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Bridge Preservation Office

Remarks and Instructions

The complete manual, revision packages, and individual chapters can be accessed at www.wsdot.wa.gov/publications/manuals/m36-64.htm

Please contact Jody Bywater at BywaterJ@wsdot.wa.gov or 360-570-2530 with comments, questions, or suggestions for improvement to the manual.

For updating printed manuals, page numbers indicating portions of the manual that are to be removed and replaced are shown below.

Chapter		Remove Pages	Insert Pages
Title Page		1 – 2	1 – 2
Foreword		3 – 4	3 – 4
Contents		7 – 14	7 – 14
Appendix 1-C	SPM Delegation Letter	1-C-1 – 1-C-2	1-C-1 – 1-C-2
Appendix 1-D	DPM Delegation Letter	1-D-1 – 1-D-2	1-D-1 – 1-D-2
Chapter 2	Bridge Files and Documentation	2-1 – 2-14	2-1 – 2-14
Appendix 2-C	Washington State Bridge Inventory System Coding Guide	2-C-1 – 2-C-166	2-C-1 – 2-C-166
Appendix 2-F	Border Bridge Information	2-F-1 – 2-F-2	2-F-1 – 2-F-2
Chapter 3	Inspections and Reports	3-1 – 3-92	3-1 – 3-94
Chapter 4	WSDOT Bridge Elements	4-1 – 4-98	4-1 – 4-98
Chapter 5	Load Rating and Scour	5-1 – 5-14	5-1 – 5-16
Appendix 7-D	Bridge Preservation Office Lead Approval Criteria	7-D-1 – 7-D-2	7-D-1 – 7-D-2

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State Construction Office
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Olympia, WA 98504-7354

Approved By

Signature

Washington State Department of Transportation

Washington State Bridge Inspection Manual

M 36-64.09

January 2019

Bridge Preservation Office/Local Programs

Americans with Disabilities Act (ADA) Information

English

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The *Washington State Bridge Inspection Manual* (WSBIM) is published jointly by the Bridge and Structures and the Local Programs offices of the Washington State Department of Transportation (WSDOT). This manual is the primary source of information and guidance for those who inspect bridges subject to the National Bridge Inspection Standards (NBIS), the National Tunnel Inspection Standards (NTIS) and managed by state and local agencies within Washington State.

This publication is the official source for all information relevant to Washington State's compliance with the NBIS, the National Bridge Inventory, the NTIS, the National Tunnel Inventory, and the Washington State Bridge Inventory. It is also the official source of information for the inspection of bridges* and selected structures on state right of way that are not subject to the NBIS, and for the recordkeeping requirements for these bridges and selected structures in the Washington State Bridge Inventory.

The WSBIM is managed by the Bridge Inspection Committee composed of individuals listed in this document. Suggestions for improvement and updating the manual are always welcome. All questions and comments regarding this manual will be reviewed by this committee and incorporated into subsequent revisions as appropriate.

Approved:	Approved:
______________________________	______________________________
Harvey Coffman, P.E, S.E.	Debbie Lehmann, P.E.
WSDOT Bridge Preservation Engineer/	FHWA Washington Division Bridge Engineer
Statewide Program Manager	

*Bridge(s) is intended to mean all reportable structures which includes bridges, culverts and tunnels.

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Contents

Chapter 6 Damage and Repairs

Chapter 7 Quality Control/Quality Assurance

Chapter 8 Electrical and Mechanical

Chapter 9 Tunnels

Appendix 1-C SPM Delegation Letter

Washington State Department of Transportation

Memorandum

January 31, 2018

TO: Harvey Coffman, Bridge Preservation Engineer
Bridge & Structures Office, Development Division

THRU: Jeff Carpenter, P.E.,
Director of Development Division, State Design Engineer

FROM: JWC R. Marshall Elizer, Jr., P.E., PTOE
Assistant Secretary for Multimodal Development and Delivery

SUBJECT: Delegation of NBIS Program Manager for Statewide Bridge Inspection Program

This is to advise you that as the incumbent Bridge Preservation Engineer of the Bridge and Structures Office, you are hereby delegated authority as Program Manager for the statewide bridge inspection program, as defined in the National Bridge Inspection Standards 23 CFR 650.307(e), §650.307(c) (1), and §650.307(c)(2).

These duties may be further delegated to individuals meeting the qualifications of 23 CFR 650.309(a). However, the responsibility must remain with you as the Program Manager in accordance with 23 CFR 650.307(d).

RME:jf

cc: Jeff Carpenter
Mark Gaines
Debbie Lehmann, FHWA

Appendix 1-D DPM Delegation Letter

Washington State
Department of Transportation

Memorandum

August 2, 2018

TO: Tom Castor, P.E.
Marine Project Engineer
MS: TB-32

FROM: Harvey L. Coffman, P.E., S.E.
Bridge Preservation Engineer
MS: 47340

SUBJECT: Sub-delegation of Bridge Inspection Program Manager for Washington State Ferry's

By authority granted to me as the Statewide Program Manager, I am sub-delegating to you as the Washington State Ferry's, WSF, Marine Project Engineer, Program Manager Duties for the federally reportable inventory of the WSF. These duties are defined in the National Bridge Inspection Standards (NBIS) 23 CFR 650.307(e), §650.307(c) (1), and §650.307(c) (2), for all WSF bridge inspection programs.

You may further sub-delegate these duties however; I do not expect that you will have a need to do so.

Please note, that the overall bridge inspection program responsibility must remain with the Bridge Preservation Engineer as the Statewide Program Manager in accordance with 23 CFR 650.307(d).

HLC: mms

cc: Jeff Carpenter, State Design Engineer
Mark Gaines, State Bridge and Structures Engineer
George Comstock, Coding & Appraisal Engineer
Debbie Lehmann, FHWA Washington Division Bridge Engineer

DOT Form 700-008 EF
Revised 5/99

Washington State Department of Transportation

Memorandum

July 31, 2018

TO: Roman Peralta, P.E.
Local Programs Bridge Engineer
MS: 47390

FROM: Harvey L. Coffman, P.E., S.E. HLC
Bridge Preservation Engineer/Statewide Program Manager
MS: 47340

SUBJECT: Sub-delegation of Bridge Inspection Program Manager for Local Agencies

By authority granted to me as the Statewide Program Manager, I am sub-delegating to you as the Local Programs Bridge Engineer, Program Manager duties for the federally reportable inventory of Local Agency bridges and tunnels, as defined in the National Bridge Inspection Standards (NBIS) 23 CFR 650.307(e), §650.307(c) (1), and §650.307(c) (2), and the National Tunnel Inspection Standards (NTIS) 23 CFR 650.507(g), §650.507(e) (1), §650.507(e) (2), §650.507(e) (3) for all the local agency bridge inspection programs.

These duties can be further sub-delegated by you to any local agency representative who meets the qualifications stated in §650.309(a) or §650.509(a) as appropriate. This action must be done in writing.

Please note, that the overall bridge inspection program responsibility must remain with the Bridge Preservation Engineer as the Statewide Program Manager in accordance with 23 CFR 650.307(d), and/or §650.507(f).

These qualifications need to be renewed as defined in WSBIM section 1-5.2 to maintain certification as program manager.

HLC: mms

cc: Jeff Carpenter, State Design Engineer
Mark Gaines, Bridge and Structures Engineer
George Comstock, Coding & Appraisal Engineer
Kathleen Davis, Local Programs
Debbie Lehmann, Bridge Engineer Washington Division FHWA

DOT Form 700-008 EF

2-1 General

This chapter establishes policies on how the Washington State Department of Transportation (WSDOT) and local agencies maintain bridge files, both to meet Federal Highway Administration (FHWA) requirements and effectively manage physical assets (also sometimes called physical features) on WSDOT right of way. These policies apply to structures that are generally called bridges, culverts, tunnels, lids, detention vaults, overpasses, and undercrossings when they meet certain criteria commonly based on structure geometry, location, and use described in more detail below.

These policies also apply differently depending on bridge ownership and location and fall into three main categories:

1. WSDOT-owned structures on WSDOT right of way.
2. Local agency-owned structures on WSDOT right of way.
3. Local agency-owned structures on local agency right of way.

Unless otherwise specifically noted below, all policies apply to WSDOT and local agency owned structures on WSDOT right of way. However, only those policies directly associated with FHWA requirements apply to local agency owned structures on local agency right of way. There are occasionally special circumstances in which WSDOT owns a structure on local agency right of way. This chapter has no specific policies in this case, except that the bridge file must be maintained under all circumstances.

This chapter addresses the following topics associated with bridge files:

- Maintaining physical paper and electronic bridge files.
- Maintaining a state bridge inventory.
- Submitting state bridge inventory data to FHWA.
- Responding to FHWA and Statewide Program Manager (SPM) requests for information.

Each topic has components mandated by FHWA and components required by WSDOT policy. The following sections clearly identify the authorizing environment.

2-2 Maintaining Bridge Files and Documentation

This section is largely based on requirements established by Section 2 of the AASHTO *Manual for Bridge Evaluation* (MBE) with Interim Revisions. The MBE emphasizes three main points for maintaining a bridge file:

A. Bridge owners should maintain a complete, accurate, and current file of each bridge under their jurisdiction.

B. A bridge file always contains the current and sometimes the cumulative information about an individual bridge.

C. A bridge file may be stored electronically, on paper, or a mixture of both.

The remainder of this Section 2-2 describes WSDOT Bridge Preservation Office policy for maintaining bridge records.

Electronic Files

Electronic bridge files are maintained on the BEISt internal website:
http://beist/inventoryandrepair/inventory/bridge

This website contains the following:

1. Scanned copies of signed inspection reports in pdf format dating back to approximately the year 1998.
2. Scanned copies of the Washington State Structural Inventory and Appraisal (SIA) sheet dating back to 2011.
3. Current inspection photographs in jpg format.
4. Current and historic repair recommendations displayed directly from the BPO database (See Section 2-3), dating back to approximately the year 2002.
5. Scanned copies of contract plans, as-builts when available, otherwise award plans. Note that the plan sheets on BEISt are not the official plans, which are owned by the WSDOT regions where the bridge is located.
6. In-house repair plans dating back to 2013.
7. Scanned copies of correspondence, historic repair and maintenance reports, miscellaneous studies, and other records are scanned from the paper files and loaded onto BEISt for selected bridges. This is generally done in response to a public disclosure request or a legal discovery requirement.

Paper Files

Appendix 2-A has a plan of the WSDOT Bridge Preservation Office indicating where paper files are maintained. Paper files must be maintained on WSDOT owned or maintained structures, including:

1. All signed bridge inspection reports, including but not limited routine, fracture critical, underwater, and special report types. Original signed reports are stored in paper files and digital copies are stored electronically. Signed damage inspections in response to fires, floods, earthquakes, etc. shall also be included.
2. Any and all miscellaneous special inspections, studies, investigations, or file reviews. Examples include but are not limited to: load testing documentation, findings from FHWA technical advisory requests for information, survey results, or ground/slope stability studies.
3. A current printout of any specific inspection requirements/procedures, usually but not necessarily associated with fracture critical, underwater, or special inspection reports.
4. A stamped Load Rating Summary sheet which shows the controlling ratings shall be placed in the letter file. The original load rating calculations for state owned bridges shall be filed in the Risk Reduction section at the WSDOT Bridge Preservation Office.
5. Scour files are located in the Risk Reduction section at the WSDOT Bridge Preservation Office.
6. All current agreements with other agencies for maintenance, rehabilitation, or shared ownership.

Note: The inspection reports, miscellaneous studies and inventory data is cumulative, meaning that all historic as well as current data must be kept in the bridge file. All documents listed above, and others listed in the MBE, may be stored electronically as a supplement to the paper files. WSDOT bridge files stored electronically have a backup system intended to protect the electronic data for the life of the structures.

Other Files – Some bridge records are not available electronically at the BEISt internal website or in paper files as indicated in Appendix 2-A. The WSDOT *Bridge Design Manual* M 23-50 provides some guidance on where these records are located. The following provides some additional information:

Contract Documents – For contracts let thru WSDOT Contract Ad and Award, Washington State Archive maintains a paper cumulative file by contract number of awarded contracts and construction documents as required by the *Construction Manual* Section 10-3. WSDOT Records and Information maintains electronic copies of finalized As-Built Contract Plans.

WSDOT Bridge and Structures Office maintains structural plans and selected shop drawings which are stored electronically. Structural plans include culvert shop drawings that contain plan and design information along with plan contracts from other agencies that complete work on the WSDOT system. Shop drawings include: steel structures, expansion joints, specialized bearings (such as pot or seismic isolation bearings), prestressed girders, post-tensioned structures, and special structural designs (such as pontoon, suspension, or movable bridges).

WSDOT maintains a state Contract History database that records all contract work completed on state managed structures. This database correlates contract number and contract work to structures maintained by the WSDOT bridge inventory and starting in 2017 associates this contract work to each BMS element in each structure affected by this contract.

In-House Repair Documents – WSDOT maintains a cumulative file of all in-house repair recommendations made by the Bridge Preservation Office, and follow-up verification information when repairs are completed. If maintenance reports prepared by region maintenance crews are provided to the bridge record, they are also permanently retained. In-house drawings and specifications supplementing the repair recommendations are also retained in the electronic record starting in 2013.

Correspondence on Significant Actions or Findings – WSDOT maintains a cumulative file of correspondence (letters, emails, memos, etc.) related to significant actions or findings, including but not limited to:

- Urgent or emergency actions including posting, restricting or closing a bridge
- Critical findings, including Critical Damage Bridge Repair Reports (see WSBIM Chapter 6)
- Special reports, including deck delamination/chloride testing, settlement/ movement monitoring, and life cycle studies

This correspondence may need a “summary memo to file” after the significant actions or findings are fully addressed. This memo is intended to provide full context and the final disposition of the actions or findings for the record.

2-2.1 Transferring Bridge Ownership and/or Program Manager

Whenever a bridge transfers ownership and/or program manager responsibility, the entire bridge file, both paper and electronic, must be transferred to the new owner/program manager. Bridge transfers must be acknowledged and documented by both program managers involved along with any additional deeds, agreements, plans or other documentation available. All transfer documentation must be retained in the bridge file. See Appendix 2-B for a checklist and SPM signoff sheet. In some cases, the acknowledgement of the transfer by the program managers may be the only documentation available.

Transferring Bridge Ownership and/or Program Manager responsibilities are performed by the SPM or Local Programs DPM, but updating the electronic record in WSBIS must be performed by the Superuser account under the direct control of the SPM. This is intended to ensure that adequate documentation for these transfers are in place.

In cases where WSDOT transfers a bridge file to another agency, a complete electronic copy of the entire bridge file is made and retained permanently. Other agencies are encouraged to follow this practice, but are not required to.

2-2.2 Dead/Obsolete Bridge Files

When a bridge is demolished or permanently removed from service and no longer considered appropriate for inclusion in the bridge inventory, the program manager for the “dead” bridge shall add documented acknowledgement of the removal from the inventory into the bridge file which then must be retained for a minimum of five years. WSDOT maintains dead bridge files permanently. Local agencies are encouraged to maintain permanent dead bridge files as well, though there is no requirement to do so.

See Section 2-3.3 for more information on processing “dead” bridge electronic records in the WSBIS.

2-2.3 Structures on WSDOT Right of Way

WSDOT shall maintain a bridge file for all structures considered appropriate for inclusion in the WSBIS that are on the WSDOT right of way, including local agency bridges passing over state routes or adjacent to state routes, whether or not the structure is subject to the NBIS or reported to the NBI. For more information, see Section 2-3.4.

2-3 Maintaining a State Bridge Inventory – WSBIS

Washington State is required by 23 CFR 650.315 to maintain an inventory of all bridges (structures) subject to the National Bridge Inspection Standards (NBIS), from which selected data is reported to FHWA as requested for entry into the National Bridge Inventory (NBI). FHWA has a Stewardship Agreement with Washington State to submit NBI data on April 1 and October 1 each year.

The Moving Ahead for Progress in the 21st Century Act by the US Congress (MAP-21) has partially superseded 23 CFR Part 500, and mandates that National Bridge Elements be submitted to FHWA for all NBI bridges carrying National Highway System (NHS) routes. See www.fhwa.dot.gov/map21 for more information about MAP-21.

Federal law under 23 CFR Part 500 provides an option for state agencies to maintain a Bridge Management System (BMS), with the incentive that federal funding can be used with more flexibility. Washington State has chosen to implement a BMS and integrally incorporate it into the state inventory for bridges managed under the WSDOT bridge program. In addition, Washington State maintains an inventory to meet WAC 136-20-020, which requires that each county maintain an inventory of bridges in the state inventory. The Washington State Bridge Inventory System (WSBIS) is maintained to meet these federal and state laws and regulations. The WSBIS is also maintained to meet the WSDOT mission statement with respect to operating the state bridge structures, and provides a means for local agencies to do the same.

The WSBIS Coding Guide provides detailed instructions on how to create, update, and delete records in WSBIS, see Appendix 2-C. This coding guide is intended to define the data fields and how to edit them for use by bridge inspectors and inventory managers. This coding guide is largely based on the federal coding guide and must meet the following requirements:

1. Whenever a database field has to be translated to match the federal coding guide, this translation must be clearly defined.
2. The WSBIS coding guide cannot contradict the federal coding guide. In cases where the federal coding guide is either inconsistent with other FHWA requirements or vague, the WSBIS coding guide needs to clearly identify the issue and describe how the field should be coded into WSBIS.
3. Optional fields must be clearly identified.
4. Every field must clearly state what structure type or types it applies to, and clearly define how it should be coded for these various structure types. The current list of structure types are:
    - Structures and culverts carrying public roadways
    - Pedestrian, railroad, and other non-vehicular structures over public roadways. Private roads over public roadways are also included in this structure type.
    - Tunnels carrying public roadways within

    Structures not associated with any public roadway are not specifically included in this list, but when a field must be coded for these structures the coding guide will simply state "All structure records".
5. In cases where multiple routes interact with a structure, a "secondary" record is needed to maintain route information – usually an "undercrossing record". Every field that must be populated for secondary records will be clearly identified.

2-3.1 *WSBIS Inventory and Data*

The WSBIS needs to be understood clearly in two ways – which structures are included in the inventory and what data associated with these structures is maintained. Each of these categories has both mandated and optional components.

Beginning in October 2014 there is a requirement, from MAP-21, to collect National Bridge Element data for bridges carrying NHS routes. WSDOT is meeting this mandate by requiring these bridges to have BMS elements in WSBIS, which in turn will be translated into National Bridge Elements for submittal. See Appendix 2-E for the WSDOT BMS to NBE translation specifications. See www.fhwa.dot.gov/map21 for more information about MAP-21.

2-3.1.A Mandated Bridges and Culverts in the WSBIS – Reported to the NBI

In general, a structure that is subject to the NBIS and must be reported to the NBI when it meets all of the following:

- Carries highway traffic.
- Is owned by a public agency or built on public right of way for a public agency. Bridges owned by road associations or individual property owners on private right of way do not qualify.
- Is open to the public. Bridges posted "no trespassing" or otherwise clearly identified that they are privately owned or restricted to authorized users are not considered public. Bridges behind locked gates are also not considered public.
- Has a clear span along centerline of roadway greater than 20 feet.

Utility and Detention Vaults – Based on an agreement between Washington State and FHWA, vaults under roadways are considered subject to the NBIS when the minimum clear span along the centerline of the roadway exceeds 20 feet AND is wider than 12 feet, including any structure that has any portion directly under a lane or shoulder.

There are a few special circumstances that affect whether or not a bridge is subject to the NBIS and reported to the NBI not mentioned above (see Section 2-3.5).

Structures over federal aid or STRAHNET highways must include an "under" record(s) in the WSBIS and be reported to the NBI.

2-3.1.B Mandated Tunnels in the WSBIS – Reported to the NTI

In general, a tunnel that is subject to the NTIS and must be reported to the NTI when it meets all of the following:

- Carries highway traffic inside the tunnel.
- Is owned by a public agency or built on public right of way for a public agency. Bridges owned by railroads or other owners on private right of way do not qualify. Also tunnels under public roadways that do not carry traffic inside the tunnel do not qualify.
- Is open to the public. Tunnels posted "no trespassing" or otherwise clearly identified that they are privately owned or restricted to authorized users are not considered public. Tunnels behind locked gates are also not considered public.

NBI and NTI cannot inventory the same structure twice – There are cases where a structure has features that make it possible to consider either a bridge or a tunnel. In these cases, the owning agency can make the determination, but a structure that is coded as a bridge cannot be reported to the NTI, and similarly a structure that is coded as a tunnel cannot be reported to the NBI.

2-3.1.C Optional Structures in the WSBIS – Not reported to the NBI or NTI

Optional structures include any structure that the state or local agency manages as part of their structure inventory, but which do not qualify for reporting to the NBI or NTI. Typically this will include bridges with span lengths less than 20 feet (short spans), pedestrian structures that do not cross over or under a highway, "under" records for a route that is neither federal aid nor STRAHNET, and pedestrian or railroad tunnels under public roadways.

Note: Local agency structures on WSDOT right of way have special requirements as noted in Section 2-3.4.

2-3.1.D Mandated Data in the WSBIS

All data fields defined in the FHWA Coding Guide are required in the WSBIS. In cases where structures are maintained in WSBIS but not reported to the NBI, it is still required to complete all these fields in some consistent manner defined in the coding guide.

2-3.1.E National Bridge Element (NBE) Data

All bridges subject to the NBIS and carrying NHS routes are required to include WSDOT Bridge Management System (BMS) elements and translated to National Bridge Elements and included with the annual NBI data submittal. See Appendix 2-E for detailed information on the translation process.

2-3.1.F Optional Data in the WSBIS

All other data, including BMS elements for bridges not on NHS routes, condition states, repairs, notes, and electronic photos and documents are not required in the WSBIS, and are not reported to the NBI.

