require almost continuous maintenance. Compared to the life span of a concrete bridge, the timber bridge would be rebuilt several times. LCP appropriately factors in all the down time, user detour and delay costs, material cost, labor cost, replacement cost, life expectancy, etc. to help determine that the concrete bridge is a superior long-term decision. The LCP concept supports sound agency decisions.

Typically, an asset is well maintained when it is maintained at a level that minimizes long term costs and is kept in "Good" condition so that it performs at the level it is needed. Over the life of an asset, well-timed preservation activities can cut life cycle costs by as much as half when compared to a policy where no preservation is performed. In relative terms, repainting a house at the most appropriate time, but not too soon, allows maximization of the value of your previous paint job, while not resulting in exposure of wood to long-term damage. Preservation treatments in this context would include repaint, repair and repaint, replace and repaint with each having a higher long-term cost. While these simple examples illustrate the concept, these decisions are not always simple, and they need to be applied to thousands of assets with individual life cycles and sets of potential actions an owner can take to minimize cost.

Management Systems and LCP

Bridge and Pavement Management Systems are specifically designed to perform life-cycle cost analysis. Life-cycle planning (LCP) is inherently included in all analyses conducted for the TAMP and the ITD work planning process. The gap analysis process also supports LCP trade-off decisions made. The use of calibrated deterioration models and assigned condition improvements capture the life cycles of specific treatments for each asset type.

Regular recalibration of management systems ensures reasonable estimates of the benefit and duration of treatment application. Life cycles of specific treatments are evaluated during calibration efforts, including comparison with historic performance of those treatments. When combined with regular risk and resiliency reviews and planning processes, the entire life cycle cost of a given roadway, bridge, or another asset can be understood.

Additional detail is provided below as to how ITD's bridge and pavement systems capture life-cycle costs and improvements.

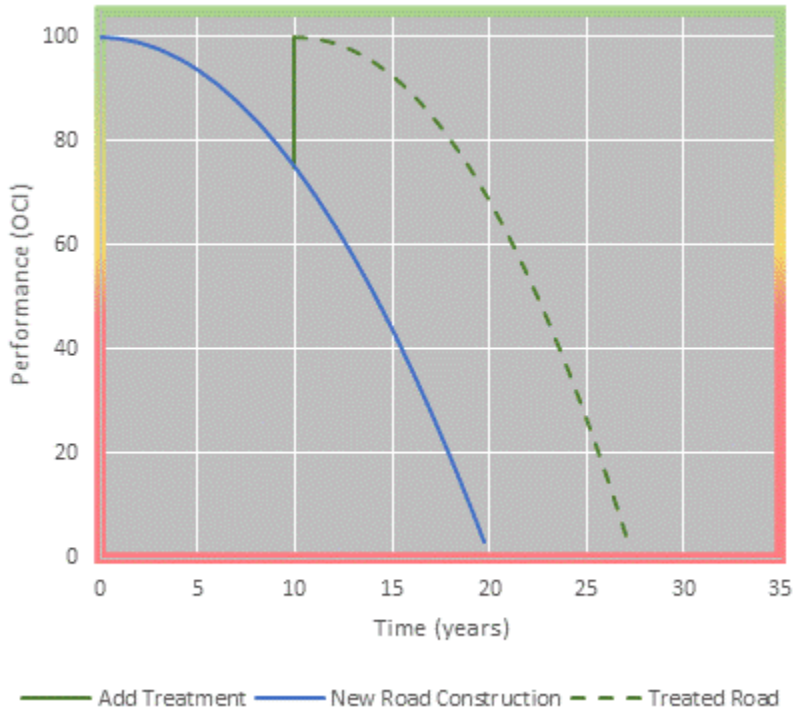
Life-Cycle Planning - Deterioration Curves

To ensure appropriate decisions, LCP endeavors to find the optimal level of treatment or preservation to minimize long-term costs. Ideally, preservation expenditures should neither be applied too frequently nor delayed too long. As indicated in Figure 5-1**,** relatively inexpensive treatments, early in the life of an asset, maintain the asset in nearly excellent condition while effectively extending the life of the initial investment significantly. Conversely, the do-nothing approach does not allow the asset to reach its expected service life effectively and has the consequence of very rapid deterioration later in the asset's life.

This figure provides a simplified depiction of the life-extending benefit of a preventive maintenance treatment. The vertical axis indicates the condition of the pavement, from 0 (Poor) to 100 (Good). The horizontal axis indicates time in years. The graph shows two downward curves, a typical pavement deterioration curve that goes downward from "Good" to "Poor" as the years pass and, above it, a life extension curve. Both curves begin within the "Good" condition segment of the axis; however, the life extension curve begins in a later year. Each curve is made of data points at intervals measured using a pavement management system.

The deterioration curve is interrupted by a life-extension action showing that a preventive maintenance treatment has been applied. A second line extends upward from the point of treatment to the life extension curve's starting point (within the "Good" area), showing that the preventive maintenance has restored the pavement's condition to "Good." The life extension curve slopes downward from this starting point, as the

Figure 5-1: Schematic LCP Deterioration Curve



pavement returns to the condition it was in before the treatment. The length of the life extension curve represents the extended service life gained through the preventive maintenance treatment. The data points on the two curves indicate that periodic measurements of pavement condition before and after the preventive maintenance makes it possible to determine the extended service life of a treatment.

A well-calibrated management system will also identify when an asset is excessively deteriorated and a more aggressive treatment such as rehabilitation or reconstruction should be considered. The tools in ITD's Pavement Management System

(PMS) and Bridge Management System (BMS) provide the capability of evaluating this trade-off. Highly deteriorated assets may be programmed into broader reconstruction and rehabilitation efforts to address particularly "Poor" condition segments.

ITD Treatment Type Definitions

All physical assets deteriorate with age and use. As assets deteriorate, applying appropriate treatments can slow or repair that deterioration. In general, treatments are categorized by their impact and cost. The treatments below are descriptions of Idaho-specific treatment concepts. Table 5-2 includes a crosswalk between ITD Treatments and Federal Work Types for pavements.

- **Maintenance treatments** generally involve repairs to specific elements or aspects of an asset. These treatments are typically used for assets that are in "Fair" to "Good" condition, but in need of specific repairs. Examples of corrective repairs include replacing a leaking expansion joint on a bridge or bump grinding on pavement. These types of treatments are not part of ITDs LCP approach.
- **Preservation and Resurfacing treatments** typically arrest minor deterioration without significantly improving condition or provide a modest improvement in condition. While these types of treatments do not provide a significant improvement in condition, they are very effective at extending the time an asset remains in "Good" or "Fair "condition. Examples of preservation maintenance treatments include bridge deck sealing, pavement crack sealing, thin pavement overlays, and chip sealing.
- **Restoration treatments** are like preservation treatments except that they are more significant. Restoration treatments seek to arrest moderate deterioration and correct defects such as rutting or concrete overlay of a bridge deck. These treatments are usually applied to assets in "Fair" condition with the intention of bringing them back into the "Good" condition realm. Due to the heavier nature of the treatment, Restoration is mapped to and reported out as Federal work type "Rehabilitation" in Chapter 8.
- **Rehabilitation** is required for assets which have a potential for significant remaining service but require substantial repair or have major components in need of substantial repair. These treatments are usually applied to assets in low "Fair" or "Poor" condition with the intention of bringing them back to "Good" condition. Examples of rehabilitation treatments include bridge deck replacement and thicker pavement milling and inlay.
- **Replacement or reconstruction** involves removing and rebuilding an asset when it has reached the end of its service life and can no longer be extended though repair or rehabilitation. This resets the asset's service life.
  - Where applicable, risk mitigation actions are added to reconstruction projects. For instance, if the pavement section in question is at risk of flooding or washout due to extreme rainfall events, raising the road or improving drainage would be considered as part of the reconstruction project. This would increase the road section's resilience to similar events.

Pavements

Life Cycle Planning Process

ITD's PMS conforms to the requirements identified in the federal asset management rule. The description in this section explains that ITD uses:

- A PMS for LCP
- The best data available for Life Cycle Analysis
- The PMS to develop and implement its pavement asset management plan including developing annual and future work programs

Pavement Management System

ITD's comprehensive Pavement Management System can conduct budget-based and unconstrained analyses. Results from work plans or prior analyses may be included, capturing planned work that impacts projects.

By definition, a PMS optimizing for benefit is conducting a life cycle analysis as it incorporates the performance and cost of all pavement sections across the state. In addition, based on results from Pavement and Bridge analysis, additional iterative analyses with varying funding scenarios can be conducted in each system to determine optimal spending patterns.

ITD currently employs a system from AgileAssets designated TAMS. This system incorporates a PMS and a Maintenance Management System (MMS) to work in tandem as part of the Department's long-term vision for asset management. This software contains a robust database that houses several kinds of data, such as bridge condition surveys, maintenance activities, pavement condition ratings, traffic data, friction data and several others.

ITD continues to refine models and decision trees used in the PMS through data analysis and validation. In addition, data collection and data management has evolved since the original implementation. The agency has retained engineering support resulting in updates and validation of this data. Field reviews of pavement conditions are carried out to provide additional insight into the deterioration trends of the state's pavements. Finally, performance measures and overall business rule changes are regularly evaluated and implemented to make required updates to PMS.

Photo 5-1: View of City of Eagle, ID

The PMS allows ITD to refine the way it invests in and maintains pavement by:

- Implementing and reviewing pavement performance curves calibrated by ITD engineers and consultants.
- Implementing decision trees that optimize and mimic ITD District engineering choices.
- Creating and using performance models that accurately track and display pavement projects.
- Employing an analysis engine that uses integer optimization to maximize benefit for project recommendations generated by the software.
- Reviewing the performance of individual pavement sections to look at overall cost over the life of a pavement section and type.
- Including non-pavement specific safety and capacity ITIP projects in pavement analysis to assess the impact of those projects on the network.

These components directly address and satisfy FHWA's requirements for the functionality of pavement management systems.

All users of the PMS have access to the full suite of available data. The system gives the District pavement designers and engineers an extensive toolbox at their disposal. It also gives the Pavement Asset Management engineer an equitable method to evaluate and distribute funding throughout the state based on predicted and modeled need. The system suggests optimized pavement project choices based on budget constraints, which the engineers balance against needs and their expert knowledge of the system.

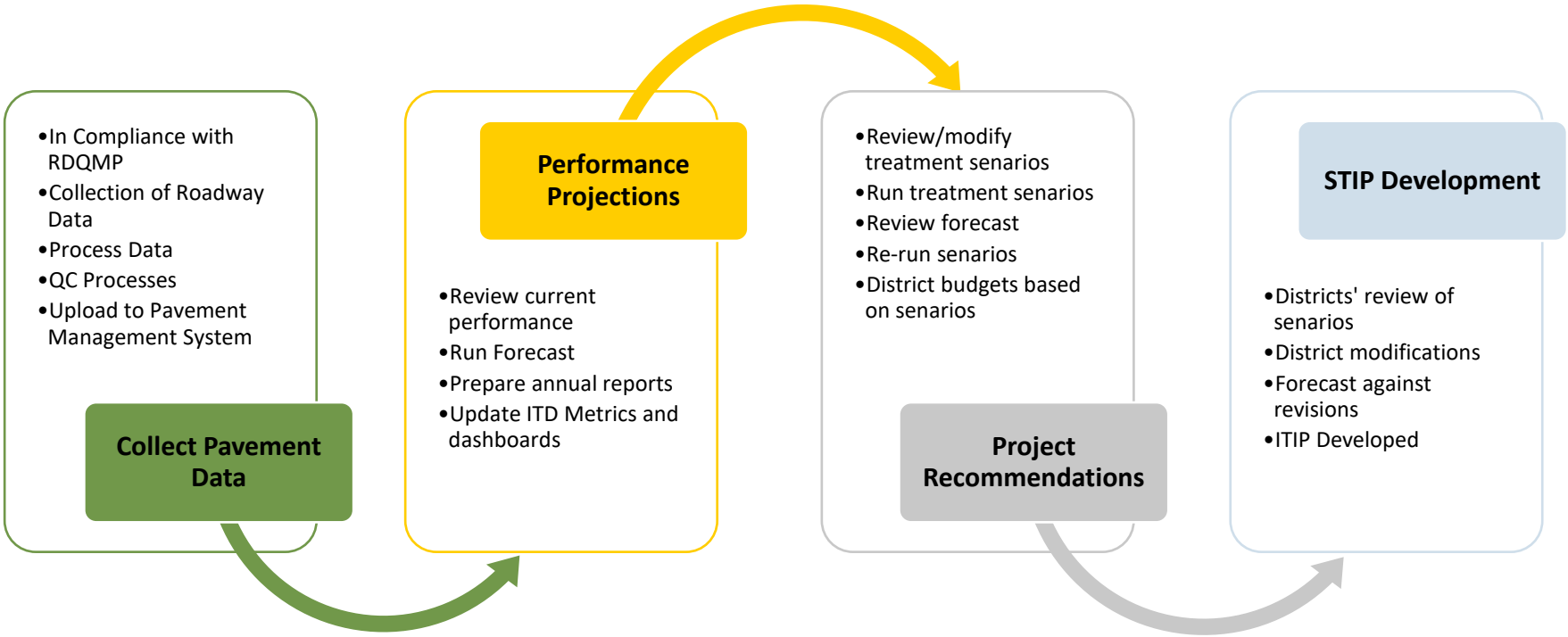
One of the most important aspects of ITD's PMS is the comprehensive analysis of the various pavement condition indexes, their use as triggers, and identifying timely preservation or rehabilitation treatments that enhance and maximize potential life cycle cost benefits. The PMS software is used to analyze this data to determine a recommended treatment for each segment of roadway based on unlimited funds, essentially defining the base need. Recommended treatments have a fixed life, because the pavement continues to deteriorate, so the next step is to generate recommended treatments for a given time period based on a defined budget.

Full details on the models, decision trees and general operations of the PMS can be found in ITD's Pavement Management System Configuration guide. Short descriptions of key components are highlighted in the sections below.

To ensure that the treatments recommended are in line with the Department's objectives and goals, the PMS was calibrated and configured. In 2015, ITD developed a PMS Configuration Document that details the means and methods that were used to configure the PMS. That manual continues to be updated on an as needed basis.

Figure 5-2 is a high level overview of how roadway performance data is aquired, utilized, and reviewed in concert with the development of the State Transportation Investment Program (STIP). The PMS is aligned with, supports and facilitates each step of the pavement lifecycle data flow. Central to the is process is a review of the existing system performance and forecasting future performance based on the project decision made today. The sections below detail the inputs and information required to facilitate analysis and work program development.

Figure 5-2: Pavement Lifecycle Process



Pavement Condition Data

Idaho collects pavement data annually using a calibrated Pathway data collection van, Pavement Friction Tester (PFT), and Falling Weight Deflectometer. The van covers the entire paved SHS network along with any NHS roads not on the SHS collecting thousands of miles of video images, cracking data, rutting data, and roughness data. The video images from the forward-facing cameras as well as the pavement surface are available to anyone using a windows-based computer online at: http://pathweb.pathwayservices.com/idaho/

In addition to pavement type, the distresses in Table 5-1 are collected and stored in the PMS. International Roughness Index (IRI) is captured and stored in inches/mile per FHWA *Highway Performance Monitoring System* (*HPMS) Field Manual* latest revision.

Table 5-1: Pavement Condition Distresses

Flexible	Rigid
• Fatigue Cracking	• Slab Cracking
• Edge Cracking	• Joint Seal Damage
• Transverse Cracking	• Joint Spalling
• Raveling	• Faulting
• Block Cracking	• Map cracking
• Patch Deterioration	• Studded tire wear
• Rutting	

For all pavement types, the rules for defining the distresses, severity and extent ranges are determined by ITD for field data collection. For each survey section, distress and extent measurements are collected for three levels of severity: Low, Medium, and High. The extent range is continuous from zero to 100 percent. ITD makes use of distresses as defined per the Federal Highway Administration Publication No. FHWA-RD-03-031 *Distress Identification Manual for the Long-Term Pavement Performance Program*, June 2003, or the latest revision.

ITD distress data collection processing takes advantage of the automated data collection capabilities of the Pathways van currently owned and operated by ITD. With this detailed data collection approach, the calculation of Individual Distress Indices allows the PMS to be configured to combine those distresses and calculate the most accurate OCI. The ITD PMS Configuration Document contains detailed explanations of how existing conditions are measured and OCI is computed. The OCI is used to define the general health of the pavement section by combining the distress indices into a calculated value. It is also used for defining Benefit in the Optimization Analysis. The OCI is a calculated score based on detailed data and is a significant divergence from the historic method for assigning Cracking Index subjectively to a pavement. It represents a defensible overall estimate of pavement health.

ITD also calculates the Federal 0.1-mile measure condition state for sections using the criteria defined in the HPMS Field Manual such as cracking, IRI, rutting and faulting.

The following sections detail the performance criteria utilized within the ITD PMS based on the data ITD collects annually. Models have been developed and updated for each of these criteria. Full details can be found in the ITD PMS Configuration Document.

Overall Condition Index (OCI)

The standard that ITD uses for assessing pavement conditions is the Overall Condition Index (OCI). It is a general health indicator of the network measured on a 0 to 100 scale, where 100 is perfect condition. ITD considers the OCI to be a defensible, quantifiable measurement that can be used to give an accurate account of the current and future condition of the network based on the various funding scenarios that will be analyzed in PMS.

Federal Performance Measures for Life Cycle Planning

In addition to the OCI and backlog of funding needs, ITD produces analyses in its life cycle process and for its asset management implementation of federal pavement performance measures, including:

- IRI
- Rutting
- Cracking
- Faulting

Performance Models

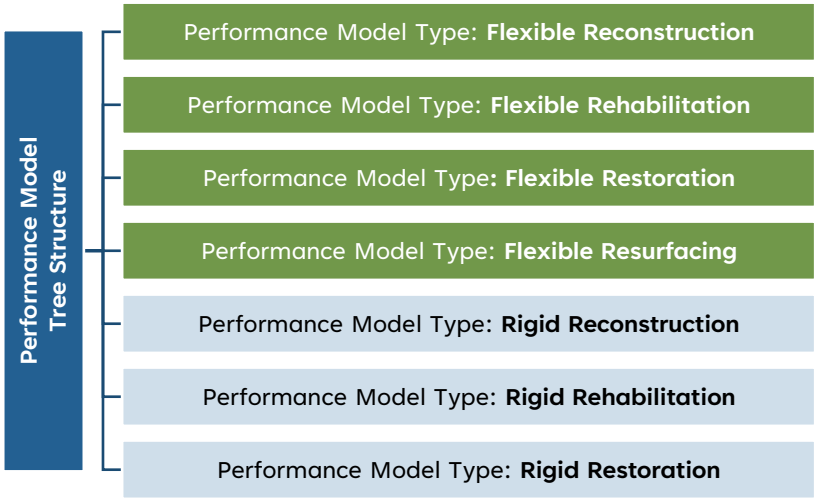
Performance Models in the PMS are used to predict pavement performance into the future in an Optimization Analysis. Performance models are based on historical performance when sufficient data is available and expert recommendations and experience in cases where datasets are small.

Pavement Performance Model Tree Structure

The Performance Model Trees in TAMS use a tree node structure to group similarly performing roads into model groups based on defined sets of attributes. The Performance Model Tree takes each Performance Model Type Category, defined by the Pavement Type and Repair Category, and assigns the correct Performance Model to each node.

In addition, Preservation treatments deteriorate under specific rules. The life expectancy of these treatments was provided by ITD staff as typical representations of field performance. Figure 5-3 identifies the key high-level model points for the various Repair Categories. The final Piecewise Linear Models are shared across the Structural Distress, Non-Structural Distress, and OCI Indices for the Repair Categories.

Figure 5-3: High Level Performance Model Tree



Examples of Flexible Pavement model can be found in Figure 5-4 while Figure 5-5 highlights examples of Rigid Pavement models.

Figure 5-4: Flexible Pavement Performance Models – All Indices

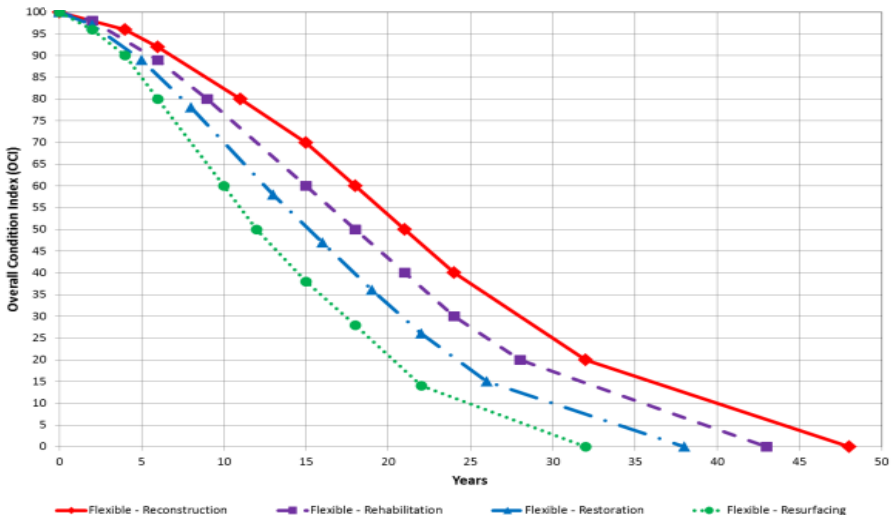
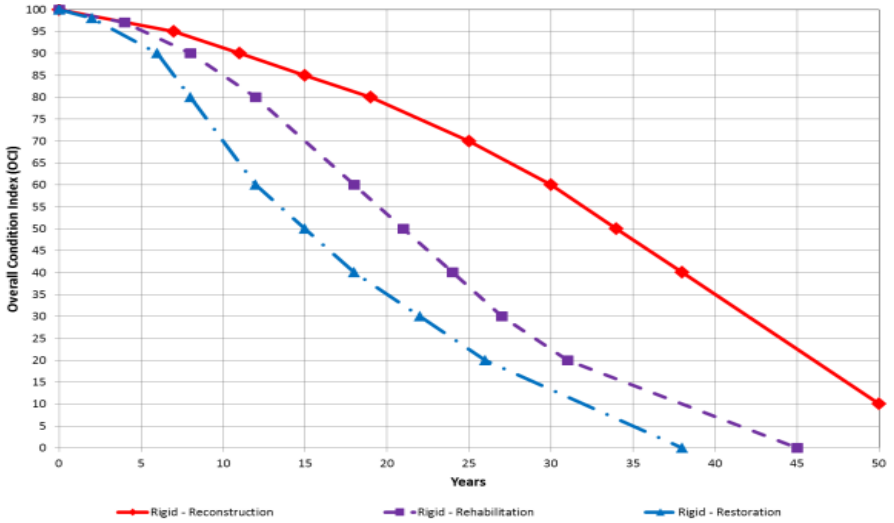


Figure 5-5: Rigid Pavement Performance Model – All Indices



Work Programming

As noted above, the combination of Pavement Condition Data, Models and Decision Trees are used to develop analyses and recommend treatments then used for ITIP and STIP programming by the ITD Districts.

Treatments and Repair Categories

Treatments are the specific names defining the material and work that was applied at a location. These are typically found in Construction History and Master Work Plan data. However, Repair Categories are generally defined to represent Treatments of similar attributes for Optimization Analysis output. There is a relationship that exists in the PMS between Treatments, Work Codes, Pavement Type, and Performance Model Type. Performance Model Type is the performance class variable that identifies which models will be assigned when a treatment is applied. Table 5-2 breaks out the ITD Repair Categories vs similar FHWA Categories for treatments.

Table 5-2: Pavement Treatment Repair Categories and Work Type Mapping

ITD Treatment Category	Description	FHWA Work Type
Do Nothing	No Maintenance Required	
Preservation	Surface Coats, Patches Grooving, Grinding and Sealing	Preservation
Resurfacing	Plant Mix Treatments (<0.15')	Preservation
Restoration	Plant Mix Treatments (>= 0.15') Grind, Joint Seal, Slab Replacement	Rehabilitation
Rehabilitation	Recycling or Reclamation with Plant Mix Overlay, Crack, Seat, and Overlay	Rehabilitation
Reconstruction	Remove and Replace	Reconstruction

Pavement Treatment Unit Costs

Pavement treatment unit cost determination is critical to the accuracy with which the PMS can forecast future needs. forecasted (preservation, reconstruction, rehabilitation, resurfacing) and type of pavement (rigid or flexible). Table 5-3 reports the current unit cost incorporated into the PMS. Costs are defined based on the treatment types. These unit costs are reported both for ITD Treatments and Federal Work Types.

