ANNUAL BRIDGE REPORT

March 2022

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 inventory and inspection, State and County funding, a review of the current bridge conditions and a summary of bridge design and construction work during the past year.

Definitions:

Bridge – structure having a clear span length greater than 20 feet measured along the centerline, also referred to as an NBI bridge.

Functionally Obsolete (FO) – designation when the deck geometry, load carrying capacity (comparison of the original design load to the current State legal load), clearance or approach roadway alignment no longer meet the usual criteria for the system of which it is an integral part. In general, FO means that the bridge was built to standards that are not used today.

Short Span Bridge – structure having a clear span length less than or equal to 20 feet measured along the centerline and meets the short span bridge criteria in the WSBIM.

Structurally Deficient (SD) – designation if significant load carrying elements are found to be in poor condition due to deterioration and/or damage, or the adequacy of the waterway opening provided by the bridge is determined to be extremely insufficient to the point of causing overtopping with intolerable traffic interruptions.

Sufficiency Rating (SR) – provides a method of evaluating highway bridge data by calculating four separate factors to obtain a numeric value which is indicative of bridge sufficiency to remain in service. The result of this method is a percentage in which 100 percent would represent an entirely sufficient bridge and zero percent would represent an entirely insufficient or deficient bridge. The formula considers the structural adequacy, functional obsolescence, level of service and essentiality for public use.

WSBIM – Washington State Bridge Inspection Manual.

BRIDGE INVENTORY

Spokane County currently has 176 bridges in its bridge inspection inventory, 18 of which are owned by the Railroad, 7 of which are owned by small cities, and 1 is owned by parks.

Of the 150 county owned bridges, 109 are bridges and 41 are short span bridges. A breakdown by main span material as well as weight restrictions and calculated deficiencies can be found in Tables 1 and 2 below, respectively.

Table 1: Main span material breakdown for both County owned bridges and short span bridges.

Main Span Material	109 Bridges	41 Short Span Bridges
Concrete/Concrete Continuous	29	8
Prestressed and/or Post Tensioned Concrete/Concrete Continuous	65	8
Steel	12	3
Timber	3	22

Table 2: Posted and calculated designations for both County owned bridges and short span bridges.

Classification	109 Bridges	41 Short Span Bridges
Posted for Weight	9	4
Structurally Deficient (SD)	9	0
Functionally Obsolete (FO)	12	0

A complete list of posted bridges can be found in in Appendix B.

The replacement value of all county owned structures is estimated to be $315 million dollars.

BRIDGE INSPECTION

The County 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 inspections in two categories: Routine Inspections and Special Inspections. Routine Inspections must be done at least once every two years and Special Inspections are performed at different intervals as required by the condition of the bridge. Special Inspections often require specialized equipment and training to perform. There are currently 5 bridges and 8 short span bridges that require inspections every 12 months or less due to some structure components needing more frequent inspections.

Routine Inspections and some aspects of Special Inspections are accomplished by Bridge Department staff. To perform Special Inspections, the County utilizes the services of a local company, Commercial Grading, to provide the specialized equipment and operators

required to accomplish these inspections. In addition, the WSDOT Bridge Preservation Dive Team performs Underwater Inspections.

For the Parks Department and towns of Spangle, Fairfield, and Rockford, the Bridge Department staff performs routine inspections and other work, such as load rating and scour evaluation. A complete inventory of structures that Spokane County inspects can be found in Appendix A.

ROUTINE INSPECTIONS: 64 bridges, 27 short span bridges, and 1 interim inspection (which look at a specific element of a bridge rather than every piece of a bridge) were conducted in 2021. All deficiencies found from the inspections have been noted and scheduled for routine maintenance either with the Spokane County Bridge Maintenance Crew or put on the list for future Small Works Roster projects.

SPECIAL INSPECTIONS: Three inspections fall under this category:

Fracture Critical Inspection (FC): Spokane County has no FC bridges.

Underwater Inspections: The WSDOT dive team did not complete any underwater inspections in 2021.

Under Bridge Inspection Truck (UBIT): These inspections require the use of a truck that can access the soffits of high span bridges which cannot be inspected from the ground. In 2021, seven County bridges received UBIT inspections. These included: Nine Mile Road Bridge No. 2602, Seven Mile Road Bridge No. 2608, Pine Bluff Road Bridge No. 2609, Valley Chapel Road Bridge No. 3303, Cheney-Spokane Road Bridge No. 2404, Elder Road Bridge No. 5303, and Wandermere Road Bridge No. 3603.