2-3.2 *New Bridge Inventory in the WSBIS*

Newly built bridges must be added to the bridge inventory (WSBIS) and the inventory data entered within 90 days after the bridge is opened to public traffic in the anticipated final configuration as per 23 CFR 650.315(c).

New bridges to the inventory must have a unique Structure Identifier (Federal Coding Guide Item 8) in the WSBIS. In particular, when a bridge is replaced – either temporarily or permanently – with a new structure, this new structure must have a new Structure Identifier. The same Bridge Number and Bridge Name fields can be used.

Individuals who create new inventory records in the WSBIS need to be familiar with a wide variety of information sources. In preparation for creating a new inventory record, the following information should be available:

- Bridge plans
- Load rating calculations, or summary information to correctly code selected fields
- Scour calculations, or summary information to correctly code selected fields when bridge is over water
- Route information, including current State and/or Local Agency Linear Referencing System (LRS) data
- GIS location information
- Traffic information

Additional specific information may be required in many cases, including but not limited to maintenance agreements, navigable waterway permits, replacement cost estimates, and historical significance.

Individuals who create new inventory records need to coordinate closely with the inspectors who perform the initial routine/inventory inspection to ensure that all the data is collected. See Chapter 3 for inspection procedures and policies.

Temporary bridges that carry public traffic for less than 90 days or which are less than 20 feet in length do not need to be inventoried or inspected in accordance with the NBIS. In **all** other circumstances temporary bridges carrying public traffic must be inventoried and inspected in accordance with the NBIS, including:

- Temporary bridges installed either as an emergency response by agency staff or as a stand-alone contract without any other substantial work performed in the immediate vicinity of the bridge site.
- Temporary bridges that are an integral part of a larger construction project, located within that project, and maintained by a contractor.

2-3.3 *Deleting (Obsoleting) Bridges in the WSBIS*

WSBIS is designed to retain historical data indefinitely, including files of bridges that have been removed from service and no longer part of the current bridge inventory. These bridges are called "obsolete" in the WSBIS and are called "dead" in the paper files (see Section 2-2.2).

WSDOT policy guides the requirements for deleting (obsoleting) structures in the WSBIS, and applies to all bridges in the WSBIS.

Structure records are obsoleted by the SPM or Local Programs DPM, but updating the electronic record in WSBIS must be performed by the Superuser account under the direct control of the SPM. This is intended to ensure that adequate documentation for these obsoletions are in place. Obsoleting structure records shall include the following steps:

- Create a new informational report describing the circumstances of the removal and the replacement structure information if appropriate. This informational shall include the completed and signed Record Change Form, see Appendix 2-B.
- The informational report is signed by the Statewide Program Manager (SPM).
- The paper bridge file (record), including the last signed informational report documenting removal from the bridge inventory, shall be retained for a minimum of five years.

See Section 2-2.2 for more information on maintaining "dead" bridge files.

2-3.4 *Bridges with Multi-Agency Responsibility in the WSBIS*

There are several ways in which a single bridge can have more than one agency responsible for the bridge inventory data. This section describes four cases where the responsibility is shared between WSDOT and a local agency, and where either WSDOT or a local agency shares responsibility with another state.

2-3.4.A Shared Responsibility between WSDOT and Local Agencies

There are the four cases of shared responsibility between WSDOT and a local agency, based on the principle of assigning data responsibility to the agency in the best position to maintain and report the data. These cases are WSDOT policy for all structures on WSDOT right of way. However, they can apply equally to any two agencies (a county and a city, for example). Regardless of how local agencies address these cases, it is a requirement that all bridge data in WSBIS that is reported to the NBI must be complete, accurate and current. This WSDOT policy is superseded by any written agreement between two agencies regarding bridge inventory record keeping.

Case 1: WSDOT-Owned Bridges on WSDOT Right of Way – WSDOT will be responsible for maintaining all bridge inventory data and federal reporting in this situation.

Note: This situation applies to any combination of "on" and "under" records, route owners, and federal reporting status. However, WSDOT will ask local agencies for specific data regarding local agency route and traffic, both for routes "on" and "under" the bridge as applicable.

Case 2: Local Agency-Owned Bridges Carrying Highway Traffic Over State Routes – This situation assumes that the bridge must have a federally reported "on" record and at least one federally reported "under" record. The "on" record shall be maintained by the local agency and the "under" record(s) shall be maintained by WSDOT.

Case 3: Local Agency-Owned Pedestrian Bridges Over State Routes – This addresses all situations in which there is no federally reported "on" record, and assumes that there is a federally reported "under" record, and possibly additional "under" records for the *Bridge List* M 23-09. The "under" record(s) shall be maintained by WSDOT. If the local agency chooses to maintain a record, it cannot be federally reported.

Case 4: Local Agency-Owned Bridges on State Right of Way Adjacent to a State Route – This addresses all situations in which a local agency owns a structure (usually a pedestrian bridge) on state right of way that does not cross over or under any routes, and is deemed appropriate by WSDOT for inclusion in the bridge inventory. In this case, no records are federally reported

In all situations where there is shared responsibility between WSDOT and a local agency, the structure records in WSBIS must be shared, using the same structure identifier (Federal Coding Guide Item 8). Any situations that do not fit into these four cases listed above shall be considered on a case-by-case basis by the program managers involved and should address the following questions:

- Does the bridge record include a federally reported "on" record? These are bridges that are subject to the NBIS.
- Does the bridge record include one or more federally reported "under" records? These are bridges with federal aid or STRAHNET routes under the bridge.
- Is this a bridge that doesn't qualify for either an "on" or "under" record? These are pedestrian or other bridges that are not subject to the NBIS, and do not cross over a highway.
- Who owns the bridge?
- What agency owns the route on the bridge, if applicable? It is relatively common for a state owned structure to carry a local agency route, usually over a state route.
- What agency owns the route (or routes) under the bridge, if applicable?
- Does either agency need to maintain "on" or "under" records that are not federally reported? WSDOT often maintains "under" records that are not reported to hold data for the *Bridge List* M 23-09.
- Are there any interagency agreements relevant to inspection and reporting responsibility?

Any interagency agreement should address these questions, and clearly assign bridge inspection and inventory responsibilities.

2-3.4.B Shared Responsibility with Other States

WSDOT shares bridge recordkeeping and FHWA reporting responsibility for all bridges that cross state lines. For all but one bridge this shared responsibility also extends to bridge ownership and maintenance. For all bridges, responsibility to perform inspections is assigned to one state agency as established by agreement.

One local agency bridge crosses the state line between Washington and Idaho. Inspection, FHWA reporting, ownership, and maintenance responsibility is established by agreement.

See Appendix 2-F for bridge specific information.

2-3.5 *Reporting WSBIS Data to the NBI – Special Circumstances*

Section 2-3.1 outlined requirements for bridges subject to the NBIS and reported to the NBI. However, there are several special circumstances that warrant additional discussion.

Bridges Owned by Public Agencies That Are Not Open to the Public – Public agencies can own bridges that are not part of the public right of way, intended only for access by agency staff or other authorized personnel. In general, these bridges should not be reported to the NBI, and these bridges should be signed or gated so the public either does not have access to the bridge or is clearly warned that the bridge is not part of the public way. WSDOT bridges are posted "No Trespassing" at the entrance to the bridge if they are not gated.

Bridges Owned by Public Agencies That Are Closed – Bridges that are permanently closed to highway traffic but still in place may be retained in the WSBIS, but cannot be reported to the NBI. Bridges that are closed but the agency plans to either re-open or replace with a new structure can be federally reported for up to five years.

Privately-Owned Bridges – These bridges may belong to individuals, community road associations, railroads, or corporations, and may be open to the public. One relatively common example is a bridge in a shopping mall parking lot. FHWA and WSDOT promote the incorporation of these bridges in the WSBIS and recommend they be reported to the NBI if they qualify, but there is no federal or state requirement that they be inventoried.

Public Transit Bridges – Bridges carrying public transit buses in service (carrying passengers) are subject to the NBIS, even if these bridges are restricted to only public transit vehicles. Bridges carrying light rail public transit rolling stock without any vehicular or bus traffic are not currently subject to the NBIS.

Whenever a special circumstance affects the reporting of a structure, a brief explanation of the reporting status shall be kept in the electronic bridge record for all bridges inventoried in the WSBIS.

In any situation where it is unclear if a bridge should be included in the WSBIS and reported to the NBI, please consult with the SPM.

2-3.6 *Washington State Bridge List M 23-09*

The WSBIS is the source of data for the *Bridge List* M 23-09 published by the Bridge and Structures Office. It is a list of structures carrying or intersecting Washington State highways, and structures for which WSDOT has a maintenance responsibility. Data specific to this list is maintained for nearly all structures on WSDOT right of way, including local agency owned structures.

For more information on the data maintained for the *Bridge List* M 23-09, see the Washington State Bridge Inventory System Coding Guide in Appendix 2-C.

2-4 FHWA Data Submittal Process

The WSDOT Bridge Preservation Office extracts data from the WSBIS and submits it to FHWA for inclusion in the NBI and NBE once per year. Submittals may also happen at other times at the request of the Washington Division of the FHWA. The scheduled submittal is March 15 or the first work day following this date. The data submitted includes all the data defined by the NBI federal coding guide, the NBE specifications, and the NTI specifications, and is provided in a very specific format also defined by these documents. This submittal is performed by the Bridge Preservation Office and submitted to the FHWA User Profile and Access Control System (UPACS) under the authority of the SPM.

Data drawn for submittal to the NBI, NBE and NTI is taken only from the most current "released" data from WSBIS, meaning that each structure record has been through the quality control process described in Chapter 7, including acceptance by the BPO and LP data stewards. However, in addition to this quality control process, prior to the scheduled FHWA submittal both the BPO and LP data stewards run systemic checks of the data to identify and correct data errors. In particular, these checks are intended to ensure the following:

- Structures added to the inventory are reviewed to determine if they should be reported to FHWA.
- Structures removed from the inventory are reviewed to determine if they should be reported to FHWA and to ensure the electronic records accurately and sufficiently document the obsolete record.
- Structures that are transferred between agencies are reviewed to ensure the electronic records accurately document the transfer.
- Structures with shared responsibility are reviewed to ensure the electronic records are complete and accurate.

The intent is to submit error free data each submittal. In cases when errors are found but cannot be corrected because a field visit is required, the intent is that these errors will be corrected at the next regularly scheduled inspection.

Data submitted to FHWA is used for performance measurements after the submittal, both by FHWA and WSDOT. Verifying timely inspections for the federally reported inspection types is a primary focus of these performance measures. For the March 15 data submittal, all inspection work due through December 31 of the previous year must be "released" into WSBIS prior to March 15.

2-5 Responding to FHWA

Information Requests – FHWA requests bridge inspection information from WSDOT on a periodic basis. The information requested can be in response to national technical advisories, FHWA's oversight of the NBIS program in Washington State, or based on the WSDOT/FHWA Stewardship Agreement.

The bridge inspection requests for information from FHWA will typically be in the form of an email request with an assigned completion date based on the specific request, but can be in any format. The FHWA Division Bridge Engineer will submit the information request to the SPM. The SPM will review the FHWA information request and forward/disseminate the request to the necessary individuals for response. All information will be provided back to the SPM who will then forward the requested information to the Washington FHWA Division Bridge Engineer by the deadline in the original request.

Communication Between FHWA and WSDOT – Appendix 2-H identifies the standard communication protocol for normal operations. There is no protocol for urgent or emergency situations. The Washington SPM will be included in all written and email communications to or from FHWA regarding any bridge inspection, bridge emergency, or critical finding issues within the state of Washington. The WSDOT LP DPM and the Washington SPM will be included in all written and email communications to or from FHWA where local agency bridges are involved.

Annual NBIS Program Review – FHWA conducts an annual review of the bridge inspection organization within the state of Washington. The purpose of this review is to assure compliance with the NBIS. The review examines all facets of the inspection program – the effectiveness of the overall organization, delegated functions, inspection personnel, inspection procedures, bridge records and files, and the inventory of bridge data. It is intended to identify and correct any weaknesses while building upon existing strengths. In addition, site reviews of bridge inspections and interviews of inspection personnel are conducted. FHWA also conducts reviews of NBI data that is submitted for Washington by WSDOT.

Additional information on the NBI and NBIS can be found on the FHWA Office of Bridges and Structures website at www.fhwa.dot.gov/bridge/nbis.htm.

2-6 Appendices

Appendix 2-A	WSDOT BPO Floor Plan with File Locations
Appendix 2-B	Record Change Form
Appendix 2-C	Washington State Bridge Inventory System Coding Guide
Appendix 2-D	Vacant
Appendix 2-E	WSDOT BMS to NBE Translation
Appendix 2-F	Border Bridge Information
Appendix 2-G	Sufficiency Rating Calculation
Appendix 2-H	WSDOT/FHWA Communication Protocol Flowchart

Appendix 2-C Washington State Bridge Inventory System Coding Guide

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Table 1 WSBIS Item Numbers by Sequence

WSBIS Item No.	WSBIS Item Name	WSBIS Application Tab	Page No.
1001	Structure Identifier	Bridge ID Tab	2-C-71
1019	Owner	Bridge ID Tab	2-C-74
1021	County Code	Bridge ID Tab	2-C-76
1022	Urban Code	Tunnel ID Tab	2-C-155
1132	Structure Name	Bridge ID Tab	2-C-73
1156	Location (Main Listings)	Bridge ID Tab	2-C-74
1188	Latitude	Bridge ID Tab	2-C-78
1196	Longitude	Bridge ID Tab	2-C-78
1232	Features Intersected	Bridge ID Tab	2-C-73
1256	Facilities Carried	Bridge ID Tab	2-C-73
1274	Region code	Bridge ID Tab	2-C-77
1276	FIPS Code	Bridge ID Tab	2-C-79
1285	Toll	Bridge ID Tab	2-C-80
1286	Custodian	Bridge ID Tab	2-C-74
1288	Parallel Structure	Bridge ID Tab	2-C-80
1289	Temporary Structure	Bridge ID Tab	2-C-81
1291	Median	Layout Tab	2-C-105
1292	Historical Significance - NRHP	Bridge ID Tab	2-C-82
1293	Open, Closed or Posted	NBI Tab	2-C-42
1310	Skew	Layout Tab	2-C-95
1312	Flared Flag	Layout Tab	2-C-96
1332	Year Built	Layout Tab	2-C-85
1336	Year Rebuilt	Layout Tab	2-C-85
1340	Structure Length	Layout Tab	2-C-86
1348	Maximum Span Length	Layout Tab	2-C-89
1349	Tunnel Length	Layout Tab	2-C-158
1352	Lanes On	Layout Tab	2-C-90
1354	Lanes Under	Crossing Tab	2-C-117
1356	Curb-to-Curb Width	Layout Tab	2-C-90
1360	Out-to-Out Deck Width	Layout Tab	2-C-92
1364	Sidewalk/Curb Width Left	Layout Tab	2-C-92
1367	Sidewalk/Curb Width Right	Layout Tab	2-C-93
1370	Minimum Vertical Clearance Over Deck	Layout Tab	2-C-96
1374	Minimum Vertical Clearance Under Bridge	Layout Tab	2-C-97
1378	Vertical Underclearance Code	Layout Tab	2-C-99
1379	Minimum Lateral Underclearance Right	Layout Tab	2-C-99
1382	Lateral Underclearance Code	Layout Tab	2-C-102
1383	Minimum Lateral Underclearance Left	Layout Tab	2-C-102
1386	Navigation Control	Layout Tab	2-C-103
1387	Navigation Vertical Clearance	Layout Tab	2-C-104
1390	Navigation Horizontal Clearance	Layout Tab	2-C-104
1394	Vertical Lift Minimum Clearance	Layout Tab	2-C-104
1397	Approach Roadway Width	Layout Tab	2-C-106
1401	Min. Vertical Clearance Over Tunnel Roadway	Layout Tab	2-C-161
1402	Tunnel Height Restriction	Layout Tab	2-C-162
1408	Tunnel Hazardous Material Restriction	Layout Tab	2-C-162

Table 1 WSBIS Item Numbers by Sequence

WSBIS Item No.	WSBIS Item Name	WSBIS Application Tab	Page No.
1409	Tunnel Other Restrictions	Layout Tab	2-C-163
1413	Detour Length	Crossing Tab	2-C-119
1432	Inventory Route On/Under	Crossing Tab	2-C-107
1433	Inventory Route Highway Class	Crossing Tab	2-C-108
1434	Inventory Route Service Level	Crossing Tab	2-C-108
1435	Route	Crossing Tab	2-C-109
1436	Route Direction	Route Tab	2-C-165
1445	ADT	Crossing Tab	2-C-109
1451	ADT Truck Percentage	Crossing Tab	2-C-110
1453	ADT Year	Crossing Tab	2-C-110
1457	Future ADT	Crossing Tab	2-C-110
1463	Future ADT Year	Crossing Tab	2-C-111
1467	Linear Referencing System Route	Crossing Tab	2-C-111
1469	LRS Milepost	Crossing Tab	2-C-112
1483	National Highway System	Crossing Tab	2-C-112
1484	Base Highway Network	Crossing Tab	2-C-113
1485	STRAHNET Highway	Crossing Tab	2-C-113
1486	Federal Lands Highways	Crossing Tab	2-C-114
1487	Functional Classification	Crossing Tab	2-C-115
1489	National Truck Network	Crossing Tab	2-C-116
1490	Lane Use Direction	Crossing Tab	2-C-116
1491	Horizontal Clearance, Route Direction	Crossing Tab	2-C-117
1495	Horizontal Clearance, Reverse Direction	Crossing Tab	2-C-117
1499	Maximum Vertical Clearance, Route Direction	Crossing Tab	2-C-120
1510	Number of Bores	Layout Tab	2-C-158
1511	Tunnel Shape	Layout Tab	2-C-159
1512	Portal Shape	Layout Tab	2-C-160
1513	Ground Conditions	Layout Tab	2-C-160
1514	Complex	Layout Tab	2-C-161
1532	Main Span Material	Design Tab	2-C-127
1533	Main Span Design	Design Tab	2-C-128
1535	Approach Span Material	Design Tab	2-C-129
1536	Approach Span Design	Design Tab	2-C-129
1538	Number of Main Spans	Design Tab	2-C-131
1541	Number of Approach Spans	Design Tab	2-C-131
1543	Service in Tunnel	Layout Tab	2-C-157
1544	Service On	Design Tab	2-C-131
1545	Service Under	Design Tab	2-C-132
1546	Deck type	Design Tab	2-C-133
1547	Wearing Surface	Design Tab	2-C-134
1548	Membrane	Design Tab	2-C-134
1549	Deck Protection	Design Tab	2-C-135
1550	Design Load	Design Tab	2-C-136
1551	Operating Rating Method	Load Rating Tab	2-C-140
1552	Operating Rating Tons	Load Rating Tab	2-C-141
1553	Operating Rating Factor	Load Rating Tab	2-C-142

Table 1 WSBIS Item Numbers by Sequence

WSBIS Item No.	WSBIS Item Name	WSBIS Application Tab	Page No.
1554	Inventory Rating Method	Load Rating Tab	2-C-140
1555	Inventory Rating Tons	Load Rating Tab	2-C-141
1556	Inventory Rating Factor	Load Rating Tab	2-C-142
1560	Posted Load – Gross	Load Rating Tab	2-C-157
1561	Posted Load – Axle	Load Rating Tab	2-C-157
1562	Posted Load – Type 3	Load Rating Tab	2-C-157
1563	Posted Load – Type 3S2	Load Rating Tab	2-C-157
1564	Posted Load – Type 3-3	Load Rating Tab	2-C-157
1585	Border Bridge State Code	Design Tab	2-C-136
1588	Border Bridge Percent	Design Tab	2-C-137
1590	Border Bridge Structure Identifier	Design Tab	2-C-137
1657	Structural Evaluation	NBI Tab	2-C-34
1658	Deck Geometry	NBI Tab	2-C-35
1659	Underclearances	NBI Tab	2-C-38
1660	Operating Level	NBI Tab	2-C-41
1661	Alignment	NBI Tab	2-C-39
1662	Waterway	NBI Tab	2-C-40
1663	Deck Condition	NBI Tab	2-C-45
1671	Superstructure Condition	NBI Tab	2-C-46
1676	Substructure Condition	NBI Tab	2-C-47
1677	Channel Protection Condition	NBI Tab	2-C-48
1678	Culvert Condition	NBI Tab	2-C-49
1679	Pier/Abutment Protection	NBI Tab	2-C-52
1680	Scour	NBI Tab	2-C-53
1684	Bridge Rails	NBI Tab	2-C-55
1685	Transitions	NBI Tab	2-C-57
1686	Guardrails	NBI Tab	2-C-58
1687	Terminals	NBI Tab	2-C-58
1844	Proposed Improvement Work Type	Proposed Improvements Tab	2-C-150
1846	Proposed Improvement Work Method	Proposed Improvements Tab	2-C-150
1847	Proposed Improvement Length	Proposed Improvements Tab	2-C-150
1861	Proposed Improvement Total Cost	Proposed Improvements Tab	2-C-152
1867	Proposed Improvement Structure Cost	Proposed Improvements Tab	2-C-151
1873	Proposed Improvement Roadway Cost	Proposed Improvements Tab	2-C-151
1879	Proposed Improvement Estimate Year	Proposed Improvements Tab	2-C-152
1990	Routine Inspection Date	Report Tab	
1990	Fracture Critical Inspection Date	Report Tab	
1990	Underwater Inspection Date	Report Tab	
1990	Special Feature Inspection Date	Report Tab	
1991	Routine Inspection Frequency	Report Tab	