Unit costs are derived using actual costs from analogous construction and paving activities carried out by ITD. To develop analogous estimates, current project construction costs and quantities are reviewed by the asset management section as provided by the Construction Cost Management section. ITD intends to further update the unit cost development process using standard typical sections for easier cost updating.

Table 5-4 provides a summary of the inputs and treatment options highlighted in the sections above. This summarizes the variables and inputs used in the analysis process for the PMS.

Table 5-3: ITD Treatment and Federal Work Type Unit Costs

ITD Treatment	Average SY Cost	Estimated Cost Per Lane Mile	Federal Work Type
Maintenance - Flexible	Variable	Variable	Maintenance - Flexible
Maintenance - Rigid	Variable	Variable	Maintenance - Rigid
Preservation - Flexible	$6.40	$45,056	Preservation - Flexible
Preservation - Rigid	$87.76	$617,830	Preservation - Rigid
Resurfacing - Flexible	$14.66	$103,206	Preservation - Flexible
Rehabilitation - Flexible	$66.32	$466,893	Rehabilitation - Flexible
Rehabilitation - Rigid	$102.27	$719,981	Rehabilitation - Rigid
Restoration - Flexible	$95.10	$669,504	Rehabilitation - Flexible
Restoration - Rigid	$294.54	$2,073,562	Rehabilitation - Rigid
Reconstruction - Flexible	$325.93	$2,294,547	Reconstruction - Flexible
Reconstruction - Rigid	$389.54	$2,742,362	Reconstruction - Rigid

Table 5-4: Treatment Hierarchy by Distresses

Pavement Types:	
Flexible:	**Rigid:**
Distress Indices:	
• Overall Condition Index • Non-Structural Distress Index • Structural Distress Index	• Overall Condition Index • Slab Index • Joint Index
Distress Types:	
• Fatigue Cracking • Edge Cracking • Patch Deterioration • Transverse Cracking • Block Cracking • Raveling	• Slab Cracking • Map Cracking • Joint Seal Damage • Joint Spalling • Faulting
Treatments:	
Flexible:	**Rigid:**
• Do Nothing or No Maintenance Required • Preservation: Surface Coats, Patches • Resurfacing: Plant Mix Treatments (<0.15') • Restoration: Plant Mix Treatments (>= 0.15') • Rehabilitation: Recycling or Reclamation with Plant Mix Overlay • Reconstruction: Remove and Replace	• Do Nothing or No Maintenance Required • Preservation: Grooving, Grinding and Sealing • Resurfacing is not applicable to rigid pavements • Restoration: Grind, Joint Seal, Slab Replacement • Rehabilitation: Crack, Seat, and Overlay • Reconstruction: Remove and Replace

STIP Development

ITD's pavement management system is integral to the agency's pavement planning and programming. The PMS is used to estimate investment levels and investment types for each district both at the network and at the project level. Districts are given funding allocations and treatment allocations based on the model's recommendations. Analysis outputs are based on and constrained by anticipated funding levels.

Districts must balance those recommendations with engineering judgment of local conditions. Districts then develop a project-level set of projects for their district programs. Those projects are then modeled to determine if the projects selected will allow ITD to achieve its pavement condition targets. This occurs prior to final programming in the STIP.

It is important to note that previously approved work programs (STIP and ITIP) are included in the PMS modeling scenarios to account for the work already planned and its impact on the forward-looking analysis efforts. All analyses conducted for the TAMP update incorporated approved work program sections for a seven-year period.

Photo 5-2: View of an ITD Division 1 Highway

Bridges

Life Cycle Planning Process

AASHTOWare BrM includes a bridge level Life Cycle Cost Analysis (LCCA) capability that assists ITD in creating life cycle plans for each bridge to assist ITD in its selection of projects for inclusion in ITD's ITIP. The LCCA capability allows ITD to include individual bridge profiles to be used as part of a network analysis in terms of a refined lifecycle cost (LCC) for any number of given bridges. BrM uses a recursive algorithm to optimize the solution with the highest cost benefit ratio in relation to the bridge's life.

Bridge Management System

ITD uses the Bridge Management System (BrM) which is developed by the American Association of State Highway and Transportation Officials (AASHTO). ITD uses BrM to store inventory data, condition data, and inspectors' recommended work candidates, and as a tool to program projects in the ITIP.

AASHTOWare BrM is a comprehensive system developed as a tool to assist in the challenging task of bridge management. BrM stores bridge inventory and inspection/condition data; applies network-wide preservation and improvement policies for use in evaluating the needs of each bridge in a network; and makes recommendations for what projects to include in the ITIP for deriving the maximum benefit from limited funds.

BrM supports the entire bridge management cycle, allowing user input at every stage of the process. The system stores bridge inventories and records condition data. Once condition data has been entered, BrM can be used for maintenance tracking and federal reporting. BrM produces prioritized recommendations for bridge projects that maximize performance contingent upon budgetary constraints. It also integrates the objectives of public safety and risk reduction, user convenience, and preservation of investment to help ITD produce budgetary, maintenance, and program strategies. Additionally, it provides a systematic procedure for the allocation of resources to the preservation and improvement of the bridges in a network. BrM accomplishes this by considering both the costs and benefits of maintenance actions versus investment in improvements or replacements.

Photo 5-3: Rainbow Bridge on SH55, ITD District 3

AASHTOWare BrM is configured to meet ITD's specific needs, policies, and practices to improve the performance and resiliency of Idaho's bridges. It enables ITD to meet regulatory requirements, internal goals, and strategic objectives.

ITD and AASHTOWare BrM utilize a multi-objective decision-making process to compare and provide weight to competing bridge needs. Table 5-5 shows examples of the multi-objective variables configured into BrM.

Table 5-5: Multi-Objective Variables

Bridge Parameter	Consideration
Bridge Age	Consider replacement if greater than 50 years old
Overload Permit Capacity and Annual Trip Routing	Consider replacing bridges on routes that restrict commercial truck traffic
Bridge Condition	Consider replacement of bridges with NBI ratings of 5 or less
Scour Critical Rating	Consider replacing bridge or installation of scour countermeasures
Weight Posted Bridges	Consider replacing bridges with legal weight restrictions
Seismic Vulnerability	Consider replacement or retrofit of bridges in high seismic areas
Overhead Clearance	Consider replacement if overhead clearance is less than 16’
Bridge Width	Consider replacement if width is functionally obsolete
Review Element Condition States	Consider replacement if large percentages are in Condition State 3 or 4
Design Vehicle	Consider replacement if design vehicle less than HS-20
Route and ADT	Consider higher replacement priority for bridges on the Interstates and high ADT routes
Life Cycle Cost Analysis	Consider replacement where rehabilitation costs exceed 50% of new bridge cost
Benefit/Cost Ratio	Consider replacement based on higher B/C ratio from BrM
Project Budget	Consider project budget size for best fit for Bridge funding
Bridge Performance Measure	Consider projects that move bridge condition measure upward

ITD Bridge Deterioration Model and Multi-Criteria Optimization Process

While ITD's Bridge Condition Performance measure is primarily driven by bridge condition, other functional aspects of bridges are considered through the multi-objective optimization process. When bridges are replaced in the Bridge Restoration program, they are modernized to appropriate design standards and consider other modes of traffic such as accommodation for pedestrian, bicyclist, buses and other future transit compatibility as appropriate.

Deterioration Forecasting and Prioritization

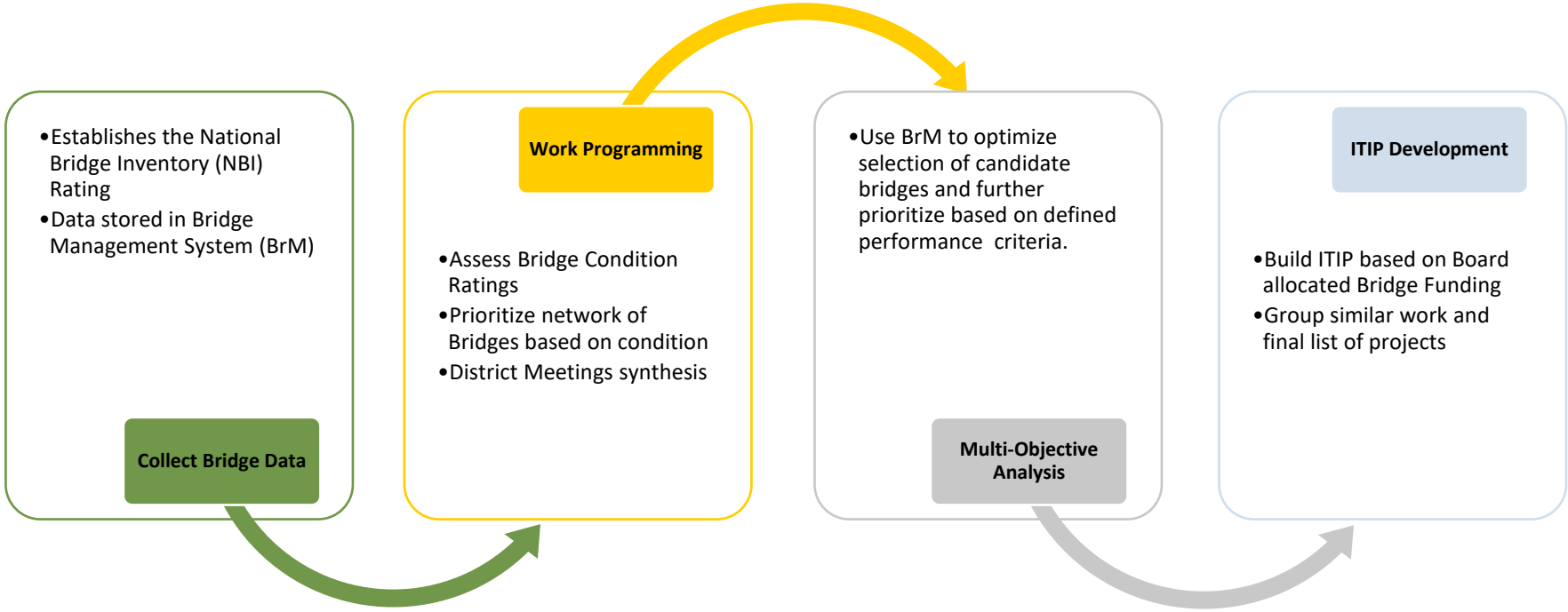
BrM uses algorithms, decision trees, utility profiles and deterioration rates that are built into the BrM software with customization by ITD. Decision trees, and to some extent algorithms, have been customized by Bridge staff to align with the business practices and policies of ITD. Deterioration rate curves have been derived from analysis of years of historical ITD bridge data.

All information fed into BrM is used to model future conditions on bridges. BrM makes predictions about future bridge performance levels based on several funding scenarios. High, medium and low funding scenarios are run. Medium is considered maintaining current funding levels. High and low levels represent an increase and a decrease in funding levels respectively. All this information is reviewed by Bridge staff to ascertain optimal investment levels for the time period.

Using the information from BrM condition data, output from BrM planning modules, and ITD's in-house Bridge Deterioration Models, subject matter experts draft a list of best value investments for the SHS bridges. These investments are developed or scoped at a planning level into projects and grouped into similar work programs of restoration and preservation work. This information is reviewed jointly by ITD staff in the central office and in district offices. As buildable projects emerge, staff from the central office and district offices collaboratively develop the final list of projects for the Bridge Restoration and Bridge Preservation programs. Some consideration is given to reasonably balance programs across the state.

The final work programs for Bridge Preservation and Bridge Restoration are established with consideration to yearly funding levels set by the ITD Board. Increased funding over the past few years has enabled ITD to invest in improving an increasing amount (when compared to historical levels) of bridge deck area from "Not-Good" to "Good" condition or to a State of Good Repair. The amount of improving deck area has been greater than the amount of deck area that is declining. This shift from deficient bridges to a State of Good Repair is the basis for a positive trend in ITD's SHS Bridge performance measure as well as the Federal Bridge Performance Measure for the NHS. Figure 5-6 is a high-level schematic overview of how bridge performance data is acquired, utilized, and reviewed in concert with the development of the Idaho Transportation Investment Program (ITIP). ITD's Bridge Management System (BrM) is used at multiple points of this process.

Figure 5-6: Bridge Lifecycle Data Flow



It is important to note that the bridge programs that ITD uses to address bridge deficiencies are project oriented and include all project costs such as approach roadway work and other ancillary highway work such as traffic control, drainage, and/or lighting. For example, Interstate System Interchange projects that include bridges can be, and are, programmed in the Bridge Restoration Program at times. Funding on these larger and complex projects to address bridge deficiencies may be less than one-half the total project cost.

Bridge Life Cycle Strategy

ITD's goal in using Bridge Preservation and Restoration programs and a life cycle planning process is to maximize a bridge's utility while simultaneously minimizing costs (investments) over the bridge's service life, usually 75 plus years. See Table 5-6 below for lifecycle planning objectives and strategies employed by ITD. Typically, after initial construction of a bridge and its subsequent opening to the public, cyclic maintenance is programmed for the bridge to maintain it in "Good" condition. Protective deck overlays, joint replacements, and painting are examples of cyclic maintenance. Sometimes as the bridge ages, more extensive bridge rehabilitation or repairs are necessary such as deck overlay or complete deck replacement.

These strategies show that ITD is moving toward managing bridges with the lowest lifecycle cost, although financial constraints and other uncertainties such as increasing heavy truck loads, increasing use of deicing chemicals, changes in the construction market, unexpected extreme events, and other factors make finding the overall lowest life cycle cost across all bridges on the SHS a constantly moving target. Due to the constantly changing bridge conditions ITD maintains real time data in AASHTOWare BrM and does scenario modeling annually for the ITIP.

Table 5-6: Bridge Preservation Lifecycle Planning Objectives and Strategies

Objectives	Strategies
Extend the Service Life of our Bridges and keep "Good" condition bridges in "Good" condition	Move away from bare deck strategy. Provide deck protective systems, program cyclic maintenance and bridge preservation projects
Life cycle cost analysis	Optimize repair strategies and materials using life cycle cost analysis
High priority repair projects	Program and designate high priority projects for unique repairs
Maximize bridge budget by bundling candidate bridges and repair treatments into efficient contracts	Group like preservation treatments for multiple bridges for economy of scale
Evaluate painting or protective coating needs on a cyclic basis	Forecast potential needs in advance for inclusion into projects

Environmental Conditions & Risk Considerations

The State of Idaho has a broad range of climate regions in which bridges are located. From dry, semi-arid desert regions in the south, to mountainous regions throughout much of the state where heavy snowfall and winter conditions are common, to wet-riverine environments in the valleys where occasional flooding and debris flow occurs during wetter years. This diversity influences bridge service life and performance. ITD considers climatic factors and their deterioration severity through use of service environments in its BrM deterioration modeling. Service environments consider exposure to things such as freeze/thaw cycles, deicing salt exposure, or debris impact and scour on bridge elements. These service environments help ITD to consider the deterioration of a bridge due to environmental factors and prioritize actions based on life cycle cost analysis and best change in utility.

Investing in Preservation vs Restoration Work

ITD has funding dedicated to Bridge Preservation and to Bridge Restoration programs. These dedicated funding programs are integral to ITD's focus on improving performance of bridges. Preservation and restoration, together, have allowed ITD to shift away from a worst first approach to best value work programming. To achieve this shift, ITD staff analyzed the outcome of bridge conditions that would result from several different funding splits between bridge preservation and restoration.

In the analysis, bridge conditions were related to age. Costs for preservation and restoration projects were expressed in terms of bridge deck area. As mentioned, several budget levels were investigated. Greater or lesser budgets delivered preservation and restoration at greater or lesser aggregate quantity of bridge deck area. The analysis showed that funding directed to a mix of preservation and restoration projects would lead to better conditions across all SHS bridges. The result of the study set ITD's current strategy for managing SHS bridges and culverts. ITD's management strategy directs approximately 20% of funding to Bridge Preservation and 80% of funding to Bridge Restoration. With 79% of bridges in a State of Good Repair and a target to be at 80% in a State of Good Repair, this 80/20 balance between restoration and preservation is optimal. As bridge conditions improve, as they are forecasted to do, ITD will reevaluate this balance and determine if there is more optimal balance in how funds are split between restoration and preservation when the performance targets are achieved, and the gaps are closed.

As mentioned, ITD currently directs approximately 20% of its bridge funding to preservation and 80% to restoration. Investing in bridge preservation keeps our "Good" bridges in "Good" condition and flattens the rate of bridge deterioration that normally occurs over time. Companioned with this is an 80% funding allocation to restoration work. This work takes bridges in "Poor" condition and returns them to "Good" condition. Most of the time this is through replacement of "Poor," obsolete, and restricted bridges with new bridges in excellent condition capable of carrying modern heavy vehicle loads. Some bridges are restored through rehabilitation work. Such as a bridge with a deck in "Poor" condition and girders in "Fair-to-Good" condition. The optimal investment type for this bridge may be to replace the deck only and do spot repairs on the girders and foundation.

The current 80/20 split is sustainable with given funding. This split shows ITD will meet its performance target and close the current performance gap in about one year. When the performance target is achieved, investing a larger percentage of bridge funds in preservation may be optimal in the future. However, for the current conditions, as ITD strives to reach our bridge performance target, with given funding levels, the 80/20 split in bridge funding is appropriate.

Work Programming

ITD bridge work programming is organized and funded as Routine Maintenance, Preservation and Restoration. Routine Maintenance is done by ITD district maintenance crews, and Restoration and Preservation projects are done by contract.

Treatments, Unit Cost, and Repair Categories

Within the Restoration Program and Preservation Program, bridge treatments define the work/projects that are done to a bridge. These are shown in Table 5-7. Estimated unit cost and work descriptions are shown for the most common treatments performed in each ITD work category.

Table 5-7: Bridge Treatment Categories and FHWA Work Type Mapping and Unit Costs

ITD Treatment Category	Estimated Unit Cost ($/SFT Deck Area)	Description	FHWA Work Type
Do Nothing		No Maintenance Required	
Routine Maintenance		Bridge washing, snow removal, brush cutting	**Maintenance**
Preservation	$15	Concrete Patches Structural Steel Painting, Concrete Sealing, Thin Overlays	**Preservation**
Preservation	$50	Rigid Overlays	**Preservation**
Restoration	$170	Major substructure and superstructure repair, deck replacement, superstructure replacement	**Rehabilitation**
Restoration	$375	Structure Replacement	**Reconstruction**

Project selection for the Bridge Preservation Program centers on keeping our bridges that are in "Good" or "Fair" condition in "Good" or "Fair" Condition. Project selection has a focus on cyclic maintenance and preserving current conditions. Candidate selection emphasizes similarity of preservation treatments amongst groupings of bridges in an area while applying the right treatment at the right time for optimal cost effectiveness.

Cyclic maintenance in Bridge Preservation projects involve activities performed roughly at predetermined intervals to maintain current conditions on bridges. Following these intervals and implementing these activities will delay deterioration. ITD strives to implement deck protective systems within one to three years after original construction is complete, and then do periodic cyclic maintenance as determined by BrM and expert judgement. Depending on a bridge's condition and the type of treatment chosen, ITD expects to reapply the treatment on a 10 to 30-year cycle.

Preservation Strategy Example

Table 5-8 shows a rehabilitation strategy comprised of rehabilitation and replacement actions, producing a net present value of $833 per square foot of deck area. Table 5-9 shows a preservation strategy adding deck protection using thin overlays to extend deck life resulting in a net present value of $596 per square foot of deck area. While the ITD preservation strategy requires more treatments to be undertaken thoughout the life cycle of the structure, the costs are much lower than doing nothing for many years and then implementing fewer but much more costly treatments to maintain a bridge. This is illustrated in Figure 5-7. It can be seen that the cumulative net present value of the preservation strategy saves $237 per square foot of deck over the life of the structure as compared to the rehabilitation strategy.

Table 5-8: Rehabilitation Strategy Life Cycle Planning Costs

Rehabilitation Strategy		
Year	**Activity**	**Cost (ft^2)**
0	New Construction	$375
20	Deck Rehabilitation	$50
	Joint Replacement	$4
40	Deck Replacement	$175
60	Deck Rehabilitation (Hydro & Silica Fume Overlay)	$50
	Joint Replacement	$4
80	Deck Replacement	$175
100	Replace Bridge	
Net Present Value		**$833**

Table 5-9: Preservation Strategy Life Cycle Planning Costs

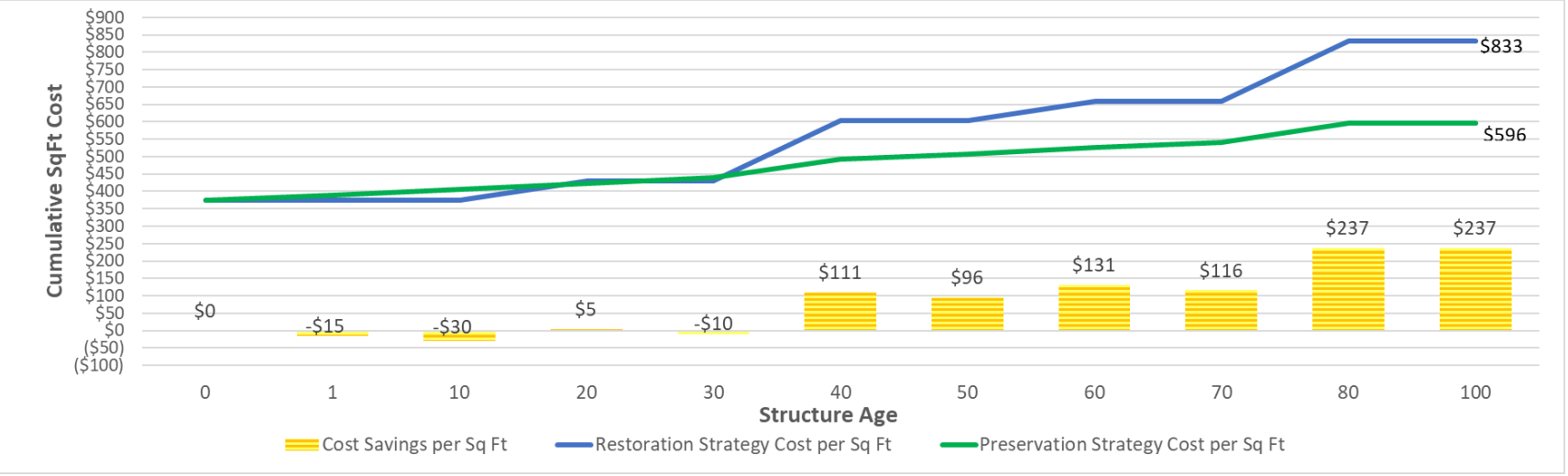
Preservation Strategy		
Year	**Activity**	**Cost (ft2)**
0	New Construction	$375
1	Thin Overlay	$15
10	Thin Overlay	$15
20	Thin Overlay	$15
	Joint Replacement	$4
30	Thin Overlay	$15
40	Deck Rehabilitation (Hydro & Silica Fume Overlay)	$50
	Joint Replacement	$4
50	Thin Overlay	$15
60	Thin Overlay	$15
	Joint Replacement	$4
70	Thin Overlay	$15
80	Deck Rehabilitation	$50
	Joint Replacement	$4
100	Replace Bridge	
Net Present Value		**$596**

Cyclic Bridge Preservation

Another example of ITD's life cycle planning approach is how we determine the right action or investment at the right time. Typically, when a new bridge is constructed a protective bridge deck overlay will be installed within approximately one to three years after it is opened to traffic. The selection of the type of protective overlay is dependent on route, ADT and cost. For lower ADT routes, many times a protective overlay applied on a cyclic schedule can prove to have a high-cost benefit ratio. On the other hand, for high traffic routes like the Interstates a more costly but longer lasting more durable protective overlay proves to be more cost effective over the life of the bridge considering the high traffic these bridges tend to carry, the high cost to control traffic during installation, the associated safety concerns on these high speed bridges, the high traffic volumes on these routes and the impact or user costs to the public if these were bridges under more frequent construction installing cheaper, less durable treatments.

Further, ITD's life cycle cost analysis takes into consideration other typical maintenance activities such as joint or bearing work and application of other protective coatings. The initial costs of these activities and the estimated life of these activities are considered. The objective is to time these other activities with the next cyclic application or bridge preservation activity takes place to realize savings in administering construction contracts and contractor costs mobilizing to a bridge site to do work.

Figure 5-7: Comparison of Rehabilitation vs Preservation Cumulative Lifecycle Costs



Bridge Restoration and Rehabilitation

Project selection for the Bridge Restoration Program centers on taking bridges that are in Poor condition and returning them to Good Condition. Project selection is primarily condition based, with additional emphasis on age, restrictions on freight or truck traffic, susceptibility to extreme events e.g., earthquake or flood. Consistent with the multi-criteria optimization process described earlier, other factors can also influence project selection such as route importance, traffic volume, and width/lane restrictions.

