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Date: February 20, 2024

To: Public Works Director, Bill Helbig, P.E.

From: Pete Fisch, Engineering Technician II *PF*

Subject: **2023 ANNUAL BRIDGE REPORT**

The bridges of the Spokane Valley road system have been inspected in accordance with the guidelines set forth by both the FHWA National Bridge Inspection Standards and the Washington State Bridge Inspection Manual and herewith I submit a report of the findings of these inspections. These findings will be taken into consideration in the preparation of the proposed 2025 Capital Bridge Budget and 2024-2029 Six Year Construction Programs.

There were a couple bridge accomplishments this past year.

- The Barker Road Bridge over the BNSF RR Tracks (SPOKV-5502) was completed in the spring of 2023. The Initial Inspection was completed on June 1, 2023. All bridge elements are sound.



*Barker Rd Over BNSF RR*

- The Mission Avenue over Evergreen Road bridge was resurfaced with a Federal Grant. The deck was re-surfaced with an epoxy based two-layer system to help preserve the superstructure from water intrusion.



*Mission Ave over Evergreen Rd*

- The Pines Road/BNSF Grade Separation Project will construct an underpass under the BNSF railway, replace the existing signalized intersection at Pines Road and Trent Avenue with multilane roundabout, construct a shared use path, and includes a new trailhead connection to the Centennial Trail. The city is working on acquiring the final right of way required to construct the project. Several utility relocations are scheduled to take place in late winter/early spring. Bridge construction by BNSF is anticipated to begin this summer and the roadway/trailhead construction is tentatively planned to begin in the fall.
- In October 2023, City started final design and environment on the preferred interchange alternative for the Trent/Sullivan interchange. Project includes replacing both Sullivan bridges over Trent Avenue and BNSF railway. The design is anticipated to be complete in Summer of 2025. Construction has not been funded at this time. Total project cost is anticipated to be \$43 million. The city received partial funding for the Sullivan / Trent (SPOKV-4501) Interchange project for design Alternative Analysis.

## **NATIONAL BRIDGE INSPECTION STANDARDS:**

In May of 2022 the National Bridge Inspection Standards Final Rule was published. The Federal Highway Administration issued a rule establishing new bridge coding requirements and more detailed element level bridge inspection condition data to better show the severity and extent of bridge condition deficiencies. The collection and use of element level bridge inspection data by the FHWA is expected to improve the performance management of the nation's highway bridges through enhanced national level analysis, forecasting, and reporting of bridge conditions and needs (preservation, improvement, and replacement) using risk-based, data driven methods.

The goals of this rule are to:

- Set the framework for the inventory and assessment of common bridge elements that can be used to better describe the condition of highway bridges in the National Bridge Inventory, and
- Provide consistency for element identification, quantity measurement, and condition state assessment.

### **Framework**

This specification provides the framework needed to support the collection and reporting of element level bridge condition data to the FHWA. Refer to the AASHTO Manual for Bridge Element Inspection, First Edition (AASHTO Manual) for element descriptions, quantity calculations and condition state definitions.

### **Elements**

Refer to Table 1 for a listing of elements for which data will be collected by the FHWA. Data items to be collected for each element inventoried for a bridge are specified in the Element Data Items section. Specific material defects as shown in the AASHTO Manual will not be collected.

### **Element Condition**

All elements have four defined condition states. The severity of multiple distress paths or deficiencies is defined in the AASHTO Manual for each condition state with the general intent of the condition states as follows: Condition State 1 – Good, Condition State 2 – Fair, Condition State 3 – Poor, and Condition State 4 – Severe.

For primary load carrying elements, quantities reported to the FHWA in Condition State 4 indicate that a structural review, defined in the AASHTO Manual, has been completed and observed defects impact strength or serviceability. Once actions have been taken to address severe defects, those quantities may be reassigned to another applicable condition state.

Link to Final Rule.