Table 1 WSBIS Item Numbers by Sequence

WSBIS Item No.	WSBIS Item Name	WSBIS Application Tab	Page No.
1991	Fracture Critical Inspection Frequency	Report Tab	
1991	Underwater Inspection Frequency	Report Tab	
1991	Special Feature Inspection Frequency	Report Tab	
1992	Routine Inspection Target Date	Report Tab	2-C-153
2000	Main Listing Flag	Crossing Tab Supplement	2-C-123
2009	Bridge Number	Bridge ID Tab	2-C-71
2010	Bridge Sort Number	Bridge ID Tab	2-C-72
2023	City	Bridge ID Tab	2-C-77
2181	Section	Bridge ID Tab	2-C-79
2183	Township	Bridge ID Tab	2-C-79
2185	Range	Bridge ID Tab	2-C-79
2295	Historical Significance - HAER	Bridge ID Tab	2-C-82
2346	Screening Length	Layout Tab	2-C-82
2368	Minimum Vertical Clearance Over Deck Override	Layout Tab	2-C-106
2400	Program Manager	Bridge ID Tab	2-C-74
2401	Crossing Manager	Crossing Tab Supplement	2-C-123
2402	Crossing Description	Crossing Tab Supplement	2-C-123
2409	NTI Reportable Flag	Crossing Tab	2-C-122
2410	NBI Reportable Flag	Crossing Tab	2-C-122
2411	Bridge List	Crossing Tab Supplement	2-C-124
2436	Route Sequencer	Crossing Tab Supplement	2-C-124
2437	Bridge List Milepost Override	Crossing Tab Supplement	2-C-124
2438	Milepost Sequencer	Crossing Tab Supplement	2-C-124
2440	Milepost	Crossing Tab	2-C-109
2468	Directional Indicator	Crossing Tab Supplement	2-C-125
2470	Ahead/Back Indicator	Crossing Tab Supplement	2-C-125
2500	Minimum Vertical Clearance, Route Direction	Crossing Tab Supplement	2-C-123
2501	Maximum Vertical Clearance, Reverse Direction	Crossing Tab	2-C-120
2502	Minimum Vertical Clearance, Reverse Direction	Crossing Tab Supplement	2-C-123
2537	Alphabetic Span Type	Design Tab	2-C-130
2580	Reference Inspection Date	Load Rating Tab	2-C-139
2581	Load Rating Date	Load Rating Tab	2-C-139
2582	Rated By	Load Rating Tab	2-C-139
2587	Type 3 Rating Factor	Load Rating Tab	2-C-142
2588	Type 3S2 Rating Factor	Load Rating Tab	2-C-142
2589	Type 3-3 Rating Factor	Load Rating Tab	2-C-142
2590	Notional Rating Load (NRL) Rating Factor	Load Rating Tab	2-C-142

Table 1 WSBIS Item Numbers by Sequence

WSBIS Item No.	WSBIS Item Name	WSBIS Application Tab	Page No.
2591	Single Unit 4 (SU4) Rating Factor	Load Rating Tab	2-C-143
2592	Single Unit 5 (SU5) Rating Factor	Load Rating Tab	2-C-143
2593	Single Unit 6 (SU6) Rating Factor	Load Rating Tab	2-C-143
2594	Single Unit 7 (SU7) Rating Factor	Load Rating Tab	2-C-143
2596	Overload 1 (OL-1) Rating Factor	Load Rating Tab	2-C-144
2597	Overload 2 (OL-2) Rating Factor	Load Rating Tab	2-C-144
2598	Emergency Vehicle 2 (EV2) Rating Factor	Load Rating Tab	2-C-143
2599	Emergency Vehicle 3 (EV3) Rating Factor	Load Rating Tab	2-C-143
2610	Asphalt Depth	NBI Tab	2-C-59
2611	Design Curb Height	NBI Tab	2-C-59
2612	Bridge Rail Height	NBI Tab	2-C-59
2613	Risk Category	NBI Tab	2-C-43
2614	Subject to NBIS Flag	NBI Tab	2-C-60
2615	Special Structures Flag	Bridge ID Tab	2-C-83
2642	Inspection Hours	Report Tab	2-C-31
2643	Inspection Overtime Hours	Report Tab	2-C-31
2646	Inspector Initials	Report Tab	2-C-31
2649	Inspector Certification Number	Report Tab	2-C-31
2654	Co-Inspector Initials	Report Tab	2-C-31
2675	Number of Utilities	NBI Tab	2-C-59
2688	Revise Rating Flag	NBI Tab	2-C-61
2691	Photos Flag	NBI Tab	2-C-61
2693	Soundings Flag	NBI Tab	2-C-61
2694	Clearance Flag	NBI Tab	2-C-62
2695	QA Flag	NBI Tab	2-C-62
2853	Proposed Improvement Roadway Width	Proposed Improvements Tab	2-C-151
2860	Proposed Improvement Cost Per SF of Deck	Proposed Improvements Tab	2-C-151
2870	Proposed Improvement Eng. and Misc. Cost	Proposed Improvements Tab	2-C-151
2883	Proposed Improvement Calculation	Proposed Improvements Tab	2-C-149
2900	Late Inspection Explanation	Report Tab	2-C-32
2901	Program Manager Response Date	Report Tab	2-C-32
2902	Program Manager Approval	Report Tab	2-C-32
2920	Report Type	Report Tab	2-C-25
2921	Inspection Type	Report Tab	2-C-25
2922	Inspection Due Date	Report Tab	2-C-30
2923	Inspection Due Date Override	Report Tab	2-C-30
2924	Report Type Notes	Report Tab	2-C-30
2930	Obsolete Structure Flag	Bridge ID Tab	2-C-83
7281	Legislative District 1	Bridge ID Tab	2-C-83
7283	Legislative District 2	Bridge ID Tab	2-C-83
7296	Historical Significance - Local	Bridge ID Tab	2-C-83
7441	Speed Limit	Crossing Tab	2-C-122

Table 1 WSBIS Item Numbers by Sequence

WSBIS Item No.	WSBIS Item Name	WSBIS Application Tab	Page No.
7479	Federal Aid Route Number	Crossing Tab	2-C-122
7557	Design Exception Date	Design Tab	2-C-122
7565	Federal Aid Project Number	Design Tab	2-C-137
7644	Inspection Report Hours	Report Tab	2-C-32
7664	Drain Condition	NBI Tab	2-C-63
7665	Drain Status	NBI Tab	2-C-63
7666	Deck Scaling	NBI Tab	2-C-64
7667	Deck Scaling Percent	NBI Tab	2-C-64
7669	Deck Rutting	NBI Tab	2-C-64
7670	Deck Exposed Rebar	NBI Tab	2-C-65
7672	Curb Condition	NBI Tab	2-C-65
7673	Sidewalk Condition	NBI Tab	2-C-66
7674	Paint Condition	NBI Tab	2-C-66
7681	Approach Condition	NBI Tab	2-C-67
7682	Retaining Wall Condition	NBI Tab	2-C-67
7683	Pier Protection Condition	NBI Tab	2-C-68
7710	Sufficiency Rating	NBI Tab	2-C-68
7711	Structurally Deficient/Functionally Obsolete	NBI Tab	2-C-69
7832	Water Type	Waterway Tab	2-C-145
7833	Flood Plain Intrusion	Waterway Tab	2-C-145
7834	Flood Control	Waterway Tab	2-C-145
7835	Scour History	Waterway Tab	2-C-146
7836	Streambed Material Type	Waterway Tab	2-C-146
7837	Substructure Stability	Waterway Tab	2-C-146
7838	Waterway Obstruction	Waterway Tab	2-C-147
7839	Streambed Stability	Waterway Tab	2-C-147
7840	Streambed Anabranch	Waterway Tab	2-C-147
7841	Piers in Water	Waterway Tab	2-C-148

Coding Guide Instructions

This coding guide is intended as a companion to the BridgeWorks application, and provides more detailed definitions for many of the data entry fields visible in BridgeWorks. Those fields defined herein have the associated 4 digit WSBIS Item Number in blue parentheses next to the data entry field. BridgeWorks users who need more information about how to code a field should click on these item numbers, which will take them to the relevant section in this coding guide.

This coding guide also identifies data fields that are reported to the NBI and/or NTI. Some WSBIS field definitions vary from the NBI or NTI, and are automatically translated when submitted to FHWA. This coding guide identifies all translated fields. In some cases, NBI field definitions have been updated by memorandum or are subject to interpretation. These issues are addressed in the NBI Commentary subsection of each field definition when they occur.

I. **Item Format**

Each field defined herein has a standard header:

WSBIS Item (with units)

WSBIS Item 1356 – Curb-to-Curb Width (feet) **N(4,1)**
NBI Item 51
NTI Item G.3

FHWA Items, if applicable **WSBIS Item Data Format**

The **WSBIS Item (with units)** includes the 4 digit item number and item name. In some cases units are not applicable, and therefore not shown. The leading digit of the item numbers has the following significance:

- 1xxx item numbers are reported to the FHWA, either to the NBI, NTI, or both.
- 2xxx item numbers are not reported to the FHWA and are maintained by WSDOT Bridge Preservation Office.
- 7xxx item numbers are not reported to the FHWA and are maintained by WSDOT Local Programs.

The **FHWA Items, if applicable**, identify the equivalent FHWA items in the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (aka the NBI coding guide) or the Specifications for the National Tunnel Inventory (aka the NTI coding guide).

The **WSBIS Item Data Format** describes the data type and size limitations for data entry into BridgeWorks, using the following codes:

N(x,y) — Numeric, with x identifying the total number of characters and y identifying the number of decimal places. This data format requires a decimal place and only allows numbers. For example N(4,1) would allow a number of 432.1 though 32.1 or 2.0 would also be allowed.

AN(x) — Alphanumeric, with x identifying the total number of characters. This data format allows virtually any character to be placed in this field, either letters, numbers, dashes, spaces, etc.

Pulldown — Populated by using a pulldown menu of pre-selected options.

Date — Populated with a pop-up calendar or user data entry in mm/dd/yyyy format

Check Box	Clicking on the box adds a check mark, activating feature in BridgeWorks
Calculated	A calculated field, no direct data entry by user.
Integer	These fields are populated only by whole numbers, no decimals allowed.

II. On, Under, and "Neither On or Under" Records

On and Under records define how a structure relates to public roadways, signifying routes On and routes Under a structure. Note that when a single structure carries a public roadway and has a public roadway crossing under it, it should have both an On and Under record. In cases where multiple roadways cross under a structure, it may have multiple Under records, each carrying data specific to that route.

"Neither On or Under" records are used when the structure has no relationship to a public roadway.

Examples:

Bridge 90/327 Schoessler Rd Over I-90 – This bridge has an On crossing record for Shoessler Rd and an Under crossing record for I-90.

Bridge 90/531N I-90 Over Garden Springs Rd – This bridge has an On crossing record for I-90 and an Under crossing record for Garden Springs Road.

Bridge 90/564P Pedestrian Br Over I-90 – This bridge has an Under crossing record for I-90 and no On record, since the bridge doesn't carry a public roadway.

Bridge 90/179.25 Schnebly Coulee – This bridge has an On crossing record for I-90 and no Under record, since the bridge doesn't have a public roadway crossing under it.Bridge 90/43P Mercer Slough Pedestrian Bridge – This is a "Neither On or Under record" since it doesn't carry a public roadway on or under it.

Tunnel 90/55 SE 35th St Tunnel Under I-90 – Tunnels are coded as Under records, and only carry route information for the route inside the tunnel. As of 2018, WSBIS doesn't maintain data for routes on top of tunnels.

Pedestrian and railroad bridges over routes carrying public roadways are inventoried in WSBIS primarily to manage restrictions to roadway traffic imposed by these structures. WSBIS maintains less data for these structures, as compared to bridges carrying public roadways themselves. Table 2 provides a listing of the WSBIS fields maintained for these structures.

Table 2 WSBIS Items Coded for Pedestrian, Railroad, and other non-vehicular bridges over public roadways[1]

WSBIS Item No.	WSBIS Item Name	NBI Item No.	Page No.
Report Tab			
2920	Report Type	-	2-C-25
1991	Routine Inspection Frequency	91	
1991	Fracture Critical Inspection Frequency	92A	
1991	Underwater Inspection Frequency	92B	
1991	Special Feature Inspection Frequency	92C	
1990	Routine Inspection Date	90	
1990	Fracture Critical Inspection Date	93A	
1990	Underwater Inspection Date	93B	

Table 2 WSBIS Items Coded for Pedestrian, Railroad, and other non-vehicular bridges over public roadways[1]

WSBIS Item No.	WSBIS Item Name	NBI Item No.	Page No.
1990	Special Feature Inspection Date	93C	
2922	Inspection Due Date	-	2-C-30
2923	Inspection Due Date Override	-	2-C-30
2924	Report Type Notes	-	2-C-30
2921	Inspection Type	-	2-C-25
2646	Inspector Initials	-	2-C-31
2649	Inspector Certification Number	-	2-C-31
2654	Co-Inspector Initials	-	2-C-31
2642	Inspection Hours	-	2-C-31
2643	Inspection Overtime Hours	-	2-C-31
7644	Inspection Report Hours	-	2-C-32
2900	Late Inspection Explanation	-	2-C-32
2901	Program Manager Response Date	-	2-C-32
2902	Program Manager Approval	-	2-C-32
NBI Tab			
Adequacy Appraisals			
2613	Risk Category	-	2-C-43
Condition Codes[2]			
1663	Deck Condition	58	2-C-45
1671	Superstructure Condition	59	2-C-46
1676	Substructure Condition	60	2-C-47
1677	Channel Protection Condition	61	2-C-48
1678	Culvert Condition	62	2-C-49
Miscellaneous Fields			
2614	Subject to NBIS Flag	-	2-C-60
Inspection Flags			
2691	Photos Flag	-	2-C-61
2694	Clearance Flag	-	2-C-62
2695	QA Flag	-	2-C-62
Bridge ID Tab			
1001	Structure Identifier	8	2-C-71
2009	Bridge Number	-	2-C-71
2010	Bridge Sort Number	-	2-C-59
1132	Structure Name	-	2-C-73
1232	Features Intersected	6	2-C-73
1256	Facilities Carried	7	2-C-73
1156	Location (Main Listings)	9	2-C-74
2400	Program Manager	-	2-C-74
1286	Custodian	21	2-C-74
1019	Owner	22	2-C-74
1021	County Code	3	2-C-76
2023	City	-	2-C-77
1274	Region code	2	2-C-77
1188	Latitude	16	2-C-78
1196	Longitude	17	2-C-78

Table 2 WSBIS Items Coded for Pedestrian, Railroad, and other non-vehicular bridges over public roadways[1]

WSBIS Item No.	WSBIS Item Name	NBI Item No.	Page No.
2181	Section	-	2-C-79
2183	Township	-	2-C-79
2185	Range	-	2-C-79
1276	FIPS Code	4	2-C-79
1285	Toll	20	2-C-80
1288	Parallel Structure	101	2-C-80
1289	Temporary Structure	103	2-C-81
1292	Historical Significance - NRHP	37	2-C-82
2295	Historical Significance - HAER	-	2-C-82
7296	Historical Significance - Local	-	2-C-83
7281	Legislative District 1	-	2-C-83
7283	Legislative District 2	-	2-C-83
2615	Special Structures Flag	-	2-C-83
2930	Obsolete Structure Flag	-	2-C-83
Layout Tab			
1332	Year Built	27	2-C-85
1336	Year Rebuilt	106	2-C-85
1340	Structure Length	49	2-C-86
1348	Maximum Span Length	48	2-C-89
1352	Lanes On	28A	2-C-90
1374	Minimum Vertical Clearance Under Bridge	54B	2-C-97
1378	Vertical Underclearance Code	54A	2-C-99
1379	Minimum Lateral Underclearance Right	55B	2-C-99
1382	Lateral Underclearance Code	55A	2-C-102
1383	Minimum Lateral Underclearance Left	56	2-C-102
1386	Navigation Control	38	2-C-103
1387	Navigation Vertical Clearance	39	2-C-104
1390	Navigation Horizontal Clearance	40	2-C-104
Crossing Tab			
1432	Inventory Route On/Under	5A	2-C-107
1433	Inventory Route Highway Class	5B	2-C-108
1434	Inventory Route Service Level	5C	2-C-108
1435	Route	5D	2-C-109
2440	Milepost	-	2-C-109
1445	ADT	29	2-C-109
1451	ADT Truck Percentage	109	2-C-110
1453	ADT Year	30	2-C-110
1457	Future ADT	114	2-C-110
1463	Future ADT Year	115	2-C-111
1467	Linear Referencing System Route	13A	2-C-111
1469	LRS Milepost	11	2-C-112
1483	National Highway System	104	2-C-112
1484	Base Highway Network	12	2-C-113
1485	STRAHNET Highway	100	2-C-113

Table 2 WSBIS Items Coded for Pedestrian, Railroad, and other non-vehicular bridges over public roadways[1]

WSBIS Item No.	WSBIS Item Name	NBI Item No.	Page No.
1486	Federal Lands Highways	105	2-C-114
1487	Functional Classification	26	2-C-115
1489	National Truck Network	110	2-C-116
1490	Lane Use Direction	102	2-C-116
1354	Lanes Under	28B	2-C-117
1491	Horizontal Clearance, Route Direction	47	2-C-117
1495	Horizontal Clearance, Reverse Direction	47	2-C-117
1413	Detour Length	19	2-C-119
1499	Maximum Vertical Clearance, Route Direction	10	2-C-120
2501	Maximum Vertical Clearance, Reverse Direction	10	2-C-120
2409	NTI Reportable Flag	-	2-C-122
2410	NBI Reportable Flag	-	2-C-122
7479	Federal Aid Route Number	-	2-C-122
7441	Speed Limit	-	2-C-122
Crossing Tab Supplement			
2000	Main Listing Flag	-	2-C-123
2401	Crossing Manager	-	2-C-123
2402	Crossing Description	-	2-C-123
2500	Minimum Vertical Clearance, Route Direction	-	2-C-123
2502	Minimum Vertical Clearance, Reverse Direction	-	2-C-123
2411	Bridge List	-	2-C-124
2436	Route Sequencer	-	2-C-124
2437	Bridge List Milepost Override	-	2-C-124
2438	Milepost Sequencer	-	2-C-124
2468	Directional Indicator	-	2-C-125
2470	Ahead/Back Indicator	-	2-C-125
Design Tab			
1532	Main Span Material	43A	2-C-127
1533	Main Span Design	43B	2-C-128
1535	Approach Span Material	44A	2-C-129
1536	Approach Span Design	44B	2-C-129
2537	Alphabetic Span Type	-	2-C-130
1544	Service On	42A	2-C-131
1545	Service Under	42B	2-C-132
1546	Deck type	107	2-C-133
1547	Wearing Surface	108A	2-C-134
1548	Membrane	108B	2-C-134
1549	Deck Protection	108C	2-C-135

Notes:
1. These structures are always associated with a Condition and/or Primary Safety Inspection report type.
2. Condition codes used only when Condition report type is used.

Tunnels are coded as Under records. Table 3 identifies the fields coded for tunnels, noting that all route information applies to the route inside the tunnel.