Photo 5-4: Example of Poor Condition Bridge Deck

Currently 80% of ITD's bridge funding is devoted to this program. As described in Chapter 3, ITD has undertaken a multi-year initiative to increase the percentage of bridge deck area in "Good" condition to 80% on the SHS. A substantial investment has been taken in recent years to replace or rehabilitate Poor condition bridges, and currently Idaho SHS bridges are at 79% Good using their performance scale. The specific dollar amount invested fluctuates somewhat from year to year, but on average, starting in FY24, ITD is spending $100 million every year on this program to reduce the number of old, obsolete bridges. Another way to look at the Bridge Restoration program at ITD is that with the yearly investment approximately 100,000 sq. ft. of bridge deck area is improved from Poor condition to Good condition.

The previous discussion is especially important in the Bridge Restoration program. Often Bridge Restoration projects, especially those replacing Poor bridges with new ones, include some portion of approach roadway work on either end of the bridge. While the Bridge Restoration program's primary objective is to address deficiencies on Poor condition bridges, many other non-bridge costs may be included in a given project in this program depending on specific project constraints and scope. For example, Poor condition bridges that are being replaced within an Interstate System Interchange can be programmed in the Bridge Restoration Program. The funding needed to address only bridge deficiencies may be far less than half the total project cost due to the approach roadway work adjustments often needed in modernizing a freeway system interchange. ITD accounts for additional non-bridge costs by assigning a cost multiplier to certain Bridge Restoration projects it is considering undertaking.

Chapter 6 – Risk Management Process

Risk & Resiliency Management

ITD utilizes an ongoing Enterprise Risk Management (ERM) process at the Senior and Executive leadership level to track and manage risks. Asset Management risks are included in the risk portfolio managed by leadership.

ITD considers management of risk and resilience to be integrated processes. By identifying risks to the agency and determining and implementing mitigation strategies, the resilience of agency programs and assets is improved.

High Level Risks

Risk Management Process

ITD keeps an enterprise risk register to manage high-level agency and program risks. This register is assessed and updated annually by ITD leadership at the Senior and Executive Leadership Levels. New risks can be identified by employees, FHWA, managers, and other sources. They are assessed by the ERM team and subject matter experts applicable to each identified risk. Risks that have been identified for mitigation are assigned a team with an Executive and/or Senior Level manager to lead the mitigation effort. As part of the assessment, risk impact and likelihood are reviewed and adjusted if conditions have changed. Risk Mitigation efforts are updated quarterly.

Risk Heat Map

ITD uses a heat map (see Table 6-1) to assess risk severity and prioritize risks for mitigation. All Very High and High risks are assigned a team for mitigation. Medium risks may be assigned a team depending on if there are available resources. ‘Low’ risks are monitored but typically not directly mitigated.

Table 6-1: Risk Heat Map

Aggregate Impact (across all impact types)	Likelihood Rating: Rare	Unlikely	Possible	Likely	Very Likely
Very Significant	M	M	H	VH	VH
Major	L	M	M	H	VH
Moderate	L	M	M	M	H
Minor	L	L	L	M	M
Insignificant	L	L	L	L	M

VH = Very High
H = High
M = Medium
L = Low

Table 6-2 contains the 'Likelihood Rating' matrix that ITD uses in evaluating infrastructure risk.

Table 6-2: Likelihood Rating Matrix

	Likelihood Rating and Definitions				
	Rare	**Unlikely**	**Possible**	**Likely**	**Very Likely**
For Recurring Events	< Once in 5 years	Once in 5 years	Once in 3 years	Once per year	> Once per year
For Single Events	< 10% (Less than 1 in 10)	10% to 25% (Avg. of about 1 in 6)	25% to 40% (Avg. of about 1 in 3)	40% to 60% (Avg. of about 1 in 2)	>60% (Avg. of about 4 in 5)

Table 6-3 contains the definition of impact types used in risk evaluation. These categories are used in conjunction with the Likelihood rating to determine the overall risk rating using the Risk Heat Map from above.

Table 6-3: Impact Types and Definitions

	Reputational (political and community)	Compliance (regulatory and policy)	Health and Safety	Disruption of Services/ Operations	Financial (capital, operations, penalties)
Very Significant	* Sustained negative media attention at state or national level lasting months * Irreparable loss of public confidence in ITD * Major impact to organization, (Governor's office, Legislature as a body) taking over the business, passing legislation to control the department, change in the Director, changes in the Board Chair, using ITD as the excuse not to pass legislation * Statewide impacts	* Loss of life * Property damage more than $1M * An event that causes an ITD employee to be fired for negligence	* Worker or public fatality * Significant community health impact * Permanent impact to flora or fauna population(s) in impacted area * Serious, long-term impairment of ecosystem function	* Unable to deliver multiple mission critical services for a week or longer	* State revenue reduction of 10% or more in a given fiscal year * Federal revenue reduction of 20% or more in a given fiscal year * Loss of a single major revenue stream – Fuel Tax, Vehicle Registration, DMV fees, etc. * A reduction in PCN's and associated funding of 25% or greater
Major	* Sustained negative media attention at state or national level lasting weeks * Loss of public confidence in ITD for several months * Several of these groups (Governor's office, Legislature as a body, local agencies, state agendas, major businesses) upset at the same time, pressure to or threats to take over the business, pass legislation to control the department, calls for changing the Director, changes in the Board Chair, using ITD as the excuse not to pass legislation, authorizing special audits * A State agency elevates an issue to the Governor's office * Statewide impacts	* Loss of funding * Fines in excess of $100K * Loss of service * Impacts that result in attorneys from oversight agencies becoming involved	* Worker or public permanent disability * Multiple workers hospitalized but recover * Serious but non-debilitating injury or illness to members of the public * Severe damage to flora or fauna population(s) requiring years to recover * Medium-term impairment of ecosystem function	* Unable to deliver multiple mission critical services for several days * Unable to deliver a single mission critical service for a week or longer	* State revenue reduction between 5% to 10% in a given year * Federal revenue reduction between 10% to 20% in a given fiscal year * Major reduction of a single major revenue stream of 50% or more (Fuel Tax, Vehicle Registration, DMV fees, etc.) * A reduction in PCN's and associated funding of 20% or greater

	Reputational (political and community)	Compliance (regulatory and policy)	Health and Safety	Disruption of Services/ Operations	Financial (capital, operations, penalties)
Moderate	* Sustained negative media attention at state level lasting up to a week * Loss of local community confidence in ITD for several weeks * Several of these groups upset at the same time (Governor's office, legislature as a body, local agency, state agency, groups of businesses, groups of individuals). Concerns growing amongst these groups * A State agency threatens to elevate an issue to the Governor's office * Issues/concerns that are affecting multiple Districts and areas across the state	* Diminished decision-making authority * Impacts that require ITD to mitigate compliance issues by spending more than $10K	* Single worker hospitalized * Multiple workers require out-patient treatment * Increase in ITD absentee rate (e.g., resulting in higher stress for remaining employees) * Moderate but short-term impact to flora or fauna population(s) (can recover within a season) * Short-term impairment of ecosystem function	* Unable to deliver multiple mission critical services for a single day * Unable to deliver a single mission critical service for several days	* State revenue reduction between 3% to 5% in a given year * Federal revenue reduction between 5% to 10% in a given fiscal year * Adjustments that require special Legislative authority by way of Supplemental Appropriation (not including revenue increases) or Holdbacks * GARVEE Bond program that requires issuance of bonds, but market conditions are unfavorable to issue or interest rates would be 50% greater than the average of previous bonds * A reduction in PCN's and associated funding of 10% or greater
Minor	* One-off negative media attention at local level * Letters of complaint or dissatisfaction from a local agency, individual business complaints that take significant time and effort to resolve but are ultimately resolved * Concerns affecting more than one area and multiple Districts	* Impacts that require ITD to perform no-cost mitigation actions	* Single worker requires out-patient medical treatment * Minor, short-term impact to isolated members of flora or fauna population * No ecosystem impairment	* Time to process routine services is increased, but not suspended for several days	* State revenue reduction between 1% and 3% in a given fiscal year * Federal revenue reduction between 1% and 5% in a given fiscal year * Adjustments that require DFM special approval (not including object/program transfers) * GARVEE Bond program that requires issuance of bonds, but market conditions are unfavorable to issue or interest rates would be 25% greater than the average of previous bonds * A reduction in PCN's and associated funding of 5% or greater

	Reputational (political and community)	Compliance (regulatory and policy)	Health and Safety	Disruption of Services/ Operations	Financial (capital, operations, penalties)
Insignificant	* No notable negative media attention * Letters of complaint or dissatisfaction from a local agency or individuals that are quickly resolved * Problems isolated to an individual District or local area	* Legal issue managed by routine procedures	* Near miss (avoided injury or worse) * No threat to flora or fauna	* Time to process routine services is increased but not suspended for a day or less	* State revenue reduction of less than 1% in a given fiscal year * Federal funds that are allotted based on continuing resolutions * Internal transfers of budgets between programs *A reduction in PCN's and associated funding of less than 3%

High Priority Risks

From the ERM process, ITD leadership identified and evaluated nine high priority agency and/or program level risks in 2022 that relate to the NHS conditions and TAMP processes. The processes for identifying and evaluating these risks are outlined in the following sections. The list of risks including full evaluations is included in Appendix C – Highways Risk Register. The top agency, program, and asset level risks are listed in Table 6-4 and Table 6-5 and described in this section.

ITD maintains an enterprise level risk register which identifies and tracks high level risks to the agency and its initiatives. For the TAMP, this list has been filtered to risks which may impact the NHS conditions or associated TAMP processes. Table 6-4 lists the high-level risks to NHS pavements and bridges with high scores by ITD in the annual risk analysis process. The risks were rated (using the process outlined later in this chapter) as being Very High or High in terms of likelihood and impact on the agency.

Table 6-4: Top Agency Level Risks

Risk	Risk Title	Description of the Risk	Risk Rating
14	Increased funding	– Challenges related to being able to capitalize on and respond to increased funding.	Very High
21	Increasing the transportation system capacity to meet the need	– Challenges related to increased demand for transportation system infrastructure across a broad spectrum of stakeholder needs.	Very High
28	Right of Way process and procedures	– Challenges related to ROW information, process, and resources.	Very High
3	Managing current data and reliance of data used in performing critical functions	– Challenges related to the growth and use of data and information by ITD in managing its transportation system.	High
19	Efficient delivery of Plans, Specifications, and Estimates for bidding.	– Challenges related to project delivery to meet system needs, meet expectations, and adapt to funding changes.	High
20	Forecasting future transportation system needs	– Challenges related to changes in demographics, growth, system usage, urbanization, connected and autonomous vehicles.	High
29	Materials testing standards	– Challenges related to industry changes, accurate and sufficient testing, technology, and workflow.	High

Risk	Risk Title	Description of the Risk	Risk Rating
48	Natural or other disasters that impact our roadways, bridges, airstrips, and buildings	– Challenges with external factors that impact our system both man-made and natural. This includes extreme events and climate change impacts such as flooding, landslides, extreme temperatures, etc.	High
76	Consistent application of regs	– Challenges relating to consistent interpterion and application of regulations that guide ITD's actions.	High

Mitigation Efforts for High Priority Risks

Each of the Very High and High priority risks identified above has associated response actions identified. ITD is pursuing these actions to manage and mitigate high level risks where possible. These actions are described below.

Increased funding - ITD continues to maintain a pool of on-the-shelf projects to meet fiscal opportunity and allow the program time to adjust as well as allowing projects that can be made ready sooner to advance. ITD is working with support agencies and the contracting community to discuss increased workloads. Inflation is a concern and ITD is monitoring the impacts.

Increasing the transportation system capacity to meet the need - Idaho has increased funding for expansion projects. ITD is coordinating with local land use agencies for better planning. An organizational change to create a section with increased focus on transportation systems management and operations has been completed. ITD has also invested in Inrix Highway data to look at congestion analysis and measures.

ROW Processes and Procedures - ITD is re-evaluating and streamlining the ROW process. Additional full-time positions have been given to ROW to help with the workload. ROW agents are being put in each district to facilitate the process. A ROW Liaison has been assigned to the Deputy Attorney General to coordinate condemnation cases.

Managing current data and reliance of data used in performing critical functions - ITD formed an IT Steering Committee to prioritize project and data efforts that best align with department goals. Data stewards were created to identify who owned data. GIS is used to connect data sets for broader use. A practical data governance effort was elevated to work with ITD leadership on the governance effort.

Efficient delivery of Plans, Specifications, and Estimates for bidding - There is an ongoing effort to focus on the delivery of the ITIP. ITD continues to invest in perfecting the statewide project delivery status and report process. ITD maintains and updates a list of Ready Early projects and capitalizes on the Early Development Policy. ETS has dedicated staff supporting

Highways projects, as well as adding staff to directly support end users using CADD and Construction Management Software.

Forecasting future transportation system needs – ITD participates in the AASHTO Connected Vehicle Task force. ITD has recently completed the long-range transportation plan and is tracking connected automated technology. Work is ongoing to develop and use a statewide congestion measure to assess projects. ITD is looking into IIJA opportunities for funding.

Materials testing standards – There are annual testing firm meetings with the Chief Operating Officer. ITD started the Industry/ITD Peer Review Advisory group with quarterly meeting. Presently ITD is updating the Quality Assurance Manual and procedures.

Natural or other disasters that impact our roadways, bridges, airstrips and buildings – ITD is working on an on-call agreement with a contractor for geotechnical stabilization. ITD monitors the risk of inland flooding via StreamStats. ITD is also working on a traffic incident response team. For extreme weather and climate change impacts ITD is sponsoring a study of landslide hazards as well as an update of the NOAA Atlas 14 precipitation data. For additional resilience initiatives related to extreme weather and climate change, see the section titled Asset Level Risk and Resilience Initiatives.

Consistent application of regulations – ITD is updating manuals for staff and training Project Managers. The programmatic agreements ITD has with resource agencies are being updated.

Asset Level Risks

In compliance with the Code of Regulations (CFR) Title 23, Chapter I, Subchapter G, Part 667, ITD conducted statewide evaluations to determine if there are reasonable alternatives to roads, highways, and bridges that have required repair and reconstruction activities on two or more occasions due to emergency events. The following section outlines the tools and processes ITD has implemented to evaluate repeat-damage assets on applicable projects prior to their inclusion in the STIP.

Inventory of Repeatedly Damaged Assets (1997 to 2022)

The 2022 ITD TAMP includes a registry of once- and twice-damaged assets associated with natural disasters or externally caused catastrophic failures declared as emergencies by the Governor or President. The following process identified 11 total repeatedly damaged and repaired assets as of 2022 included in Appendix D – Damaged Asset Registry. The registry was developed through the workflow below:

1. Identify emergency projects in Idaho from 1997 to 2022 through the following information:
    a. FHWA Division FMIS report for emergency projects sent March 2022.
    b. Collected project reports for state emergencies, including:
        i. Projects in the performance programs “ER - Emergency Repair” or “ER - Permanent Repair”; and/or,
        ii. Projects with subclasses of “Bridge Emergency Relief” or “Roadway Emergency Relief”; and/or,

iii. Projects with a DDIR file attached.
iv. Obligations on the state ER code.

c. Additional consultation with ITD headquarters pavement and bridge asset engineers as well as division staff.

2. Compile associated project information using ITD OTIS system.
3. Review available project information and identify key characteristics such as:
   a. Pavement replacement start and end limits
   b. Structure repair or replacement scope.
   c. Emergency event-type
   d. Location, route ID, count

Additions and removals to the damaged asset registry are the responsibility of the Asset Manager.

ITD is implementing the process to track damaged assets, emergency funding, and the need to evaluate the assets below prior to programming any new projects. As an example, US95 is highlighted in Table 6-5, which shows assets damaged twice or more as of 2022, because it is on the NHS. A mitigation project was implemented for the landslide on US95 following the second event in 2005. While the project did not eliminate the risk of a slide occurring completely, it drastically lowered the likelihood. A complete mitigation project was evaluated in 2006 and determined to not be a practical solution. For the full list of repeatedly damaged and repaired assets, see Appendix D – Damaged Asset Registry.

Table 6-5: List of Assets Repeatedly Damaged Due to Emergency Events

HWY	County	Route ID	Measure From	Measure To	Emergency Event	Year
Atlanta Road, STC-3809	Boise	00435AOH000	3.4002	30.1126	Flood	1997
Atlanta, STC 3809	Elmore	00443AOH000	30.2994	32.2990	Flood	2006
US 95	Idaho	01540AUS095	204.7782	205.0779	Slide	1997
US 95	Idaho	01540AUS095	204.4286	205.4276	Landslide	2005
SH 57	Bonner	01620ASH057	1.8047	7.1964	--	1997
SH 57	Bonner	01620ASH057	1.9238	2.1026	Landslide	2017
Dufort Road, STC-5780	Bonner	03820AOH000	1.1501	7.1505	--	1997
Dufort Rd, STC-5780	Bonner	03820AOH000	1.5801	1.6305	Settlement/Landslide	2011

HWY	County	Route ID	Measure From	Measure To	Emergency Event	Year
Westside Rd,	Boundary	04450AOH000	7.7659	14.6660	Mudslide	1997
Westside Rd	Boundary	04450AOH000	11.6959	11.8959	Landslide	2017
Westside Rd	Boundary	04450AOH000	12.3960	0.0000	Landslide	2017
Dent Road, STC-4783	Clearwater	05250AOH000	0.0000	5.3993	Flood	1997
Dent Bridge Road, STC-4783	Clearwater	05250AOH000	0.9312	1.0312	Landslide	2011
Dent Bridge Rd - STC 4783	Clearwater	05250AOH000	1.1003	0.0000	Slide	2017

Triggering a Damaged-Asset Resiliency Evaluation Process

For future identification of repeatedly damaged assets, the information from the damaged asset registry will be used to create a layer in ITD's GIS platform showing all damaged assets. The assets that have been damaged twice or more will be flagged. This will trigger an assessment as described below to achieve compliance with current Part 667 requirements. District development personnel will be trained to query this layer before a project is programmed into the STIP to identify whether a mitigation action should be considered.

The use of a GIS layer will enhance ITD's ability to identify, flag, and trigger an assessment. By overlaying past-damaged assets with proposed projects, ITD will be able to assess where we are doing repair and reconstruction that will trigger the need to evaluate reasonable alternatives to replacing the damaged asset in kind and reduce the risk of future damage. If the need to evaluate is triggered, the evaluation will be completed as described in the steps below and the resulting project may be programmed into the STIP. The evaluation results will be placed in the project file by the Asset Manager and be available upon FHWA request.

The process has the following steps and responsible parties:

1. Populate damaged asset registry using information from projects that received emergency funding. This will include the ability to add or remove damaged assets as needed. The registry will be kept with the Asset Engineer and Emergency Manager.
2. Populate the corresponding GIS database and map with information from the damaged asset registry. Newly damaged assets will be added to the database for future assessment. Twice-damaged assets that were evaluated and then repaired and replaced in accordance with the evaluation recommendations will be removed. This will be completed in partnership with the Asset

Engineer, Asset Management Group, GIS, Emergency Management, and Data Analytics.

3. The evaluation of resilient options will be performed for the following three scenarios:
   - NHS assets that have been damaged two or more times will have an evaluation completed and placed on file for use as needed. They will be updated every four years.
   - During the annual project programming cycle, the GIS database will be queried to cross-check projects that are being proposed for non-NHS roads, against the registry of damaged assets. This will be done by the Asset Engineer, Bridge and Pavement Engineers, and District Planners. If a proposed project includes a twice-damaged asset, an evaluation will be completed before any project involving that asset is programmed.
   - If an emergency event occurs that meets the repair and reconstruction threshold, the assets that have become twice-damaged due to the event will be evaluated. If a replace-in-kind is performed, the asset will be put into the database for future assessments.

The project team will propose and evaluate reasonable project alternatives in accordance with the process outlined in the next section. The evaluation will be placed in the project file. The most cost-beneficial alternative will be considered for inclusion and programmed into the STIP for normal project development.

Resilient Alternative Evaluation Process and Tool

This section outlines the evaluation process that ITD will perform for proposed projects that include work on a twice-damaged asset.

Overview of Process:

The evaluation process aims to compare components of the current asset that has been damaged to new mitigation options to determine if there is a greater cost-benefit to implement a new alternative. The asset information required for the evaluation can be collected using available ITD inventory information and GIS tools.

The cost is comprised of the estimated cost to replace-in-kind or to implement any resilient options. The benefit is determined by estimating the reduction to the Owner and User Risk if the resilient option was constructed[1].

When a risk mitigating project is selected, it is included into either the BMS or PMS as a committed project. With the completion of one of these projects, the resilience of the system to emergency events improves.

[1] Owner risk is the monetary risk to the entity that owns the asset, i.e. ITD, while User risk is the monetary risk to the traveling public, generally due to delays experienced while the damaged asset is under repair. The difference between the annual risk of the new proposed resiliency mitigation compared to replacing the asset in-kind is used alongside the annual cost of each option to determine the Benefit to Cost (B/C) ratio.

Risk Management Initiatives – Extreme Weather and Resilience

Described below are initiatives and processes that ITD is pursuing in relation to the topics of Extreme Weather and Resilience.

Agency Level Risk and Resilience Initiatives

The risk register includes extreme weather, climate change, and system resiliency related risks that are being tracked and mitigated. ITD has also reached out to the Department of Emergency Management to partner in applying for an IIJA grant to study resiliency and climate change impacts at the statewide level.

Asset Level Risk and Resilience Initiatives

The Bipartisan Infrastructure Law requires that State DOTs consider extreme weather and resiliency as part of the analyses within the TAMP. ITD is actively registering key staff in training classes on this topic to better evaluate how it can act now to prepare its transportation assets for extreme weather events.

Part 667 Asset Identification and Evaluation Process

The current Part 667 evaluation process and the consideration of those evaluations in the STIP development exhibit that ITD considers extreme weather and resilience in risk management and life cycle planning (LCP). The projects identified in the STIP are included as committed projects in the management systems for analysis. As the management systems host much of ITD's LCP, if resilient alternative projects identified in the Part 667 process are included in the STIP, they are incorporated in the LCP analysis as well.

Extreme weather is also considered as part of this process as emergency events that cause damage to assets in ITD often relate to extreme weather.

Hydraulic Design & Hydrology

ITD will prepare climate change guidance into a subsection of the Roadway Design Manual 600 section and Bridge Hydraulics Manual, or a memo in the interim. This subsection will layout a brief breakdown of the non-stationary climate theory and its impacts to the analyses. It will then set the limits for when projects must account for these impacts. Last, the manual will give recommended processes for including the impacts in the hydrologic predictions.

Pavement Design - Materials Modeling, Selection, and Climatic Models

Pavement ME Design Climatic Data Sets. ITD uses AASHTOWare Pavement ME Design to predict the service life of our hot mix asphalt (HMA) and Portland cement concrete (PCC) roadways. ITD is pursuing an update to our Pavement ME Implementation Roadmap. One aspect ITD will consider is revisiting the climatic data sets used to develop the state-specific calibration parameters a decade earlier and compare against the current state of practice for the Pavement ME data sets. This will help ITD identify risks in ITD's current application of Pavement ME Design and evaluate if new climatic calibration is required.

Aggregate Coefficient of Thermal Expansion (PCC Paving). ITD prepared local calibrations and state-specific materials catalogs for PCC concrete paving materials. A vital design consideration for PCC pavement is representing an aggregate's coefficient of thermal expansion (CTE) in concert with pavement

design thickness, joint spacing and dowel bar configuration. Extreme climatic events can cause the concrete aggregate to expand or contract significantly. Currently, ITD does not check the Contractor's production CTE value against the value used for design. ITD needs to track this data and evaluate if there is a meaningful difference between design and construction values for aggregate thermal expansion and if any differences would have an impact on roadway service life.

PG Binder Grading Selection (HMA Paving). ITD uses FHWA's LTTPBind software to specify project-specific asphalt binders based on climate and traffic conditions. ITD's current direction is to use the desktop software ver. 3.1. However, FHWA has updated the software for a web-based version that allows expanded use of MERRA climatic data and Long-Term Pavement Performance (LTPP) climatic data which is not addressed in the desktop ver. 3.1. Accordingly, ITD is working with FHWA support staff to evaluate the benefits of using the expanded climactic data sets and documenting the reasons for any changes.