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 shared between Bridge Department staff and a consultant.

In 2014, FHWA mandated that all bridge load ratings be updated to address a new class of trucks. A two-tier timetable was established and the Bridge Department is currently working to ensure compliance with the load rating schedule.

SCOUR EVALUATIONS: All bridges over water must be evaluated for the stability of their foundations due to the erosion of the stream bed which supports them. For bridges that have foundations classified as scour critical or unknown, a Scour Plan of Action has been prepared which includes monitoring during high flows and is updated as needed.

FUNDING

The Federal Government provides the main source of funds for bridge rehabilitation and replacement projects which are constructed under contract. Under the 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 NHS 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 a snapshot of the sufficiency rating for the 150 Spokane County owned bridges in 2021. A complete list of the SD, FO, and weight restricted bridges can be found in Appendix B.

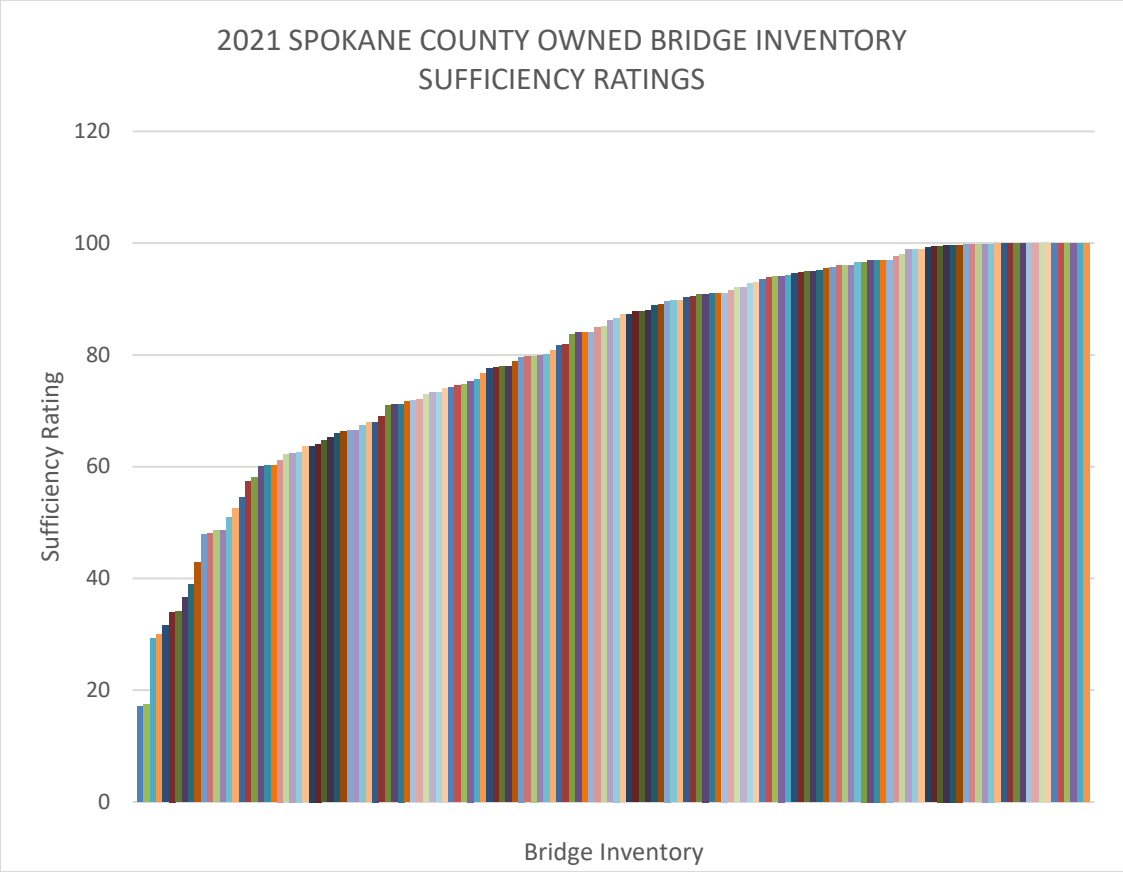

Figure 1: Sufficiency ratings for the 150 Spokane County owned bridges.

In most years, Federal funding is provided at an 80% level with the County Road Fund providing a 20% match. However, on occasion, State funding such as those available through the Rural Arterial Program (RAP) have been utilized as matching funds.