Table 3 WSBIS Items Coded for Tunnels

WSBIS Item No.	WSBIS Item Name	NTI Item No.	WSBIS Application Tab	Page No.
Report Tab				
2920	Report Type	-	Report Tab	2-C-25
1991	Routine Inspection Frequency	D.3	Report Tab	
1991	Fracture Critical Inspection Frequency	-	Report Tab	
1991	Underwater Inspection Frequency	-	Report Tab	
1991	Special Feature Inspection Frequency	-	Report Tab	
1990	Routine Inspection Date	D.2	Report Tab	
1990	Fracture Critical Inspection Date	-	Report Tab	
1990	Underwater Inspection Date	-	Report Tab	
1990	Special Feature Inspection Date	-	Report Tab	
2922	Inspection Due Date	-	Report Tab	2-C-30
2923	Inspection Due Date Override	-	Report Tab	2-C-30
2924	Report Type Notes	-	Report Tab	2-C-30
2921	Inspection Type	-	Report Tab	2-C-25
2646	Inspector Initials	-	Report Tab	2-C-31
2649	Inspector Certification Number	-	Report Tab	2-C-31
2654	Co-Inspector Initials	-	Report Tab	2-C-31
2642	Inspection Hours	-	Report Tab	2-C-31
2643	Inspection Overtime Hours	-	Report Tab	2-C-31
7644	Inspection Report Hours	-	Report Tab	2-C-32
2900	Late Inspection Explanation	-	Report Tab	2-C-32
2901	Program Manager Response Date	-	Report Tab	2-C-32
2902	Program Manager Approval	-	Report Tab	2-C-32
NBI Tab (NTI Tab in WSBIS Application)				
Adequacy Appraisals				
1293	Open, Closed or Posted	L.4	Load Rating Tab	2-C-42
2613	Risk Category	-	NTI Tab	2-C-43
Miscellaneous Fields				
2614	Subject to NBIS Flag	-	NTI Tab	2-C-60
Inspection Flags				
2688	Revise Rating Flag	-	NTI Tab	2-C-61
2691	Photos Flag	-	NTI Tab	2-C-61
2694	Clearance Flag	-	NTI Tab	2-C-62
2695	QA Flag	-	NTI Tab	2-C-62
Bridge ID Tab (Tunnel ID Tab in WSBIS Application)				
1001	Structure Identifier	I.1	Tunnel ID Tab	2-C-71
2009	Bridge Number	-	Tunnel ID Tab	2-C-71
2010	Bridge Sort Number	-	Tunnel ID Tab	2-C-72
1132	Structure Name	I.2	Tunnel ID Tab	2-C-73
1232	Features Intersected	-	Tunnel ID Tab	2-C-73
1256	Facilities Carried	I.10	Tunnel ID Tab	2-C-73
1156	Location (Main Listings)	-	Tunnel ID Tab	2-C-74
2400	Program Manager	-	Tunnel ID Tab	2-C-74
1286	Custodian	C.2	Tunnel ID Tab	2-C-74

Table 3 WSBIS Items Coded for Tunnels

WSBIS Item No.	WSBIS Item Name	NTI Item No.	WSBIS Application Tab	Page No.
1019	Owner	C.1	Tunnel ID Tab	2-C-74
1021	County Code	I.4	Tunnel ID Tab	2-C-76
2023	City	-	Tunnel ID Tab	2-C-77
1274	Region code	I.6	Tunnel ID Tab	2-C-77
1188	Latitude	I.13	Tunnel ID Tab	2-C-78
1196	Longitude	I.14	Tunnel ID Tab	2-C-78
2181	Section	-	Tunnel ID Tab	2-C-79
2183	Township	-	Tunnel ID Tab	2-C-79
2185	Range	-	Tunnel ID Tab	2-C-79
1276	FIPS Code	I.5	Tunnel ID Tab	2-C-79
1285	Toll	C.4	Tunnel ID Tab	2-C-80
1292	Historical Significance - NRHP	-	Tunnel ID Tab	2-C-82
2295	Historical Significance - HAER	-	Tunnel ID Tab	2-C-82
7296	Historical Significance - Local	-	Tunnel ID Tab	2-C-82
7281	Legislative District 1	-	Tunnel ID Tab	2-C-83
7283	Legislative District 2	-	Tunnel ID Tab	2-C-83
2615	Special Structures Flag	-	Tunnel ID Tab	2-C-83
2930	Obsolete Structure Flag	-	Tunnel ID Tab	2-C-83
Layout Tab				
1332	Year Built	A.1	Layout Tab	2-C-85
1336	Year Rebuilt	A.2	Layout Tab	2-C-85
1340	Structure Length	-	Layout Tab	2-C-86
1356	Curb-to-Curb Width	G.3	Layout Tab	2-C-90
1364	Sidewalk/Curb Width Left	G.4	Layout Tab	2-C-92
1367	Sidewalk/Curb Width Right	G.5	Layout Tab	2-C-93
Crossing Tab (Route Tab in WSBIS Application)				
1432	Inventory Route On/Under	-	Route Tab	2-C-107
1433	Inventory Route Highway Class	I.9	Route Tab	2-C-108
1434	Inventory Route Service Level	-	Route Tab	2-C-108
1435	Route	I.7	Route Tab	2-C-109
2440	Milepost	-	Route Tab	2-C-109
1445	ADT	A.4	Route Tab	2-C-109
1451	ADT Truck Percentage	A.5	Route Tab	2-C-110
1453	ADT Year	A.6	Route Tab	2-C-110
1457	Future ADT	-	Route Tab	2-C-110
1463	Future ADT Year	-	Route Tab	2-C-111
1467	Linear Referencing System Route	I.11	Route Tab	2-C-111
1469	LRS Milepost	I.12	Route Tab	2-C-112
1483	National Highway System	C.5	Route Tab	2-C-112
1484	Base Highway Network	-	Route Tab	2-C-113
1485	STRAHNET Highway	C.6	Route Tab	2-C-113
1486	Federal Lands Highways	-	Route Tab	2-C-114
1487	Functional Classification	C.7	Route Tab	2-C-115
1489	National Truck Network	-	Route Tab	2-C-116
1490	Lane Use Direction	C.3	Route Tab	2-C-116
1354	Lanes Under	A.3	Route Tab	2-C-117

Table 3 WSBIS Items Coded for Tunnels

WSBIS Item No.	WSBIS Item Name	NTI Item No.	WSBIS Application Tab	Page No.
1491	Horizontal Clearance, Route Direction	-	Crossing Tab (INV)	2-C-117
1495	Horizontal Clearance, Reverse Direction	-	Crossing Tab (INV)	2-C-117
1413	Detour Length	A.7	Route Tab	2-C-119
1499	Maximum Vertical Clearance, Route Direction	-	Crossing Tab (INV)	2-C-120
2501	Maximum Vertical Clearance, Reverse Direction	-	Crossing Tab (INV)	2-C-120
2409	NTI Reportable Flag	-	Route Tab	2-C-122
2410	NBI Reportable Flag	-	Route Tab	2-C-122
7479	Federal Aid Route Number	-	Route Tab	2-C-122
7441	Speed Limit	-	Route Tab	2-C-122
Crossing Tab Supplement				
2000	Main Listing Flag	-	Crossing Tab (INV)	2-C-123
2401	Crossing Manager	-	Crossing Tab (INV)	2-C-123
2402	Crossing Description	-	Crossing Tab (INV)	2-C-123
2500	Minimum Vertical Clearance, Route Direction	-	Crossing Tab (INV)	2-C-123
2502	Minimum Vertical Clearance, Reverse Direction	-	Crossing Tab (INV)	2-C-123
2411	Bridge List	-	Crossing Tab (INV)	2-C-124
2436	Route Sequencer	-	Crossing Tab (INV)	2-C-124
2437	Bridge List Milepost Override	-	Crossing Tab (INV)	2-C-124
2438	Milepost Sequencer	-	Crossing Tab (INV)	2-C-124
2468	Directional Indicator	-	Crossing Tab (INV)	2-C-125
2470	Ahead/Back Indicator	-	Crossing Tab (INV)	2-C-125
Design Tab				
2537	Alphabetic Span Type	-	Layout Tab	2-C-130
Load Rating Tab				
2580	Reference Inspection Date	-	Load Rating Tab	2-C-139
2581	Load Rating Date	-	Load Rating Tab	2-C-139
2582	Rated By	-	Load Rating Tab	2-C-139
1551	Operating Rating Method	-	Load Rating Tab	2-C-140
1554	Inventory Rating Method	L.1	Load Rating Tab	2-C-140
1553	Operating Rating Factor	L.3	Load Rating Tab	2-C-142
1556	Inventory Rating Factor	L.2	Load Rating Tab	2-C-142
2587	Type 3 Rating Factor	-	Load Rating Tab	2-C-142

Table 3 WSBIS Items Coded for Tunnels

WSBIS Item No.	WSBIS Item Name	NTI Item No.	WSBIS Application Tab	Page No.
2588	Type 3S2 Rating Factor	-	Load Rating Tab	2-C-142
2589	Type 3-3 Rating Factor	-	Load Rating Tab	2-C-142
2590	Notional Rating Load (NRL) Rating Factor	-	Load Rating Tab	2-C-142
2591	Single Unit 4 (SU4) Rating Factor	-	Load Rating Tab	2-C-143
2592	Single Unit 5 (SU5) Rating Factor	-	Load Rating Tab	2-C-143
2593	Single Unit 6 (SU6) Rating Factor	-	Load Rating Tab	2-C-143
2594	Single Unit 7 (SU7) Rating Factor	-	Load Rating Tab	2-C-143
2598	Emergency Vehicle 2 (EV2) Rating Factor	-	Load Rating Tab	2-C-143
2599	Emergency Vehicle 3 (EV3) Rating Factor	-	Load Rating Tab	2-C-143
2596	Overload 1 (OL-1) Rating Factor	-	Load Rating Tab	2-C-144
2597	Overload 2 (OL-2) Rating Factor	-	Load Rating Tab	2-C-144
Tunnel Supplement Tab				
1992	Routine Inspection Target Date	D.1	Report Tab	2-C-153
1022	Urban Code	C.8	Tunnel ID Tab	2-C-155
1560	Posted Load – Gross	L.5	Load Rating Tab	2-C-157
1561	Posted Load – Axle	L.6	Load Rating Tab	2-C-157
1562	Posted Load – Type 3	L.7	Load Rating Tab	2-C-158
1563	Posted Load – Type 3S2	L.8	Load Rating Tab	2-C-157
1564	Posted Load – Type 3-3	L.9	Load Rating Tab	2-C-157
1543	Service in Tunnel	A.8	Layout Tab	2-C-157
1349	Tunnel Length	G.1	Layout Tab	2-C-158
1510	Number of Bores	S.1	Layout Tab	2-C-158
1511	Tunnel Shape	S.2	Layout Tab	2-C-159
1512	Portal Shape	S.3	Layout Tab	2-C-160
1513	Ground Conditions	S.4	Layout Tab	2-C-160
1514	Complex	S.5	Layout Tab	2-C-161
1401	Min. Vertical Clearance Over Tunnel Roadway	G.2	Layout Tab	2-C-161
1402	Tunnel Height Restriction	L.10	Layout Tab	2-C-162
1408	Tunnel Hazardous Material Restriction	L.11	Layout Tab	2-C-162
1409	Tunnel Other Restrictions	L.12	Layout Tab	2-C-163
1436	Route Direction	I.8	Route Tab	2-C-165

III. Establishing/Reestablishing the Inventory Record

The original inventory record needs to be established only once and is required when:

- A new bridge has been built (usually before it is placed in service).
- An existing bridge has been replaced with a new bridge **(it is required that the existing record and its' SID be deleted before a new record for the bridge is established with a new unique SID)**.
- A detour bridge has been built and remains in service for more than three years or beyond the life of the contract under which it was built.
- An existing bridge not previously inventoried is added to the statewide inventory.

A bridge's original inventory record can be established by the following steps.

1. In BridgeWorks, select "Create Structure" from the Operation tab at the top of the main page. A new window will pop up with ten data entry fields. Two of these fields are automatically filled in by the BridgeWorks application. First, the Provisional (or temporary) SID will be assigned. Second, the "Sort Bridge Number" will be created when you fill the "Bridge Number" field. The last two digits of the Provisional SID are for sequencing the creation of multiple new records (i.e., "01", 02). The permanent SID is assigned by WSDOT when the new record is released to the WSBIS. Enter valid data in all of the other fields.

   After completing all fields, click "Create Structure" button to close the window and add the new record to your inventory list. You can then choose the new record off the bridge list and continue adding the required inventory information.

2. Enter appropriate values in the data entry fields on the application forms (tabs).
3. A copy of this Inventory Report shall be kept in the bridge file.

IV. **Reestablishing the Inventory Record**

If an Inventory record for a bridge has been mistakenly deleted or obsoleted (as sometimes happens when a bridge has changed ownership), it can be recovered by emailing a request to the Local Agency Bridge Inventory Engineer for local agency bridges or to the BPO Bridge Inventory Engineer for State owned bridges. In the request, be sure to provide correct control field information.

Once the record has been recovered, it must be reviewed for errors and corrected. Submit the updated data in the manner described for updating the inventory.

V. **Updating the Inventory**

The original bridge inventory record needs to be updated whenever new data must be added or whenever changes must be made to the existing record.

Updates to the original inventory data may be required as a result of damage to the bridge, changed conditions noted during an inspection, safety improvements or rehabilitation, when new computations or measurements are made, or when the bridge changes ownership. Updates to a bridges' inventory record must be reported to the Local Agency Bridge Inventory Engineer or the BPO Bridge Inventory Engineer within 90 days. Updates that have not been Released to the bridge inventory will not be included in any submittals and reports prepared using that data.

To start the update process, select the bridge record from the Bridge List you want to change. Be sure the latest Master Control Data (MCD) in the Control Data Grid is highlighted and then click "Edit Control Data" from the Control Data to create an updatable copy. This new copy will be in a state of "Work" and is called an Update Control Data (UCD). To complete an update, this procedure will be followed.

1. Review the data displayed in the BridgeWorks forms (tabs). All of the forms except BMS, Notes, Repairs, Photos, Files, and Letters are arranged with two data fields after the field name. The left side data field will display existing information. The right side data field is for entering update information.
2. Enter new coding values in each Data Entry Field that must be updated. Make sure your entry is complete. Choosing F9 from your keyboard or clicking the Inspector Data Check" button on the Control Data tab will cause BridgeWorks to run the error

checking process for the selected Control Data (CD). BridgeWorks will then provide you with a list of errors or will let you know that no errors were found. This process can be run on UCD's or MCD's.

- If you are entering new data, simply enter the appropriate values in the field.
- If you are making a change to existing data, the entire field must be re coded. For example, if the name shown in Item 232 - Features Intersected, has been misspelled, the entire name must be reentered, not just one or two letters corrected.
- If you want to blank out an entire field, type an asterisk (*) in the update field. The existing data contained in that field will be erased and the field will be blank after the record is processed. Some fields cannot be blank, in which case the asterisk will not be processed.

3. When all updates are complete to the satisfaction of the Team Leader responsible for the bridge inspection, the report is submitted to the state of "Lock." At this point, and depending on the procedures of the bridge owner, the inspection report and the inventory data is given to the Team Leader's Program Manager or supervisor for their review. This internal review falls under the heading of Quality Control (QC) and is an important step in the release process. Once the Program Manager or supervisor is satisfied with the report, the UCD is sent to either the Local Agency or BPO Bridge Inventory Engineer for final review of the inventory data and subsequent release to the bridge inventory.
4. WSDOT Team Leaders typically submit paper copies of approved inspection reports to the BPO Bridge Inventory Engineer for review and release. See Chapter 7 for details on WSDOT procedures.

   Local agency Team Leaders and/or consultants should create a Selection Set of approved UCD's which can be sent to the Local Agency Bridge Inventory Engineer for review.

   The UCD's are reviewed to ensure correctness and consistency before the data is released to the Inventory.

   Any errors found will be noted and returned to the bridge owner or Team Leader for corrections. Once the corrections are made, the UCD is again submitted for review. Once the Inventory Engineer is satisfied with the correctness of the UCD it is released to the Bridge Inventory. At this point, the UCD becomes an MCD and can no longer be changed. An MCD is a permanent part of the bridge record history and further changes must be made through the UCD process.
5. After release, the Bridge Inspection Report and the WSBIS Bridge Inventory Report are printed. The final validation of the inspection report is completed when the Bridge Inspection Team members sign the report. The report is then added to the inspection history in the official bridge file and the previous WSBIS Inventory Report is replaced with the current report.

   This process must be completed within 90 days of the inspection date but it is recommended that the release is done as soon as possible. The quality of the inspection report tends to degrade through an extended review. Instead, complete the release process on the UCD and make any later corrections through an Informational UCD.

VI. **Deleting/Transferring the Inventory Record**

When an inventory record becomes obsolete, it needs to be changed from "Active" to "Inactive" status in the WSBIS database. The reasons a record may become obsolete include:

- A bridge has been bypassed and is no longer in use, or
- A bridge has been demolished, or
- A bridge has been permanently closed to traffic.

If a new bridge replaces an existing bridge, the agency must obsolete the old record and establish a new inventory record.

To obsolete the inventory record of a local agency bridge, the bridge owner should send an email listing the control data for each bridge to be deleted to either the WSDOT Local Agency Bridge Engineer or the Local Agency Bridge Inventory Engineer. This email shall include the Structure Identification Number and Bridge Name along with instructions that the record is to be deleted. The Local Agency Bridge Engineer will request that the record be obsoleted under the procedures defined in Section 2-3.4.

If the jurisdiction of a bridge is being transferred from one agency to another, **the bridge record shall not be obsoleted**.

Instead, the Owner Code, Custodian Code and, if necessary, the City Code shall be updated by the original owner prior to sending the bridge records to the new owner. For example:

> The city of Selah has expanded its boundaries and annexed a bridge from Yakima County.

Yakima County would update the Owner Code from 02 to 04, the Custodian Code the same if appropriate, and the City Code from 0000 to 1155 prior to the data being submitted for update. Selah would then be responsible to correct the Bridge Number and all other data for the Inventory record.

This will ensure that a given bridge retains its unique Structure Identifier throughout the life of the bridge. See Section 2-2.1 for additional information on bridge ownership transfers.

A sample of the entire WSBIS Inventory Report is shown in the Section 3-5.

Reports Tab

WSBIS Item 1990 – Inspection Date	**Pulldown**
WSBIS Item 1991 – Inspection Frequency (months)	**N(3,0)**
WSBIS Item 2920 – Report Type	**Check Box**
WSBIS Item 2921 –Inspection Type	**Pulldown**

Applicable Structure Types

- **All structure records**

Editing Report Types. A check is required in this box on at least one Report Type every time you create an update. This check mark is reflected to the right of the Report Type label as a Green Check Mark indicating that this Report Type is the focus of the current update. Other Report Types not checked are not the current focus but should not be removed from the update in order to retain the continuity of the Structure record except under specific circumstances described below.

Adding and Removing Report Types. Under most circumstances the assigned report type(s) never change for the life of the structure. Occasionally users may need to add or remove a report type based on changed circumstances or simply to update the record with information not collected as part of a field inspection. Report types are added and removed using the "Select Report Types button in the lower right corner of the input form. Users must clearly understand how inspection reports should be used before modifying the report types associated with a structure. Please refer to Tables 2920a through d and Chapter 3 for more information.

Table 2920a summarizes all the Report Types, Inspection Types, Inspection Dates/Frequencies, and how these fields relate to the NBI and NTI.

Table 2920a Report Types and Inspection Types

Report Type	Inspection Type Code	Inspection Type	NBI Item		NTI Item	
			Insp. Date	Insp. Freq.	Insp. Date	Insp. Freq.
Routine[1]	N/A		90	91	D.2	D.3
Fracture Critical[1]	N/A		93A	92A	-	-
Underwater[1]	N/A		93B	92B	-	-
Special Feature[1]	1	Movable	93C	92C	-	-
	2	Floating	93C	92C	-	-
	3	Suspension	93C	92C	-	-
	4	Redundant Pin and Hanger	93C	92C	-	-
	5	Segmental	93C	92C	-	-
	6	Ferry Terminal	93C	92C	-	-
	7	High Strength Steel	93C	92C	-	-
	8	Structure with Temporary Support	93C	92C	-	-
	9	Cable Stayed	93C	92C	-	-
	0	Other	93C	92C	-	-
Short Span	-		-	-	-	-
Condition	-		-	-	-	-
Priimary Safety	-		-	-	-	-

Table 2920a Report Types and Inspection Types

Report Type	Inspection Type Code	Inspection Type	NBI Item		NTI Item	
			Insp. Date	Insp. Freq.	Insp. Date	Insp. Freq.
Damage	A	Overheight	-	-	D.5	-
	B	Lateral Damage to Vertical Member	-	-	D.5	-
	E	Flood	-	-	D.5	-
	G	Earthquake	-	-	D.5	-
	H	Bridge Rail	-	-	D.5	-
	O	Other	-	-	D.5	-
	S	Reported by Others - Overheight	-	-	D.5	-
	T	Reported by Others - Lateral	-	-	D.5	-
	U	Reported by Others - Bridge Rail	-	-	D.5	-
In-Depth	-		-	-	D.4	-
Interim	-		-	-	D.6	-
UW Interim	-		-	-	-	-
Routine Mechanical[2]						
Routine Electrical[2]						
Secondary Safety	-		-	-	-	-
Geometric	-		-	-	-	-
Inventory	-		-	-	-	-
Feature	-		-	-	-	-
Equipment	-		-	-	-	-
2 Man UBIT	-		-	-	-	-
Informational	-		-	-	-	-

1. These report types are used only for structures subject to the NBIS or NTIS. If a structure does not meet this criteria, another report type must be used (usually Short Span, Primary/Secondary Safety or Condition report types). Refer to Chapter 3 for more detailed descriptions of report types.
2. Mechanical and Electrical report types created automatically by the Complex Structures system.

Table 2920b identifies four “core” report types. Every structure in WSBIS must have one of these report types, and except when structures have multi-agency inspections, only one of these core reports should be associated with each structure. Their usage is summarized in this table but more detailed guidance is provided in Chapter 3.

Table 2920b Core Report Types

Report Type	Structure Characteristics	Typical Examples
Routine	Structures subject to the NBIS or NTIS	Highway bridges over 20 feet long
Short Span	Structures not subject to the NBIS or NTIS and do carry public roadways	Highway bridges under 20 feet long
Condition	Structures not subject to the NBIS or NTIS and don’t carry public roadways	Pedestrian bridges owned by highway agency
Primary Safety	Structure has a public roadway undercrossing	Railroad bridges over highway OR multi-agency inspection responsibility[1]

1. Multi-agency bridges are only case where more than one core report type can be associated with a structure.

Table 2920c identifies supplemental report types that can be added to a structure record in addition to one of the core report types. Their usage is summarized in this table but more detailed guidance is provided in Chapter 3.

Table 2920c Supplemental Report Types

Supplemental Report Type	Associated Core Report Type	Usage	Typical Examples
Fracture Critical	Routine	Use for bridges subject to the NBIS and deemed fracture critical.	Steel Truss bridges.
Underwater	Routine	Use for bridges subject to the NBIS when piers or abutments are permanantly underwater exceeding wading depths.	Bridges with foundations in deep water.
Special Feature	Routine	Use for bridges subject to the NBIS and deemed to have special features.	Suspension bridges, pin & hanger components
Damage	Any	Use when structure has sustained damage from a specific event, as opposed to environmental degradation or wear.	Earthquakes, floods, vehicle hits.
In-Depth	Any	Use when a structure needs a one-time targeted inspection for any reason.	Preparing a detailed condition assessment for a repair or rehabilitation contract.
Interim	Routine, Condition	Use when some structure components need more frequent inspection. Dovetail inspection date and frequency with associated report type.	Decayed timber, cracked steel in redundant/secondary components, significant structural movement, significant scour accessible by wading
UW Interim	Underwater	Use when some underwater structure components need more frequent inspections. Dovetail inspection date and frequency with Underwater report type.	Underwater components with significant structural damage, significant scour not accessible by wading
Routine Mechanical	Routine	Generated automatically when a mechanical inspection report is completed in the Complex Structures system.	Tunnels and movable bridges with mechanical components.
Routine Electrical	Routine	Generated automatically when a electrical inspection report is completed in the Complex Structures system.	Tunnels and movable bridges with electrical components.
Secondary Safety	Primary Safety	Use when more than one agency performs a safety inspection	Railroad bridge over a state route and a city street.
Geometric	Any	Use to document collection of vertical and horizontal clearance data	Bridges with highway and/or railroad undercrossings; through trusses or arches with superstructure over the deck.
Inventory	Any	Use when creating a new structure record or when an existing structure is significantly modified.	Adding a new structure to the inventory. Whenever a bridge is rehabilitated, widened, seismically retrofitted, or otherwise significantly modified.