Chapter 7 – Financial Planning Process

The Idaho Transportation Department (ITD) has a robust financial planning process to ensure that the state's bridges and highways are properly maintained. This document describes the process ITD employs to identify available revenue sources and to program funds for maintaining the state's transportation infrastructure assets. The process begins at the highest level with the identification of State, Federal and Local resources available for the NHS. The next step is to account for the expenditures necessary for department operations. The funding available for the Highway Funding Plan (HFP) is calculated by subtracting the department operating costs from the total available revenue.

The HFP includes all funds available for the maintenance, operations and construction of the bridges and highways under ITD's jurisdiction. There are many funding needs in the HFP in addition to the infrastructure in the asset management plan. Examples of these funding needs include those programmed for Transportation Alternatives, Recreational Trails, Railroad Crossings, and many local programs. These funds are subtracted from the total available in the HFP to calculate the amount of funding available for the Transportation Asset Management Plan (TAMP). This section details the steps ITD employs to identify the funding for the TAMP.

Photo 7-1: Aerial View of Idaho Highway

Financial Plan Requirements

FHWA is quite specific about financial plans. It defines them as a long-term plan spanning 10 years or longer, presenting a State DOT's estimates of projected available financial resources and predicted expenditures in major asset categories that can be used to achieve State DOT targets for asset condition during the plan period, and highlighting how resources are expected to be allocated based on asset strategies, needs, shortfalls, and agency policies.

The financial plan leads to investment strategies. Those are defined as a set of strategies that result from evaluating various levels of funding to achieve State DOT targets for asset condition and system performance effectiveness at a minimum practicable cost while managing risks.

FHWA in Sec. 515.7 (6) (d) says the state shall establish a financial plan development process that identifies annual costs over a minimum of 10 years. The plan shall produce:

(1) The estimated cost of expected future work to implement investment strategies contained in the asset management plan, by State fiscal year and work type;

(2) The estimated funding levels that are expected to be reasonably available, by fiscal year, to address the costs of future work types. State DOTs may estimate the amount of available future funding using historical values where the future funding amount is uncertain;

(3) Identification of anticipated funding sources; and

(4) An estimate of the value of the agency's NHS pavement and bridge assets and the needed investment on an annual basis to maintain the value of these assets.

ITD Funding Sources

ITD's revenues come from many sources, each of which are described below.

State Highway User Revenue

Approximately half of the revenue generated for the maintenance and operation of the infrastructure in ITD's jurisdiction is from state sources. This section includes a description of these sources.

Beginning Cash Balance

Known or projected operational cost savings and receipts above forecast can yield uncommitted cash balances at the end of each year. These cash balances are available in addition to forecasted revenue to support operational and program costs in subsequent year(s).

Highway Distribution Account (HDA)

The Highway Distribution Account includes state highway user revenue collected from motor fuels tax (gasoline and special fuels), motor vehicle registrations, and miscellaneous fees and permits. The SHA receives 57% of this revenue; the remaining amount is distributed to local highway jurisdictions and the Idaho State Police.

Ethanol Exemption

Seven percent of the motor fuel revenue is distributed to the State Highway account because of the elimination of the tax exemption for ethanol.

New User Revenue

During the 2015 Legislative session, the tax rate for motor fuels and registration fees for motor vehicles were raised. This additional revenue is reported independent of other revenue sources. Sixty percent of this revenue is directed to the SHA, the remainder is distributed to local highway jurisdictions.

The new revenue is generated by the following:

- Increased motor-fuel taxes by 7 cents per gallon
- Increased annual vehicle registration fees:
  - Passenger Vehicles $21
  - Motorcycles $10
  - Vehicles more than 8,000 pounds $25
  - Electric Vehicles $140
  - Plug-in Electric Hybrid Vehicles $75

State Highway Account (SHA) Miscellaneous Revenue

Certain registration, permit, and title fees identified in Idaho Code as well as miscellaneous receipts for sale of equipment, services, and supplies are also distributed to the SHA.

Estimates of state funds available for the HFP take into account projected revenues, the reservation of state matching funds for federal aid, and other operational needs not shown in the STIP.

The amount of state highway funding can be impacted by legislation passed in any given year. In 2019, the legislature passed Senate Bill 1201, which removes the Idaho State Police from the Highway Distribution Account distribution formula over a period of five years beginning in fiscal year 2022.

The 2019 legislature also passed Senate Bill 1065 which provides a financing mechanism to issue bonds secured by the Transportation Expansion and Congestion Mitigation Fund to finance projects approved by the Idaho Transportation Board. This legislation set a limit of 1% of sales tax, but no less than $15 million a year, to be deposited into the TECM fund.

In 2021, the legislature passed House Bill 362, which raised the percentage of sales tax distributed to the Transportation Expansion and Congestion Mitigation (TECM) fund to 4.5% but not less than $80 million. The estimated state funding for FY22 through FY31 available for highway capital construction averages above $700 million annually. This includes new highway user revenue and other funding generated by bills passed during the 2019 legislative session. New funding from the Federal Infrastructure Investment and Jobs Act is also included.

GARVEE Bond Proceeds

GARVEE (Grant Anticipation Revenue Vehicle) bonds are revenue bonds that pledge the full faith and credit of the state. Idaho Code allows no more than 30% of ITD's federal apportionment to be used for GARVEE debt service. The department uses federal highway revenue to repay the bonds. Prior to FY17, the Idaho Legislature authorized the department to secure financing of $857 million of infrastructure improvements in the GARVEE program. Projects funded by those pre-FY17 authorizations were closed out during FY16.

The 2017 Idaho Legislature authorized the issuance of up to $300 million in GARVEE bonds. These bonds will be used to fund highway projects

The estimated debt service on $300 million in additional bonds is approximately $24.0 million annually. In combination with the $56.7 million in existing debt service, the total annual debt service, including $300 million of additional bonds, would be approximately $80.7 million ($74.5 million federal funds and $6.2 million state matching funds).

Cigarette Tax Revenue for Debt Service

The 2015 Legislature passed legislation directing Cigarette Tax revenue to pay approximately $4.7 million per year of the GARVEE debt service.

Strategic Initiative Program Fund (SIPF)

The 2015 Legislature directed ITD to establish and maintain a Strategic Initiatives Program and Fund. The purpose is to fund projects proposed by the department's six districts. The projects must compete for selection based on an analysis of their return on investment in prescribed categories.

In the 2022 Idaho Legislative session, the Legislature appropriated $200M into the Strategic Initiatives Program fund, distributed 60% to ITD and 40% to local highway jurisdictions as a part of the Governors Leading Idaho Initiative. Investments in transportation infrastructure is a cornerstone of the long-term Leading Idaho Initiative. Efforts will be made into the future to utilize General fund surpluses to target transportation infrastructure improvements in the state of Idaho. The 2017 Legislature also passed House Bill 334, which added a category to the Strategic Initiatives Program Fund, relating to child pedestrian safety on the state and local systems.

The amount to be distributed after the end of FY17 is $27.7 million ($16.6 million to ITD and $11.1 million for local projects).

TECM Fund

The 2017 Legislature also established the TECM fund. The purpose of TECM is to fund projects that are chosen by the Idaho Transportation Board based on a project's ability to improve traffic flow and mitigate traffic times and congestion. The TECM fund receives revenue from 1% of sales tax after local

revenue sharing, and all remaining money following the distribution of the cigarette tax revenue.

Federal

As is the case with other state transportation departments, ITD relies heavily on federal funding to maintain its transportation infrastructure. These federal sources include:

- Excise taxes on gasoline and special fuels used to propel motor vehicles on public highways
- Weight-based taxes on heavy vehicles registered for interstate commerce
- Tax on the value of heavy commercial vehicle sales
- Weight-based excise tax on tires exceeding 40 pounds

This revenue is directed to Idaho through Federal transportation legislation, federal project-specific discretionary awards, or prior congressional earmark awards.

The current federal transportation authorization is the Infrastructure Invest and Jobs Act (IIJA). It establishes funding over federal fiscal years 2022 through 2026. The FAST transportation program structure continues under the IIJA Act with several additions, the inclusion of new Bridge, Electric Vehicles, Carbon Reduction, and Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) programs.

Funding estimates for the federal highway program are $431 million in FY22, $440.4 million in FY23, $448.2 million in FY24, and $456 million in FY25, and $464.1 in FY26 through FY31. ITD assumes that obligation authority will be equal to 100% of estimated apportionments. Funding forecasts do not include year-end redistribution of obligational authority not used by other states.

Local

FHWA and the Idaho Transportation Board reserve certain federal funds for use by local public agencies. Local public agencies must pay the match on these federal funds most often at Idaho's sliding scale rate of 7.34% of the project cost. Local public agencies may also contribute funds in excess of the required match on federal projects or choose to contribute to state-funded projects. These are termed Local Participating funds. Finally, there may be some costs on a local project which the FHWA cannot reimburse based upon certain rules or regulations. These funds do not participate in the established match arrangement so are termed Local Non-Participating costs.

Idaho Transportation Department Expenditures

Before ITD can dedicate funds to the Highway Funding Plan, it must dedicate a portion of the available funds to department operations.

Operations costs support programs outside those funded by the Highway Funding Plan, including Administration, Capital Facilities, Aeronautics, Motor Vehicles, and Highway Operations. This section describes the department's operating costs.

Department Operations

"Coming off the top" are expenditures for basic operations required to run the department, maintain roads, and provide people and equipment to manage the highway network.

Personnel

Costs for personnel who support Operations programs, including full-time staff, temporary employees, overtime, shift-pay, and per diem for boards and commissions. These costs include employee salaries, employer benefit costs, and health insurance. Projections for annual increases in costs for salaries, benefits, and health insurance are reflected in the plan.

Operating Expenditures

Daily operating and seasonal costs are necessary to support delivery of Operations programs. Operating Expenditures cover a broad range of costs, including supplies, repair and maintenance, utilities, communications, fuel, road maintenance materials (asphalt, plant-mix), winter operations materials (salt, brine, and sand), insurance, etc. Operating expenditures reflect projected inflation and volume increases expected during the plan period.

Equipment

Acquisition cost of new and replacement equipment necessary for delivery of services in Operations programs. These costs include road equipment, computers and network equipment, specific use, laboratory, and shop equipment.

Capital Facilities

Costs needed for maintaining, designing, and building department facilities.

Trustee and Benefits

Funds passed through to entities authorized to carry out specialized program activities eligible for funding under provisions of the granting agency. This financial analysis does not carry any Trustee and Benefits resources used by the department's Operations programs.

Other Costs and Timing Adjustments Across Plan Years

Includes resources used for Operations not classified in the previous categories and addresses timing differences across plan years necessary to reconcile to available funding carried in each year of the current Highway Funding Plan.

Funding Available for Highway Program

The Program Targets spreadsheet begins with funding targets from the Highway Funding Plan. Specifically, it requires federal funds with match by year. It also requires state funds by appropriation by year. Idaho has a reduced sliding scale match rate for interstate work of 92.27 % and for non-interstate work of 92.66%. The annual match rate for NHPP funds was obtained from the composite rate on programmed 2023 – 2028 projects.

Funds available to the State Highway System are placed into Performance Programs, which address rehabilitation and restoration of assets. Specifically, the TAMP is funded through the Pavement Preservation, Pavement Restoration, Bridge Preservation, and Bridge Restoration Programs. Capacity projects sometimes have a reconstruction component to existing lanes which are also funds available to the TAMP.

Since ITS recently began its FY 2023 – 2029 Program Update, the annual targets for these programs were used in the TAMP. Each spring, the Transportation Board reviews pavement and

bridge conditions to determine funding targets for Pavements vs. Bridges vs. Safety & Capacity. Similarly, the projects programmed in FY 2023 – 2028 were used to estimate how much of these funds are used on the NHS, including interstate, as opposed to state highways

Funds not used for State Highway System State of Good Repair

The HFP includes many programs that are not intended to address the "State of Good Repair" on the state highway system. These programs are described in this section.

Highway / MPO Planning

The purpose of the Metropolitan Planning Program is to fund planning for Idaho's five metropolitan planning organizations in order to establish a cooperative, continuous, and comprehensive framework for making transportation investment decisions and to carry out transportation planning activities throughout the State.

Transportation Alternatives

The purpose of the Transportation Alternatives Program (TAP) is to provide funding for programs and projects defined as transportation alternatives, including on and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, and environmental mitigation; recreational trail program projects; safe routes to school projects; and projects for the planning, design, or construction of boulevards and other roadways largely in the right-of-way of former Interstate System routes or other divided highways.

Recreational Trails

Apportionments are transferred to the Department of Parks and Recreation for their administration of the Recreational trails program projects.

Surface Transportation - Local Programs

The purpose of the STP-Local Urban Program is to ensure that local federal-aid routes within urban areas (population 5,000 to 200,000) are in "Good" condition and unrestricted. Projects within this program should preserve and improve the conditions of the local federal-aid route as well as encourage and promote the safe and efficient management, operation, and development of the transportation systems to serve the mobility needs of people and foster economic growth and development.

Local/Off system Bridge

The purpose of the Bridge Off-System Program is to ensure that local bridges off the federal aid system are in "Good" condition and unrestricted.

Railroad Crossing

The purpose of the Rail-Highway Crossing Program is to enhance safety at Idaho's public railroad-highway crossings, provide/encourage rail safety education, and fulfill federal rail reporting requirements.

Local Safety

The purpose of the Local Highway Safety Improvement Program (LHSIP) is to work towards the elimination of fatal and serious injury crashes on the local roadway system in Idaho. The Local Highway Technical Assistance Council (LHTAC), through an application process, selects highway safety improvement projects for submission into the Program in each ITD District. The selected projects are reviewed, verified and justified for

compliance with funding regulations prior to inclusion into the Local Highway Safety Improvement Program (HSIP) portion of the Idaho Transportation Investment Program (ITIP).

Local Participating

Local public agencies may contribute funds in excess of the required match on federal projects or choose to contribute to state-funded projects. These are termed Local Participating funds.

Local Non-Participating

There may be some costs on a local project which the FHWA cannot or will not reimburse based upon a certain rule or regulation. These funds do not participate in the established match arrangement so are termed Local Non-Participating funds.

Local Match

Local funds required as the match for Federal funds on a local project.

GARVEE (Expansion)

The 2017 Idaho Legislature authorized the issuance of up to $300 million in GARVEE bonds. These bonds were used to fund highway projects.

*GARVEE Bond Debt Service **

The estimated debt service on $300 million in additional bonds is approximately $24 million annually. In combination with the $56.7 million in existing debt service, the total annual debt service, including $300 million of additional bonds, would be approximately $80.7 million ($74.5 million federal funds and $6.2 million state matching funds).

SIPF – Local

In 2017, the Legislature extended General Fund Surplus transfers by two years, directing them to the Strategic Initiatives Program fund and authorized a distribution of the fund with 60% to ITD and 40% to local highway jurisdictions administered by the Local Highway Technical Assistance Council (LHTAC).

SIPF - Child Pedestrian Safety

The 2017 Legislature also added a category to the Strategic Initiatives Program Fund relating to child pedestrian safety on the state and local systems.

Funding Available for Transportation Asset Management

The funds remaining after addressing the department's operating needs and funding the programs not used for state highway system State of Good Repair are available for maintenance of the State Highway System which includes infrastructure included in the TAMP. This section describes the programs dedicated to these assets.

Pavement Preservation

The purpose of the Pavement Preservation Program is to employ a planned strategy of cost-effective treatments to the surface of a structurally sound roadway that preserves the system, retards future deterioration, and maintains or improves the functional condition without substantially increasing structural capacity. Within this funding category, the specific work type allowed is preservation.

Pavement Restoration

The purpose of the Restoration Program is to fund pavement projects that are more extensive than pavement preventative maintenance. These structural enhancements are used to extend the service life of an existing pavement and/or improve its load carrying capacity or completely rebuild a pavement structure. Restoration of other assets and traffic operation projects are also placed in this program. Within this funding category all five work types (e.g., Maintenance, Initial Construction, Reconstruction, Rehabilitation, and Preservation) are allowed.

Bridge Preservation

The purpose of the Bridge Preservation Program is to ensure that Idaho's state highway system bridge assets are in "Good" repair and unrestricted. Within this funding category, the specific work type allowed is preservation.

Bridge Restoration

The purpose of the Bridge Restoration Program is to ensure that Idaho's state highway system bridge assets are in "Good" repair and unrestricted. Within this funding category all five work types (Initial Construction, Reconstruction, Rehabilitation, Preservation and Maintenance) are allowed.

Safety & Capacity

The purpose of the Safety and Capacity (S&C) Program is to ensure that ITD's state highway system is reliable and unrestricted, provides a means to invest in economic opportunities, and applies Idaho's Highway Safety Improvement Program (HSIP) to advance the objectives and goals of ITD's Strategic Plan. The Safety and Capacity program determines project prioritization to using funds from designated funding sources.

Transportation Expansion and Congestion Mitigation:

The purpose of the TECM Program is to identify projects that will use direct-pay funds and bond proceeds to address and mitigate transportation congestion, which may include mitigation of traffic times, improvement to traffic flow and mitigation of traffic congestion. Projects are selected by the Idaho Transportation Board in accordance with Idaho Code § 40-720.

The following tables show the expected revenues and expected expenditures or obligations. They form the "sources and uses" component of the asset management financial plan. The first three tables show expected revenues, or the sources. The last three show the expenditures/obligations, or the uses.

Table 7-1 summarizes the expected state revenues and their sources for ITD from 2022-2031. As can be seen, the Highway Distribution Account, which contains state motor fuel taxes and fees, provides the largest source of ITD's state revenue. In addition, as can be seen, some state funds are dedicated for specific programs, such as Transportation Expansion and Congestion Mitigation, and are not available for asset management purposes. All figures represent millions of dollars.

Table 7-1: Forecasted State Revenue Sources

ITD Funding and Use Summary ($ in Millions, rounded, 2022 dollars)

Highway - State	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2039	FY2030	FY2031	10-Yr Total
Anticipated State Funding											
Beginning Cash Balance		37.2	25.4	-	-	-	-	-	-	-	**62.6**
Highway Distribution Account [1]	245.0	247.4	252.0	257.1	261.7	263.2	265.8	268.5	271.2	273.9	**2,605.8**
Ethanol Exemption [1]	20.0	20.4	20.6	20.8	20.9	21.2	21.4	21.6	21.8	22.1	**210.8**
New User Revenue [1]	75.0	75.0	76.1	77.0	78.0	78.5	79.3	80.1	80.9	81.7	**781.5**
State Highway Account Misc Revenue [2]	39.0	39.1	39.0	39.7	38.8	38.9	38.9	38.9	38.9	38.9	**390.1**
TECM	62.3	177.0	60.0	45.0	30.0	15.0	-	-	-	-	**389.3**
TECM Bond Proceeds, Authorized in 2021	-	216.0	-	-	-	-	-	-	-	-	**216.0**
TECM Debt Service	-	3.0	20.0	35.0	50.0	65.0	80.0	80.0	80.0	80.0	**493.0**
Strategic Initiative Program Fund (SIPF) [3]	73.7	138.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	**1,171.7**
Cigarette Tax Revenue for Debt Service [4]	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	**47.0**
Total State Highway Funding Sources	**$519.6**	**$957.8**	**$617.8**	**$599.3**	**$604.1**	**$606.5**	**$610.1**	**$613.8**	**$617.5**	**$621.2**	**$6,367.8**

Table 7-2 illustrates the Federal revenues and their sources expected for 2022-2031. As with the State funds, not all Federal revenues are available for asset management purposes. As can be seen, much of the Surface Transportation Block Grant (STBG) funds are intended for urban areas, or for rural programs. Also, some are set aside for specific purposes such as Transportation Alternatives that fund projects such as bike paths. CMAQ funds are congestion mitigation/air quality funds that only can be used for congestion relief or transit projects.

Table 7-2: Forecasted Federal Revenue Sources

FY 2022 - 2031 Proposed ITD Ten-Year Transportation Plan
ITD Funding & Use Summary ($ in Millions, rounded, 2022 dollars)

Highway - Federal	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	10-Yr Total
Anticipated Federal Highway Funding											
National Freight Program	9.7	9.9	10.1	10.3	10.5	10.5	10.5	10.5	10.5	10.5	**103.2**
National Highway Performance (NHPP)	204.1	208.2	212.3	216.6	220.9	220.9	220.9	220.9	220.9	220.9	**2,166.5**
STBG - State FLEX	35.5	36.3	37.2	38.0	38.9	38.9	38.9	38.9	38.9	38.9	**380.1**
Highway Infrastructure - BRIDGE	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	**450.0**
Flexible/Restoration/ Misc/Ext Alloc Prog	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	**28.4**
STBG Urbanized > 200k (TMA)	11.1	11.3	11.5	11.7	12.0	12.0	12.0	12.0	12.0	12.0	**117.4**
STBG Urban < 200k	14.6	14.3	14.5	14.8	15.1	15.1	15.1	15.1	15.1	15.1	**149.1**
STBG Small Urban	7.3	8.1	8.2	8.4	8.6	8.6	8.6	8.6	8.6	8.6	**83.4**
STBG Rural	16.6	16.9	17.3	17.6	18.0	18.0	18.0	18.0	18.0	18.0	**176.4**
Off System Bridge	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	**50.4**
Transportation Alternatives Urbanized > 200K	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	**10.7**
Transportation Alternatives Urban 50K-200K	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4	**13.6**
Transportation Alternatives Small Urban 5K-50K	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	**7.6**

Highway - Federal	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	10-Yr Total
Transportation Alternatives Rural under 5K	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	**16.1**
Transportation Alternatives Flex	3.1	3.2	3.3	3.3	3.4	3.4	3.4	3.4	3.4	3.4	**33.3**
Carbon Reduction Urbanized > 200K	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	**13.9**
Carbon Reduction Urban 50K-200K	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	**17.6**
Carbon Reduction Small Urban 5K-50K	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**10.0**
Carbon Reduction Rural under 5K	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	**20.9**
Carbon Reduction Flex	3.2	3.2	3.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4	**33.6**
Highway Safety Improvement Prog	21.3	21.7	22.2	22.7	23.1	23.1	23.1	23.1	23.1	23.1	**226.7**
Rail-Highway Crossings	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	**19.6**
CMAQ	13.7	14.0	14.2	14.5	14.8	14.8	14.8	14.8	14.8	14.8	**145.3**
Metro Planning	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	**22.8**
SPR	7.1	7.3	7.4	7.5	7.7	7.7	7.7	7.7	7.7	7.7	**75.5**
PROTECT Program	10.3	10.5	10.7	10.9	11.1	11.1	11.1	11.1	11.1	11.1	**109.2**
Recreational Trails	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	**17.1**
Electric Vehicle Infrastructure	4.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	**61.7**
Total Federal Funding Sources	**$431.0**	**$440.4**	**$448.2**	**$456.0**	**$464.1**	**$464.1**	**$464.1**	**$464.1**	**$464.1**	**$464.1**	**$4,560.2**

Table 7-3 includes the expected local funds for the 10-years of the plan. Local funds are provided as a match to the Federal-aid funds used by local governments. These funds are seldom applied to ITD asset management projects. Usually, local matches are provided only when a local government accesses Federal-aid funds for a local bridge, pavement, or capacity project off the state highway system.

At the bottom of Table 7-3 is a summary of all expected revenues from State, Federal, and local sources. As can be seen at the far-right bottom row, a total of $11.022 billion is expected to be available from all sources for the years 2022-2031.

Table 7-3: Forecasted Local Revenue Sources Plus Summary of All Sources

ITD Funding & Use Summary ($ in Millions, rounded, 2022 dollars)

Highway - Local	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	10-Yr Total
					Anticipated Local Highway Funding						
Local Participating	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	**3.7**
Local Non-Participating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Local Match	8.3	8.3	9.0	9.1	9.2	9.2	9.2	9.2	9.2	9.2	**90.2**
Total Local Funding Sources	$8.7	$8.7	$9.3	$9.5	$9.6	$9.6	$9.6	$9.6	$9.6	$9.6	**$93.9**
Total Funding Sources	**$959**	**$1,407**	**$1,075**	**$1,065**	**$1,078**	**$1,080**	**$1,084**	**$1,088**	**$1,091**	**$1,095**	**$11,022**

Notes: Funding Sources

1. 1% increase out years
2. Flat-lined at FY 2027
3. Anticipate ongoing but authorization is year by year
4. Previously had -7% growth rate after forecast ended, no longer factored at that rate

Immediately below, Table 7-4 shows operational costs that are expected to be incurred between 2022 and 2031. These funds "come off the top" before revenues are made available for asset management purposes. These represent the essential expenditures needed for basic functions such as paying salaries, operating snowplows, maintaining garages and rest areas, paying for highway lighting, and other core functions. Total operational costs equal an estimated $2.995 billion for the 10 years.