[Overview of the National Bridge Inspection Standards \(NBIS\) Final Rule \(dot.gov\)](#)

**Table 1. Bridge Elements.**

Element	Units	Element Number					
		Steel	Prestressed Concrete	Reinforced Concrete	Timber	Masonry	Other
Deck/Slab							
Deck	SF		13	12	31		60
Open Grid Deck	SF	28					
Concrete Filled Grid Deck	SF	29					
Corrugated or Orthotropic Deck	SF	30					
Slab	SF			38	54		65
Top Flange	SF		15	16			
Superstructure							
Closed Web/Box Girder	LF	102	104	105			106
Girder/Beam	LF	107	109	110	111		112
Stringer	LF	113	115	116	117		118
Truss	LF	120			135		136
Arch	LF	141	143	144	146	145	142
Main Cable	LF	147					
Secondary Cable	EA	148					149
Floor Beam	LF	152	154	155	156		157
Pin, Pin and Hanger Assembly	EA	161					
Gusset Plate	EA	162					
Substructure							
Column	EA	202	204	205	206		203
Column Tower (Trestle)	LF	207			208		
Pier Wall	LF			210	212	213	211
Abutment	LF	219		215	216	217	218
Pile Cap/Footing	LF			220			
Pile	EA	225	226	227	228		229
Pier Cap	LF	231	233	234	235		236
Culvert							
Culvert	LF	240	245	241	242	244	243
Bridge Rail							
Bridge Rail	LF	330*		331	332	334	333
Joint							
Strip Seal	LF			300			
Pourable	LF			301			
Compression	LF			302			
Assembly with Seal (Modular)	LF			303			
Open	LF			304			
Assembly without Seal	LF			305			
Other	LF			306			
Bearing							
Elastomeric	EA			310			
Movable (roller, sliding, etc.)	EA			311			
Enclosed/Concealed	EA			312			
Fixed	EA			313			
Pot	EA			314			
Disk	EA			315			
Other	EA			316			
Wearing Surfaces and Protective Coatings							
Wearing Surfaces	SF			510			
Steel Protective Coating	SF			515			
Concrete Protective Coating	SF			521			

\*Element 330-Metal Bridge Rail may include steel or aluminum rails.

## **ANNUAL BRIDGE REPORT**

The following report is submitted in accordance with W.A.C. 136-20-060 and is the findings of the annual inspection of the bridge inventory. Included is a brief explanation of bridge inspection, State and City funding, a review of the current bridge conditions and a summary of bridge design and construction work during the past year. Spokane Valley currently has 15 bridges in its bridge inspection inventory. It has 3 more of which are owned by the Railroad and therefore require a Primary Safety Inspection only by City personnel. Spokane Valley now shares inspection and maintenance responsibilities with Spokane County on the Denny Ashlock Pedestrian Overcrossing. This bridge is owned by the Washington State Parks Commission. Annually city personnel inspect a total of 19 structures.

The replacement value of these structures is estimated to be \$105 million dollars.

### **BRIDGE INSPECTION**

Spokane Valley follows the National Bridge Inspection Standards (NBIS) in its program as required by the Federal Highway Administration (FHWA) in accordance with the Code of Federal Regulations part 650. The inspection requirements of this standard are met by performing routine inspections. Routine Inspections must be done at least once every two years.

Routine, Underwater, and Safety Inspections are accomplished by City Staff and assisted by the City's On-Call Structural Bridge Consultant, or by the WSDOT Bridge Inspection Dive Team. Safety inspections are intended to assess the safety of the structure for any immediate hazard to the route crossing under it, and the inspection is directed to only those portions of the structure that could affect that undercrossing route.

It was a busy year for Spokane Valley inspections in 2023. Ten structures were inspected.