Table 2920c Supplemental Report Types

Supplemental Report Type	Associated Core Report Type	Usage	Typical Examples
Feature	Any	Use for certified and non-certified inspectors to document time spent in bridge inspection activities. Also use for unscheduled non reoccurring inspections.	Co-inspector working on road crew documents bridge rail damage observed while in the area of the bridge. One time only chain drag of deck. Evaluation of bridge for overload permit.
Equipment	Any	Used only by local agencies at their option to schedule inspection equipment. Alternately this equipment can be scheduled within the Report Type resources grid.	
2 Man UBIT	Any	Used only when one agency provides a UBIT and UBIT operator, but no lead inspector.	
Informational	Any	Use to update a structure record with information not generally collected during a field inspection.	Updating route data, including ADT, functional classification, and NHS designation. Also used for ownership transfers and obsoleting structures.

Table 2920d summarizes the inspection frequencies associated with each report type, and in particular identifies the five report types that are not scheduled, and therefore do not have inspection frequencies. Frequencies are summarized in this table but more detailed guidance is provided in Chapter 3.

Table 2920d Report Type Inspection Frequencies

Report Type	Inspection Frequency
Routine	Usually 24 months
Fracture Critical	24 months maximum
Underwater	Usually 60 months
Special Feature	Varies based on engineering evaluation
Short Span	Varies based on owning agency guidelines
Condition	Varies based on owning agency guidelines
Priimary Safety	Varies based on inspecting agency guidelines
Damage	NOT SCHEDULED - no inspection frequency
In-Depth	NOT SCHEDULED - no inspection frequency
Interim	Varies as needed to dovetail with associated core report type
UW Interim	Varies as needed to dovetail with Underwater report type
Routine Mechanical	12 months
Routine Electrical	12 months
Secondary Safety	Varies based on inspecting agency guidelines
Geometric	Varies based on owning agency guidelines
Inventory	NOT SCHEDULED - no inspection frequency
Feature[1]	NOT SCHEDULED - no inspection frequency
Equipment	Varies based on owning agency guidelines
2 Man UBIT	Varies based on owning agency guidelines
Informational[1]	NOT SCHEDULED - no inspection frequency

1. The Informational and Feature report types are unique because a user can create and release this report type, but the next time a user creates a new UCD they are automatically removed. All other report types - scheduled or unscheduled - must be manually removed by the user as part of editing another report type.

WSBIS Item 2922 – Inspection Due Date — Calculated

Applicable Structure Types

- **All structure records**

This field is automatically calculated based on the inspection date and frequency. When an inspection was performed in a month later than expected, this calculation will restore the next due date to the original due month.

WSBIS Item 2923 – Inspection Due Date Override — Pulldown

Applicable Structure Types

- **All structures owned by a Washington State Agency**

This field should remain blank under most circumstances. However, in cases where the calculated due date needs to be adjusted, insert the desired next inspection date in this field. For Routine, FC, Underwater, and Special Feature report types, this override due date cannot cause the next inspection to exceed the calculated due date and frequency without prior approval by the program manager.

WSBIS Item 2924 – Report Type Notes — AN(unlimited)

Applicable Structure Types

- **All structure types**

This field is should remain blank under most circumstances, and is intended to describe unusual details specific to the report type. This note field can be used to explain:

- Adding an Inspection Due Date Override
- What data is updated in an informational report type

This field is not intended to hold inspection findings or explain specific information about Damage or Interim report types – use the zero note instead.

WSBIS Item 2646 – Lead Inspector Initials — Pulldown
WSBIS Item 2649 – Lead Inspector Certification Number — Computed

Applicable Structure Types

- **All structure records**

Code the lead inspector initials who performed the inspection for selected report types as designated in Table 2646 that require a lead inspector. When lead inspectors perform inspections for report types that do not require a team leader, they should still populate these fields.

Based on the lead inspector initials, the lead inspector certification number is automatically populated. When no lead inspector was involved in the inspection, these fields should remain blank.

Table 2646 Lead Inspector Initials and Certification

Required	Not required
Routine	Short Span
Fracture Critical	Condition
Underwater	Primary Safety
Special Feature	Secondary Safety
Damage	Geometric
In Depth	Inventory
Interim	Feature
UW Interim	Equipment
Routine Mechanical	2 Man UBIT
Routine Electrical	Informational

Lead inspectors must maintain current certification in order to successfully complete the inspection documentation in the WSBIS application. See Chapter 1 for more information.

WSBIS Item 2654 – Co-Inspector Initials — AN(8,0)

Applicable Structure Types

- **All structure records**

These are the initials of the individual who either assisted the lead inspector in performing an inspections or updated the bridge record using one of the reports types that doesn't require a lead inspector. See Table 2646.

WSBIS Item 2642 – Inspection Hours — N(4,1)
WSBIS Item 2643 – Inspection Overtime Hours — N(4,1)

Applicable Structure Types

- **All structure records**

This is the total number of field inspection hours (to the nearest half hour) that the inspection team spent on the bridge while performing an inspection of the designated report type. When multiple inspection teams are needed for an inspection, code the cumulative hours for each team.

Leave blank for report types that are not field based (Informational, for example).

WSBIS Item 7644 – Inspection Report Hours N(4,1)

Applicable Structure Types

- **Optional for all local agency structures**

This is the total number of hours that the inspection team spent on creating or updating the inspection report within BridgeWorks. This field is only used by local agency owners or their consultants.

WSBIS Item 2900 – Late Inspection Explanation AN(500)
WSBIS Item 2901 – Program Manager Response Date Pulldown
WSBIS Item 2902 – Program Manager Approval Pulldown

Applicable Structure Types

- **All structures subject to the NBIS or NTIS**

The Program Manager Oversight information is made up of the following three fields:

1. **Late Inspection Explanation**

   For any NBI or NTI reportable inspection type, when an inspection is or will be performed later than the calculated month due, an explanation must be provided for the delinquency. Commonly acceptable explanations include:

   - Inspection performed on a week split between two months and the inspection was performed in the "late" month.
   - Severe weather (describe weather condition)
   - Inspector safety (describe safety issue)

   Other explanations will be considered on a case by case basis by the PM or DPM in coordination with FHWA.

2. **Program Manager Response Date**

   Enter the date of the Program Manager's response to the Late Inspection Explanation. This field can only be edited using the Inventory Management managed operation and as directed by the PM or DPM.

3. **Program Manager Approval**

   Enter a Y – Approved or N – Disapproved to indicate the Program Manager's response. This field can only be edited using the Inventory Management managed operation and as directed by the PM or DPM. If Washington State is under an active Plan of Corrective Action (PCA) then approval falls to the FHWA Washington Division Bridge Engineer.

NBI Tab

Adequacy Appraisals

The items in the appraisal section are used to evaluate bridges and culverts carrying public roadways in relation to the level of service which it provides on the highway system of which it is a part. The structure will be compared to a new one which is built to current standards for that particular type of road as further defined in this section except for WSBIS Item 1661 – Approach Roadway Alignment. See WSBIS Item 1661 for special criteria for rating that item.

WSBIS Items 1657, 1658, 1659, 1661, and 1662 will be coded with a 1-digit code that indicates the appraisal rating for the item. The ratings and codes are as follows:

Table 4 NBI Adequacy Appraisal Ratings

WSBIS Code	NBI Code	Description
9	N	Not applicable
8	9	Superior to present desirable criteria
8	8	Equal to present desirable criteria
7	7	Better than present minimum criteria
6	6	Equal to present minimum criteria
5	5	Better than minimum tolerable limits
4	4	Meets minimum tolerable limits to be left in place as is
3	3	Basically intolerable requiring high priority corrective action
2	2	Basically intolerable requiring high priority replacement
1	1	This value of rating code not used
0	0	Bridge closed

WSBIS Items 1657, 1658, 1659 are calculated automatically based on other coded items.

Completed bridges not yet opened to traffic, if rated, shall be appraised as if open to traffic. Design values, for example ADT, shall be used for the evaluation. The data provided will include a code of G for WSBIS Item 1293 – Structure Open, Posted, or Closed to Traffic.

NBI Commentary:

WSBIS uses the 9 code to indicate "Not applicable," which is translated to N when reported to the NBI. WSBIS uses code 8 for "Superior or equal to present desirable criteria," which is a combination of NBI codes 8 and 9. (WSBIS does not submit a code 9 to the NBI.)

WSBIS Item 1657 Structural Evaluation — Calculated

NBI Item 67

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This item is calculated automatically and cannot be edited.

Structural Evaluation rates the adequacy of the structure’s condition, taking into account any major structural deficiencies. This rating is based on the overall condition of the superstructure, substructure, the inventory rating, and the ADT.

Table 1657 explains how the inventory rating and Proposed Improvements may further lower this code. The code for this item is no higher than the lowest of the condition codes for Superstructure Overall, Substructure Condition, or Culvert Condition.

Table 1657 Structural Adequacy Appraisal Rating

Inventory Rating HS Truck (Tons)			Structural Adequacy Appraisal Rating Code
ADT 0-500	ADT 501-5000	ADT >5000	
>36	>36	>36	9
36	36	36	8
31	31	31	7
23	25	27	6
18	20	22	5
12	14	18	4
Inventory rating less than value in rating code of 4 and requiring corrective action.			3
Inventory rating is less than above and bridge requires replacement (WSBIS Item 1844, Proposed Improvement Work Type is coded 31 or 32).			2
Bridge is closed and requires replacement.			0

NBI Commentary:

The use of the Proposed Improvement Work Type code in the calculation is not documented in the FHWA Coding Guide.

WSBIS Item 1658 – Deck Geometry — Calculated

NBI Item 68

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This item is calculated automatically and cannot be edited.

The level of service provided by the bridge is evaluated with respect to the highway system of which it is a part. This appraisal is based on the number of traffic lanes, the curb-to-curb width, the minimum vertical clearance over the bridge deck, the ADT, and the federal functional classification.

The following tables explain how the values are determined with respect to the highway system of which the bridge is a part. The lowest code determined from the tables is used.

Use this guide to determine which table to use.

Table 1658a Deck Geometry Guide to Cases

Direction of Traffic	Number of Lanes	Curb to Curb Width	Table to Use
2 way non-interstate	3+		Table 1658d
2 way non-interstate	2		Table 1658b
2 way non-interstate	1	< 16’	Table 1658c
2 way non-interstate	1	≥16’	Table 1658b
1 way non-interstate	1		Table 1658b
1 way non-interstate	2 or more		Table 1658d
Ramp	any		Table 1658e
1 way interstate	any		Table 1658d
2 way interstate	any		Table 1658d

For all bridges with a vertical clearance restriction over the deck, also use Table WSBIS-1658f. Use whichever rating code is lower.

Table 1658b Deck Geometry Appraisal Rating Case 1

Curb-to-Curb Bridge Roadway Width						Deck Geometry Appraisal Rating Code
ADT 0-100	ADT 101-400	ADT 401-1000	ADT 1-2k	ADT 2-5k	ADT >5k	
not applicable						9
≥32	≥36	≥40	≥44	≥44	≥44	8
28	32	36	40	44	44	7
24	28	30	34	40	44	6
20	24	26	28	34	38	5
18	20	22	24	28	32(28)[2]	4
16	18	20	22	26	30(26)[2]	3
Bridge is open and has a width less than required for a rating code of 3 and bridge is open.						2
Bridge is closed.						0

Notes:

1. Use the lower rating code for roadway widths between those shown.
2. For structures longer than 200 feet, use the values shown in parentheses.

Table 1658c Deck Geometry Appraisal Rating Case 2

Curb-to-Curb Bridge Roadway Width		Deck Geometry Appraisal Rating Code
ADT 0-100	ADT >100	
not applicable		9
<16	-	8
15	-	7
14	-	6
13	-	5
12	-	4
11	<16	3
Bridge is open and has a width less than required for a rating code of 3.		2
Bridge is closed.		0

Note:
Use the lower rating code for roadway widths between those shown.

Table 1658d Deck Geometry Appraisal Rating Case 3

Curb-to-Curb Bridge Roadway Width - 2 or More Lanes in Each Direction				Deck Geometry Appraisal Rating Code
Number of Lanes (N) (Interstate)		Number of Lanes (N) (Other Roadways)		
2 Lanes	> 2 Lanes	2 Lanes	> 2 Lanes	
not applicable				9
≥ 42	≥ 12N + 24	≥ 42	≥ 12N + 18	8
40	12N + 20	38	12N + 15	7
38	12N + 16	36	12N + 12	6
36	12N + 14	33	11N + 10	5
34 (29)[2]	11N + 12	30	11N + 6	4
	(11N + 7)[2]			
33 (28)[2]	11N + 11	27	11N + 5	3
	(11N + 6)[2]			
Bridge is open and has a width less than required for rating code of 3 and bridge open to traffic.				2
Bridge is closed.				0

Notes:
1. Use the lower rating code for roadway widths between those shown.
2. For structures longer than 200 feet, use the values shown in parentheses.

Table 1658e Deck Geometry Appraisal Rating Case 4

Curb-to-Curb Ramp Bridge Roadway Width		Deck Geometry Appraisal Rating Code
1 Lane	> 1 Lane	
Not Applicable		9
≥ 26	≥ 12N + 12	8
24	12N + 10	7
22	12N + 8	6
20	12N + 6	5
18	12N + 4	4
16	12N + 2	3
Bridge is open and has deck width less than required for a rating code of 3.		2
Bridge is closed.		0

Note:
Use the lower rating code for roadway widths between those shown.

Table 1658f Deck Geometry Appraisal Rating Case 5

Functional Class				Deck Geometry Appraisal Rating Code
Interstate and Other Freeway		Other Principal and Minor Arterials	Major and Minor Collectors and Locals	
Designated Routes[2]	Undesignated Routes[2]			
Minimum Vertical Clearance				
not applicable				9
≥ 17’ - 0”	≥ 16’ - 0”	≥ 16’ - 6”	≥ 16’ - 6”	8
16’ - 9”	15’ - 6”	15’ - 6”	15’ - 6”	7
16’ - 6”	14’ - 6”	14’ - 6”	14’ - 6”	6
15’ - 8”	14’ - 3”	14’ - 3”	14’ - 3”	5
15’ - 0”	14’ - 0”	14’ - 0”	14’ - 0”	4
Vertical clearance is less than value for rating of 4; corrective action is required.				3
Vertical clearance is less than value for rating of 4 and bridge requires replacement (WSBIS Item 1844 Proposed Improvement Work Type is coded 31 or 32).				2
Bridge is closed.				0

Notes:
1. Use the lower rating code for vertical clearances between those shown.
2. Use the first column (Designated Routes) for all routes except designated routes in urban areas where there is an alternative interstate or freeway facility with a minimum clearance of at least 16’ - 0″. Use the second column (Undesignated Routes) for all undesignated interstate or freeway facilities.

WSBIS Item 1659 – Underclearances **Calculated**
NBI Item 69

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This item is calculated automatically and cannot be edited.

This appraisal is based on the vertical and lateral underclearances beneath the bridge as related to the federal functional classification of the roadway carried beneath the bridge. If the bridge is not over a highway or a railroad, the field will be set to 9.

Minimum vertical underclearance, minimum lateral underclearance on right, and minimum lateral underclearance on left are used to evaluate this item.

See the following tables for an explanation of how the values are calculated.

The functional classification used in the tables is for the route under the bridge. If no Under record exits, it is assumed that the route under the bridge is a major or minor collector or a local road for the purpose of using the tables.

Table 1659a Vertical Underclearance Adequacy Appraisal Rating

Functional Class					Underclearance Adequacy Appraisal Rating Code
Interstate and Other Freeway		Other Principal and Minor Arterials	Major and Minor Collectors and Locals	Railroads	
Designated Routes[2]	Undesignated Routes[2]				
Minimum Vertical Underclearance					
not applicable					9
≥ 17’ - 0”	≥ 16’ - 0”	≥ 16’ - 6”	≥ 16’ - 6”	≥ 23’ - 0”	8
16’ - 9”	15’ - 6”	15’ - 6”	15’ - 6”	22’ - 6”	7
16’ - 6”	14’ - 6”	14’ - 6”	14’ - 6”	22’ - 0”	6
15’ - 9”	14’ - 3”	14’ - 3”	14’ - 3”	21’ - 0”	5
15’ - 0”	14’ - 0”	14’ - 0”	14’ - 0”	20’ - 0”	4
Vertical Clearance is less than value for rating of 4; corrective action is required.					3
Vertical clearance is less than value for rating of 4 and bridge requires replacement (WSBIS Item 1844 Proposed Improvement Work Type is coded 31 or 32).					2
Bridge closed.					0

Notes:
1. Use the lower rating code for vertical clearances between those shown.
2. Use the first column (Designated Routes) for all routes except designated routes in urban areas where there is an alternative interstate or freeway facility with a minimum clearance of at least 16’ - 0″. Use the second column (Undesignated Routes) for all undesignated interstate or freeway facilities.

Table 1659b Lateral Underclearance Adequacy Appraisal Rating

Functional Class							Underclearance Adequacy Appraisal Rating Code
1-Way Traffic				2-Way Traffic		Railroads	
Principal Arterials (Interstate, etc.)				Other Principal & Minor Arterials	Major & Minor Collectors and Locals		
Main Line		Ramp					
Lt.	Rt.	Lt.	Rt.				
Minimum Lateral Underclearance							
not applicable							9
≥ 30	≥ 30	≥ 4	≥ 10	≥ 30	≥ 12	≥ 20	8
18	21	3	9	21	11	17	7
6	12	2	8	12	10	14	6
5	11	2	6	10	8	11	5
4	10	2	4	8	6	8	4
Underclearance is less than value for rating of 4; corrective action is required.							3
Underclearance is less than value for rating of 4 and bridge requires replacement (WSBIS Item 1844 Proposed Improvement Work Type is coded 31 or 32).							2
Bridge is closed.							0

Notes:
1. Use the lower rating code for lateral clearances between those shown.
2. Use the value from the Right Ramp column to determine the rating code when acceleration or deceleration lanes or ramps are provided under 2-way traffic.

WSBIS Item 1661 – Alignment **Pulldown**

NBI Item 72

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code the rating based on the adequacy of the approach roadway alignment. This item identifies those bridges which do not function properly or adequately due to the alignment of the approaches. It is not intended that the approach roadway alignment be compared to current standards but rather to the existing highway alignment. This concept differs from other appraisal evaluations. The establishment of set criteria to be used at all bridge sites is not appropriate for this item. The basic criteria is how the alignment of the roadway approaches to the bridge relate to the general highway alignment for the section of highway the bridge is on.

Speed reductions necessary because of structure width and not alignment shall not be considered in evaluating this item.

Table 1661 Approach Roadway Alignment Appraisal Rating

WSBIS Code	Description
9	Not applicable (non-vehicular traffic on the structure).
8	No reduction in speed required for vehicle as it approaches the bridge.
6	Minor reduction in speed required for vehicle (less than 10 mph) as it approaches the bridge.
3	Substantial reduction in the speed of vehicle (10 mph or greater) as it approaches the bridge.

WSBIS Item 1662 – Waterway **Pulldown**
NBI Item 71

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This item appraises the waterway opening with respect to passage of flow through the bridge. Site conditions may warrant somewhat higher or lower ratings than indicated by the table (e.g., flooding of an urban area due to a restricted bridge opening).

Where overtopping frequency information is available, the descriptions given in the table for chance of overtopping mean the following:

Remote – greater than 100 years
Slight – 11 to 100 years
Occasional – 3 to 10 years
Frequent – less than 3 years

Adjectives describing traffic delays mean the following:

Insignificant – Minor inconvenience. Highway passable within hours.
Significant – Traffic delays of up to several days.
Severe – Long term delays to traffic.

Table 1662 Waterway Adequacy Appraisal Rating

WSBIS Item 1487 – Functional Class			
01, 11, 12	02, 06, 07, 14, 16, 17	08, 09, 18, 19	
Waterway Adequacy Appraisal Rating			Description
9	9	9	Bridge not over a waterway.
8	8	8	Bridge deck and roadway approaches above flood water elevations. Remote chance of overtopping OR bridge deck above roadway approaches. Slight chance of overtopping roadway approaches.
6	6	7	Slight chance of overtopping bridge deck and roadway approaches.
4	5	6	Bridge deck above roadway approaches. Occasional overtopping of roadway approaches with insignificant traffic delays.
3	4	5	Bridge deck above roadway approaches. Occasional overtopping of roadway approaches with significant traffic delays.
2	3	4	Occasional overtopping of bridge deck and roadway approaches with significant traffic delays.
2	2	3	Frequent overtopping of bridge deck and roadway approaches with significant traffic delays.
2	2	2	Occasional or frequent overtopping of bridge deck and roadway approaches with severe traffic delays.
0	0	0	Bridge closed.

BPO Specific Instructions:

BPO inspection staff inspecting bridges with records maintained by BPO do not code this field, which is maintained by the BPO Scour Engineer. If an inspector has information relevant to this code, that information notify the Scour Engineer and adjust the notes under his/her direction.

NBI Commentary:

WSBIS uses the 9 code to indicate "Not applicable," which is translated to N when reported to the NBI.

WSBIS Item 1660 – Operating Level **Pulldown**

NBI Item 70

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

The National Bridge Inspection Standards require the posting of load limits if the operating rating factor (RF) for any of the legal load configurations in the State is less than 1 based on the Load Factor Method (LFR) or the Allowable Stress Method (ASR); and less than 1 based on the Load and Resistance Factor Method. If the load capacity is such that posting is required, this item shall be coded 4 or less. If no posting is required at the operating rating, this item shall be coded 5.

This item evaluates the load capacity of a bridge in comparison to the State legal loads.