Table 7-4: Department Operations Expenditures and Remaining Available Revenues

FY 2022 - 2031 Proposed ITD Ten-Year Transportation Plan
ITD Funding & Use Summary ($ in Millions, rounded, 2022 dollars)

Department Operations	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	10-Yr Total
Personnel	130	132	137	141	146	148	150	151	153	154	**1,443**
Operating Expenses	83	86	83	83	83	84	84	84	85	85	**841**
Equipment	36	36	59	36	36	36	36	36	36	36	**382**
Capital Facilities	10	23	10	10	10	10	10	10	10	10	**111**
Trustee and Benefits	21	29	21	21	21	21	21	21	21	21	**218**
Other Costs and Timing Adjustment Across Plan Years											**0**
Total Department Operations	**$280**	**$306**	**$310**	**$291**	**$296**	**$299**	**$301**	**$302**	**$305**	**$306**	**$ 2,995**

When the $2.995 billion in operating costs are subtracted from the $11.022 billion in expected revenue, then $8.027 billion remain for the highway program. Of the $8.027 billion, $7.704 billion is available for basic highway purposes. To that is added about $323 million in funds for specific purposes. That includes $6 million in local funds to match projects and $200 million in the TECM bonds the legislature directs to capacity projects. In addition, $117 million is provided for preliminary engineering, which generally is project design, and construction engineering, which involves oversight and inspection of projects during construction. ITD also participates in numerous discretionary funding opportunities, but these are not included here due to their unpredictable nature. These funds are spent according to the terms by which they are awarded, so a grant to replace a poor NHS bridge is still spent replacing a poor bridge, which will improve the NHS bridge performance measure.

Table 7-5: Funding Available after Operation Costs are Deducted

FY 2022 - 2031 Proposed ITD Ten-Year Transportation Plan
ITD Funding & Use Summary ($ in Millions, rounded, 2022 dollars)

Funding Available for Program	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	10-Yr Total
Highway Funding Plan (Adjusted with Match)	515	914	777	776	786	785	787	788	788	788	**7,704**
Programmed Local Participating in excess of annual HFP estimate	3	2	1	1	-	-	-	-	-	-	**6**
Programmed Local Non-Participating	-	-	-	-	-	-	-	-	-	-	**-**
TECM		200						-	-	-	**200**
PE & CE for State Funded Program (STF0)	15	27	13	11	10	8	8	8	8	8	**117**
Total Funding Available for Program	**$532**	**$1,142**	**$790**	**$788**	**$796**	**$794**	**$795**	**$797**	**$797**	**$797**	**$8,027**

Table 7-6 shows $4.198 billion is expected to be allocated for asset management and safety and capacity programs between FY2022 – FY2031. An estimated $2.899 billion is expected to be obligated on basic pavement and bridge programs. That represents about 26% of the total revenue as shown in Table 7-3.

Table 7-6: Funds Programed for Asset Management, Safety and Capacity Projects

FY 2022 - 2031 Proposed ITD Ten-Year Transportation Plan
ITD Funding & Use Summary ($ in Millions, rounded, 2022 dollars)

Funding for Transportation	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	FY2031	10 Yr Total
Pavement Funding	313	152	200	198	241	228	171	145	145	145	**1,938**
Bridge Funding	80	80	100	100	100	100	100	100	100	100	**960**
Supporting Infrastructure Assets	7	7	15	15	15	15	15	15	15	15	**132**
Safety & Capacity	60	60	60	60	60	60	60	60	60	60	**600**
Freight (x 30% for SHS)	3	3	3	3	3	3	3	3	3	3	**34**
Carbon (x 100% for SHS)	3	3	4	4	4	4	4	4	4	4	**36**
Protect	11	11	12	12	12	12	12	12	12	12	**118**
System Support	7	7	7	7	7	7	7	7	7	7	**65**
Board Unallocated	10	10	10	10	10	10	10	10	10	10	**100**
TECM		215									**215**
Funding for Transportation	**$494**	**$548**	**$410**	**$408**	**$452**	**$438**	**$381**	**$355**	**$355**	**$355**	**$4,197**

Table 7-7 provides a high-level summary of all the preceding tables. Out of $11.0 billion in revenue, 28% goes to operations, 10% to non-asset management programs such as highway safety and local programs, 34% goes to other programs and costs such as transportation alternatives, preconstruction costs, railroad crossings, SPR, etc., 2% goes to the TECM program which leaves 26% expected to be available to maintain the bridges and pavements on the State Highway System. The breakout of funding by NHS and non-NHS will be provided in Chapter 8, Investment Strategies as the PMS and BMS analysis includes recommended funding levels by work type for both systems.

Table 7-7: Summary of Revenue and Expenditures/Obligations

Total Ten-Year Revenue and Allocations	Percent of Total	
Total Revenue (billions)	**$11.02**	
Operations, Personnel, Equipment	$3.0	28%
Safety, Local and Other Non-Asset Management Programs	$1.1	10%
Other Programs and Costs (TA, PE/CE, RR SPR, etc.)	$3.8	34%
TECM Program	$0.2	2%
Pavement and Bridge Asset Management Programs	$2.9	26%

Photo 7-2: View of ITD Highway 77

Asset Valuation

Asset valuation is the assignment of monetary value to physical assets based upon their condition, cost to construct, age, obsolescence, and other factors. The rationale for reporting asset valuation is to ensure that investments are adequate to ensure that the public's investment in its highway network is maintained. Highway networks generally represent a state's largest capital investment. Investing adequately in them can ensure that future generations inherit a well-maintained system, and not a major liability that is in a state of disrepair and requires substantial investment to maintain.

ITD estimated the value of its assets for this asset management plan using the concept of Depreciated Replacement Cost. This is an accounting concept adopted in Australia and Great Britain. It seeks to estimate the value of highway assets "as is." That is, what would it cost to replace them "in kind" to their current conditions?

Bridge Asset Valuation

To calculate the depreciated replacement cost of ITD bridges, the analysis first estimates what it would cost to replace all of the ITD bridges. This provides an "as new" or "replacement cost" estimate of the ITD bridge assets. Using Federal Highway data on bridge size, age, condition, and cost per square foot to replace, Table 7-8 contains those estimated values.

Table 7-8: Estimated Depreciated Replacement Cost for ITD NHS Bridges.

Depreciated Replacement Cost Exercise for Structures							
System	**Total Sq.Ft.**	**Cost Per Sq.Ft.**	**Cost to Replace All**	**Average Condition**	**As New Condition**	**Discounted by Condition**	**Depreciated Replacement Cost**
Interstate	3,826,075	$400	$1,530,430,000	6.1	9	68%	$1,040,692,400.00
Non-IS NHS	4,577,808	$327	$11,496,943,216	6.1	9	68%	$1,017,921,386.88
Total	**8,403,883**		**$ 13,027,373,216**				**$2,058,613,786.88**

The logic of the analysis follows.

- FHWA bridge data indicates that ITD owns 8.4 million square feet measured by deck area of NHS bridges of which 3.8 million square feet on the interstate.
- The replacement cost for interstate NHS bridges is $400 per square foot and $327 per square foot for Non-interstate NHS structures.
- Multiplying the deck square footage by the cost per square foot to replace the bridges generates a total replacement cost of $3.0 billion to replace all of Idaho's NHS bridges.
- Bridges are rated from 0-9 with 9 representing an "as new" structure.
- The average condition of all ITD bridges is 6.1 out of the 0-9 scale.
- Dividing 6.1 by 9 equals 68%. In other words, ITD's bridges are in 68% of "as new" condition.
- Depreciating the Replacement Cost by 68%, which represents their current condition, generates a Depreciated Replacement Value of $2.1 billion.

ITD plans to invest about $100 million annually in bridge capital projects that include preservation, rehabilitation, and replacement. Additionally, each of the six ITD districts conducts in-house bridge maintenance, and some contract maintenance. The capital investment of $100 million represents a considerable level of investment and will be adequate to sustain current bridge investments for the next decade. It bases this estimate on past trends, which indicate that this level has been adequate to sustain conditions. In addition, when projected over 10 years, $1 billion will be invested in bridges, a very considerable investment that is forecasted by the ITD bridge management system to keep the NHS bridges in acceptable condition. Considering the relatively long-life of structures and slow annual deterioration, this investment is adequate to sustain asset values for the next decade. However, beyond 10 years, more of the department's large structure will surpass their fortieth year. A "wave" or "bubble" of higher bridge investment needs will occur over the next 20 years. These structures are likely to have a higher per square foot cost than the typical Idaho structure. ITD will begin planning for a long-term strategy to ensure that bridge conditions and asset values can be preserved in the decade following this asset management plan.

NHS Pavement Asset Valuation

A similar logic was used to calculate a depreciated asset valuation for NHS pavements in Table 7-9. This calculation is very conservative and does not include costs for right-of-way, lighting, safety elements or other costs such as design or inspection. It uses only a cost-per-lane mile estimate for pavement and multiplies it by lane miles.

Table 7-9: Depreciated Replacement Costs for ITD NHS Pavements

Depreciated Replacement Cost Exercise for Pavements						
System	**Lane Miles**	**Cost per Lane Mile to Replace**	**Pavement Replacement Cost**	**Average Condition**	**As-New Condition**	**Depreciated Replacement Cost**
Interstate	2530	$2,300,000	$5,819,000,000	87.3	100	$ 5,079,987,000
Non-IS NHS	4797	$1,150,000	$5,516,550,000	92.1	100	$ 5,080,743,000
Total	**7327**		**$11,335,550,000**			**$ 10,160,730,000**

- Idaho has 2,530 lanes miles of Interstate pavement and 4,797 lane miles of non-Interstate NHS pavement for total of 7,327 lane miles.
- ITD has generated a planning level estimate combining unit costs for urban and rural Interstate highways of $2,300,000 per lane mile for pavement replacement. For non-interstate NHS routes used a planning level cost of $1,150,000.
- As can be seen when the unit costs for pavement replacement are multiplied by the lane miles it generates a replacement cost of over $11 billion for NHS pavements.
- Current conditions indicate that the average conditions of interstate pavement is approximately 87.3 and non-interstate NHS pavement is approximately 92.1.
- Using those values as percentage equivalents (0.873 and 0.921) to discount conditions, an estimated depreciated replacement cost of just over $10 billion for NHS pavement is calculated.

Chapter 8 – Investment Strategies

ITD deploys a systematic process to develop and annually update its investment strategies. ITD publishes the Idaho Transportation Investment Program (ITIP), which is built on the STIP but provides more detail and includes a detailed project list. The Program Update Manual for the ITIP provides the funding information and instructions necessary for the annual update. This is updated annually and approved by the board.

Investment Strategy Requirements

FHWA requires the asset management plan to include investment strategies, which it defines as a set of strategies that result from evaluating various levels of funding to achieve State DOT targets for asset condition and system performance effectiveness at a minimum practicable cost while managing risks.

Regulations also say that states must have an investment strategy process that describes how investment strategies are influenced by:

- Performance gap analysis
- Life-cycle planning for asset classes or asset sub-groups
- Risk management analysis; and
- Anticipated available funding and estimated cost of expected future work types associated with various candidate strategies based on the financial plan.

An asset management plan shall discuss how the plan's investment strategies collectively would make or support progress toward:

- Achieving and sustaining a desired State of Good Repair over the life cycle of the assets
- Improving or preserving the condition of the assets and the performance of the NHS relating to physical assets
- Achieving the State DOT targets for asset condition and performance of the NHS, and
- Achieving the national goals for safety, relief of congestion, movement of freight and preservation or asset conditions.

The ITIP in many ways resembles the asset management financial plan that FHWA requires except that it addresses seven years and not 10. The common elements for both include:

- A multi-year estimate of revenues by revenue source
- A year-by-year allocation of funds by program
- A description of the board's rationale for changing allocations caused by changing asset conditions or crash rates
- Although risks and gaps are not described in those terms, the ITD narrative explains how ITD and its board allocate funds to meet the transportation needs of the state. The narrative describes the funding sources, the restrictions on each source, and how allocations of the available resources are made to optimize the state's transportation performance. Table 8-1 includes the month-by-month processes that lead to approval of the ITIP and the agency's STIP.

Table 8-1: The ITIP Development Cycle

ITIP Development Calendar	
January	ITD publishes estimates of available funding, program descriptions, program targets, and a call for projects to MPOs, the LHTAC, and ITD's six districts. Districts are provided in advance with ITD's pavement-condition data and pavement management system analysis of their district conditions and recommended treatments and investment levels. District Offices also continually collaborate with the headquarters bridge staff to assess bridge conditions and identify needed bridge treatments.
March/May	The Idaho Transportation Board reviews condition targets, progress from the past year, reviews the agency's performance dashboard and receives project requests. It then develops a draft ITIP.
June	The transportation board reviews the draft ITIP and approves releasing it for public review and comment.
July	The draft ITIP is provided for public review and comment.
August	ITD staff develops a draft final ITIP incorporating the public comments.
September	ITD submits its recommended ITIP to the board.
November	The board approves submitting the State Transportation Improvement Program (STIP) to FHWA for approval, and the STIP incorporates the first four years of the ITIP.
December	FHWA and the Federal Transit Administration approve the STIP.
Ongoing	The ITD obtains input from citizens, elected officials, tribal governments, state and Federal agencies, MPOs, the LHTAC, and other interested parties.

ITD's investment strategy process satisfies the Federal requirements, although the ITIP process predates the Federal requirements by many years. This section examines each Federal requirement and how it is addressed.

Performance Gap Analysis

ITD staff and the Idaho Transportation Board review gaps in performance annually as part of the process for developing the ITIP, which includes the investment strategies. ITD regularly updates its performance dashboard and the transportation board reviews the results. The performance reports include reviews of trends such as bridge and pavement conditions and crash rates.

The review also includes consideration of sub-network changes such as changes in the six districts. Pavements are ranked by three criteria, cracking, International Roughness Index (IRI), and rutting.

As reported in Chapter 2, ITD's Interstate Highway System conditions are much better than the Federal maximum Poor percentage permitted. While the Federal maximum amount of "Poor" Interstate pavement allowed is 5%, ITD has only 0.3% "Poor" Interstate pavements, and only 0.7% of the non-interstate NHS. Only 3.5% of NHS bridge deck area is "Poor" compared to the allowable maximum of 10%.

In addition to evaluating the physical condition and gaps of bridge and pavement assets, as discussed in Chapter 4, ITD maintains programs designed to analyze and produce projects for freight, congestion mitigation, and safety. Selected projects produced by those programs produce impacts to the material condition of bridges and pavements. Those projects are programmed into and considered by both TAMS and BrM during analysis.

Life-Cycle Planning Influence

ITD's allocation of funds to bridges and pavements are also influenced by life-cycle planning analysis. Chapter 5 described in detail ITD's pavement management model. The model is run annually with updated pavement condition data. Model runs produce recommended statewide and district-by-district pavement programs based upon a mix of treatments to extend the life of pavements. The amounts needed to sustain pavements are the basis for the ITD staff's recommended pavement program funding levels that are presented to the Transportation Board.

Once funds are allocated to the districts, the districts develop their pavement programs. They base their program upon both the pavement model recommendations as well as their field observations and the need to coordinate the timing of projects with other projects on their local networks. The pavement management staff updates the candidate projects with the programmed projects, then re-runs the pavement model to update the expected system performance.

Bridges are selected based upon the engineering analysis of the headquarters and the districts who jointly develop a projects list. The bridge program includes a balanced mix of bridge replacement, rehabilitation, preservation, and maintenance based upon lifecycle principles. ITD extends the life of its structures as far as economically feasible through this mix of treatments.

Life-cycle considerations are also seen in the program allocations. Specific line items are included in the ITIP to fund both pavement and bridge preservation as well as bridge and pavement restoration. These funding splits provide the districts revenues specifically dedicated to preservation, which they can use to extend the life of pavements and bridges. Additionally, district maintenance crews perform regular bridge and pavement maintenance, which also extends the life of the assets.

Risk Analysis

ITD strategies are also driven by the need to reduce threats to asset conditions and the performance of the highway system. The highest ranked risks in the risk register are reflected in the investments and strategies undertaken by the department. For example, one of the highest ranked risks is that if programming decisions are dictated by the Idaho Legislature and do not reflect asset management priorities then the department may not be able to sustain adequate asset investment levels. To respond to this risk, ITD identified the need to urge legislators to continue giving high priority to ITD's recommended investment levels for bridges and pavements.

Another highly ranked risk-mitigation strategy is to continue investing in bridge maintenance crews to ensure adequate maintenance of structures. An opportunity is the potential benefits if the department further improves its pavement management system, which it intends to do.

Several of the risks to asset conditions that were identified were ranked as low because the department is committed to asset management. For example, the risk of ITD de-emphasizing asset management was rated as low because of the widespread commitment to asset management in the department.

One long-term risk that was identified and which will be addressed is the need to develop a long-term plan for managing the department's largest structures. Although these structures generally are in "Good" condition now, they are aging and will require significant investment over the next two decades. To respond to the risk of declining conditions among the largest structures, ITD has developed a multi-decade plan for rehabilitating or replacing its largest structures.

Funding Allocations and Overall Tradeoff Analysis Strategy

Over the years, there have been many forces guiding how ITD would allocate funding between bridges, pavements, and other initiatives. In recent years, this question has received more analytical attention. ITD's method of tradeoff analysis starts with modeling of bridges and pavements at the system level. Using the individual asset management systems, multiple scenarios are run, each one representing a given funding level. The scenarios are set up to maximize system benefit at minimum cost. This analysis results in the creation of an optimal portfolio of projects for each funding scenario considered. ITD then captures the system condition, e.g., percent of pavement in good or fair condition, associated with a modeled year and funding level.

In any given year, the projected required funding level to meet all state targets is often larger than the real funding level available. In those cases, projects are considered individually

and removed from both the bridges and pavement programs until a balanced solution can be reached.

The following investment strategies for both pavements and bridge are noted because they result from evaluating various levels of funding to achieve State DOT targets for asset condition and system performance effectiveness at a minimum practicable cost while managing risks.

NHS Pavement Investment and Performance

ITD estimates it will allocate a total of $1.94 billion between 2022 and 2031 for pavement projects, including Interstate, Non-Interstate NHS and SHS. The ITD TAMS is used to assist in programming and modeling the performance of budget allocations for Pavements, including the asset condition impact of projects selected for *non-asset* condition reasons such as resiliency, congestion, freight, or safety purposes.

Analyses are conducted by:

1) Running a multi-Constraint Optimization Analysis of budgets using ITD TAMS Management Sections (ITD typical project lengths) and optimizing the cost-benefit for those sections.
    a. Years 1-7 are frozen as they represent the ITD commitment to the public to complete projects.
2) Taking the results of this initial analysis and executing an analysis that estimates the impact of the Step 1 Master Work Program (MWP) against the 1/10th Mile Map-21 Analysis Sections to generate NHS results.
3) For the final 3 years of the analysis, 3 different budgets were floated to allow the Pavement Management System to select candidates:
    a. $115 million/year for 10 years (-$30M)
    b. $145 million/year for 10 years (typical)
    c. $175 million/year for 10 years (+$30M
4) Generate Good/Fair/Poor statistics for the MAP21 statistics from these analyses and to report them out using a report built in TAMS.

The output of this process facilitates ITD assessing NHS performance across various investment levels. To be clear, the investment level is forecasted across the entire SHS and the results are then extracted for each sub-network.

Figure Figure 8-1 shows the 10-year forecast of “Good” and “Poor” performance of the interstate for ITD investment levels of $115/$145/$175 million (for the last three years of the 10-year analysis) across the network. Table 8-2 summarizes the budgets used in the pavement analysis. Years 1-7 were fixed based on the ITD work plan. The final 3 years were varied as noted above and shown in Table 8-2.

Table 8-2: Budgets used for Pavement Analysis

Analysis Year	**Budget** $M
FY2022	312.87
FY2023	151.89
FY2024	200.18
FY2025	198.23
FY2026	241.24
FY2027	227.90
FY2028	170.80
FY2029	115 / 145 / 175
FY2030	115 / 145 / 175
FY2031	115 / 145 / 175

The current 7-year workplan indicates a slow decrease in Interstate pavement condition over several years. As shown, in Figure 8-1, a future investment of $145 million in the SHS is enough to reach a % "Good" target for MAP21 metrics of 50 for the Interstate NHS routes by 2030. For the $115 million funding level, the forecast shows achieving 50% "Good" performance right at the end of the 10-years analysis period. For $175 million funding level, 50% is achieved earlier than the current funding level. While decreasing over time, Interstate pavement performance does stay slightly above the ITD specified target of 35% "Good" pavement. In the later years, as additional optimization comes into play, performance picks up and exceeds the target. It is important to note that regardless of the funding level, it is forecasted that ITD interstate performance will stay well below the 4% threshold for percent "Poor" interstate pavement, never exceeding 1%.

Figure 8-1: Interstate NHS - Condition vs Targets

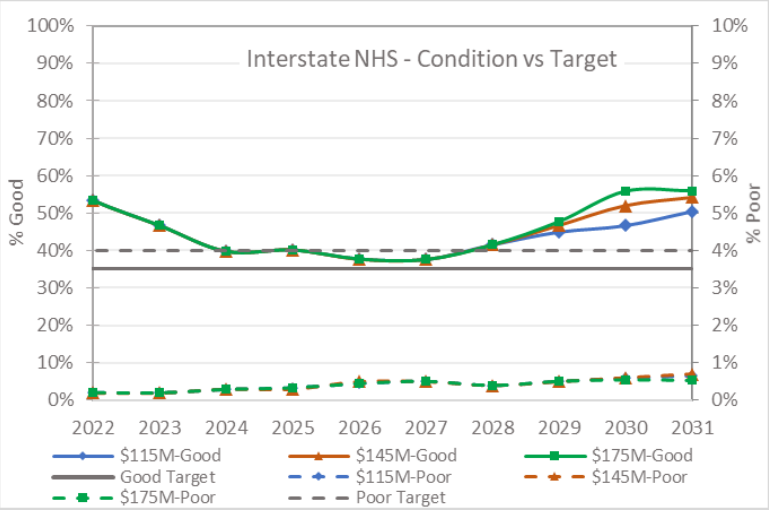


Figure 8-2 shows the NHS Non-Interstate performance for the same investment levels. It is interesting to note that in years 2023 through 2025, the percentage of "Good" pavement falls off notably but does stay just above the selected ITD goal of 20% of pavements in "Good" condition. Similarly, to Interstate Pavements, as funding flexibility increases in 2029, the percentage of "Good" pavements begins to rapidly increase, exceeding 50% "Good" by the end of the analysis for both the $145 million and $160 million funding levels. Regardless of the funding level, it is forecasted that ITD will remain *well below* the "Poor" pavement performance threshold of eight percent. As discussed in Chapter 5, the starting point for analysis is output from TAMS, but local conditions impact the final selection of treatments by ITD districts.

Figure 8-2: Non-Interstate NHS - Conditions vs Target

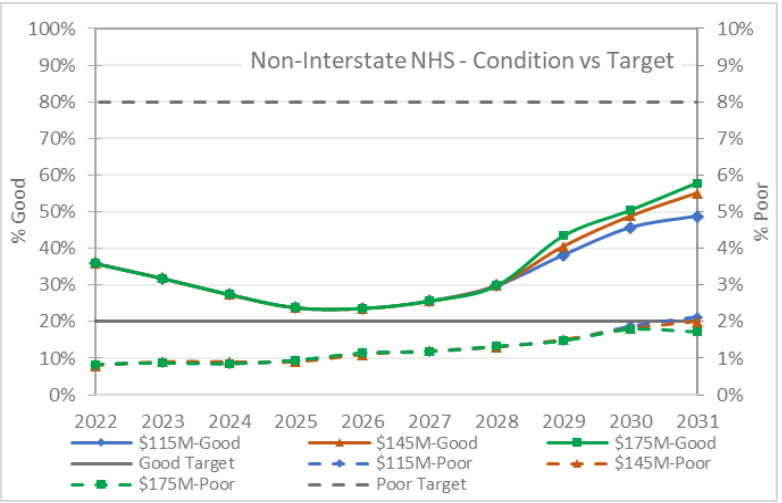


Figure 8-3 shows the total funding by work type as selected by the analysis on the entire highway system, including non-NHS routes. Note that Years 1-7 are pre-programmed as part of the ITIP process and based on past analysis and programming efforts. The main item to note is that the 7-year program is heavily geared towards rehabilitation – projects that are correcting major deficiencies. This approach moves the condition of poor condition sections upward. However, as less preservation is carried out, additional sections of pavement are likely to fall from good to fair. In years 8-10, the TAMS optimization engine is choosing primarily preservation activities – which would include thin overlays and chip seals.