The County Road Fund provides money for replacing short span bridges (less than 20 feet in length) that are not eligible to receive funding through the State, as well as yearly routine maintenance of bridges.

In 2021, the local bridge program awarded approximately $85.3 million in funds to be distributed to local agencies throughout the State in the upcoming years. Spokane County was not selected for a project during this call for projects. The next call for projects is expected in December 2022 for local agency bridge projects.

RECENTLY FUNDED PROJECTS

In December 2019, the County was successful in obtaining $4,109,512 in Federal grants for the following three bridge projects: Little Spokane Drive over Little Spokane River Bridge No. 3704 replacement, Sunset Highway over North Fork of Deep Creek Bridge No. 0514 removal, and Waikiki Road over Little Spokane River Bridge No. 2606 deck repair. The preliminary engineering began in 2020 for Little Spokane Drive and Waikiki Road and began in 2021 for Sunset Highway.

The following photos highlight two of the most recently awarded federally funded bridge projects in 2019 due to structural deficiencies.

Structural Deficient
Sufficiency Rating: 17.05 SD
Little Spokane Drive Bridge No. 3704 over Little Spokane River

Structural Deficient
Sufficiency Rating 36.60 SD
Waikiki Road Bridge No. 2606 over Little Spokane River

ACTIVE PROJECTS

Table 3 below provides the status of the active projects in 2021. Additional details about each project can be found on the following pages.

Table 3: Status of active projects in 2021.

PROJECT	ESTIMATED TOTAL COST	PLANNED CONSTRUCTION DATE	FUNDING
Projects Constructed in 2021			
Frideger Road Bridge No. 4902 CRP 3239	$1,360,000	Constructed in 2021	Federal County
Forker Road Culvert Replacement CRP 3270	$550,000	Constructed in 2021	County
Wallis Road Bridge No. 5712	$330,000	Constructed in 2021	County
Projects in Design			
Little Spokane Drive Bridge No. 3704 CRP 3267	$1,032,500	Construct in 2023	Federal County
Waikiki Road Bridge No. 2606 CRP 3264	$785,000	Construct in 2022	Federal County
Sunset Highway Bridge No. 0514 CRP 3263	$293,000	Removal in 2022	Federal County
Deer Park Milan Road Bridge No. 3915 CRP 3241	$1,325,200	Construct in 2023 or 2024	County
Marshall Road Bridge No. 2401 CRP 3301	$550,000	Construct in 2022 or 2023	County

COMPLETED BRIDGE AND SHORT SPAN BRIDGE PROJECTS

During 2021, one bridge replacement and two short span bridge replacement projects were completed. The following are a few details about the replacements.

Frideger Road Bridge No. 4902 over Little Spokane River, CRP 3239 was a bridge replacement project. It is located approximately 0.07 miles east of Elk-Camden Road in north Spokane County. The existing single span, conventionally reinforced concrete structure was scour critical and weight restricted for all seven legal trucks. The new 58-foot long structure is a single span, prestressed concrete slab girder bridge with a concrete cast-in-place deck, and included a roadway realignment. Construction was completed in Fall 2021.

Wallis Road Bridge No. 5712 over South Fork Deadman Creek was a bridge replacement project. The existing weight restricted timber bridge was deteriorating with rot and section loss in the timber beams, deck planks and piles. The existing short span bridge was removed and a new 35-foot long modular steel bridge supported on a structural earth

wall foundation was constructed. Preliminary engineering and survey work started in 2019 with construction completed in Fall 2021.

Forker Road Bridge No. 4704 over Drainage was a culvert replacement project. The existing six-foot diameter culvert was deteriorating with rot and section loss in the corrugated metal pipe bottom. The existing culvert structure was removed and a new 35-foot long modular steel bridge supported on a structural earth wall foundation was constructed. Preliminary engineering and survey work started in 2020 with construction completed in Summer 2021.

BRIDGE DESIGN

County Bridges are designed using in the latest edition of the AASHTO LRFD Bridge Design Specification in concert with the WSDOT Bridge Design Manual. Below is a short description of the bridges which are currently under design.

Waikiki Road Bridge No. 2606 over Little Spokane River, CRP 3264 is a bridge deck rehabilitation project. It is located approximately 1.7 miles west of Mill Road in north Spokane County. The existing three-span prestressed concrete girder bridge is 168 feet long with 857 square feet (19.6%) of the concrete deck deteriorating. The deck will be rehabilitated, including new asphalt approaches and expansion joint reconstruction/replacement. Design work was completed in 2020 and construction will take place in 2022.