Although posting a bridge for load-carrying capacity is required only when the RF for any of the legal loads is less than 1, highway agencies may choose to post at a lower level. This posting practice may appear to produce conflicting coding when WSBIS Item 1293 – Structure Open, Posted or Closed to Traffic is coded to show the bridge as actually posted at the site and WSBIS Item 1660 – Bridge Posting is coded as bridge posting is not required. Since different criteria are used for coding these 2 items, this coding is acceptable and correct.

The use or presence of a temporary bridge affects the coding. The actual operating rating of the temporary bridge should be used to determine this item. However, the highway agency may choose to post at a lower level. This also applies to bridges shored up or repaired on a temporary basis.

The coding shall be based on the lowest rating factor of the legal loads.

The following are Washington State maximum legal load configurations and tonnages:

Table 1660a Legal Loads

Configuration	Tonnage
AASHTO Type 3	25 Tons
AASHTO Type 3-2	36 Tons
AASHTO Type 3-3	40 Tons
SU4	27 Tons
SU5	31 Tons
SU6	34.7 Tons
SU7	38.7 Tons
EV2	28.7 Tons
EV3	43 Tons

See the *Bridge Design Manual* Chapter 13 for more information.

For WSDOT owned structures, the BPO Load Rating Engineer shall make the change to the code, and not the field inspector.

Table 1660b Operating Level Code

WSBIS Code	Operating Rating Factors based on LFR or ASR Methods or Rating Factors based on LRFR
5	RF ≥ 1
4	1 < RF ≥ 0.9
3	0.9 < RF ≥ 0.8
2	0.8 < RF ≥ 0.7
1	0.7 < RF ≥ 0.6
0	0.6 < RF
N	No rating analysis performed (bridge does not carry traffic)

NBI Commentary:

WSDOT added code N to address structures which do not carry traffic.

Text supplemented to explicitly list Washington State legal loads and tonnages.

WSBIS Item 1293 – Open, Closed or Posted **Pulldown**

NBI Item 41

NTI Item L.4

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Tunnels carrying public roadways within**

This item provides information about the actual operational status of a structure. One of the following codes shall be used:

Table 1293 Open, Closed, Posted Code

WSBIS Code	Description
A	Open, no restriction
B	Open, posting recommended but not legally implemented (all signs not in place or not correctly implemented)
D	Open, would be posted or closed except for temporary shoring, etc., to allow for unrestricted traffic
E	Open, temporary structure in place to carry legal loads while original structure is closed and awaiting replacement or rehabilitation
G	New structure not yet open to traffic
K	Structure closed to all traffic
P	Posted for load (may include other restrictions such as temporary structures which are load posted)
R	Posted for other load-capacity restriction (speed, number of vehicles on structure, etc.)

WSBIS Item 2613 – NBIS Risk Category **Calculated**

Applicable Structure Types

- **All structure records**

The NBIS risk category is based on the FHWA Metrics for the Oversight of the National Bridge Inspection Program, also called the "23 metrics":
www.fhwa.dot.gov/bridge/nbip/metrics.pdf

High risk structures are considered more vulnerable to failure and therefore are held to a higher standard of NBIS compliance in the 23 metrics, and applies only to Routine report types as defined in Table 2613.

Table 2613 FHWA Risk Category for Routine Inspections

WSBIS Item	Routine Inspection Risk Criteria
H	High risk based on any ONE of the following criteria:
	1. Low superstructure, substructure or culvert condition codes WSBIS Items 1671, 1676 or 1678 < 5
	2. Legal load posting required WSBIS Item 1660 < 5
	3. No load rating AND posting not required AND posting recommended or implemented WSBIS Item 1551=5 and WSBIS Item 1660=5 and WSBIS Item 1293=B, P, or R
	4. Scour critical or scour vulnerability unknown WSBIS Item 1680 = 0, 1, 2, 3, 6, T or U
L	Low risk, does not meet high risk criteria
N	Does not apply, no routine inspection report type

Bridges that also have Underwater report types are separately identified as high risk in the 23 metrics based on criteria 1 without the superstructure code and criteria 4 as described in Table 2613.

Condition Codes

WSBIS Items 1663, 1671, 1676, 1677, and 1678
NBI Items 58, 59, 60, 61, and 62

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways***

In order to promote uniformity between bridge inspectors, these guidelines will be used to rate and code WSBIS Items 1663, 1671, 1676, 1677, and 1678.

Condition ratings are used to describe the existing, in-place bridge as compared to the as-built condition. Evaluation is for the materials related, physical condition of the deck, superstructure, and substructure components of a bridge. The condition evaluation of channels and channel protection and culverts is also included. Condition codes are properly used when they provide an overall characterization of the general condition of the entire component being rated. Conversely, they are improperly used if they attempt to describe localized or nominally occurring instances of deterioration or disrepair. Correct assignment of a condition code must, therefore, consider both the severity of the deterioration or disrepair and the extent to which it is widespread throughout the component being rated.

The load-carrying capacity will not be used in evaluating condition items. The fact that a bridge was designed for less than current legal loads and may be posted shall have no influence upon condition ratings.

Portions of bridges that are being supported or strengthened by temporary members will be rated based on their actual condition; that is, the temporary members are not considered in the rating of the item. (See WSBIS Item 1289 – Temporary Structure Designation for the definition of a temporary bridge.)

Completed bridges not yet opened to traffic, if rated, shall be coded as if open to traffic.

'* Pedestrian, RR, and other non-vehicular bridges over public roadways do not require condition codes. WSDOT policy for WSDOT owned structures is to provide condition codes when the Condition Report type is used.

The following general condition ratings shall be used as a guide in evaluating WSBIS Items 1663, 1671 and 1676:

Table 5 Condition Rating

WSBIS Code	NBI Code	Description
9	N	Not applicable
8	9	Excellent condition - no problems noted
8	8	Very good condition – no problems noted.
7	7	Good condition – some minor problems.
6	6	Satisfactory condition – structural elements show some minor deterioration.
5	5	Fair condition – all primary structural elements are sound but may have minor section loss, cracking, spalling or scour.
4	4	Poor condition – advanced section loss, deterioration, spalling or scour.
3	3	Serious condition – loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
2	2	Critical condition – advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
1	1	"Imminent" failure condition – major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service.
0	0	Failed condition – out of service beyond corrective action.

NBI Commentary:

WSBIS uses the 9 code to indicate "Not applicable," which is translated to N when reported to the NBI. WSDOT uses condition code 8 for all cases where a bridge is in "Excellent" or "Very good" condition.

WSBIS Item 1663 – Deck Condition **Pulldown**
NBI Item 58

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways***

This item describes the overall condition rating of the deck. Rate and code the condition in accordance with the above general condition ratings.

The following structures shall be coded 9:

- Culverts
- Filled arch bridges
- Buried structures (bridges with fill depth greater than B/2, using B as defined in WSBIS Item 1340 Structure Length)

Bridges with fill depth less than B/2 shall be considered to have a deck and coded appropriately.

Deck condition ratings are also associated with deck BMS elements as shown in Chapter 4. If the inspector determines a deck code should be different from that indicated in Chapter 4 guidance, an explanation for this difference should be noted in the inspection report.

Concrete decks should be inspected for cracking, scaling, spalling, leaching, chloride contamination, potholing, delamination, and full or partial depth failures. Steel grid decks should be inspected for broken welds, broken grids, section loss, and growth of filled grids from corrosion. Timber decks should be inspected for splitting, crushing, fastener failure, and deterioration from rot.

The condition of the wearing surface/protective system, joints, expansion devices, curbs, sidewalks, parapets, fascias, bridge rail, and scuppers shall not be considered in the overall deck evaluation. However, their condition should be noted on the inspection form under the appropriate BMS element note.

Decks integral with the superstructure will be rated as a deck only and not how they may influence the superstructure rating (for example, rigid frame, slab, deck girder or T-beam, voided slab, box girder, etc.). Similarly, the superstructure of an integral deck type bridge will not influence the deck rating.

Inspection report comments are required when the condition is coded 5 or less.

‘* Pedestrian, RR, and other non-vehicular bridges over public roadways do not require condition codes. WSDOT policy for WSDOT owned structures is to provide condition codes when the Condition Report type is used.

NBI Commentary:

This item has been modified to incorporate BMS deck element condition states into the coding criteria.

WSBIS Item 1671 – Superstructure Condition **Pulldown**
NBI Item 59

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways***

This item describes the physical condition of all structural members. Rate and code the condition in accordance with the previously described general condition ratings. Code 9 for culverts.

The structural members should be inspected for signs of distress which may include cracking, deterioration, section loss, and malfunction and misalignment of bearings.

The condition of bearings, joints, paint system, etc., shall not be included in this rating, except in extreme situations, but should be noted on the inspection form under the appropriate BMS element note.

On bridges where the deck is integral with the superstructure, the superstructure condition rating may be affected by the deck condition. The resultant superstructure condition rating may be lower than the deck condition rating where the girders have deteriorated or been damaged.

Fracture critical components should receive careful attention because failure could lead to collapse of a span or the bridge.

Inspection report comments are required when the condition is coded 5 or less.

‘* Pedestrian, RR, and other non-vehicular bridges over public roadways do not require condition codes. WSDOT policy for WSDOT owned structures is to provide condition codes when the Condition Report type is used.

WSBIS Item 1676 – Substructure Condition **Pulldown**
NBI Item 60

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways***

This item describes the physical condition of piers, abutments, piles, fenders, footings, or other components. Rate and code the condition in accordance with the previously described general condition ratings. Code 9 for culverts.

All substructure elements should be inspected for visible signs of distress including evidence of cracking, section loss, settlement, misalignment, scour, collision damage, and corrosion.

The substructure condition rating shall be made independent of the deck and superstructure.

Integral-abutment wingwalls to the first construction or expansion joint shall be included in the evaluation. For non-integral superstructure and substructure units, the substructure shall be considered as the portion below the bearings. For structures where the substructure and superstructure are integral, the substructure shall be considered as the portion below the superstructure.

In all cases, if WSBIS Item 1680 – Scour is 2 or less, WSBIS Item 1676 – Substructure shall be coded the same.

Inspection report comments are required when the condition is coded 5 or less.

‘* Pedestrian, RR, and other non-vehicular bridges over public roadways do not require condition codes. WSDOT policy for WSDOT owned structures is to provide condition codes when the Condition Report type is used.

NBI Commentary:

> This item has been modified based on an April 27, 2001, FHWA memo regarding FHWA Items 60 and 113 (WSBIS Items 1676 and 1680). This memo is available at www.fhwa.dot.gov/engineering/hydraulics/policymemo/revguide.cfm.

WSBIS Item 1677 – Channel Protection Condition — Pulldown

NBI Item 61

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways***

This item describes the physical conditions associated with the flow of water through the bridge such as stream stability and the condition of the channel, riprap, slope protection, or stream control devices including spur dikes. The inspector should be particularly concerned with visible signs of excessive water velocity which may affect undermining of slope protection, erosion of banks, and realignment of the stream. Accumulation of drift and debris on the superstructure and substructure should be noted on the inspection form but not included in the condition rating.

Inspection report comments are required when the condition is coded 7 or less.

Note: A bridge with no scour potential (piles founded or on bedrock) can have a very low channel rating based on a threat to the approach fill. In this situation this code is the only way to flag the problem. Also note that roadway embankment erosion due to bridge or roadway runoff is NOT included in this field. These issues are addressed in the abutment BMS field.

‘* Pedestrian, RR, and other non-vehicular bridges over public roadways do not require condition codes. WSDOT policy for WSDOT owned structures is to provide condition codes when the Condition Report type is used.

Rate and code the condition in accordance with the following descriptive codes:

Table 1677 Channel Protection Condition Rating

WSBIS Code	Description
9	Not applicable. Use when bridge is not over a waterway (channel).
8	There are no noticeable or noteworthy deficiencies. Banks are protected or well vegetated. River control devices such as spur dikes and embankment protection are not required or are in a stable condition.
7	Bank protection is in need of minor repairs. River control devices and embankment protection have a little minor damage. Banks and/or channel have minor amounts of drift.
6	Bank is beginning to slump. River control devices and embankment protection have widespread minor damage. There is minor stream bed movement evident. Debris is restricting the channel slightly.
5	Bank protection is being eroded. River control devices and/or embankment have major damage. Trees and brush restrict the channel.
4	Bank and embankment protection is severely undermined. River control devices have severe damage. Large deposits of debris are in the channel.
3	Bank protection has failed. River control devices have been destroyed. Stream bed aggradation, degradation or lateral movement has changed the channel to now threaten the bridge and/or approach roadway.
2	The channel has changed to the extent the bridge is near a state of collapse.
1	Bridge closed because of channel failure. Corrective action may put back in light service.
0	Bridge closed because of channel failure. Replacement necessary.

WSBIS Item 1678 – Culvert Condition **Pulldown**
NBI Item 62

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways***

This item evaluates the alignment, settlement, joints, structural condition, scour, and other items associated with culverts. The rating code is intended to be an overall condition evaluation of the culvert. Integral wingwalls to the first construction or expansion joint shall be included in the evaluation.

Inspection report comments are required when the condition is coded 5 or less.

Defining culverts:

- Culverts always carry water, with only a few exceptions. These exceptions may include ancillary structures, for utility passage, old cattle undercrossing or other purposes, where the type and scope of construction may more realistically be quantified as a culvert. Most will only be non-reportable short spans, but Regional Supervisors must be consulted on these exceptions.
- Water Detention Vaults shall be coded as culverts.
- Concrete Boxes (continuous 4-sided) with or without roadway fill that carry water are coded as culverts.
- Circular and arch shaped structures with fill and no defined abutment or approach are coded as culverts.
- For Culverts, code Deck, Superstructure and Substructure (WSBIS Items 1663, 1671, and 1676) as 9.
- Code Bridge Rails and Transitions (WSBIS Items 1684 and 1685) N if there is sufficient roadway fill that there is no attachment to the structure. Guardrails and Terminals (WSBIS Items 1686 and 1687) are to be coded 0 or 1 as appropriate.
- When inspecting culverts, document the depth of the fill on both ends of the culvert. For cases where there is a significant amount of fill compared to the span length of the culvert, or total length of culverts where there are multiple barrels, estimate and document the depth of fill.
- Three sided rigid frames with fill greater than B/2 are coded as culverts.
- Culverts with structure lengths greater than 20 feet are NBI reportable regardless of fill depth.
- Culverts with structure lengths less than or equal to 20 feet are inventoried and coded in accordance with short span inspection requirements.

‘* Pedestrian, RR, and other non-vehicular bridges over public roadways do not require condition codes. WSDOT policy for WSDOT owned structures is to provide condition codes when the Condition Report type is used.

Rate and code the condition in accordance with the following descriptive codes:

Table 1678a Concrete Culvert Condition Rating

WSBIS Code	Description
9	Not applicable. Structure is not a culvert.
8	No noticeable or noteworthy deficiencies which affect the condition of the culvert. Insignificant scrape marks caused by drift.
7	Shrinkage cracks, light scaling, and insignificant spalling which does not expose reinforcing steel. Insignificant damage caused by drift with no misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls or pipes.
6	Minor deterioration or initial disintegration, minor chloride contamination, minor cracking with some leaching, or spalls on concrete or masonry walls and slabs. Local minor scouring at curtain walls, wingwalls or pipes.
5	Moderate to major deterioration or disintegration, extensive cracking and leaching, or spalls on concrete or masonry walls and slabs. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls, wingwalls or pipes.
4	Major deterioration (large spalls, heavy scaling, wide cracks, considerable efflorescence, or opened construction joint permitting loss of backfill). Considerable settlement or misalignment. Considerable scouring or erosion at curtain walls, wingwalls or pipes.
3	Excessive deterioration (any condition described in Code 4 but which is excessive in scope). Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slabs. Integral wingwalls nearly severed from culvert. Severe scour or erosion at curtain walls, wingwalls or pipes.
2	Integral wingwalls collapsed, severe settlement of roadway due to loss of fill. Section of culvert may have failed and can no longer support embankment. Complete undermining at curtain walls and pipes. Corrective action required to maintain traffic.
1	Culvert closed – corrective action may put back in light service.
0	Culvert closed – replacement necessary.

Table 1678b Metal Culvert Condition Rating

WSBIS Code	Description
9	Not applicable. Structure is not a culvert.
8	No noticeable or noteworthy deficiencies which affect the condition of the culvert. Insignificant scrape marks caused by drift. Bolts are in good condition, in place and tight.
7	Insignificant damage caused by drift with no misalignment and not requiring corrective action. Some minor scouring has occurred near wingwalls or pipes. Smooth, symmetrical curvature with superficial corrosion and no pitting. Bolts may have superficial corrosion, are in place and tight.
6	Smooth curvature, non-symmetrical shape, and significant corrosion or moderate pitting. Bolts may have significant corrosion and 10 percent of the bolts in a panel seam may be missing or loose. Local minor scouring at wingwalls or pipes.
5	Minor settlement or misalignment. Noticeable scouring or erosion at wingwalls or pipes. Significant distortion and deflection in one section. Significant corrosion or deep pitting. Bolts may have significant corrosion and 20 percent of the bolts in a panel seam may be missing or loose.
4	Considerable settlement or misalignment. Considerable scouring or erosion at wingwalls or pipes. Significant distortion and deflection throughout. Extensive corrosion or deep pitting. Bolts may have extensive corrosion and 30 percent of the bolts in a panel seam may be missing or loose.
3	Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Wingwalls nearly severed from culvert. Severe scour or erosion at wingwalls or pipes. Extreme distortion and deflection in one section. Extensive corrosion or deep pitting with scattered perforations. Bolts may have extensive corrosion and 40 percent of the bolts in a panel seam may be missing or loose.
2	Wingwalls collapsed, severe settlement of roadway due to loss of fill. Section of culvert may have failed and can no longer support embankment. Complete undermining at curtain walls and pipes. Corrective action required to maintain traffic. Extreme distortion and deflection throughout with extensive perforations due to corrosion. Bolts may have extensive corrosion and 50 percent of the bolts in a panel seam may be missing or loose.
1	Culvert closed – corrective action may put back in light service.
0	Culvert closed – replacement necessary.

Table 1678c Timber Culvert Condition Rating

WSBIS Code	Description
9	Not applicable. Structure is not a culvert.
8	No noticeable or noteworthy deficiencies which affect the condition of the culvert. Insignificant scrape marks caused by drift.
7	Insignificant damage caused by drift with no misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls, Insignificant decay with no structural loss.
6	Minor deterioration or decay. All primary structural elements are sound. Local minor scouring at curtain walls or wingwalls.
5	Moderate deterioration or decay. All primary structural elements are sound but have some section loss. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls or wingwalls.
4	Major deterioration or decay. Considerable scour or erosion at curtain walls or wingwalls. Advanced section loss or scour that affects the load capacity of the structure. Considerable settlement or misalignment.
3	Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Wingwalls nearly severed from culvert. Severe scour or erosion at curtain walls or wingwalls. Extensive deterioration or decay. Advanced section loss or scour that significantly affects the load capacity of the culvert.
2	Severe deterioration or decay. Wingwalls collapsed, severe settlement of roadway due to loss of fill. Section of culvert may have failed and can no longer support embankment. Complete undermining at curtain walls. Corrective action required to maintain traffic. Critical structural members have obvious vertical or horizontal movement affecting structural stability.
1	Culvert closed – corrective action may put back in light service.
0	Culvert closed – replacement necessary.

WSBIS Item 1679 – Pier/Abutment Protection **Pulldown**

NBI Item 111

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

If WSBIS Item 1386 – Navigation Control has been coded 1, use the codes 1 through 5 below to indicate the presence and adequacy of pier or abutment protection features such as fenders, dolphins, etc. The condition of the protection devices may be a factor in the overall evaluation of WSBIS Item 1676 – Substructure.

If WSBIS Item 1386 is coded 0, code N for this field.

Table 1679 Pier/Abutment Protection Rating

WSBIS Code	NBI Code	Description
1	1	Navigation protection not required
2	2	In place and functioning
3	3	In place but in a deteriorated condition
4	4	In place but reevaluation of design suggested
5	5	None present but reevaluation suggested
N	null	Not applicable, not a navigable waterway

NBI Commentary:

WSDOT codes N where the NBI codes a blank. This field is translated in the NBI text file.