Figure 8-3: Budget by Work Type – State Highway System

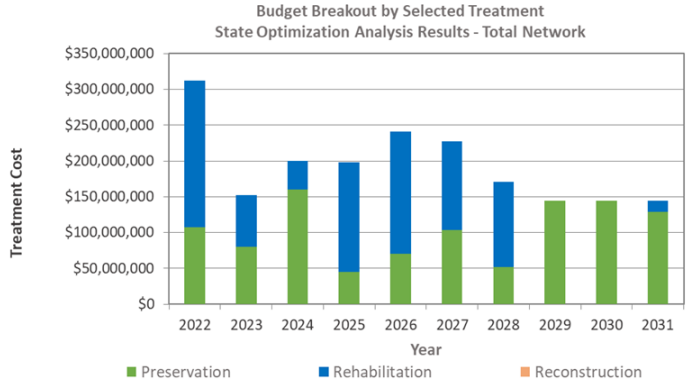
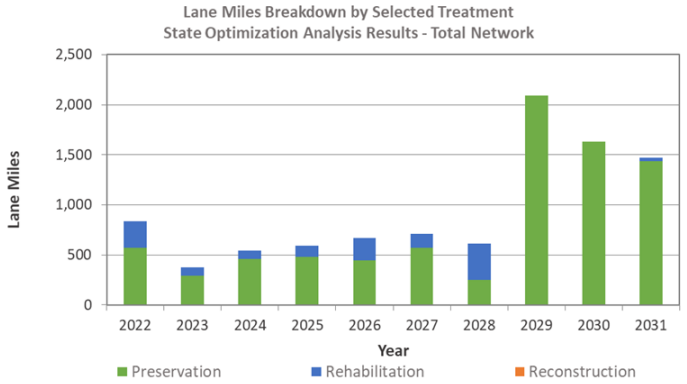


Figure 8-4 translates the expenditures into lane-miles paved. It becomes clear why a rapid uptick occurs in the percent "Good" performance in the last 3 years of the analysis in both Figure 8-1 and Figure 8-2: Significantly more miles are recommended for paving using preservation treatments. Preservation is notably less expensive than rehabilitation, and thus more miles can be treated at a given investment level.

Figure 8-4: SHS Lane Miles Paved by Work Type



These results indicate that further exploration into fully using the capabilities of TAMS to optimize investments is warranted. Further study on the use of preservation vs rehabilitation strategies should be undertaken to achieve an optimal balance. Figure 8-5 through Figure 8-8 break out recommended expenditures and lane-miles treated by Interstate and non-Interstate NHS categories. It can be noted that the interstates have a focus on rehabilitation activities during the 7-year ITIP budget period.

Appendix A contains tabular summaries of analysis results. Appendix A also summarizes estimates for New Construction costs for TECM as well as Safety and Capacity.

Figure 8-5: Interstate NHS - Budget by Work Type

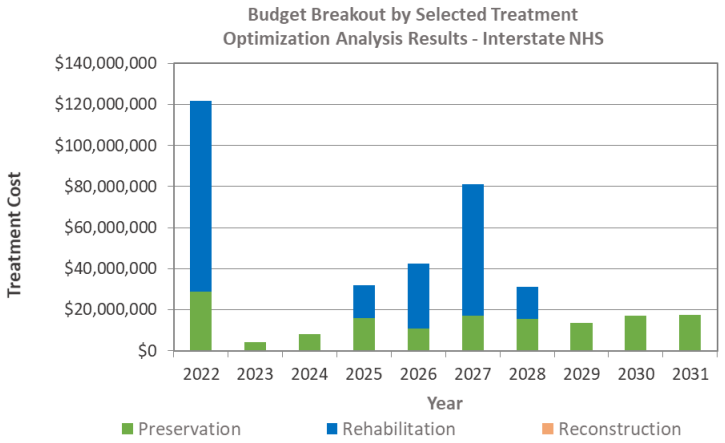


Figure 8-6: Interstate NHS – Lane Miles Paved by Work Type

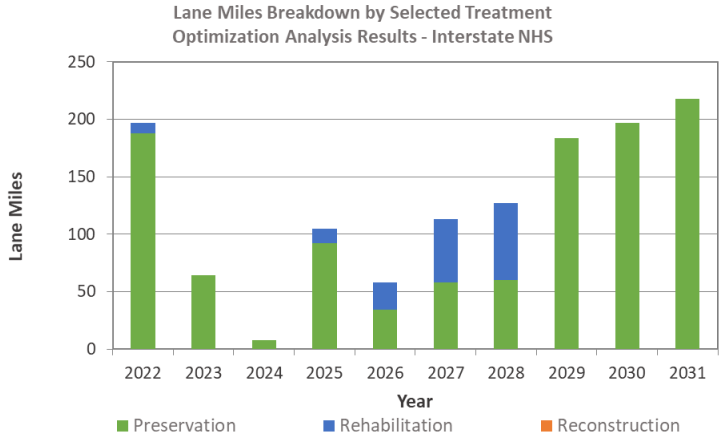


Figure 8-7: Non-Interstate NHS - Budget by Work Type

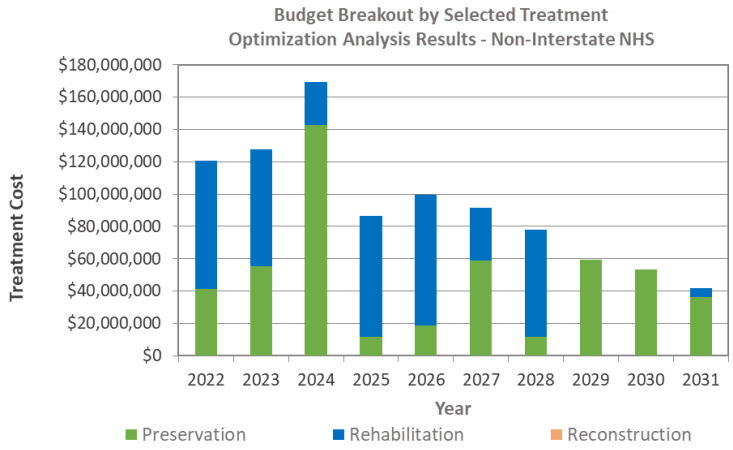
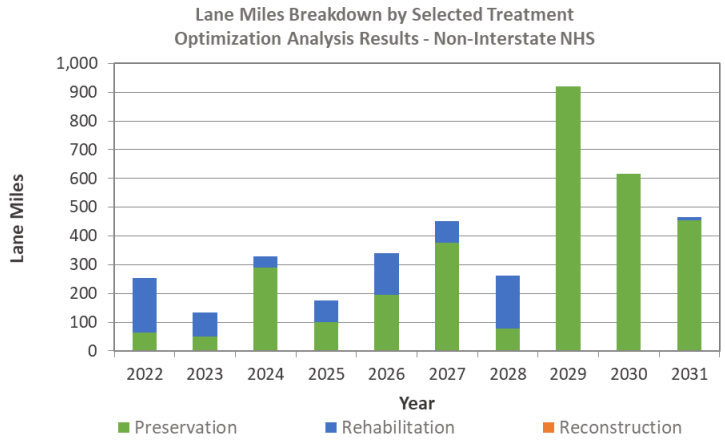


Figure 8-8: Non-Interstate NHS – Lane Miles Paved by Work Type



Pavement Investment Conclusions

Figures 8-1 and 8-2 suggest that the planned investment strategy for ITD pavement results in exceeding Federal MAP21 metrics in the outlying years of the projections. However, attention should be called back to Figure 3-8. In this figure, it is clear that ITD is looking at a trend that quickly drops below the desired state metric of 80% of pavements good or fair condition. This trend is true for all routes: Interstate, NHS, and SHS. The difference in projected performance between the Idaho and Federal performance measures is striking and worth investigating. At this time, we are not proposing changes to the Idaho performance measures and will monitor actual performance to confirm the projected trend. *Federal measures are set to reflect the results we anticipate based on managing to Idaho's performance measures.*

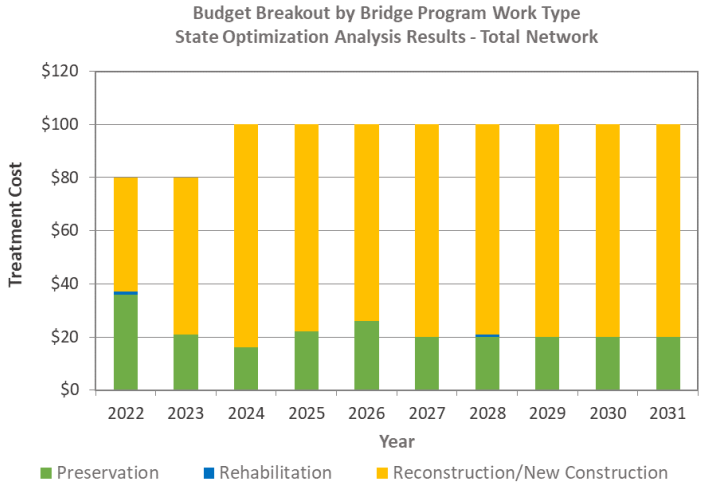
While not programming specifically to Federal metrics, ITD will continue to monitor and adjust MAP21 targets over time.

Bridge Investment and Performance Forecast

State Highway System (SHS) Investment and Performance

ITD has dedicated bridge program funding devoted to all SHS bridges including NHS structures. ITD directs approximately 20% of its bridge funding to preservation and 80% to rehabilitation and replacement (also known as reconstruction). Figure 8-9 shows estimated ITD bridge program funding in the FHWA defined work categories[2] of preservation, rehabilitation, and reconstruction/new construction. Bridge preservation is defined as actions or strategies that prevent, delay, or reduce deterioration of bridges or bridge elements; restore the function of existing bridges; keep bridges in good or fair condition; and extend their service life. Rehabilitation involves major work required to restore the structural integrity of a bridge, as well as work necessary to correct major safety defects. Reconstruction involves replacement of an existing bridge with a new facility constructed in the same general traffic corridor.

Figure 8-9: ITD SHS Annual Bridge Program Funding By Work Type

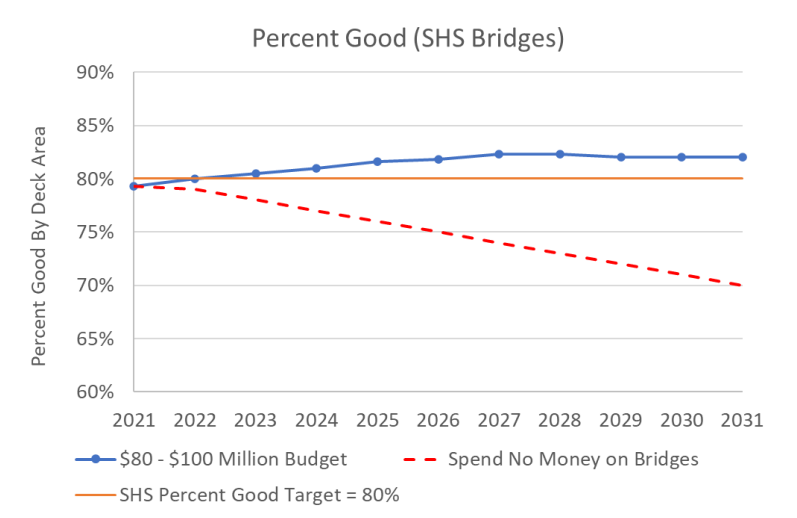


[2] Bridge Preservation Guide, Maintaining a Resilient Infrastructure to Preserve Mobility, Federal Highway Administration, Spring 2018

ITD bridge investments are driven by its state-defined bridge condition performance measure of "Good" and "Not-Good" using ITD's unique measure of "Good" being all bridges with an overall NBI rating of 6 or better and "Not-Good" being structures with an overall NBI rating of 5 or worse. ITD has had a consistent funding stream of $80 million annually to the bridge program and anticipate an increase to $100 million beginning in 2024. With that funding, ITD predicts they can meet and maintain their SHS State of Good Repair goal of 80% "Good" through 2031 as shown in

Figure 8-10. The figure also shows the impact of not having that funding.

Figure 8-10: SHS Percent of Bridges in Good Condition – ITD Performance Measure



NHS Investment and Performance

ITD also monitors and predicts the performance of their NHS structures in accordance with the FHWA national performance measures of "Good" and "Poor." As shown in Figure 8-11, ITD expects to spend approximately 49% of their bridge program budget on NHS bridge preservation, rehabilitation, and replacement projects in the next ten years. Spending on the NHS

Photo 8-1: Rainbow Bridge on SH55, ITD District 3

varies each year as determined by ITD analysis and strategy to preserve the NHS bridge network.

Figure 8-11: ITD NHS Annual Bridge Program Funding By Work Type

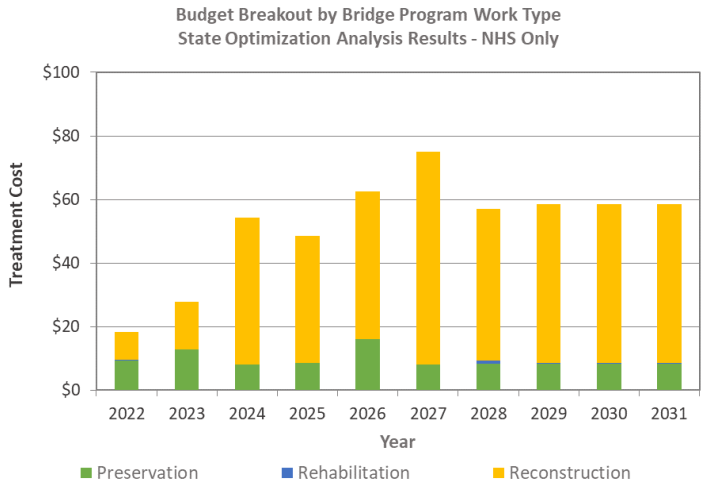
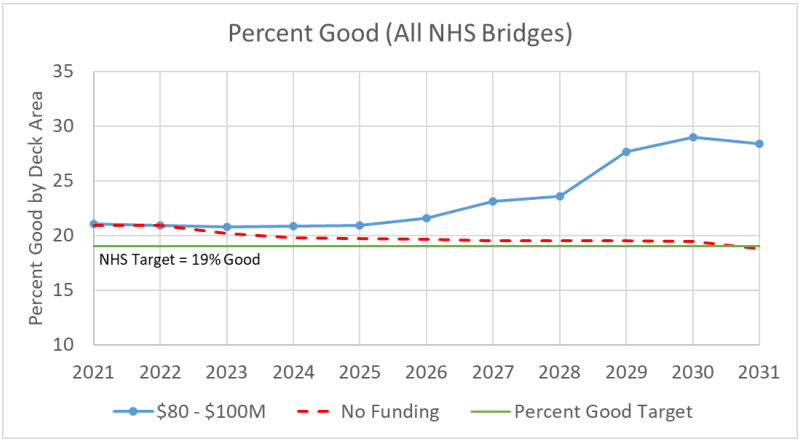
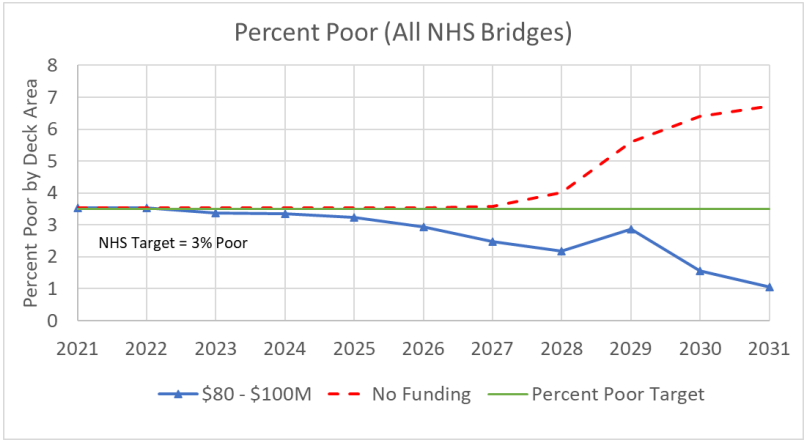


Figure 8-12 shows a ten-year forecast for Idaho Good and Poor NHS bridges along with a forecast given no funding to the program. Idaho predicts they will be able to continue to exceed their target of 19% "Good" over the next ten years given the planned budget. They also predict they will maintain the target of 3.5% "Poor" NHS bridge deck area through 2031.

See Appendix B for tabular breakouts of bridge expenditures over time.

Figure 8-12: Forecast Idaho NHS Bridge Performance (Percent Good and Poor By Deck Area)





Glossary of Terms and Acronyms

AASHTO: American Association of State Highway and Transportation Officials

AC: Asphalt Pavement

ACLM: Annualized Cost Per Lane-Mile

AADT: Annual Average Daily Traffic

ASTM: American Society for Testing and Materials

ASI: Asset Sustainability Index

ACR: Asset Consumption Ratio

ASR: Asset Sustainability Ratio

Asset management: Asset management means a strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on both engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the life cycle of the assets at minimum practicable cost.

Asset Management Plan*:* A document that describes how a State DOT will carry out asset management. This includes how the State DOT will make risk-based decisions from a long-term assessment of the National Highway System (NHS), and other public roads included in the plan at the option of the State DOT, as it relates to managing its physical assets and laying out a set of investment strategies to address the condition and system performance gaps. This document describes how the highway network system will be managed to achieve State DOT targets for asset condition and system performance effectiveness while managing the risks, in a financially responsible manner, at a minimum practicable cost over the life cycle of its assets.

BMS: Bridge Management System

BrM: AASHTO's Bridge Management Software, formerly known as PONTIS.

Bridge deck: Decks are the horizontal portion of the bridge, usually made of concrete; the deck is atop the superstructure and includes the traffic-carrying surface.

Bridge superstructure: The portion of the bridge that supports the deck, spans the opening, and connects the substructure elements.

Bridge substructure: The portions of the bridge including piers and abutments that transfer the load from the superstructure to the foundations.

BRR: Backlog Reduction Ratio

CAR: Cost Accrual Ratio (CAR)

CE: Construction Engineering

CMAQ: Congestion Mitigation/Air Quality

Cracking: As measured by the Federal definition, cracking refers to the percentage of the total asphalt pavement area for a given section that exhibits visible cracking., the percentage of concrete slabs that exhibit cracking for jointed concrete pavement, and the percentage of the total area that exhibits cracking or other visible distress for continuously reinforced concrete pavement.

Culvert: A buried structure supporting a roadway with a span of at least 20-feet in length

Department/ITD: The Idaho Transportation Department

ERM: Enterprise Risk Management

FAST Act: Fixing America's Surface Transportation Act

Faulting: A difference in elevation across a joint or crack usually associated with concrete pavement.

Federal-aid highways: A network of approximately 1 million miles of roads and highways out of about 4.1 million miles of public roads nationwide. Several categories of Federal Highway funds are eligible to be spent on the Federal-aid network. Most Federal-aid funds are not eligible off the Federal-aid system except for some bridge, safety, and transportation alternatives funds.

Federal Highway Administration (FHWA): The division of the U.S. Department of Transportation that oversees Federal highway programs.

Financial plan: As defined by FHWA, a financial plan means a long-term plan spanning 10 years or longer, presenting a State DOT's estimates of projected available financial resources and predicted expenditures in major asset categories that can be used to achieve State DOT targets for asset condition during the plan period, and highlighting how resources are expected to be allocated based on asset strategies, needs, shortfalls, and agency policies.

FWD: Falling Weight Deflectometer

GARVEE: Grant Anticipation Revenue Vehicle

GIS: Geography Information System

GPR: Ground Penetrating Radar

HDA: Highway Distribution Account

HFP: Highway Funding Plan

HPMS: Highway Performance Monitoring System

HSIP: Highway Safety Investment Program

IDI: Individual Distress Index

Interstate Highway System: A national network of 48,500 miles of freeways signed as Interstate Highways.

Investment strategies: Investment strategy means a set of strategies that result from evaluating various levels of funding to achieve State DOT targets for asset condition and system performance effectiveness at a minimum practicable cost while managing risks.

IRI: The International Roughness Index (IRI) is a statistic used to estimate the amount of roughness in a measured longitudinal profile. It measures inches of roughness, or "bounce", per mile of road.

Idaho Transportation Department (ITD) Board: A board that oversees the operations of the Idaho Transportation Department. The Idaho Transportation Board establishes state transportation policy and guides the planning, development and management of the transportation network.

ITIP: Idaho Transportation Improvement Plan. This is the spending plan that ITD uses to track and manage the funding for ITD's various programs, partnership, and projects it uses to manage the transportation system.

LCA: Lifecycle Cost Analysis

LCP: Lifecycle Cost Planning

LHTAC: Local Highway Technical Assistance Council

LRS: Linear Referencing System

Local highways: Streets and roads owned by the cities and counties, as opposed to ITD.

Measures: As defined by FHWA, measures are an expression based on a metric that is used to establish targets and to assess progress toward achieving the established targets.

MAP-21: The Moving Ahead for Progress in the 21st Century act signed into law on July 26, 2012.

MMS: Maintenance Management System

MPO: Metropolitan Planning Organization

MWP: Master Work Program

National Highway System (NHS): Is a network of 222,000 miles that include the Interstates as well as other major arterials.

NBI: National Bridge Inventory

OCI: Overall Condition Index

OTIS: Office of Transportation Investment System, which is the web-based application for collecting and reporting on the ITD transportation system and associated investments

PCC: Portland Cement Concrete

PE: Professional Engineering

Performance Gap: FHWA defines a performance gap as the difference between a desired condition level, or target, and the actual condition.

PFT: Pavement Friction Tester

PMS: Pavement Management System

QC: Quality Control

RDQMP: Roadway Data Quality Management Program

Resilience: the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions[1]

Risk: The positive or negative effect of uncertainty on objectives.

Risk Management: The systematic process of managing risk.

RSI: Remaining Service Interval

Rutting: Rutting means longitudinal surface depressions in the pavement derived from measurements of a profile transverse to the path of travel on a highway lane.

S & C: Safety and Capacity

SHA: State Highway Account

SHS: State Highway System

SIPF: Strategic Initiatives Program and Fund

SPR: State Planning and Research

State of Good Repair: Means ITD is achieving the performance targets of Idaho's TAMP.

STBG: Surface Transportation Block Grant

STIP: State Transportation Investment Program

STP: Surface Transportation

TAMP: Transportation Asset Management Plan

TAMS: Transportation Asset Management System

TAP: Transportation Alternatives Program

Target: As defined by FHWA means a quantifiable level of performance or condition, expressed as a value for the measure, to be achieved within a time period required by the Federal Highway Administration (FHWA).