In 2023, Routine Inspections were conducted on six City bridges. These included: Sullivan Road OC SR 290 bridge (SPOKV-4501), Sullivan Road Over BNSF RR bridge (SPOKV-4502), Sullivan Road Over Spokane River bridge (SPOKV-4508), Sullivan Road Over Spokane River bridge (SPOKV-4511), Mission Avenue Over Evergreen Road bridge (SPOKV-4518), Sands Road Over Chester Creek bridge (SPOKV-4520). Three of these inspections required a UBIT (Under Bridge Inspection Truck) to further complete the inspection. The city rented the UBIT from WSDOT out of Olympia.

In 2023, three Short Span Inspections were conducted. The Thorpe Road Over Chester Creek bridge (SPOKV-4421), Sullivan Road Pedestrian Undercrossing (SPOKV-4500), and the Steen Road Over Saltese Creek bridge (SPOKV-4509).

(A Short Span inspection type is used for bridges/culverts that have an opening of 20 feet or less. Short Spans are not reported to the NBI.)

In 2023, Primary Safety Inspections were completed on two railroad structures: Park Road UC UP RR Tracks (SPOKV-4593) and Sprague Ave UC UP RR (SPOKV-4594).

A Primary Safety Inspection is used by an agency that chooses to inspect a structure owned by another agency such as a railroad bridge over a city street.

No Underwater Inspections were required in 2023.

Other noteworthy elements of the NBIS which are integral to the bridge program are:

**LOAD RATING:** All bridges on the inventory have been rated to determine the percentage of legal loads which they can safely carry. This is an ongoing effort, and the files are maintained as the condition of the inventory changes. This work is managed by City staff and carried out by the city's On-Call Structural Bridge Consultant. No City structures are currently load posted.

**SCOUR EVALUATIONS:** All bridges over water must be evaluated for the stability of their foundations due to the erosion of the streambed, which supports them. For bridges that have foundations classified as scour critical or unknown, a Scour Critical Plan of Action has been prepared which includes monitoring during high flows and is updated on an annual basis. The city owns one Scour Critical Bridge: Sullivan Road Over Spokane River, northbound (SPOKV-4511). The Scour Critical Plan of Action was updated in October 2023.



*Sullivan Road over BNSF RR, SPOKV-4502*

## 2023 FINDINGS

- **SPOKV-4421 Thorpe Road over Chester Creek – Short Span Inspection**

The Thorpe Road bridge was inspected on October 2, 2023.

Generally, in fair shape. There is some minor hairline web/flange cracking in the Prestressed Concrete Multiple Web Girder Units that is being monitored. The west approach roadway has some settling. Spokane Valley maintenance crews have re-arranged the ballast under the structure to inhibit erosion of the concrete caps. Some minor repairs noted.

- **SPOKV-4500- Sullivan Road Pedestrian Undercrossing- Short Span Inspection**

The Sullivan Road Pedestrian Undercrossing was inspected on July 17, 2023.

All elements were found to be in good condition. Typical hairline cracking in the wing walls. One minor repair noted.

- **SPOK-4501- Sullivan Road Overcrossing SR 290- Routine and Equipment Inspection**

The Sullivan Road bridge overcrossing SR 290 was inspected on October 4, 2023.

This bridge has been hit half a dozen times since 2000. Most girders are showing hairline shear cracks in web, fillet and flange. No changes. Pier walls have several hairline vertical cracks. Concrete abutments have several full-height vertical cracks. Bearing pads are generally in poor shape; cracked and crushed, beginning to fail.

- **SPOKV-4502- Sullivan Road over BNSF RR Tracks- Routine and UBIT Inspection**

The Sullivan Road bridge over the BNSF Railroad tracks was inspected on October 4, 2023.

All elements were found to be stable, with no changes. The bridge has been found to be rated Fair. Many girders have hairline diagonal cracks in the web, with map cracking prevalent in girder ends and top flanges. Concrete Abutments have several spalls and delaminations. Bearing pads J through O (6), at both abutments in poor condition. Pads are split, cracked and crushed. Some minor repairs noted.

- **SPOKV-4508- Sullivan Road over Spokane River- Routine and Initial UBIT Inspection**

The Sullivan Road bridge over the Spokane River was inspected on October 3, 2023.