WSBIS Item 1680 – Scour **Pulldown**

NBI Item 113

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code as indicated below to identify the current status of the bridge regarding its vulnerability to scour:

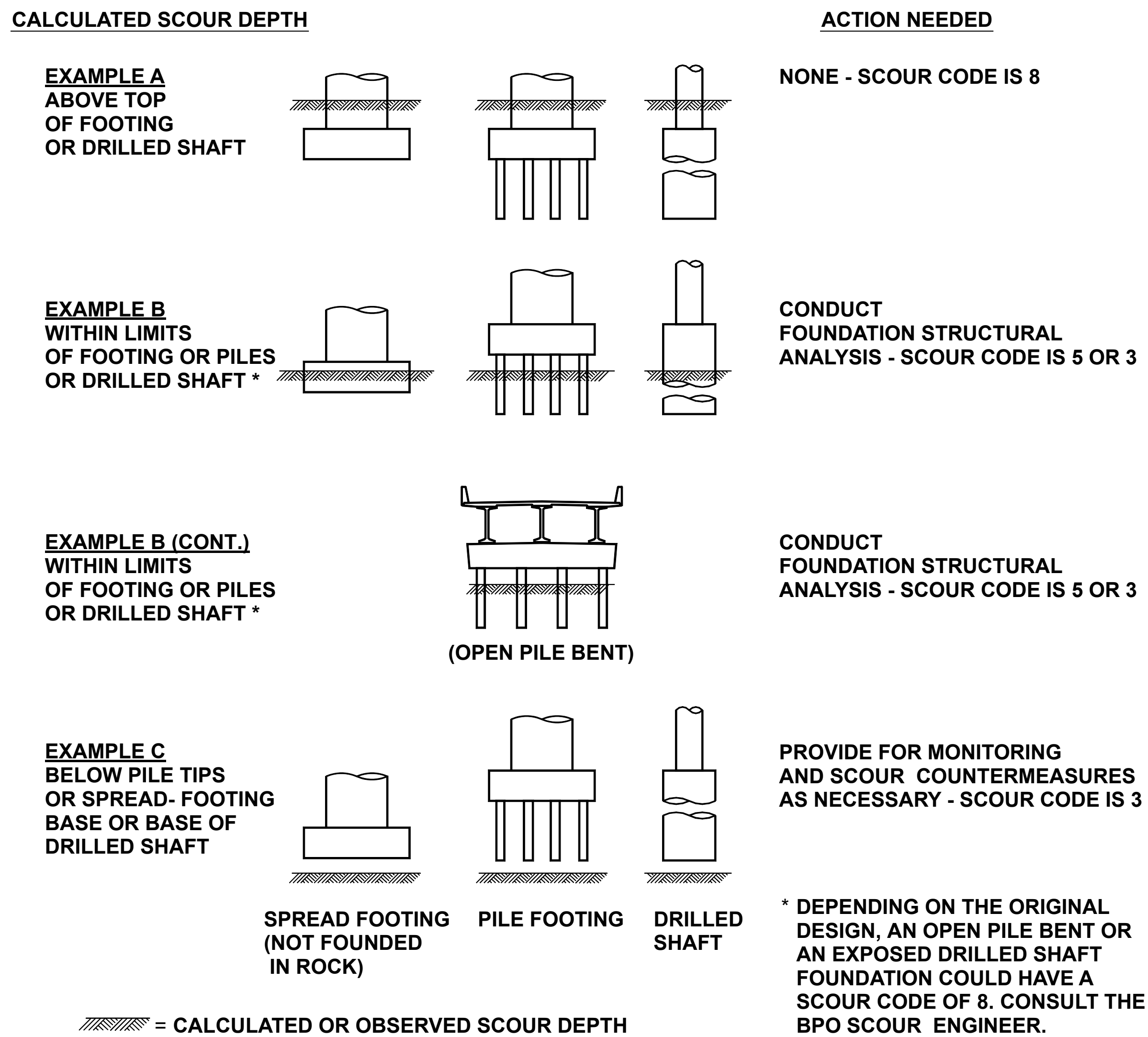
Table 1680 Scour Rating

WSBIS Code	Description
N	Bridge not over waterway.
U	Bridge with unknown foundation that has not been evaluated for scour. Until risk can be determined, a plan of action should be developed and implemented to reduce the risk to users from a bridge failure during or immediately after a flood event (see HEC 23).
T	Bridge over tidal waters that has not been evaluated for scour, but considered low risk. Bridge will be monitored with regular inspection cycle and with appropriate underwater inspections. (Unknown foundations in tidal waters should be coded U.)
9	Bridge foundations (including piles) on dry land well above flood water elevations.
8	Bridge foundations determined to be stable for the assessed or calculated scour conditions. Scour is determined to be above top of footing or drilled shaft (Example A) by: • assessment (e.g., bridge foundations are on rock formations that have been determined to resist scour within the service life of the bridge), or • calculation (exposed drilled shafts may be included by calculations), or • installation of properly designed countermeasures (see HEC 23).
7	Countermeasures have been installed to mitigate an existing problem with scour and to reduce the risk of bridge failure during a flood event. Instructions contained in a plan of action have been implemented to reduce the risk to users from a bridge failure during or immediately after a flood event.
6	Scour calculation/evaluation has not been made.
5	Bridge foundations determined to be stable for assessed or calculated scour conditions. Scour is determined to be within the limits of footing or piles, including open pile bents, or drilled shafts (Example B) by: • assessment (e.g., bridge foundations are on rock formations that have been determined to resist scour within the service life of the bridge), or • calculations, or • installation of properly designed countermeasures (see HEC 23).
4	Bridge foundations determined to be stable for assessed or calculated scour conditions; field review indicates action is required to protect exposed foundations (see HEC 23).
3	Bridge is scour critical; bridge foundations determined to be unstable for assessed or calculated scour conditions: • Scour within limits of footing or piles, or drilled shafts (Example B) • Scour below spread-footing base or pile tips, or base of shafts (Example C)
2	Bridge is scour critical; field review indicates that extensive scour has occurred at bridge foundations, which are determined to be unstable by: • a comparison of calculated scour and observed scour during the bridge inspection, or • an engineering evaluation of the observed scour condition reported by the bridge inspector in WSBIS Item 1676 – Substructure.
1	Bridge is scour critical; field review indicates that failure of piers/abutments is imminent. Bridge is closed to traffic. Failure is imminent based on: • a comparison of calculated and observed scour during the bridge inspection, or • an engineering evaluation of the observed scour condition reported by the bridge inspector in WSBIS Item 1676 – Substructure.
0	Bridge is scour critical. Bridge has failed and is closed to traffic.

These codes are generally determined based on scour analyses made by hydraulic, geotechnical, or structural engineers. However, bridge inspectors play a key role in determining selected scour codes:

- Scour code 4 can be determined by the bridge inspector regardless of any previous higher scour code, based on observed conditions.
- For scour codes of 2 or less, the WSBIS Item 1676 – Substructure code must have a matching code.
- For WSDOT bridges, all changes to the 1680 Scour Code must be reviewed and approved by the BPO Sour Engineer.

Figure WSBIS 1680



NBI Commentary:

This item has been modified based on an April 27, 2001 FHWA memo regarding FHWA Items 60 and 113 (WSBIS Items 1676 and 1680). This memo is available at www.fhwa.dot.gov/engineering/hydraulics/policymemo/revguide.cfm.

Traffic Safety

WSBIS Items 1684, 1685, 1686, 1687
NBI Item 36A through D

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Bridge inspection shall include the recording of information on traffic safety features so that the evaluation of their adequacy can be made.

Use the following codes for each of the four traffic safety segments:

Table 6 Traffic Safety Feature Codes

WSBIS Code	Description
0	Inspected feature does not meet currently acceptable standards or a safety feature is required and none is provided.
1	Inspected feature meets currently acceptable standards.
N	Not applicable (structure does not carry traffic) or a safety feature is not required (see item description for requirements).

NBI Commentary:

WSDOT has applied state safety standards to determine how these fields are coded.

WSBIS Item 1684 – Bridge Rails **Pulldown**
NBI Item 36A

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Bridge railings should be coded to reflect the current WSDOT standards. Refer to *Design Manual* Section 1610.07 Bridge Traffic Barriers.

Acceptable crash tested bridge rails fall into two general categories.

Thrie-beam Retrofit

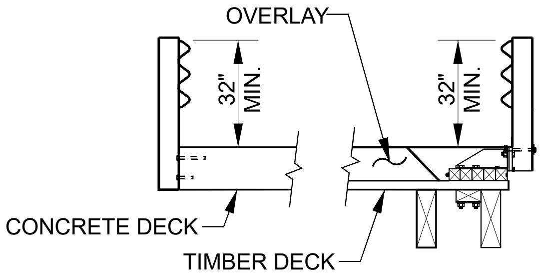
- Thrie-beam mounted to baluster rail
- Steel truss and Thrie-beam
- Edge mounted Thrie-beam
- Thrie-beam mounted to steel posts on concrete deck
- Thrie-beam mounted to open girder

Concrete Rail

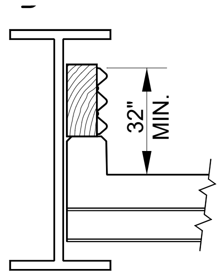
- New Jersey style rail
- F-shaped concrete rail
- Single slope concrete rail
- 32” vertical concrete parapet
- Type 7 concrete rail

Bridge rails are coded as N when there is sufficient roadway fill that there is no attachment to the structure.

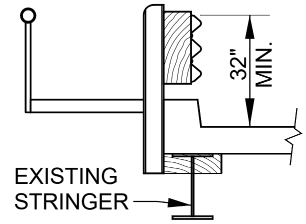
Figure WSBIS 1684



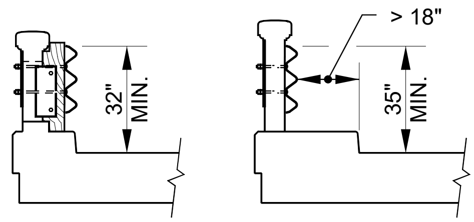
EDGE MOUNTED THRIEBEAM (Fig. a)



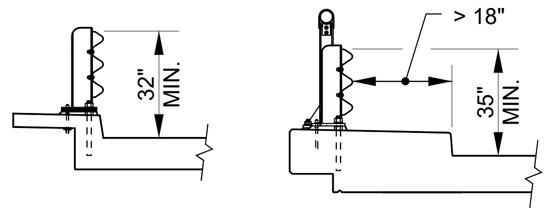
THRIE BEAM MOUNTED TO OPEN GIRDER (Fig. b)



STEEL TRUSS & THRIE BEAM (Fig. c)

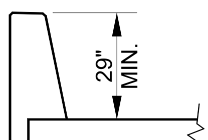


THRIE BEAM MOUNTED TO BALLUSTER RAIL (Fig. d)



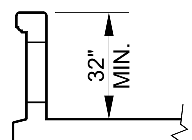
THRIE BEAM MOUNTED TO STEEL POSTS ON CONCRETE DECK (Fig. e)

THRIE BEAM RETROFIT



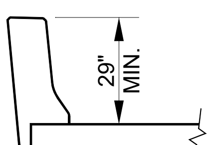
SINGLE SLOPE CONCRETE RAIL (Fig. a)

(NOTE: BARRIER IS ACCEPTABLE WITH ANY TYPE OF METAL RAIL MOUNTED TO IT)



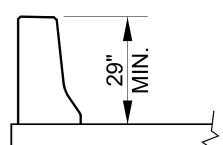
32" INCH VERTICAL CONCRETE PARAPET (Fig. b)

(NOTE: BARRIER IS ACCEPTABLE WITH ANY TYPE OF METAL RAIL MOUNTED TO IT)



F-SHAPE TYPE CONCRETE RAIL (Fig. c)

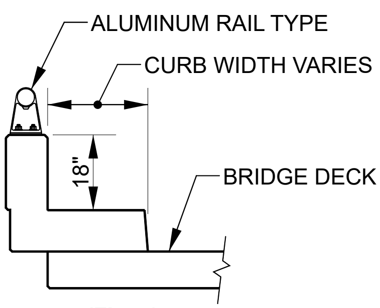
(NOTE: BARRIER IS ACCEPTABLE WITH ANY TYPE OF METAL RAIL MOUNTED TO IT)



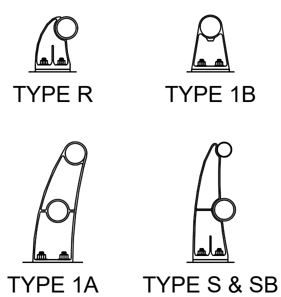
NEW JERSEY STYLE RAIL (Fig. d)

(NOTE: BARRIER IS ACCEPTABLE WITH ANY TYPE OF METAL RAIL MOUNTED TO IT)

CONCRETE RAIL



(Fig. a)



ALUMINUM RAIL TYPE	CURB WIDTH	
	9 INCHES OR LESS	GREATER THAN 9 INCHES
TYPE R, S, OR SB	CODE 1	CODE 1
TYPE 1B OR 1A	CODE 1	CODE 0

TYPE 7 BRIDGE RAIL

WSBIS Item 1685 – Transitions **Pulldown**

Item 36B

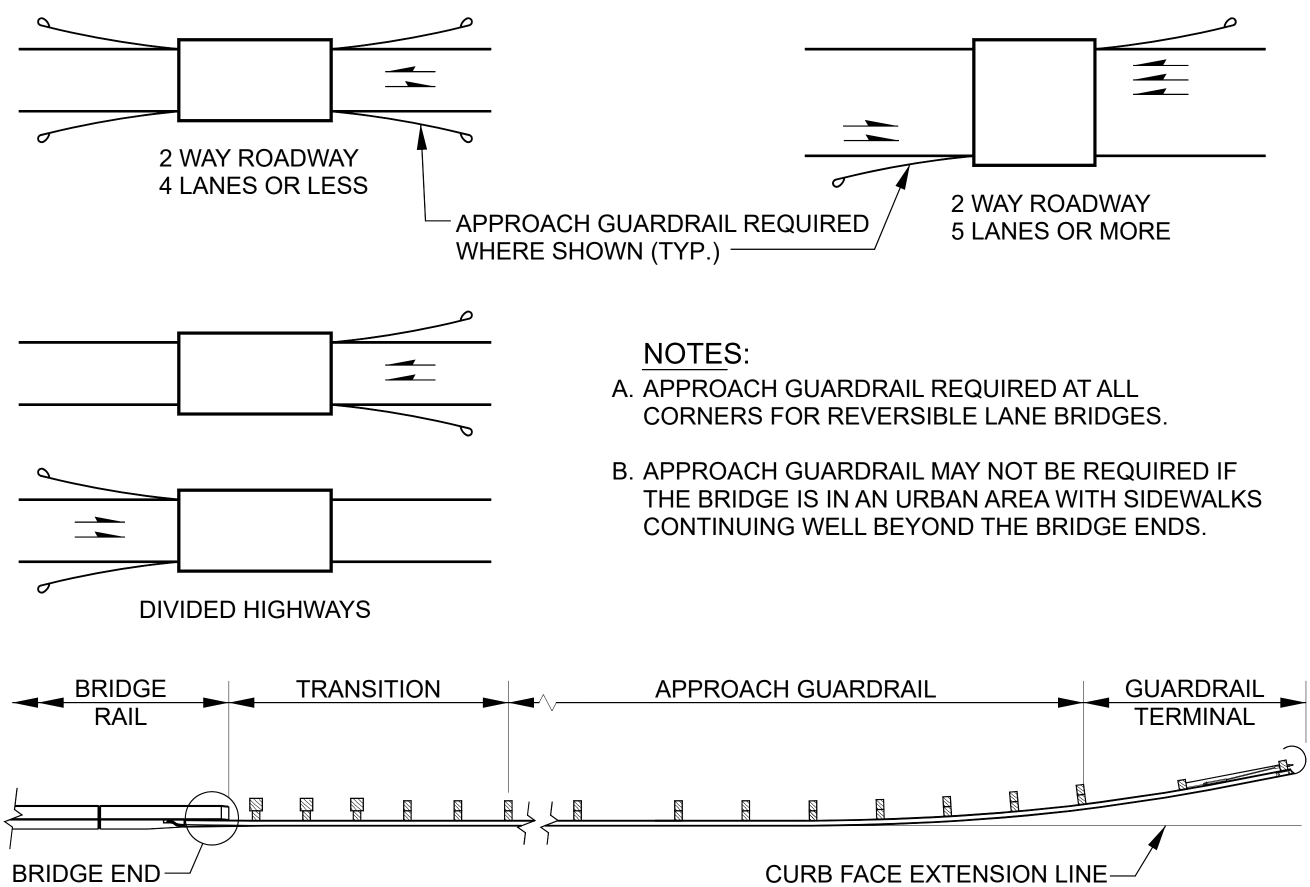
Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Transition details are shown in WSDOT Standard Plans Section C. Features that the inspector should note are:

- If guardrails are not required, the absence of transitions is automatically acceptable and coded as 1.
- Transitions must be nested (two layers). In most cases this will be Thriebeam. W-beam is allowed only when there is insufficient bridge rail height to accommodate the Thrie-beam transition, for example Type 7 bridge rail.
- Post spacing should decrease in the transition resulting in gradual stiffening as a vehicle moves along the transition from a flexible guardrail to the more rigid concrete bridge rail.
- Type III transitions (hollow steel post) have generally been retrofitted, but are only acceptable if they have been retrofitted with a block out less than or equal to 1' – 6" from rail to anchor. On oneway highways, the non-retrofitted posts are acceptable on the trailing edge. Unless further investigation shows that it meets current standards, this is the criteria for acceptance that will be used.
- Transitions are coded as N when there is sufficient roadway fill that there is no attachment to the structure.

Figure WSBIS 1685



WSBIS Item 1686 – Guardrails **Pulldown**
Item 36C

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

W-beam and Thrie-beam are acceptable rail types. Details of these rails are shown in Standard Plans Section C. Features that the inspector should pay close attention to while inspecting the approach rail are:

- Rails are not necessarily required at all four corners of the bridge. Code Guardrails as 1 when not required.
- Posts should be 6″ × 8″ timber (nominal), or W6x9's, spaced at 6′ 3″ o.c. Nested Thrie-beam is also acceptable but requires lower post spacing.
- Guardrail height (from ground to top of W-beam) should be between 26″ and 28″.
- Guardrail height (from ground to top of Thrie-beam) should be 32″.
- Concrete rail is acceptable.

WSBIS Item 1687 – Terminals **Pulldown**
Item 36D

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- Terminals are to be coded as 1 or 0 if they are within a reasonable distance of the bridge. On a fill embankment, this would be near the bottom of the fill slope (*Design Manual* M 22-01). Otherwise they will be coded as an N.
- If guardrails are not required, the absence of terminals is automatically acceptable and coded as 1.
- Acceptable guardrail terminals are shown in the Washington State *Standard Plans* Section C or *Design Manual* M 22-01.

Miscellaneous Fields

WSBIS Item 2610 – Asphalt Depth (inches) N(5,2)

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code the average depth of asphalt in inches on the deck as observed from field measurements, or as determined from comparing the design curb height against the measured curb height from the top of asphalt. In cases where there is ballast, such as on timber decks, enter the full thickness of ballast and asphalt.

Code 0 when:

There is no asphalt on the deck.

When the structure does not have a deck, including when asphalt pavement is placed on fill over a culvert. In cases where there is ballast, such as on timber decks, enter the full thickness of ballast and asphalt.

WSBIS Item 2611 – Design Curb Height (inches) N(5,2)

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code the curb height shown on current bridge plans in inches. Code 0 when there is no curb.

WSBIS Item 2612 – Bridge Vehicle Rail Height (inches) N(5,2)

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code the vehicle rail height as measured in the field, from the top of the rail system to the bridge deck.

WSBIS Item 2675 – Number of Utilities Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This field indicates the number of franchise utilities attached to the bridge. Utilities include, but are not limited to, water pipes, sewer lines, telephone lines, power lines, and gas lines. Conduit for electricity used on the bridge is not considered a utility. A conduit cluster (e.g., a telephone cluster) is considered one utility. This field is not used to evaluate the condition of utilities on the bridge, only the number of utilities present. If more than nine utilities are attached to the bridge, code 9. If there are no utilities, code 0.

WSBIS Item 2614 – Subject to NBIS Flag — Pulldown

Applicable Structure Types

- **All structure records**

This field identifies whether or not the bridge is subject to the National Bridge Inspection Standards (NBIS).

Y	Bridge is subject to the NBIS
N	Bridge is not subject to the NBIS.

This field is based on 23 CFR 650.305, found at www.fhwa.dot.gov/legsregs/directives/fapg/cfr0650c.htm, and the Questions and Answers paragraphs Q303-1 through Q303-6, found at www.fhwa.dot.gov/bridge/nbis/index.cfm. Structures subject to the NBIS include all publicly owned highway structures carrying public roads over a depression or obstruction and having an opening measured along the center of the roadway of more than 20 feet between one of the following:

- Undercopings of abutments
- Spring lines of arches
- Extreme ends of openings for multiple box culverts
- Extreme ends of openings for multiple pipe culverts where the clear distance between pipes is less than half of the smaller contiguous pipe

Structures not subject to the NBIS include:

- Sign support structures
- High mast lighting
- Retaining walls
- Noise barrier structures
- Overhead traffic signs
- Tunnels
- Structures carrying only pedestrians
- Structures carrying only railroad

Ownership and access are also important factors. To be subject to the NBIS, a structure must be both publicly owned and publicly accessible. Structures not subject to the NBIS include:

- Privately owned structures accessible to the public (e.g., road association structures)
- Publicly owned bridges that are not accessible to the public (e.g., structures behind gates used to access dams for agency employees and contractors)

Inspection Flags

WSBIS Item 2688 – Revise Rating Flag Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Tunnels carrying public roadways within**

This code indicates whether or not the structure should be reviewed for a revised rating based on field conditions. A note shall be added by the inspector identifying the reason/condition that prompts reevaluation of the load rating.

Y Yes, review rating
* Null field, rating review is not required

See Section 5-2.

WSBIS Item 2691 – Photos Flag Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

This code indicates whether or not the structure needs photos taken.

D Deck photo needed
E Elevation or tunnel portal photo needed
P Deck and Elevation photos needed
* Null field, photos are not required

WSBIS Item 2693 – Soundings Flag Pulldown

This code indicates whether or not soundings of the streambed (streambed cross sections at the bridge) are required.

Y Soundings need to be taken.
* Null field, soundings are not required

This field is coded as part of the inspection planning process, and instructs the inspector to take soundings. When soundings are taken, the flag should be changed to null.

Note: Pedestrian bridges over waterways are managed for soundings and may be coded Y as appropriate.

WSBIS Item 2694 – Clearance Flag Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

This field indicates that an inspection team should collect clearance data.

C Measure horizontal/lateral and vertical clearances.
* Null field, measurements are not required, or were just collected.

This field is coded as part of the inspection planning process, and instructs the inspector to collect and record clearance measurements in accordance with WSDOT policy (see Chapter 3) and as indicated in the 2694 inspection note. Note that all vertical clearances in, on and under the structure need to be collected unless otherwise noted.

After measurements are collected and documents given to a Geometric Engineer for processing, change this code from C to * (null).

WSBIS Item 2695 – QA Flag Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

This code indicates whether or not a quality assurance report was created for this structure.

Y Quality assurance report on file.
* Null field

Local Agency Appraisals

WSBIS Item 7664 – Drain Condition Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This is the condition rating of the drains in the bridge deck.A rating of 5 should be used to indicate the drains are completely plugged with dirt and debris. Use Table WB76-64 Condition Rating for Secondary Bridge Members (Drains).