Little Spokane Drive Bridge No. 3704 over Little Spokane River, CRP 3267 is a bridge replacement project. It is located approximately 1.2 miles west of Highway 2 in north Spokane County. The existing 90-foot long, three span, conventionally reinforced concrete structure is scour critical and weight restricted for all seven legal trucks. The replacement structure will be a single span, prestressed concrete girder bridge with a concrete cast-in-place deck and steel piling and include a roadway realignment. Construction is slated for 2023.

Sunset Highway Bridge No. 0514 over North Fork of Deep Creek, CRP 3263 is a bridge removal project. It is located approximately 500 feet west Highway 2 in west Spokane County. The existing single span steel and concrete bridge is 27 feet long and was built in 1910. The weight restricted bridge will be removed, stream banks stabilized and scoured areas filled with streambed sediment. The survey for the design work was completed in 2020 with design started in 2021 and bridge removal to take place in 2022.

Deer Park Milan Road Bridge No. 3915 over Bear Creek, CRP 3241 is a bridge replacement project. It is located approximately 4 miles east of Deer Park. The existing single span cast-in-place concrete bridge was built in 1921 and widened to the north in

1973. It is scour critical and deteriorating. The replacement structure is still being evaluated and will be built on the existing alignment. The topographic survey was completed in 2018 with design work scheduled for 2022 and construction in 2023 or 2024.

BRIDGE MAINTENANCE

Routine maintenance includes work on the inventory of timber bridges, by rebuilding deteriorated superstructures, updating bridge rail systems, repairing damaged guardrail and scour repair. There is also an extensive inventory of concrete bridges which receive maintenance work such as repairing and washing decks, cleaning and replacing expansion joints and bridge rail repairs. The bulk of this work is accomplished by the Bridge Maintenance Crew who also handle emergency repairs and monitoring of the inventory during high water events.

MAJOR BRIDGE MAINTENANCE

Three major bridge maintenance projects were completed in 2021. Design work for two other bridge replacement projects that will use County funds and the Bridge Maintenance and District Crews to perform the work will continue in 2022.

Cahill Road Bridge No. 4215 over Drainage was a deck replacement in Fall 2021. Significant deterioration of the timber deck warranted a deck replacement. All other elements of the bridge were found to be in good to satisfactory condition. A modular corrugated steel deck and gravel wearing surface replaced the timber deck.

MOVING FORWARD

Of the 22 County owned timber bridges, 18 are founded on timber pile. Most of these timber bridges were built in the 1950's and 1960's and have an average age of 66 years. The typical expected service life of a timber bridge is 50 years, indicating that the County's timber bridge inventory is at or beyond its expected service life. Currently, 27 percent of the timber bridges supported by timber piling are considered in poor condition as the timber substructure and/or piles are wearing out and beginning to fail. With more expected to be added to this list, funding options and replacement structures will be reviewed.

APPENDIX A
INVENTORY OF STRUCTURES

Spokane County

Bridge Description	Total Number of Bridges	Bridges with weight restrictions	Closed bridges	Bridges with height restrictions
Railroad Under Crossings (Primary Safety Inspections)	17	0	0	14
Railroad Over Crossings	7	2	1	0
River, Stream, Drainage Crossings, Trails, and Roadways	145	13	1	0
Totals:	167	15	2	14

SMALL CITY BRIDGES INSPECTED BY SPOKANE COUNTY

City of Fairfield

Bridge Description	Total Number of Bridges	Bridges with weight restrictions	Bridges with height restrictions
River, Stream and Drainage Crossings	2	0	0
Totals:	2	0	0

City of Rockford

Bridge Description	Total Number of Bridges	Bridges with weight restrictions	Bridges with height restrictions
River, Stream and Drainage Crossings	1	0	0
Totals:	1	0	0

City of Spangle

Bridge Description	Total Number of Bridges	Bridges with weight restrictions	Bridges with height restrictions
River, Stream and Drainage Crossings	4	0	0
Totals:	4	0	0

APPENDIX B
2021 BRIDGE REPORT FIGURES AND TABLES

Bridges Categorized as Structurally Deficient in 2021 (9)