Most elements were found to be in good condition. The south end of the bridge, at the compression seal, keeps delaminating and having to be repaired. Compression seals are failing and need to be replaced, also. Sidewalks are showing signs of settling, may need to be repaired in the near future. Some minor repairs were also noted.

- **SPOKV-4509- Steen Road over Saltese Creek- Short Span Inspection**

The Steen Road bridge over Saltese Creek was inspected on October 2, 2023.

Most elements were found to be in good condition. Deck timbers that were replaced in 2021 in good condition. Superstructure coded 5 for Fair due to decay and crushing of girder ends. Will budget approximately \$20,000 for replacement of three timber girders for FY2025.

- **SPOKV-4511- Sullivan Road over Spokane River- Routine & UBIT Inspection**

The Sullivan Road Bridge northbound over the Spokane River was inspected on October 3, 2023.

Most elements were found to be in good condition. This is our scour critical bridge. An annual Feature UW inspection was performed on August 29, 2023. Measurements were taken around spread footings with no significant changes. A new channel cross section was created with no significant changes. The asphalt side of the north joint shows wear and needs repaired. The compression seal at the north joint is failing and needs repaired.

- **SPOKV-4518- Mission Avenue over Evergreen Road- Routine Inspection**



The Mission Avenue bridge over Evergreen Road was inspected on Oct. 5, 2023.

All elements were found to be sound. In June the deck was overlaid with a 2-layer polymer-based overlay through a federal grant. New compression seals were installed as part of the grant. There was also some ADA-related sidewalk work completed. Some minor repairs were also noted.

- **SPOKV-4520- Sands Road over Chester Creek – Routine Inspection**

The Sands Road bridge over Chester Creek was inspected on October 2, 2023.

This inspection brought forth some concerns regarding various elements. First, there are many hairline cracks along the flange to web interface of the multi-web girders that I have been monitoring over the last few inspections. Generally, they are stable, but some have grown in length. A couple show shear cracking. Strength or performance are not affected. I will continue to monitor these defects. The existing riprap along the concrete abutments was re-positioned to prevent further erosion of the concrete abutments. The deck shows signs of wear since the 2-layer polymer overlay was installed in 2015. There are numerous spalls and longitudinal cracks, 4' spacing, in the deck that need to be repaired.

- **SPOKV-4593- Park Road under UP RR – Primary Safety Inspection**

The Park Road under the UPRR bridge was inspected on October 9, 2023.

This bridge was given a Primary Safety inspection. This bridge is owned by Union Pacific Railroad. These inspections are intended to assess the safety of the structure for any immediate hazard to the route crossing under it. All safety elements were found to be safe except for some bird barriers which needed repair. The abutments were cleaned, and the bird barriers re-installed in December 2023.

- **SPOKV-4594- Sprague Avenue Undercrossing UP RR- Primary Safety Inspection**

The Sprague Avenue bridge undercrossing the Union Pacific Railroad was inspected on October 9, 2023.

All safety elements were found to be safe. Some minor repairs were noted.