TECM: Transportation Expansion and Congestion Mitigation

VMT: Vehicle Miles Traveled

Appendix A – Pavement Analysis Output Tabular Summaries

Figure A-1: SHS (Total Network) Budget by Work Type - $145M Scenario

Year	Rehab	Recon	Preservation	Total by Year
2022	$149.48 M	$0 M	$91.94 M	**$241.42 M**
2023	$77.97 M	$0 M	$60.98 M	**$138.95 M**
2024	$38.65 M	$0 M	$159.07 M	**$197.72 M**
2025	$149.96 M	$0 M	$39.29 M	**$189.25 M**
2026	$169.53 M	$0 M	$69.59 M	**$239.12 M**
2027	$128.97 M	$0 M	$99.89 M	**$239.84 M**
2028	$110.84 M	$0 M	$46.55 M	**$157.4 M**
2029	$0 M	$0 M	$144.97 M	**$144.97 M**
2030	$0 M	$0 M	$144.93 M	**$144.93 M**
2031	$15.46 M	$0 M	$128.99 M	**$144.46 M**
Total	**$840.87 M**	**$0 M**	**$986.2 M**	**$1838.06 M**

Figure A-2: NHS Interstate Budget by Work Type - $145M Scenario

Year	Rehab	Recon	Preservation	Total by Year
2022	$46.51 M	$0 M	$25.58 M	**$72.09 M**
2023	$0 M	$0 M	$4.41 M	**$4.41 M**
2024	$0 M	$0 M	$4.11 M	**$4.11 M**
2025	$16.13 M	$0 M	$10.63 M	**$26.76 M**
2026	$29.48 M	$0 M	$11 M	**$40.49 M**
2027	$57.85 M	$0 M	$16.45 M	**$74.3 M**
2028	$20.13 M	$0 M	$15.69 M	**$35.81 M**
2029	$0 M	$0 M	$13.73 M	**$13.73 M**
2030	$0 M	$0 M	$17.2 M	**$17.2 M**
2031	$0 M	$0 M	$17.44 M	**$17.44 M**
Total	**$170.1 M**	**$0 M**	**$136.24 M**	**$306.34 M**

Figure A-3: NHS Non-Interstate Budget by Work Type - $145M Scenario

Year	Rehab	Recon	Preservation	Total by Year
2022	$82.85 M	$0 M	$46.24 M	**$129.09 M**
2023	$77.97 M	$0 M	$36.66 M	**$114.63 M**
2024	$26.69 M	$0 M	$143.22 M	**$169.91 M**
2025	$124.73 M	$0 M	$11.91 M	**$136.64 M**
2026	$76.35 M	$0 M	$17.62 M	**$93.97 M**
2027	$33.46 M	$0 M	$66.98 M	**$100.44 M**
2028	$68.68 M	$0 M	$7.2 M	**$75.89 M**
2029	$0 M	$0 M	$59.16 M	**$59.16 M**
2030	$0 M	$0 M	$53.21 M	**$53.21 M**
2031	$5.68 M	$0 M	$36.24 M	**$41.92 M**
Total	**$496.41 M**	**$0 M**	**$478.45 M**	**$974.86 M**

Figure A-5: NHS Interstate Condition Summary - Federal Metrics

Year	Good	Fair	Poor
2022	53.4%	46.4%	0.2%
2023	46.7%	53.1%	0.2%
2024	39.8%	59.9%	0.3%
2025	40.2%	59.5%	0.3%
2026	37.7%	61.8%	0.5%
2027	37.6%	61.9%	0.5%
2028	41.5%	58.1%	0.4%
2029	46.7%	52.8%	0.5%
2030	52.0%	47.5%	0.6%
2031	54.2%	45.1%	0.7%

Figure A-1: NHS Non-Interstate Condition Summary - Federal Metrics

Year	Good	Fair	Poor
2022	35.9%	63.3%	0.8%
2023	31.9%	67.3%	0.9%
2024	27.5%	71.7%	0.9%
2025	23.9%	75.2%	0.9%
2026	23.7%	75.2%	1.1%
2027	25.7%	73.1%	1.2%
2028	29.9%	68.8%	1.3%
2029	40.6%	57.9%	1.5%
2030	48.8%	49.3%	1.8%
2031	55.1%	42.9%	2.0%

Table A-6: Transportation Expansion and Congestion Mitigation New Construction

Year	Interstate	Non-Interstate	Total by Year
2022			
2023	$0.3 M	$19.58 M	**$19.88 M**
2024	$13.2 M	$78.93 M	**$92.13 M**
2025	$0.15 M	$81.71 M	**$81.86 M**
2026	$20.1 M	$9.1 M	**$29.2 M**
2027			
2028			
2029			
2030			
2031			
Total	**$33.75 M**	**$189.32 M**	**$223.07 M**

Table A-7: Safety and Capacity Improvements New Construction

Year	Interstate	Non-Interstate	Total by Year
2022			
2023		$41.51 M	**$41.51 M**
2024	$2.7 M	$32.25 M	**$34.95 M**
2025	$3.48 M	$55.47 M	**$58.95 M**
2026	$60.42 M	$124.67 M	**$185.09 M**
2027	$1.48 M	$44.48 M	**$45.96 M**
2028	$4.4 M	$41.84 M	**$46.24 M**
2029		$78.13 M	**$78.13 M**
2030			
2031			
Total	**$72.48 M**	**$418.35 M**	**$490.83 M**

Appendix B – Bridge Analysis Output Tabular Summaries

Table B-1: SHS Estimated (Total Network) Budget by Work Type - $80M - $100M Scenario

Year	Preservation	Rehabilitation	Reconstruction/New Construction	Total by Year
2023	$36 M	$1 M	$43 M	**$80 M**
2024	$21 M	-	$59 M	**$80 M**
2025	$16 M	-	$84 M	**$100 M**
2026	$22 M	-	$78 M	**$100 M**
2027	$26 M	-	$74 M	**$100 M**
2028	$20 M	-	$80 M	**$100 M**
2029	$20 M	$1 M	$79 M	**$100 M**
2030	$20 M	-	$80 M	**$100 M**
2031	$20 M	-	$80 M	**$100 M**
Total	**$201 M**	**$2 M**	**$657 M**	**$940 M**

Table B-2: NHS Estimated Budget by Work Type - $80M - $100M Scenario (Total Bridge Program)

Year	Preservation	Rehabilitation	Reconstruction	Total by Year
2023	$9 M	-	$9 M	**$18 M**
2024	$13 M	-	$15 M	**$28 M**
2025	$8 M	-	$46 M	**$54 M**
2026	$9 M	-	$40 M	**$49 M**
2027	$16 M	-	$46 M	**$62 M**
2028	$8 M	-	$67 M	**$75 M**
2029	$8 M	$1 M	$48 M	**$57 M**
2030	$8 M	-	$50 M	**$58 M**
2031	$8 M	-	$50 M	**$58 M**
Total	**$87 M**	**$1 M**	**$371 M**	**$459 M**

Appendix C – Highways Risk Register

Idaho Transportation Department - Risk Register						
Risk Identification			2021 Risk Ratings			
Risk #	Risk Title	Description of the Risk	Aggregate Impact	Likelihood	Risk Rating	Current Risk Response Action(s)
14	Increased funding	•Challenges related to being able to capitlaize on and respond to increased funding.	Very Significant	Likely	VH(O)	Ongoing efforts to maintain a prioritized list of approved capital and operational projects ready for execution. Strategic Initiatives and Early Ready projects. Continue to deliver projects earlier in the fiscal year. Corridor studies to aid scoping and estimating. Operations - facilities assessment plans, increased materials, equipment. Identification of projects that could be started sooner. State general fund may also provide money for highways but still need to gather more info on this. Need to also consider impact to operation's resources if additional expansion occurs. Q4 2021: Meeting with outside agencies to discuss increased work loads (Corps of Engineers, fish and game, SHPO, FHWA, etc.). Districts are having pre-advertisement meetings with contractors about large projects. Ongoing group meetings with TECM consultants/partners & ITD staff. ITD Board subcommittee had a listening workshop with local agencies about Federal Funding distributions (Board Policy 4028). Monitoring price escalations on key construction materials
21	Increasing the transportation system capacity to meet the need	• Challenges related to increased demand for transportation system infrustructure across a broad specturm of stakeholder needs.	Very Significant	Likely	VH	Transitioning from information solutions to integrated solutions in Connected Automated Technology (CAT) or Dynamic Signaling, resulting in a higher level of capacity. Purchase of INRIX Highway data for analytical purposes (adopted into several work flows) and have provided basic training to the district planners allowing for better reporting on congestion and high level analysis on the state highway systems. Initiated conversations on developing a statewide measure of congestion. Encouraged partnering with land-use agencies in urban environment when conducting corridor plans to better understand future needs or scenarios due to urban growth. For active transportation, Planning Services is evaluating implementation of Everyday Counts 5 – Safe Transportation for Every Pedestrian to help implement proven cost effective pedestrian safety counter measures and help streamline scoping/design for applicable projects. Support the governor's transportation funding plan. Fall 2021: Development for Approx. $9 billion worth of expansion projects has been initiated with environment docs as well as limited design for $1.5 billon
28	Right of Way process and procedures	• Challenges related to ROW information, process, and resorces.	Very Significant	Very Likely	VH	Spring 2021: ROW Processes are hindering projects significantly and posing risk to ability to deliver. The process is being re-evaluated. Recruitment is a challenge along with turnover. Right-of-way resources are lacking. Q4 2021: Right of Way summit held with key internal stakeholders. Identified additional PCNs for right of way positions, attention is to put a senior right of way agent in each district to help facilitate the process. Updating right of way exhibits for the Right of Way manual. Assigned a right of way liaison to the Deputy attorney General to assist in the coordination with the Right of Way Condemnation cases.
3	Managing current data and reliance of data used in performing critical functions	• Challenges related to the growth and use of data and information by ITD in manasing it's transportation system.	Moderate	Very Likely	H(O)	Created an IT Steering Committee. Created Data Stewards with Highways and DMV to identify ownership of data. Highways is gathering all data into one location. Created application portal to allow work from remote site with out VPN connections. Currently moving data and applications to the cloud and utilizing collaboration tools. Linking & sharing GIS centralized data with other applications (WARS, TAMS, Bridge, etc.). Linking and sharing data sources across multiple applications (WARS, TAMS, Advantage, GIS, etc.)
19	Efficient delivery of Plans, Specifications, and Estimates for bidding.	•Challenges related to project delivery to meet system needs, meet expectations, and adapt to funding changes.	Very Significant	Possible	H (T/O)	Continue statewide focus on statewide delivery of the ITIP. Continue perfecting Project Delivery Status and Report process that includes Management, PM's, DCE's, and Liaisons. Regular review and maintenance of Ready Early List of projects. Receive approval for projects to be added to the Early Development Program and develop projects to the approved level per the Early Delivery Policy. ETS now has a dedicated ASM for Highways, Admin/Aero, and DMV. ETS finishing plans for implementing DevOps around application support and enhancement. ETS is holding a monthly meetings to review status of each project w/ETS management. ETS PMO manager is monitoring projects and providing mentorship to project managers. Working with IT Steering Committee to identify method of ranking IT requests based on effort & impact
20	Forecasting future transportation system needs	Challenges related to changes in demographics, growth, system usage, urbinaization, connected, and autonomous vehicles.	Major	Likely	H	ITD participates in the AASHTO Connected Vehicle/Automated Vehicle Task Force through the AASHTO Planning Committee, Long range plan: migration and population increases in Idaho and identifies solutions to improve planning for these. Monitoring Connected Automated Technology (CAT) by using two variables - private vehicle use price and vehicle type - and opportunities from the IIJA. Planning Services and Data Analytics are planning to partition travel demand modeling duties. Planning Services has initiated conversations on developing a statewide measure of congestion. Completed and ready for evaluation and analysis in early 2022. Evaluating use of permanent remote workforce patterns - commuting pattern changes and out of state workforce residing in Idaho. Corridor plans being developed, integrating things such as land-use forecasting into corridor plans. Renewed subscription to INRIX travel speed data for 2022
29	Materials testing standards	•Challenges related to industry changes, accurate and sufficient testing, technogly, and workflow.	Major	Likely	H	An all testing firms expectations with COO annual meeting. Initiated the Industry/ITD Peer Review Advisory Group (PRAG) with quarterly asphalt leadership meetings. Facility improvements. Q4 2021: Currently revising Quality Assurance manual and procedures
48	Natural or other disasters that impact our roadways, bridges, airstrips and buildings	•Challenges with external factors that impact our system both man made and natural.	Major	Likely	H	Working to get a State wide on call agreement with a contractor (Geo technical stabilization) but this is not finalized 2021. Q4 2021: Working on assembling traffic incident response management team. Hazmat Roles and Responsibilities updated by December 2022
76	Consistent application of regs	•Challenges relating to consistent intereptation and application of regulations that guide ITDs actions.	Major	Likely	H	SOP's being developed for environmental. SHPO historic Hwys context review. Environmental training for PM's being developed - planned to delivery 1/21. Updating programmatic agreement with other agencies - F&G, USACE, SHPO complete; F&WS, BA w USFW and NOA underway; EPA on Sole Source Aquifers. New NEPA regulations September 2020 with significant changes to process and timeframes for completion, however FHWA may not have guidance for another year. Q4 2021: CEQ (Council on Environmental Quality) continues to evaluate environmental regulations creating uncertainty. Updating ITD noise policy

Appendix D – Damaged Asset Registry

ITD Damaged Asset Registry	
Legend:	Twice-Damaged
	Would not consider damaged asset
Last Updated	9/22/2022

11 total

HWY	BMP	EMP	County	Route ID	Measure From	Measure To	Damage Year	Asset Type	Road Type (if applicable)	Struct ID	Emergency Event	Repair Work Performed	Key Number	Project Number	Federal Aid Number (Info)	Comments/ Actions Needed
I-15	94.37	94.52	Bingham	01330AIN015	94.26693674	94.41444673	1997	Bridge	--	11491	--	bridge reconstruction, bridge approach work, bituminous concrete work, riprap, pier repair	KN06258	152057	IM-ER-CM-15-2(057)94	Same event
I-15	95.96	97.13	Bingham	01330AIN015	95.83063528	97.24695972	1997	Pavement	--	--	--	Bituminous concrete work, gravel or stone aggregate	KN07076	0152059-01	ER-15-2(059)96	
I-15	96.1	96.1	Bingham	01330AIN015	95.9683727	0	1997	Bridge	--	19225	--	Bituminous concrete work, bridge reconstruction	KN07079	152060	ER-15-2(060)96	
I-15	92.5	94.5	Bingham	01330AIN015	92.38360779	94.39478758	1997	Other	--	--	--	Reconstruction, realignment	KN07569	152066	ER-15-2(066)92	
US 95	175.4	181.4	Adams	01540AUS095	169.7405572	175.7346912	1997	Pavement	Asphalt	--	Landslide	asphalt reconstruction	KN06837	3110115	ER-3110(115)	Same event
US 95	178.3	178.3	Adams	01540AUS095	172.7146993	NULL	1997	Bridge	--	18275	--	bridge approach work, bridge replacement, 2 lanes, no added capacity	KN06501	3110122	ER-3110(122)	
US 95	210.35	210.65	Idaho	01540AUS095	204.7782247	205.0778765	1997	Pavement	Asphalt	--	Landslide	Riprap base and plantmix	KN07259	4110125	ER-4110(125)	--
US 95	67.25	178.23	Adams, Idaho, Washington	01540AUS095	86.4206806	129.5136958	1997	Pavement	Asphalt	--	Slide/Flood	Reconstruction, 3/4" aggregate base, plant mix, emulsified asphalt	KN06680	3110114-02	ER-3110(114)	--
US 95	172.94	181.3	Adams, Idaho	01540AUS095	166.7660051	175.6309296	1997	Other	--	--	--	Reconstruction, Riprap, Embankment stabilization	KN06847	3110116-01	ER-3110(116)	Same event
US 95	177.5	181	Adams, Idaho	01540AUS095	171.1256543	175.8488877	1997	Other	--	18280	--	Reconstruction, realignment, bituminous concrete work, bridge reconstruction, Pavement AND Bridge	KN06868	3110117	ER-3110(117)	
US 95	210.35	210.65	Idaho	01540AUS095	204.7782247	205.0778765	1997	Pavement	--	--	Slide	Rockfall fence	KN07082	4110122	ER-4110(122)	Slope stabilization
US 95	318	318	Boundary	01540AUS095	504.5575558	0	1997	Other	--	--	Slide	Pavement shoe, bituminous surface, shot rock, pit run rock, 3/4" base, plantmix	KN07085	5110116	ER-5110(116)	Roadway/Slope stabilization
US 95	182.4	182.4	Idaho	01540AUS095	176.7524461	176.7809616	1997	Bridge	--	18285	--	Replacement	KN06866	4110120	ER-4110(120)	--
US 95	210	211	Idaho	01540AUS095	204.4285968	205.4275512	2005	Pavement	--	--	Landslide	rock slope scaling, permanent rock fall protection fence, roadway remove and repair	KN10446	A101446	A010(446)	--
US 95	498	--	Boundary	01540AUS095	484.3859056	484.5839199	2017	Pavement	Asphalt	--	Landslide	excavation, erosion control, rock mulch in place, cold milling, asphalt, 3/4 gravel, geotextiles, horizontal drains	KN20339	A020339	A020339	--
SH 200	60.4	60.9	Bonner	01610ASH200	30.59286597	31.09296588	1997	Other	--	--	--	Reconstruction, Realignment	KN07089	5120103	ER-5120(103)	Roadway/Slope stabilization
SH 57	1.8	7.2	Bonner	01620ASH057	1.8047309	7.19643649	1997	Pavement	Asphalt	--	--	plantmix, rock ballast, 36" CMP	KN07088	5778100	ER-5779(100)	--
SH 57	1.92	2.1	Bonner	01620ASH057	1.92383105	2.10259987	2017	Pavement	Asphalt	--	Landslide	Excavation, rock mulch in place, erosion control, asphalt, 3/4" gravel in place, gabion Baskets, shoring	KN20340	A020340	A020340	--
SH 97	76.968	76.992	Kootenai	01790ASH097	16.33866511	16.36275457	2017	Pavement	Asphalt	--	Landslide	Excavation, rock mulch in place, erosion control, asphalt, 3/4" gravel in place, gabion Baskets, shoring	KN20343	A020343	A020343	--
Clear Creek Rd McConnel Property near the town of Kooksia	108.96	108.96	Idaho	01798AOH000	8.95941591	0	2019	Pavement	Asphalt	--	Flood	Replaced Rip rap, backfilled to divert stream, gravel fill, temp diversion dam, plant mix paving, erosion control, riprap geotextile	KN22474	A022474	A022474	--
Clear Creek, Ketelo Property, near Kamiah	107.18	107.18	Idaho	01798AOH000	7.179339	0	2019	Other	Shoulder Riprap	--	Flood	Repair of roadway shoulder, diversion dam, riprap, riprap geotextile, erosion control planting	KN22475	A022475	A022475	--
Clear Creek Rd above Elk Meadow Property near the Town of Kooksia	105.1	105.1	Idaho	01798AOH000	5.10074455	0	2019	Pavement	Asphalt	--	Flood	Temp diversion dam, excavation, plant mix paving, MSE wall, riprap, seeding mulck tackifier, riprap geotextile, erosion control planting	KN22477	A022477	A022477	--
Clear Creek Rd Elk Meadows near Town of Kooskia	105.18	105.18	Idaho	01798AOH000	5.17993979	0	2019	Pavement	Asphalt	--	Flood	Temp diversion dam, excavation, plant mix paving, granular borrow, riprap, riprap geotextile, erosion control planting	A022478	A022478	A022478	--
I-15	100.014	100.014	Idaho	01801AOH000	0.01000912	0.06313893	1997	Bridge	--	29305	--	Reconstruction, bridge approach work	KN08528	2500102	ER-2500(102)	--
SH 5	5.8	6	Benewah	01820ASH005	5.76885674	5.96274927	2017	Pavement	Asphalt	--	Landslide	Excavation, shoe fly construction, fill with shot rock and base, geogrid and geofabric, asphalt paving of temp show fly, guardrail, plantmix paving, erosion control, conc barrier new and rem old	KN20338	A020338	A020338	--
Near Glenwood and Adams Rd	101.3	101.3	Idaho	01841AOH000	1.29945217	0	--	Other	Asphalt	--	Flood	replacing roadways, embankments, repaving, and upsizing culvert, structural fill, riprap, head wall, plant mix paving, eropsion control, wattles, riprap, riprap geotextiles	KN22485	A022485	A022485	--
SH 162	15.83	15.83	Idaho	01950ASH162	15.8124701	NULL	1997	Other	--	--	Flood	48" pipe culvert, 96" pipe culvert, concrete paved pipe invert (96"), riprap, concrete paved pipe invert (128" x 83")	KN06865	4716102	ER-4716(102)	Pipe Replacement

HWY	BMP	EMP	County	Route ID	Measure From	Measure To	Damage Year	Asset Type	Road Type (if applicable)	Struct ID	Emergency Event	Repair Work Performed	Key Number	Project Number	Federal Aid Number (Info)	Comments/ Actions Needed
SH 14	39	39	Idaho	01970ASH014	39.1157149	0	2016	Pavement	Asphalt	--	Landslide	Rockfall rail, slope stabilization, repair pavement	KN19782	A019782	A019782	--
SH 71	6	10	Washington	01980ASH071	5.9388576	9.93814894	1998	Pavement	Asphalt (? "Plantmix overlay")	--	Landslide	Slope Stabalization/slide protection	KN07541	3882102	ER-3882(102)	--
SH 71	15.6	15.6	Washington	01980ASH071	66.26475208	93.14269861	1998	--	--	--	Landslide	drain pipe installation (6"), seeding, fertilizer, erosion control	KN07542	--	ER-3882(103)	--
SH 55	74	101	Boise, Valley	01990ASH055	66.26475208	93.14269861	1997	Pavement	--	--	Flood	slope stabilization/slide protection, 2 lanes, 1 minor culvert replacement	KN06687	3270115-01	ER-3270(115)	Same event
SH 55	71.7	81.8	Boise, Valley	01990ASH055	63.96704531	74.02886951	1997	Pavement	Asphalt	--	Landslide	slope stabilization/slide protection, 2 lanes, 6 culverts (24"), plantmix pavement	KN06902	3270116	ER-3270(116)	
South Greensferry Rd at address 4745 STC-5742, GREENSFERRY RD MP 100	100	100	Kootenai	02013AOH000	0	0	2017	Pavement	Asphalt	--	Landslide	Excavation, Imported Fill, Geotextile fabric, base course, asphalt, drain pipe installation (4"), 2-lane rd	KN20317	A020317	A020317	Need to confirm MP and Route ID
SH 21	22.95	33	Boise	02140ASH021	18.30910379	28.36005576	1997	Pavement	--	--	Flood	slope stabilization/slide protection, 12" pipe culvert, riprap	KN06874	3290105-01	ER-3290(105)	Same event
SH 21	22	82.4	Boise	02140ASH021	17.35866955	31.86234938	1997	Pavement	Asphalt	--	--	slope stabilization/slide protection, plantmix pavement, retaining wall	KN06901	3290106	ER-3290(106)	
SH 21	22	82.4	Boise	02140ASH021	17.35866955	77.70324303	1997	Other	--	--	Slide/Flood	Reconstruction, slope stabilization	KN06701	3290104-01	ER-3290(104)	
US 93	298	298	Lemhi	02220AUS093	287.0798426	NULL	1998	Pavement	Concrete ("Shot Crete")	--	Landslide	temp replacement, roadway replacement	KN07520		ER-6350(108)	--
SH 34	104.3	104.3	Caribou	02360ASH034	96.1917471	NULL	2006	Pavement	--	--	Landslide		KN10457	A010457	A010(457)	--
St. Joe Rv Rd, STC-5711	1	1	Benewah	03420AOH000	1.0006911	NULL	1997	Other	--	--	--	Slope stabilization, bituminous concrete work, riprap, retaining wall	KN06913	5711103	ER-5711(103)	Slope stabilization
St. Joe Rv Rd, STC-5711	13.5	13.5	Benewah	03420AOH000	13.4998139	NULL	1997	Other	--	--	--	Slope stabilization	KN07170	5711104	ER-5711(104)	Slope stabilization
Snake River Bridge, Ferry Butte Rd	0.05	0.21	Bingham	03490AOH000	0.04998558	0.21017997	1997	Bridge	--	19340	--	debris removal, pier retrofit	KN07317	1888100	ER-1888(100)	--
Rose Rd	2	2.1	Bingham	03560AOH000	1.99761302	2.09749836	1997	Pavement	--	--	Flood	Bituminous concrete work, reconstruction, realignment, 2 lanes	KN07112	7711101	STP-ER-7711(101)	--
Rose-Firth Rd	11	11.5	Bingham	03560AOH000	10.98947881	11.48951006	1997	Pavement	--	--	--	Reconstruction, realignment, bituminous concrete work, riprap, embankment replacement	KN07110	1837100	ER-1837(100)	--
Snake River Bridge, W of Shelly	1.146	1.226	Bingham	03580AOH000	1.14638521	1.22651485	1997	Bridge	--	19275	--	pier retrofit, riprap abutment	KN07316	1847100	ER-1847(100)	--
Banks to Lowman Hwy, STC-3824	0.5	25.05	Boise	03770AOH000	0.50012604	24.97198615	1997	Pavement	--	--	Slide/Flood	Reconstruction, realignment	KN06686	3824100-01	ER-3824(100)	--
Peninsula Rd, STC-5783	0.2	11.1	Bonner	03800AOH000	0.20004891	11.10048456	1997	Pavement	Asphalt	--	Flood	Plantmix, slope stabilization	KN07093	5783100	ER-5783(100)	Slope and embankment
Eastriver Road, STC-5783	11.3	11.4	Bonner	03800AOH000	11.30040941	11.40035726	2011	--	--	--	Landslide	Resurface, Restore, Rehabilitate, Widen, 3/4" Aggregate, Granular Base, Base Course, Horizontal Drains	KN12937	A012937	A012937	--
Eastriver	10	10	Bonner	03800AOH000	10.0006245	0	2017	Pavement	Asphalt	--	Landslide	Excavation, silt fence, topsoil, 18" pipe culvert, 8" storm sewer pipe, planted trees, erosion blanket, 6" perforated drain pipe, 6" trench drian, 6" toe drain, 2" horizontal drain	KN20346	A020346	A020346	--
Old Priest RV Road, STC-5770	2	2.4	Bonner	03810AOH000	1.99999628	2.40001332	1997	Pavement	Asphalt	--	--	shot rock, plantmix, 18" CMP	KN07099	5770100	ER-5770(100)	--
St. Joe River Road	105.2	107	Shoshone	03820AOH000	5.20069999	7.00043	1997	Bridge	--	--	Flood	bridge approach work	KN07101	5731102	ER-5731(102)	--
Dufort Road, STC-5780	1.15	7.15	Bonner	03820AOH000	1.15006354	7.15046462	1997	Pavement	Asphalt	--	--	shot rock, plantmix, bituminous concrete work	KN07100	5780101	ER-5780(101)	--
Dufort Rd, STC-5780	1.58	1.58	Bonner	03820AOH000	1.58009572	1.63054059	2011	Pavement	Asphalt	--	Settlement/Landslide	culvert pipes with aprons, riprap, asphalt	KN12938	A012938	A012938	--
Westside Rd,	8.37	15.27	Boundary	04450AOH000	7.76589521	14.66603793	1997	Pavement	Asphalt	--	Mudslide	Plant mix, shot rock, 18" CMP, slope stabilization	KN07094	5804101-01	ER-5804(101)	--
Old US 2/Deep Cr Loop, STC-5804	1.1	1.2	Boundary	04450AOH000	0.49496954	0.59499991	2011	Pavement	Asphalt	--	Landslide	widen, realign, HMA patch, culverts	KN12932	A012932	A012932	--
West Side Road/Lion's Den, STC-5804	6.6	6.66	Boundary	04450AOH000	5.99568001	6.05571057	2011	Pavement	--	--	Landslide	resurface, restore, rehabilitate, widen	KN12933	A012933	A012933	--
Westside Rd	12.3	12.5	Boundary	04450AOH000	11.69593195	11.89594485	2017	Pavement	Asphalt	--	Landslide	Excavation, Imported Fill, riprap, geogrid, plantmix pavement	KN20323	A020323	A020323	--
Westside Rd	13	13	Boundary	04450AOH000	12.3959536	0	2017	Pavement	Asphalt	--	Landslide	Excavation with Ballast, Riprap, Geogrid, Subgrade sep geo, plantmix pavement, rock mulch and seed/mulch/tack installation	KN20326	A020326	A020326	--
Deep Rock Loop, STC-5804	1.1	1.1	--	04450AOH000	0.4949696	0	2017	Pavement	Asphalt	--	Slide	Plant mix, 24" culvert	KN20319	A020319	A020319	--
Cavendish Road	0.8	1.88	Clearwater	05240AOH000	0.80014408	1.10007004	1997	Pavement	Asphalt	--	Flood	shotrock fill, remove bitimus surface, plantmix	KN07278	4771102	ER-4771(102)	--
Dent Road, STC-4783	0	5.4	Clearwater	05250AOH000	-0.00000003	5.39929976	1997	Pavement	Concrete	--	Flood	slope stabilization, bituminous concrete	KN06892	4783102	ER-4783(102)	--
Dent Bridge Road, STC-4783	0.931	1.031	Clearwater	05250AOH000	0.93116857	1.03118565	2011	Pavement	--	--	Landslide	resurface, restore, rehabilitate, widen loss of roadway shoulder, concrete barrier	KN12942	A012942	A012942	--