Bridge #	Bridge Name	Sufficiency Rating	Posting Status	Year Built	Length (ft)	Traffic Volume (ADT)
SPOK-3704	LITTLE SPOK DR OV LITTLE SPOK RIVER	17.05	Posted	1951	90	1109
SPOK-3703	COLBERT RD OV LITTLE SPOKANE RIVER	17.38	Posted	1953	90	2167
SPOK-3801	CHATTAROY RD OV LITTLE SPOKANE RIVER	29.23	Posted	1953	45	1387
SPOK-3112	OLD STATE ROUTE 195	29.91	Posted	1929	195	888
SPOK-0514	SUNSET HWY OV N FK DP CR	33.99	Posted	1910	27	8
SPOK-2606	WAIKIKI RD OV LITTLE SPOKANE RIVER	36.60	Open	1961	168	2944
SPOK-2404	CHENEY-SPO OVER UP&BN RR	42.80	Posted	1949	547	2238
SPOK-1506	GORDON RD OVER DEEP CREEK	48.63	Open	1981	111	155
SPOK-5208	STARR RD OV SOUTH FORK ROCK CREEK	65.99	Open	1959	42	16

Bridges Categorized as Functionally Obsolete in 2021 (11)

Bridge #	Bridge Name	Sufficiency Rating	Posting Status	Year Built	Length (ft)	Traffic Volume (ADT)
SPOK-3715	GREENLEAF DRIVE	31.51	Open	1990	126	1422
SPOK-3902	DEER PARK-MILAN RD OV LITTLE SPOKANE RIVER	48.04	Posted	1954	42	2046
SPOK-2608	SEVEN MILE RD OV DEEP CREEK	52.57	Open	1958	170	2901
SPOK-3308	VALLEY CHAPEL ROAD OV CALIFORNIA CREEK	63.68	Open	1923	38	411
SPOK-5303	ELDER RD OV UPRR	64.07	Open	1961	149	2089
SPOK-4204	KEEVEY ROAD OV LATAH CREEK	64.66	Open	1976	96	15
SPOK-4403	DUNN RD OV CALIFORNIA CREEK	76.70	Closed	1963	42	0
SPOK-3701	LITTLE SPOKANE DR OV LITTLE SPOKANE RIVER	79.81	Open	1961	97	2456
SPOK-2604	RUTTER PKWY OV LITTLE SPOKANE RIVER	81.70	Open	1960	157	2317
SPOK-3313	ELDER RD OV CALIFORNIA CREEK	87.28	Open	1984	73	62
SPOK-4212	HAYS ROAD	92.99	Open	1960	81	9

APPENDIX B

2021 BRIDGE REPORT FIGURES AND TABLES

Bridges with Weight Restrictions in 2021 (13)

Bridge #	Bridge Name	Sufficiency Rating	Posting Status	Year Built	Length (ft)	Traffic Volume (ADT)
SPOK-3704	LITTLE SPOK DR OV LITTLE SPOK RIVER	17.05	Posted	1951	90	1109
SPOK-3703	COLBERT RD OV LITTLE SPOKANE RIVER	17.38	Posted	1953	90	2167
SPOK-3801	CHATTAROY RD OV LITTLE SPOKANE RIVER	29.23	Posted	1953	45	1387
SPOK-3112	OLD STATE ROUTE 195	29.91	Posted	1929	195	888
SPOK-0514	SUNSET HWY OV NORTH FORK DEEP CREEK	33.99	Posted	1910	27	8
SPOK-4814	ANTLER RD OV DEER CREEK	34.17	Posted	1955	18	21
SPOK-2401	MARSHALL RD OV MARSHALL CREEK	38.93	Posted	1960	20	44
SPOK-2404	CHENEY-SPOKANE OV UP&BN RR	42.8	Posted	1949	547	2238
SPOK-3902	DEER PARK-MILAN RD OV LITTLE SPOKANE RIVER	48.04	Posted	1954	42	2046
SPOK-2203	WELLS RD OV SANDERS CREEK	48.53	Posted	1953	30	282
SPOK-3705	SHADY SLOPE RD OV LITTLE DEEP CREEK	54.43	Posted	1955	20	1641
SPOK-3620	JAY AVE OV DRAINAGE	66.54	Posted	1963	27	159
SPOK-1102	BADGER LAKE RD OV BADGER LAKE OVERFLOW	67.36	Posted	1952	21	141

APPENDIX B

2021 BRIDGE REPORT FIGURES AND TABLES

County Owned Short Span Bridges (41)