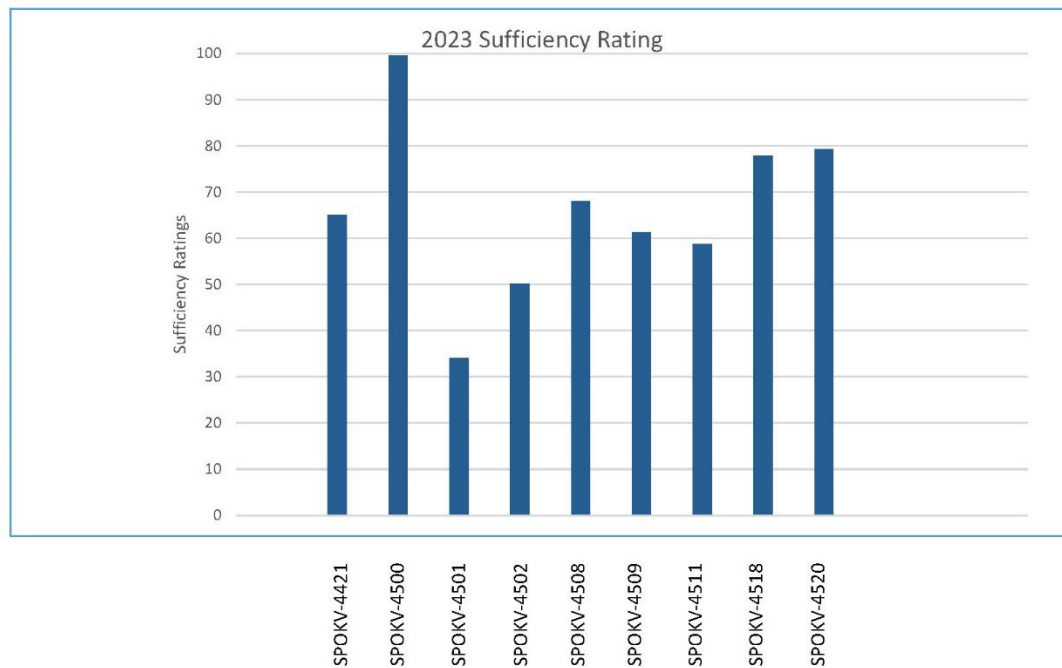
This year I was accompanied by Jessica Soward, a Structural Engineer with Sargent Engineer, Inc. on several of the inspections. Jessica added her expertise as Co-Inspector.

## **FUNDING**

The Federal Government provides the main source of funds for bridge rehabilitation and replacement projects which are constructed under contract. Under the Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21) structure, bridges located on the National Highway System are eligible for funding under the National Highway Performance Program (NHPP) while bridges not located on the National Highway System have a separate set-aside in the Surface Transportation Program (STP). In Washington, the MAP-21 Steering Committee created a set-aside for the local bridge program. Agencies with eligible bridges can then apply for these funds through a process which awards funds to those bridges with the greatest need. In general, eligibility is established based on four criteria with the sufficiency rating being the primary factor. The sufficiency rating (SR) is a number on a scale of 0 to 100, with 100 being a new bridge that captures all the factors which reflect the condition of a bridge. The other three criteria are structural deficiency (SD), functional obsolescence (FO), and scour condition.



Figure 1, below, shows the sufficiency rating for the 9 Spokane Valley owned bridges (not including the railroad owned bridges and pedestrian structures) that were inspected in 2023.



*Sufficiency ratings for the 9 Spokane Valley owned bridges that were inspected in 2023.*

Currently funding for major bridge projects comes out of either the Capital Projects budget or is funded through grants under the Local Bridge Rehabilitation Program. At the moment there is no mechanism for funding short span bridges (20 feet long, or less, of which the city owns three). Short span bridges are not eligible to receive funding through the State. Maintenance and minor bridge projects are funded out of the road maintenance fund #101.