HWY	BMP	EMP	County	Route ID	Measure From	Measure To	Damage Year	Asset Type	Road Type (if applicable)	Struct ID	Emergency Event	Repair Work Performed	Key Number	Project Number	Federal Aid Number (Info)	Comments/ Actions Needed
Dent Bridge Road, STC-4783	13	13.06	Clearwater	05250AOH000	12.99994079	13.05994643	2011	Bridge	--	--	Landslide	2 lane asphalt bridge approach, riprap, MSE wall, HMA	KN12943	A012943	A012943	--
Dent Rd	32.5	32.5	Clearwater	05250AOH000	32.5013763	0	2017	Pavement	Asphalt	--	Landslide	Temp & Permanent repairs; excavation, rip rap, granular burrow, aggregate sub base, woven geotextile, culvert installation (24X20), erosion control, asphalt	KN20335	A020335	A020335	--
Dent Bridge Rd - STC 4783	1.1	1.1	--	05250AOH000	1.1003395	0	2017	Other	--	--	Slide	Slope stabilization, riprap, 8" angular basalt	KN20332	A020332	A020332	Slope stabilization
Grangemont Rd, STC-4782	4.6	4.9	Clearwater	05260AOH000	4.59949175	4.8995733	2011	Pavement	Asphalt	--	Settlement/Landslide	French drain, plantmix, 3/4" aggregate base	KN12944	A012944	A012944	--
Grangemont Rd, STC-4782	22.2	22.2	--	05260AOH000	22.1996696	0	2017	Pavement	Asphalt	--	--	18" CMP, replace roadbed, HMA, retaining wall, riprap	KN20331	A020331	A020331	--
Pine Rd, STC-3811	12.9	13.2	Elmore	05280AOH000	12.89956065	13.19951432	1997	Other	--	--	--	Waffle drain, 6" ADS	KN07077	3811101	ER-3811(101)	Slope stabilization
Ola to Sweet, STC-3840	6.859,100.55	20.03,102.85	Gem	05560AOH000	6.86817769	20.08262591	1997	Bridge	--	19955	--	Slope stabilization, slide protection, bridge reconstruction	KN06872	3840100-01	ER-3840(100)	--
Old Highway 7	3.85	4.21	Idaho	05730AOH000	3.84913484	4.20923843	2019	Other	Asphalt	--	Flood	1050 ft of ditch length affected, reclaimed ditch material, resized culvert (removed 75' of 48" CMP, installed 75' of 96" COMP), erosion control, HMA Asphalt, reclaim ditch material, excavation	KN22482	A022482	A022482	--
Graves Creek Road (Area #1)	0.58	0.58	Idaho	05740AOH000	0.58002759	0	2019	Pavement	Asphalt	--	Flood	Rebuild roadway (approx. 150 '), add riprap, install 12' lane with shoulder and base, HMA Asphalt, erosion control, riprap geogrid	KN22483	A022483	A022483	--
Graves Creek Rd (Area #2)	2.09	2.09	Idaho	05740AOH000	2.08992868	0	2019	Pavement	Asphalt	--	Flood	Rebuild roadway (approx. 200'), riprap embankment, install 24' pavement width and shoulder with base, ballast section on compacted subgrade, HMA Asphalt, erosion control, riprap geogrid	KN22502	A022502	A022502	--
Graves Creek Rd (Area #3)	2.31	2.31	Idaho	05740AOH000	2.30994845	0	2019	Pavement	Asphalt	--	Flood	Rebuild roadway (approx. 200' with 100' pavement), add riprap, install 12' lane with shoulder and base, HMA Asphalt, erosion control, riprap geogrid	KN22503	A022503	A022503	--
Graves Creek Rd (Area #4)	2.39	2.39	Idaho	05740AOH000	2.38996038	0	2019	Pavement	Asphalt	--	Flood	Rebuild roadway (approx. 800' of bank and 400' roadway embankment), add riprap, install 12' lane with shoulder and base, HMA Asphalt, erosion control, riprap geogrid	KN22504	A022504	A022504	--
Graves Creek Rd (Area #5)	3.67	3.67	Idaho	05740AOH000	3.66989795	0	2019	Pavement	--	--	Flood	Rebuild roadway shoulder (approx. 800' bank), riprap, riprap geogrid,	KN22505	A022505	A022505	--
Graves Creek Rd (Area #6)	4.7	4.7	Idaho	05740AOH000	4.69987679	0	2019	Other	--	--	Flood	Rebuild 1200' of bank and embankment, install new shoulder ballast on compacted subgrade, riprap, erosion control, granular borrow,	KN22506	A022506	A022506	--
Graves Creek Rd (Area #7)	4.18	4.18	Idaho	05740AOH000	4.17990228	0	2019	Other	Asphalt	--	Flood	Rebuild 300' of bank and embankment, install gabion wall. HMA asphalt, riprap, erosion control, granular borrow, excavation	KN22507	A022507	A022507	--
Sally Ann Road	0.2	0.95	Idaho	05780AOH000	0.19996645	0.94998925	2019	Other	Asphalt	--	Flood	14000 ft of ditch length affected, reconstruct partial roadway and re-establish ditch material, cleared culverts, replaced 1- 18" culvert, HMA Asphalt, 18" CMP, erosion control	KN22481	A022481	A022481	--
Twin Bridges, STC-6768	3.16	3.373	Jefferson, Madison	05820AOH000	3.16018669	3.87310289	1997	Bridge	--	--	Flood	bridge replacement/reconstruction	KN07078	6768100	ER-6768(100)	--
Snake River Ave	7.7	8.7	Nez Perce	06750AOH000	7.69973565	8.56273351	1998	Pavement	asphalt	--	Landslide	reslope and fill, install diversion box, buttress fill, bike path pavement and reslope, road sub-base, install wall, Install Drainage (culverts, diversion boxes, rock, rip rap), base install, overlay Country Club Drive; permanent repairs	KN07521	7014100	ER-7014(100)	Same event
Snake River Ave	7.905	8.154	Nez Perce	06750AOH000	7.90478413	8.1538568	1998	Pavement	concrete	--	Landslide	Permanent repair: bituminous concrete, in-fill buttress (for bikeway and Snake River Avenue), final pavement lift, installation of safety features	KN07994	7014101	ER-7014(101)	
County Club Dr, STC-7034	1.63	2.212	Nez Perce	07040AOH000	1.61540867	2.18570698	1997	Pavement	--	--	--	Slope stabilization, slide protection, utility adjustment, resurface, restore, rehabilitate, widen	KN07975	7034100	ER-7034(100)	--

HWY	BMP	EMP	County	Route ID	Measure From	Measure To	Damage Year	Asset Type	Road Type (if applicable)	Struct ID	Emergency Event	Repair Work Performed	Key Number	Project Number	Federal Aid Number (Info)	Comments/ Actions Needed
Warm Lake Road, STC-3904	19.25	19.3	Valley	07850AOH000	19.25022108	19.30021315	1997	Pavement	Concrete	--	Flood	realign and reconstruct 2 lanes with plantmix, 30" CMP	KN06875	3904100	ER-3904(100)	--
US 95	518.3	518.5	Boundary	21635AOH000	-0.00000003	0.10001208	2017	Pavement	Asphalt	--	Landslide	Excavation, rock mulch in place, erosion control, asphalt, 3/4" gravel in place, gabion Baskets, shoring	KN20341	A020341	A020341	--
STC-3894	0.7	38.6	Adams	32407AOH000	0.69847187	22.91825501	1997	Pavement	Asphalt	--	Flood	Slope stabilization, riprap, 24" CMP, plantmix	KN06899	3894100-01	ER-3894(100)	Slope failure
Mud Cr. Br., STC-3899	28.34	28.44	Valley	02052AOH000	1.75205987	1.82268974	2002	Bridge	--	20085	Flood	--	KN09068	3899100	ER-3899(100)	--
SH 34	32	32	Franklin	02360ASH034	24.72433586	24.85907515	2018	Pavement	--	--	Rockslide	Rock buttress at toe of the slides and reconstruction of roadway slope back up to the shoulder of roadway	KN20344	--	--	--
Central Ridge Road, STC-4747	15.3	17.4	Lewis	06500AOH000	3.2809272	NULL	2019	Pavement	Gravel	--	Rockslide	Slope repair, shoulder repair, road repair	KN20347	--	--	--
Farm to Market, STC-3878	3.6	3.789	Washington	07920AOH000	3.59993536	3.78880691	2019	Pavement	--	--	Flood	Road resurfacing, up to 4 ft shoulder rebuilt	KN20422	--	--	--
Cove Road, STC-8217	0.76	1.37	Washington	07880AOH000	0.75975578	1.36983153	2017	Pavement	Asphalt	--	Flood	Asphalt road repair, up to 4 ft shoulder rebuit	KN20517	--	--	--
Couper Lane, STC-3870	0.49	0.6	Washington	07890AOH000	0.48965757	0.60028411	2017	Pavement	--	--	Flood	Up to 4 ft of shoulder will be rebuilt	KN20628	--	--	--
SH 71	14	23	Washington	01980ASH071	0.81981367	28.45651586	1997	Pavement	--	--	Flood/Slide	--	KN06822	--	--	--
US 95	508.7	509.2	Boundary	01540AUS095	495.301687	495.8019032	2001	Pavement	Concrete	--	Slide	Reconstruction, realignment, bituminous concrete work, slide buttress	KN07565	--	ER-5110(127)	--
Banks to Lowman Hwy,	17.5	17.5	Boise	03770AOH000	17.5006734	NULL	2004	Pavement	--	--	Slide	Resurface, restore, rehabilitate, widen	KN09316	--	ER-3824(101)	--
Middlefork Boise River Road, STC-3809	130.3	132.3	Elmore	00443AOH000	30.29943942	32.29896454	2005	Pavement	--	--	--	Reconstruction, realignment	KN09702	--	ER-3809(102)	--
US 2	26.69	26.69	Dover	01590AUS002	26.5520498	NULL	2006	Pavement	--	--	Flood	Reconstruction, realignment	KN10953	--	A010(953)	--
Elk Meadow Cr Br	--	--	Idaho	05597APO000	0	NULL	2012	Bridge	--	29188	--	Reconstruction, bridge approach work	KN13379	--	A013(379)	--
District 3	--	--	DISTRICTWIDE	05608APO000	NULL	STATE	1997	Pavement	--	--	Flood	Reconstruction	KN6836	0003113-01	ER-0003(113)	Updated 9/7/2022
Leitch Cr Rd, STC-4708	100	103.4	Idaho	01838AOH000	-0.00000003	3.3999265	1997	Pavement	--	--	--	Reconstruction	KN6889	4708100-01	ER-4708(100)	Updated 9/7/2022
Grimes Cr Rd, STC-3883	100.2	101	Boise	00426AOH00	0.20002312	1.00010255	1997	Pavement	--	--	Flood	Slope stabilization, riprap	KN6905	3883100-01	ER-3883(100)	Updated 9/7/2022
Nettleton Gulch Rd, STC-7105	14.9	15.8	Kootenai	624014900	0.89993573	1.79992821	1997	Pavement	--	--	Flood	Reconstsruction, realignment	KN6912	7105100	ER-7105(100)	Updated 9/7/2022
West of Hope, SH-200	44.8	44.8	Bonner	01610ASH200	14.9944468	NULL	1997	Pavement	--	--	Flood	Riprap	KN7090	5120104	ER-5120(104)	Updated 9/7/2022
Cottonwood Rd, STC-5747	103.8	103.8	Kootenai	01994AOH00	3.7997541	NULL	1997	Pavement	--	--	--	Reconstruction, realignment	KN7092	5747100	ER-5747(100)	Updated 9/7/2022
County Road 2	2.15	2.15	Boundary	04450AOH000	1.5449466	NULL	1997	Pavement	--	--	--	Slope stabilization	KN7095	5804102-01	ER-5804(102)	Updated 9/7/2022
Upper Pack RV Rd, STC-5784	104.7	106.8	Bonner	00811AOH000	4.70002077	6.80030371	1997	Pavement	--	--	--	Reconstruction, realignment	KN7098	5784100	ER-5784(100)	Updated 9/7/2022
Moon Pass Rd, STC-5711	58.7	58.7	Shoshone	02455AOH000	18.4569469	NULL	1997	Pavement	--	--	--	Reconstruction, realignment	KN7171	5711105	ER-5711(105)	Updated 9/7/2022
Moon Pass Rd, STC-5711	59.43	59.43	Shoshone	02455AOH000	17.726927	NULL	1997	Pavement	--	--	--	Reconstruction, realignment	KN7172	5711106	ER-5711(106)	Updated 9/7/2022
Forest Rd 456, STC-5758	8.5	8.54	Shoshone	07450AOH000	8.49928698	8.53924436	2011	Pavement	--	--	Settlement/Landslide	culvert failure/washout, retaining wall, ditch failure/washout	KN12939	A012939	A012939	Updated 9/7/2022
Lions Den/Westside Rd MP 7.0, STC-5804	7	7	Boundary	04450AOH000	6.395733	0	2017	Pavement	--	--	Flood	Removed roadway surface and shoulder/slope that was covered by mud slide. Rebuilt 200'x24' of roadway, rock mulched down slope for stabilization	KN20320	A020320	A020320	Updated 9/7/2022
Westside Rd MP 12.0, STC-5804	12	12	Boundary	04450AOH000	11.3959896	0	2017	Pavement	--	--	Flood	Rebuilt east side of roadway including excavation, base and asphalt of approximately 120'x12'	KN20322	A020322	A020322	Updated 9/7/2022
Westfield Rd MP 14.7, STC-5804	14.7	14.7	Boundary	04450AOH000	14.0959947	0	2017	Pavement	--	--	Flood	100' of roadway and shoulder slump and slide. Complete rebuild of 100'x12'x5' of roadway and shoulder	KN20327	A020327	A020327	Updated 9/7/2022
Westside Rd MP 16.6, STC-5804	16.6	16.6	Boundary	04450AOH000	15.9960113	0	2017	Pavement	--	--	Flood	Loss of roadway embankments for 50' on east side. Riprap, roadway base and gravel resurface	KN20328	A020328	A020328	Updated 9/7/2022
Glenwood Rd MP 101.9-104.8, STC-4730	101.92	104.81	Idaho	0181AOH000	1.9194051	4.8092051	2019	Pavement	Asphalt	--	Flood	Replacing roadway shoulders and portions of the road, riprap	KN22480	A022480	A022480	Updated 9/7/2022
STC-4715, CLEAR CREEK RD CROCKER PROPERTY, IDAHO CO	106.46	106.46	Idaho	01798AOH000	6.45982473	0	2019	Pavement	--	--	Flood	Rebuild washed out roadway, approx. 90'. Replace washed out roadway prism with fill, replaced damaged shoulder, and line bank with 4' thick rip rap.	KN22476	A022476	A022476	Updated 9/14/2022
SH 52, EMMETT TO PAYETTE	8.9	11.5	Payette, Gem	02010ASH052	8.88822063	11.48005834	1997	Pavement	--	--	Flood/Slide	Reconstruction, realignment	KN06821	ER-3260(102)	3260102-02	Updated 9/14/2022
District-wide flood damage	0	0	--	05608APO000	0	NULL	1997	--	--	--	Flood	Assessment and local coordination performed by the state	KN06836	ER-0003(113)	0003113-01	Updated 9/14/2022
US 95	183	187	--	01540AUS095	177.3341609	181.3383516	1997	--	--	--	Flood/Slide	Labor and materials	KN06867	ER-4110(121)	4110121	Updated 9/14/2022

HWY	BMP	EMP	County	Route ID	Measure From	Measure To	Damage Year	Asset Type	Road Type (if applicable)	Struct ID	Emergency Event	Repair Work Performed	Key Number	Project Number	Federal Aid Number (Info)	Comments/ Actions Needed
Kidder Ridge Road, STC 4722	100	101.27	Idaho	01839AOH000	-0.00000003	1.2699053	1997	Pavement	--	--	Flood/Slide	Slope stabilization, slide protection	KN06869	ER-4722(101)	4722101-01	Updated 9/14/2022
LOCAL, GOODRICH RD, PAVEMENT REPAIR, E of CAMBRIDGE	100.367	100.467	Washington	00563AOH000	2.29267228	2.39274528	1997	Pavement	--	--	Flood/Slide	Slope stabilization, slide protection	KN06871	ER-3888(101)	3888101-01	Updated 9/14/2022
STC-3830, 7 MI SLOUGH BR & UPRR XING to PAYETTE RV BR	0.987	2.548	Gem	07990AOH000	0.1854264	1.74555908	1997	Pavement	--	--	Flood/Slide	Slope stabilization, slide protection	KN06882	ER-3830(100)	3830100-01	Updated 9/14/2022
STC-4710, GRAVE CR RD, MP 6, 97-1 EVENT	6.1	7.1	Idaho	05740AOH000	6.09980515	7.09981757	1997	Pavement	--	--	Flood/Slide	Slope stabilization, slide protection	KN06884	ER-4710(102)	4710102-01	Updated 9/14/2022
STC-4710, GRAVE CR RD, EVENT 97-1	2.1	5.4	Idaho	05740AOH000	2.0999368	5.39984899	1997	Pavement	--	--	Flood/Slide	Slope stabilization, slide protection	KN06887	ER-4710(103)	4710103-01	Updated 9/14/2022
STC-4805, CEDAR RIDGE RD, 97-1 EVENT	100.4	106.3	Latah	02184AOH000	0.39997444	3.696389	1997	--	--	--		Contract work	KN06891	ER-4805(101)	4805101	Updated 9/14/2022
US 95, SOUTH PAYETTE SIDEWALK REPAIR	67.25	67.25	Payette, Gem	01540AUS095	64.290947	NULL	1997	Pavement	--	--	Flood	Reconstruct, realign	KN06903	ER-3110(118)	3110118	Updated 9/14/2022
US 95S, JCT US 95 TO 6TH ST S, PAYETTE	0	0.98	Payette	01542AOH000	-0.00000003	0.89401102	1997		--	--	Flood	Traffic control and debris cleanup	KN06904	ER-8753(100)	8753100-01	Updated 9/14/2022
STC-5736, NORTH HAYDEN LAKE RD, KOOTENAI CO	109	117	Kootenai	01987AOH000	8.89958673	15.78172986	1997	--	--	--	--	Removal of debris (trees)	KN06914	ER-5736(100)	5736100-01	Updated 9/14/2022
LOCAL, EAST RIVERVIEW DR, KOOTENAI CO	1.9	7.99	Kootenai	05920AOH000	0.63004338	4.80004027	1997	Pavement	--	--	Flood	Reconstruct, realign	KN06915	ER-5735(100)	5735100-01	Updated 9/14/2022
STC-5752, COEUR D' ALENE RV RD, EVENT 97-2	2.2	2.2	Kootenai	07430AOH000	2.2009399	NULL	1997	--	--	--	--	Removal of debris (trees)	KN07102	ER-5752(102)	5752102	Updated 9/14/2022
STC 5783, PENINSULA RD MP .33	0.33	0.37	Bonner	03800AOH000	0.33000247	0.37004342	2011	--	--	--	Landslide	Excavation, base construction	KN12934	A012934	A012934	Updated 9/14/2022
STC 5783, PENINSULA RD MP .60	0.6	0.64	Bonner	03800AOH000	0.60002294	0.64000431	2011	--	--	--	Landslide	Base, traffic control	KN12935	A012935	A012935	Updated 9/14/2022
STC 5783, EASTRIVER RD MP 6.77	6.77	6.8	Bonner	03800AOH000	6.77020877	6.80019316	2011	--	--	--	Landslide	Slide stabilization	KN12936	A012936	A012936	Updated 9/14/2022
STC-5758, FOREST RD 456 / BEAVER CR RD MP 9.3	9.3	9.31	Shoshone	07450AOH000	9.29899464	9.30868857	2011	Other	--	--	--	Placement of pavement	KN12940	A012940	A012940	Retaining wall failure; Updated 9/14/2022
STC 5711, FOREST RD 456 / MOON PASS	26.8	26.81	Shoshone	03420AOH000	26.79983366	26.80986045	2011	Other	--	--	--	--	KN12941	A012941	A012941	Ditch failure; Updated 9/14/2022
STC-5810, COW CREEK RD MP 100.1, BOUNDARY CO	100.1	100.1	Boundary	02545AOH000	0.0999587	0	2017	--	--	--	Flood	Repaired 100' of roadway shoulder	KN20316	A020316	A020316	Updated 9/14/2022
STC-5801, CROSSPORT RD MP 9.5, BOUNDARY CO	9.5	9.5	Boundary	04480AOH000	9.4989571	0	2017	--	--	--	Flood	Repaired 90' of roadway shoulder and edge of roadway	KN20318	A020318	A020318	Updated 9/14/2022
STC-5804, WESTSIDE RD MP 19.0, BOUNDARY CO	19	19	Boundary	04450AOH000	18.3953981	0	2017	--	--	--	Flood	Repaired 40' of roadway	KN20329	A020329	A020329	Updated 9/14/2022
STC-4782, GRANGEMONT RD MP 4.75, CLEARWATER CO	4.75	4.75	Clearwater	05260AOH000	4.7495198	0	2017	--	--	--	Flood	Used labor forces/equipment to open roadway for traveling public. This included adding HMA.	KN20330	A020330	A020330	Updated 9/14/2022

Document Change Registry

Revision	File Version #	Date	Description
1	1.4	October 2022	Final Draft of Original Submittal
2	1.6	December 2022	First Revised TAMP Submittal addressing programmatic explanations
3	1.71	February 2023	TAMP update addressing additional FHWA Comments
4	1.8	December 2024	TAMP Appendix A, Tables A-1, A-2 and A-3 updated with minor technical corrections discovered during the annual consistency determination.