Bridge #	Bridge Name	Sufficiency Rating	Posting Status	Year Built	Length (ft)	Traffic Volume (ADT)
SPOK-4814	ANTLER RD OV DEER CREEK	34.17	Posted	1955	18	21
SPOK-2401	MARSHALL RD OV MARSHALL CREEK	38.93	Posted	1960	20	44
SPOK-3710	SHADY SLOPE RD OV PEONE CREEK	50.87	Open	1964	21	1641
SPOK-3705	SHADY SLOPE RD OV LITTLE DEEP CREEK	54.43	Posted	1955	20	1641
SPOK-2818	DAHL RD OV SPRING CREEK	57.43	Open	1916	16	995
SPOK-3619	HOLLAND AVE OV DRAINAGE	60.00	Open	1974	13	772
SPOK-2813	DAHL RD OV DRAGOON CREEK	62.21	Open	1916	16	972
SPOK-2101	CHENEY-PLAZA RD OV BUCKEYE CREEK	62.45	Open	1921	12	234
SPOK-3915	DEER PARK-MILAN RD OV BEAR CREEK	65.21	Open	1921	13	3810
SPOK-4909	MILAN-ELK RD OV DRY CREEK	66.36	Open	1968	17	1478
SPOK-3202	SPANGLE-WAVERLY RD OV SPANGLE CREEK	66.38	Open	1917	20	854
SPOK-1102	BADGER LAKE RD OV BADGER LAKE OVERFLOW	67.36	Posted	1952	21	141
SPOK-2909	BRIDGES RD OV DRAGOON CREEK	67.98	Open	1972	18	40
SPOK-4404	CONNOR RD OV CALIFORNIA CREEK	67.99	Open	1953	21	36
SPOK-3201	KEEVY RD OV SPANGLE CREEK	68.97	Open	1951	22	30
SPOK-5305	OLD ELDER RD OV MICA CREEK	71.19	Open	1921	21	20
SPOK-3709	WOOLARD RD OV LITTLE DEEP CREEK	73.25	Open	1958	22	301
SPOK-4410	BELMONT RD OV CALIFORNIA CREEK	75.63	Open	1965	19	566
SPOK-3204	WHITTIER RD OV N PINE CREEK	77.95	Open	1954	16	88
SPOK-4408	MADISON RD OV CALIFORNIA CREEK	79.73	Open	1952	19	767
SPOK-0515	STROUP RD OV NORTH FORK DEEP CREEK	80.00	Open	1967	21	20
SPOK-2911	SPRING CREEK RD OV SPRING CREEK	80.07	Open	1964	21	49
SPOK-3706	SHADY SLOPE OV PEONE CRK OVERFLOW	80.71	Open	1964	21	1662

Bridge #	Bridge Name	Sufficiency Rating	Posting Status	Year Built	Length (ft)	Traffic Volume (ADT)
SPOK-0512	COULEE HITE RD OV NORTH FORK DEEP CREEK	83.99	Open	1952	21	25
SPOK-5107	KNIGHT RD OV COVE CREEK	84.00	Open	1962	16	26
SPOK-3203	CEDAR RD OV DRAINAGE	84.99	Open	1967	12	12
SPOK-3102	BABB RD OV NORTH PINE CREEK	86.08	Open	1952	20	84
SPOK-3621	IVANHOE RD OV DRAINAGE	89.68	Open	1957	21	180
SPOK-3622	BARNES RD OV DRAINAGE	89.75	Open	1957	21	272
SPOK-0524	STROUP RD OV BRANCH DEEP CRK	90.34	Open	1950	20	20
SPOK-6201	IDAHO RD OV ROSE CREEK	93.99	Open	1900	18	9
SPOK-4202	RATTLERS RUN RD OV RATTLERS RUN CREEK	94.10	Open	1964	21	24
SPOK-5905	BLANCHARD CREEK RD OV OVERFLOW	94.28	Open	2020	14	77
SPOK-4801	BRUCE RD OV DEER CREEK	95.96	Open	1950	19	47
SPOK-4215	CAHILL RD OV DRAINAGE	95.99	Open	1955	18	22
SPOK-0508	COULEE HITE RD OV DP CRK	96.00	Open	1962	22	17
SPOK-5701	MUZZY RD OV THOMPSON CREEK	96.57	Open	1951	21	379
SPOK-0406	THORPE ROAD OV SOUTH FORK DEEP CREEK	96.96	Open	1962	19	78
SPOK-3108	GRIFFITH RD ARCH PIPE OV NORTH PINE CREEK	97.00	Open	1994	18	3
SPOK-1201	MULLINIX RD OV COLUMBIA PLATEAU TRAIL	98.90	Open	1994	17	195
SPOK-3104	DIXON ROAD ARCH PIPE	100.00	Open	1992	17	18