### RECENTLY FUNDED PROJECTS

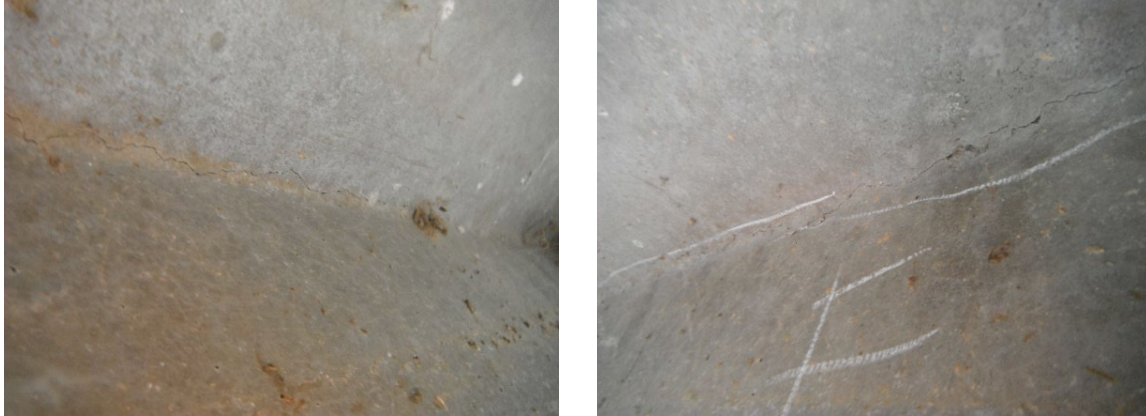
In July of 2021 the city was awarded funds to repair the Mission Avenue over Evergreen Road bridge deck (SPOKV-4518). This grant is for \$261,100. This project was completed in August 2023.

### BRIDGE DESIGN

**Thorpe Road Bridge over Chester Creek Superstructure Replacement Project** is in the design stages. This project will replace the current superstructure with new girders and a new deck. A feasibility study was completed in 2023. The study identified several alternatives for replacing the superstructure. The City's Structural On-Call Consultant will design a superstructure based on recommendations from city staff.



*Thorpe Road Bridge over Chester Creek, SPOKV-4421*



*Web-to-Flange interface cracking, Thorpe Road bridge over Chester Creek, SPOKV-4421.*

**Sands Road Bridge over Chester Creek Superstructure Replacement Project** is in the planning stages only. This project would replace the existing superstructure with a new pre-stressed concrete slab bridge with a cast-in-place deck and would include new asphalt approaches. The existing multi-web girders are showing signs of increased stresses upon the girders. The latest inspection reports show cracking at the web-to-flange interfaces with a shear crack developing at the end of one of the girders. The bridge currently has pre-stressed concrete multi-web girders with an epoxy overlay deck. Cracks are showing through the deck along the lines where the 4' wide girders are connected. This project is currently in the Scoping Phase only.



*Sands Road Bridge over Chester Creek, SPOKV-4520*





*Shear crack at north end of Girder C, east side, and reflective cracking in the bridge deck, SPOKV-4520*

## **BRIDGE MAINTENANCE**

Bridge maintenance is a large part of the City of Spokane Valley's Bridge Preservation Program. Many repairs were conducted this past year. City personnel carry out a variety of bridge repairs and maintenance activities over the course of the year. In the past year, crews have removed debris from water channels, painted over graffiti, patched deck spalls, trimmed trees, removed homeless shelters from undersides of bridges, flushed deck drains, cleaned bridge expansion joints of debris, waterproofed deck timbers, and repaired guardrails and pedestrian rails.



*Sullivan Road over Spokane River south approach deck repair, SPOKV-4508*

One major repair that was completed was the replacement of the original compression seal in the Barker Road over Spokane River bridge. This was completed in May by N.A. Degerstrom. Another repair that was completed was the removal of the existing rebar that was left over from the demolition of the Barker Road bridge back in 2010. Staff were alerted to a complaint

of rebar protruding from the old concrete foundations. This was noticed when the summer river flows dropped to their lowest levels. This was obviously a safety concern, so staff was able to hire a Contractor, get the appropriate permits and approvals to cut and remove the rebar from the river bottom. This was accomplished in the first week of September prior to water levels rising.



*Barker Bridge Rebar Reclamation Project, SPOKV-5503*

## **BRIDGE PRESERVATION PROJECTS**

In July 2021, the city was awarded \$261,100 to repair the deck of the Mission Avenue over Evergreen Road bridge (4518). Construction was completed in summer 2023. The city's contractor installed a two-part epoxy sealer on the deck to help seal out water from penetration into the deck. New compression seals and upgraded ADA sidewalks were also installed as part of the project.



*Mission Avenue over Evergreen bridge with new deck overlay and new compression seals, SPOKV-4518.*