Table WB76-64 Condition Rating for Secondary Bridge Members (Drains)

WSBIS Code	Description
9	Not Applicable.
8	Very Good Condition. No problems noted.
7	Good Condition. Some minor problems.
6	Satisfactory Condition. Structural elements show some minor deterioration.
5	Fair Condition. All primary structural elements are sound but may have deficiencies such as minor section loss, deterioration, cracking, spalling, or scour.
4	Poor Condition. Advanced deficiencies such as section loss, deterioration, cracking, spalling, or scour.

WSBIS Item 7665 – Drain Status Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This code describes the present status of the drains on the bridge.

Table WB76-65

WSBIS Code	Description
9	Drains status is unknown
4	Drains have been disconnected
3	Drains have been replaced by another type
2	Drains have been permanently blocked
1	Drains exist as built
0	Drains do not exist

WSBIS Item 7666 – Deck Scaling Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This code describes the severity of any deck scaling present.

The amount and type of deterioration present in the top surface of concrete bridge decks is to be rated. If the bridge does not have a concrete deck (for example, it has an asphalt overlay or a steel or timber deck), code N.

N None
L Light (scaling up to ¼″ deep)
M Moderate (scaling up to ½″ deep)
H Heavy (scaling or spalls up to 1″ deep)
S Severe (over 1″ deep)

WSBIS Item 7667 – Deck Scaling Percent N(2,0)

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This value is the percentage of the total deck area where scaling and/or spalling are present. It includes any areas which have been patched.

In scaled areas of more than 1 percent, estimate the percentage at 5 percent increments. The amount and type of deterioration present in the top surface of concrete bridge decks is to be calculated. If the bridge does not have a concrete deck (for example, it has an asphalt overlay or a steel or timber deck), code 00.

WSBIS Item 7669 – Deck Rutting Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

The amount and type of deterioration present in the top surface of concrete bridge decks is to be rated using the following codes. If the bridge does not have a concrete deck (i.e., it has an asphalt overlay or a steel or timber deck), code 0.

Table WB76-69

WSBIS Code	Description
8	No wear
7	Exposed aggregate
5	Visible wheel track rutting
3	Wheel track rutting has exposed reinforcing steel
0	Not applicable

WSBIS Item 7670 – Deck Exposed Rebar **Pulldown**

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This code describes the degree to which the deck area shows exposed reinforcing steel.

The amount and type of deterioration present in the top surface of concrete bridge decks is to be rated. If the bridge does not have a concrete deck (for example, it has an asphalt overlay or a steel or timber deck), code 0.

Table WB76-70

WSBIS Code	Description
8	None
7	Some cracking in deck over reinforcing steel
5	0 to 5 percent of deck area shows exposed reinforcing steel
3	More than 5 percent of deck area shows exposed reinforcing steel
0	Not applicable

WSBIS Item 7672 – Curb Condition **Pulldown**

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This is the condition rating of any curbs located on the bridge. Use Table WB7672 Condition Rating for Secondary Bridge Members (Curbs).

Table WB76-72 Condition Rating for Secondary Bridge Members (Curbs)

WSBIS Code	Description
9	Not Applicable.
8	Very Good Condition. No problems noted.
7	Good Condition. Some minor problems.
6	Satisfactory Condition. Structural elements show some minor deterioration.
5	Fair Condition. All primary structural elements are sound but may have deficiencies such as minor section loss, deterioration, cracking, spalling, or scour.
4	Poor Condition. Advanced deficiencies such as section loss, deterioration, cracking, spalling, or scour.

WSBIS Item 7673 – Sidewalk Condition Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This is the condition rating of any sidewalks which are an integral part of or are attached to the bridge. This rating considers the condition of any structural members (i.e., stringers) which may support the sidewalk.

To be considered a sidewalk, the member must be greater than or equal to three feet in width. Use Table WB76-73 Condition Rating for Secondary Bridge Members (Sidewalk).

Table WB76-73 Condition Rating for Secondary Bridge Members (Sidewalk)

WSBIS Code	Description
9	Not Applicable.
8	Very Good Condition. No problems noted.
7	Good Condition. Some minor problems.
6	Satisfactory Condition. Structural elements show some minor deterioration.
5	Fair Condition. All primary structural elements are sound but may have deficiencies such as minor section loss, deterioration, cracking, spalling, or scour.
4	Poor Condition. Advanced deficiencies such as section loss, deterioration, cracking or spalling.

WSBIS Item 7674 – Paint Condition Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This field contains the condition rating of any paint applied to the bridge to protect the primary structural steel members.

If paint has been applied only on secondary members such as bridge rails or light posts, code 9 in this field.

Table Number Title

WSBIS Code	Description
9	Not applicable.
8	Bridge has recently been painted.
7	Paint is in good condition with only minor weathering.
6	Bridge needs to be painted within five years.
5	Bridge needs to be painted within three years.
4	Bridge needs to be painted within two years.

A paint code of ‘5’ or ‘4’ needs to have at least one paint inspection form completed as part of the inspection report in the bridge file. The bridge is also a candidate for paint testing.

WSBIS Item 7681 – Approach Condition Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This is the general physical condition rating of the approach roadway. This evaluation takes into consideration visible signs of wear, cracking, spalling, etc., but does not consider the alignment or width of this roadway.

Table Number Title

WSBIS Code	Description
9	Not applicable.
8	Smooth approach onto the bridge structure.
6	Less than 1″ of settlement of the approach roadway causing minor bouncing and load impact onto the bridge. Monitor the settlement.
3	More than 1″ of settlement of the approach roadway causing bouncing and load impact onto the bridge. Needs to be ACP feather repaired to provide a smooth transition onto the bridge.

Note: Code 6 for well maintained gravel roads. Code 3 for gravel roads in rough condition.

WSBIS Item 7682 – Retaining Wall Condition Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This field contains the general condition rating of any retaining walls associated with the bridge. This evaluation should take into consideration whether movement, cracking, or settling has occurred.

Wingwalls and curtain walls should not be considered under this code as they are considered part of the abutment. Use Table WB76-82 Condition Rating for Retaining Walls.

Table WB76-82 Condition Rating for Retaining Walls

WSBIS Code	Description
9	Not Applicable.
8	Very Good Condition. No problems noted.
7	Good Condition. Some minor problems.
6	Satisfactory Condition. Structural elements show some minor deterioration.
5	Fair Condition. All primary structural elements are sound but may have deficiencies such as minor section loss, deterioration, cracking, spalling, or scour.
4	Poor Condition. Advanced deficiencies such as section loss, deterioration, cracking, spalling, or scour.
3	Serious Condition. Loss of section, deterioration, spalling, or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
2	Critical Condition. Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete maybe present or scour may have removed substructure support. Unless closely monitored, it may be necessary to close the bridge until corrective action is taken.
1	Imminent Failure Condition. Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service.
0	Failed Condition. Out of service. Beyond corrective action.

WSBIS Item 7683 – Pier Protection Condition Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This rating describes the general condition rating of any pier and/or abutment protection features (i.e., fenders and dolphins) which have been put in place to protect the bridge against collisions from vessels or objects in tow.

This field is used for rating the general condition of the bridge's pier protection features and does not evaluate the adequacy of those features.

If no pier protection exists, code 9. Use Table WB76-83 Condition Rating for Secondary Bridge Members (Pier Protection).

Table WB76-83 Condition Rating for Secondary Bridge Members (Pier Protection)

WSBIS Code	Description
9	Not Applicable.
8	Very Good Condition. No problems noted.
7	Good Condition. Some minor problems.
6	Satisfactory Condition. Structural elements show some minor deterioration.
5	Fair Condition. All primary structural elements are sound but may have deficiencies such as minor section loss, deterioration, cracking, spalling, or scour.
4	Poor Condition. Advanced deficiencies such as section loss, deterioration, cracking, spalling, or scour.

WSBIS Item 7710 – Sufficiency Rating Calculated

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This item is calculated automatically and cannot be edited, and applies only to local agency bridges and culverts.

The Sufficiency Rating (SR) formula 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.

See Appendix 2-G for the Sufficiency Rating formula.

WSBIS Item 7711 – Structurally Deficient/Functionally Obsolete Calculated

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This item is calculated automatically and cannot be edited, and applies only to local agency bridges and culverts.

Bridges are considered Structurally Deficient (SD) 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.

SD is numerically defined as follows:

- A bridge component (deck, superstructure, substructure or culvert) having a condition rating of 4 or less (poor condition).

  or

- Structural Evaluation or Waterway Adequacy rated 2 or less (a bridge with a very low load rating capacity, or a bridge that is subject to overtopping with significant or severe traffic delays).

For a structure to be considered SD, one of the following items must be true:

Table 7711a Structurally Deficient Guide

WSBIS Item	Condition/Appraisal Rating
1657 – Structural Evaluation	≤ 2
1662 – Waterway Adequacy	≤ 2
1663 – Deck	≤ 4
1671 – Superstructure	≤ 4
1676 – Substructure	≤ 4
1678 – Culvert	≤ 4

Bridges are considered Functionally Obsolete (FO) 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. Examples of characteristics leading to an FO classification:

- Low load carrying capacity
- Low waterway adequacy
- Deck geometry (insufficient deck roadway width)
- Insufficient horizontal and vertical clearances
- Poor approach roadway alignment

For a structure to be considered FO, one of the following items must be true:

Table 7711b Functionally Obsolete Guide

WSBIS Item	Appraisal Rating
1657 – Structural Evaluation	3
1658 – Deck Geometry	≤ 3
1659 – Underclearances	≤ 3
1661 – Approach Roadway Alignment	≤ 3
1662 – Waterway Adequacy	3

Bridge ID Tab

WSBIS Item 1001 – Structure Identifier **AN(8)**
NBI Item 8
NTI Item I.1

Applicable Structure Types

- **All structure records**

This field must be unique for every structure in the Washington State Bridge Inventory, and cannot change for the life of the structure. Furthermore, when a new structure replaces an old structure, a new unique structure identifier must be coded. The old identifier cannot be recycled.

The BPO and LP Data Stewards assign the structure identifier when the original structure inventory record is processed. When initially creating a new structure in BridgeWorks, a temporary structure ID is generated with an X as the first character. This temporary structure ID will be changed when the record is "released" into the database.

NBI and NTI Commentary:

This field is translated to the NBI by adding 7 zeroes to the end of the 8-digit WSBIS code. This translation is done automatically with the generation of the NBI text file and NTI xml file. The NBI coding guide states that all structures with a closed median should be considered one structure, not two, presumably even in cases when they are actually structurally distinct. In some instances WSDOT has coded these structures separately.

WSBIS Item 2009 – Bridge Number **AN(13)**

Applicable Structure Types

- **All structure records**

This is a unique (to the owner agency) alphanumeric code assigned by the owner of the structure. This field does not require all spaces to be filled; however, the field cannot be left blank.

WSDOT owned structure numbers are formatted as follows:

[route number] / [alphanumeric character string]

WSDOT structure numbers follow several rules:

1. The forward slash (/) is always in the 4th position, with leading blanks as needed. For example, structure on I-5 are coded with two leading blanks followed by a 5 and a forward slash. Structure on US 395 have no leading blanks.
2. In general, every structure must have a unique structure number. The exception is when structures are replaced the structure number usually doesn't change. In this case, the obsoleted structure will have the same structure number.
3. The alphanumeric character string following the forward slash is numerically sequenced by increasing route milepoint, and is often followed by letter characters:

   Characters providing route-related information:

   E east structure of a pair on a divided south-north route
   W west structure of a pair on a divided south-north route
   N north structure of a pair on a divided west-east route

S south structure of a pair on a divided west-east route
E-N ramp carrying from eastbound to northbound (vary as needed)
ECD eastbound collector distributor (vary as needed)
A structure not on mainline
F structure on frontage road
ALT structure on alternate route mainline
SP structure on spur route

Characters providing structure design type information:

C culvert
P pedestrian bridge
DV detention vault
LID structure intended to reconnect severed residential areas

Examples:

90/43S Eastbound I-90 bridge at Mercer Slough in South Bellevue
5/26N-N Ramp carrying northbound I-5 traffic to northbound 139th St.
5/313P Pedestrian bridge over I-5 in Tumwater

4. Short span structure numbers are followed by a decimal point and a two digit number, e.g. 5/300.25.
5. The second portion of WSDOT structure numbers range from 1 to 99 within the first county in which the route occurs, 100 to 199 in the second county, 200 to 299 in the third county, and so on.

WSBIS Item 2010 – Bridge Sort Number AN(20)

Applicable Structure Types

- **All structure records**

This field is used for sorting structure numbers within the application and in various database queries. This field is maintained for tunnels and culverts.

The Structure Sort Number uses three digits for the route number and three digits for the structure number, with leading zeroes as necessary. Any following alpha characters are included. A total of 20 characters can be used.

When a decimal place is used in the Structure number, the character z is used in the structure sort number. This facilitates correct sorting.

Many local agency Structure Sort Numbers begin with a 99 and a space.

Examples:

Structure Number	Structure Sort Number
97/140W	097140W
97/285.6C	097285z6C
5/344S-E	005344S-E
241/2	241002
1135-2	99 1135-2

For state owned structures, this item is coded by the BPO Information Group and is visible in the BridgeWorks Inventory Management mode.

WSBIS Item 1132 –Bridge Name **AN(50)**
NTI Item I.2

Applicable Structure Types

- **All structure records**

This is the name of the structure, either as determined by legislative action or as determined by the structure owner. If the structure name is more than one word, separate words with a blank space. If the name of the structure exceeds the 50 character limit, use abbreviations to shorten it.

WSBIS Item 1232 – Features Intersected **AN(24)**
NBI Item 6

Applicable Structure Types

- **All structure records**

This item contains a description of the features intersected by the structure. When the structure is a bridge, the feature will always describe something under the bridge. When the structure is a tunnel, it will always describe something on top of the tunnel. The data in this segment shall be left justified and is limited to 24 characters. When one of the features intersected is another highway, the signed number or name of the highway shall appear first in the field. The names of any other features shall follow, separated by a comma.

Examples:

SR 99, BLUE R, RR
I-405 N-E & N-W RAMPS
GOOSE CREEK
SR 524 SPUR/44TH AVE W
TERRAIN

NBI Commentary:

The NBI coding guide separates this field into two segments (6A with 24 characters and 6B with 1 character). However, it's also stated that 6B is not used. The WSBIS coding guide eliminates any reference to 6B, but a blank space is created automatically in the NBI text file.

WSBIS Item 1256 – Facilities Carried **AN(18)**
NBI Item 7
NTI Item I.10

Applicable Structure Types

- **All structure records**

The facility being carried by the structure shall be recorded and coded. For all bridges this item describes the use on the structure, and for all tunnels this describes the use in the tunnel. This item shall be left justified and is limited to 18 characters.

Examples:

US 12
RAILROAD
MAIN STREET
PEDESTRIANS
ISRAEL RD

WSBIS Item 1156 – Location **AN(25)**
NBI Item 9

Applicable Structure Types

- **All structure records**

This item contains a narrative description of the structure location for the inventory route. Descriptions should be oriented ahead on station whenever possible. Do not use city limits, as these boundaries may move. This item shall be left justified.

Examples:

19.3 E JCT SR 203
14.7 E MASON CO

WSBIS Item 2400 – Program Manager **Pulldown**

Applicable Structure Types

- **All structure records**

This field identifies the individual responsible for bridge and tunnel inspection and reporting as described in the National Bridge Inspection Standards Title 23 CFR 650.307 and the National Tunnel Inspection Standards Title 23 CFR 650. 507. Both the NBI/NTI program manager and delegated program managers are listed in this field as appropriate.

In cases when the bridge is not subject to the NBIS or NTIS, this field identifies who is responsible for inspecting the structure and maintaining the structure records in accordance with WSDOT policies.

WSBIS Item 1286 – Custodian **Pulldown**
NBI Item 21
NTI Item C.2
WSBIS Item 1019 – Owner **Pulldown**
NBI Item 22
NTI Item C.1

Applicable Structure Types

- **All structure records**

The actual name of the owner and custodian of the structure shall be recorded on the inspection form. In most cases the owner and custodian will be the same agency, but if they are different the two agencies should have an agreement. This agreement should be part of the bridge record if it's available. If more than one agency has equal ownership or shares custodianship, code one agency in the hierarchy of State, Federal, county, city, railroad, and other private.

Table 1019 Owner and Custodian Codes

WSBIS Code	NBI Code	NTI Code	Description
1	001	001	State Highway Agency
2	002	002	County Highway Agency
4	004	004	City or Municipal Highway Agency
11	011	011	State Park, Forest, or Reservation Agency
12	012	012	County Park, Forest, or Reservation Agency
13	012	012	City Park, Forest, or Reservation Agency
21	021	021	Other State Agencies
22	001	001	Washington State Ferries
24	025	025	Other County Agency
25	025	025	Other City or Local Agencies
26	026	026	Private (other than railroad)
27	027	027	Railroad
28	027	027	Light Rail
31	031	031	State Toll Authority
32	032	032	County Toll Authority
33	032	032	City or Other Toll Authority
60	060	060	Other Federal Agencies (not listed below)
61	061	061	Indian Tribal Government
62	062	062	Bureau of Indian Affairs
63	063	063	Bureau of Fish and Wildlife
64	064	064	U.S. Forest Service
66	066	066	National Park Service
68	068	068	Bureau of Land Management
69	069	069	Bureau of Reclamation
70	070	070	Corps of Engineers (Civil)
71	071	070	Corps of Engineers (Military)
72	072	072	Air Force
73	073	073	Navy/Marines
74	074	074	Army
80	080	080	Unknown
92	001	001	Idaho maintenance responsibility
93	001	001	Oregon maintenance responsibility

NBI and NTI Commentary:

Selected codes have been eliminated because they are not used by any structures in Washington State (NSA, Pentagon, etc.). Selected codes were added, generally to differentiate county agencies from other local agencies, provide a unique code for Washington State Ferries, and codes for Oregon and Idaho border bridges maintained by these other state agencies.

WSBIS Item 1021 – County Code **Pulldown**

NBI Item 3
NTI Item I.4

Applicable Structure Types

- **All structure records**

This code identifies the county in which the structure is located. If this is a jointly owned structure, the county that is responsible for reporting the data to the inventory should be entered here. For WSDOT structures, the county at the beginning of bridge is coded.

A map of county limits is available at www.wsdot.wa.gov/data/tools/geoportal.

Table 1021 County Codes

WSBIS Code	NBI/ NTI Code	County Name
1	001	Adams
2	003	Asotin
3	005	Benton
4	007	Chelan
5	009	Clallam
6	011	Clark
7	013	Columbia
8	015	Cowlitz
9	017	Douglas
10	019	Ferry
11	021	Franklin
12	023	Garfield
13	025	Grant
14	027	Grays Harbor
15	029	Island
16	031	Jefferson
17	033	King
18	035	Kitsap
19	037	Kittitas
20	039	Klickitat

WSBIS Code	NBI/ NTI Code	County Name
21	041	Lewis
22	043	Lincoln
23	045	Mason
24	047	Okanogan
25	049	Pacific
26	051	Pend Oreille
27	053	Pierce
28	055	San Juan
29	057	Skagit
30	059	Skamania
31	061	Snohomish
32	063	Spokane
33	065	Stevens
34	067	Thurston
35	069	Wahkiakum
36	071	Walla Walla
37	073	Whatcom
38	075	Whitman
39	077	Yakima

NBI and NTI Commentary:

The WSBIS county code is translated to the NBI county code using the formula (WSBIS Code x 2) – 1 = NBI code and as shown above.

WSBIS Item 2023 – City **Pulldown**

Applicable Structure Types

- **All structure records**

This is the 1990 federal census place code, updated by OFM. .

If the bridge is not in a city, code 0 - Unincorporated.

A map of city limits is available at www.wsdot.wa.gov/data/tools/geoportal.

WSBIS Item 1274 – Region Code **Pulldown**
NBI Item 2
NTI Item I.6

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

This is the WSDOT region in which the bridge is located.

Table 1274 Region Code

WSBIS Code	NBI Code	NTI Code	Region Name
NW	1	NW	Northwest Region
NC	2	NC	North Central Region
OL	3	OL	Olympic Region
SW	4	SW	Southwest Region
SC	5	SC	South Central Region
EA	6	EA	Eastern Region

A region boundary map can be found at
www.wsdot.wa.gov/mapsdata/products/digitalmapsdata.htm.

NBI and NTI Commentary:

This field is translated as shown in the table above for the NBI, but is not translated for the NTI.

WSBIS Item 1188 – Latitude **(XX degrees XX minutes XX.XX seconds)**
NBI Item 16
NTI Item I.13
WSBIS Item 1196 – Longitude **(XXX degrees XX minutes XX.XX seconds)**
NBI Item 17
NTI Item I.14

Applicable Structure Types

- **All structure records**

Code the latitude and longitude in degrees, minutes and seconds to the nearest hundredth of a second using the NAD 83/91 - North American Datum of 1983, with 1991 adjustments. Note that true longitudes are a negative number at all locations in Washington State, but when coded in WSBIS a positive number is used.

Accurate data can be acquired using internet resources such as Google Maps or Bing Maps.

For bridges and culverts carrying public roadways, the reading should be taken at the beginning of the structure at centerline. When the inventory route has a Linear Referencing System (LRS) designation, the beginning of the structure is the lower milepoint for the LRS route.

For pedestrian, RR and other non-vehicular structures over public roadways, the reading should be taken at the centerline of the roadway under the bridge.

For tunnels carrying public roadways within, the reading should be taken at the beginning of the tunnel portal at the centerline.

WSBIS Item 2181 – Section N(2)
WSBIS Item 2183 – Township N(2)
WSBIS Item 2185 – Range N(3)

Applicable Structure Types

- **All structure records**

Section, township, and range numbers are location markers established by survey mapping. If the structure runs along a section, township, or range line, use the smaller of the two numbers. If a structure crosses any line, use the number at the beginning of the structure.

WSBIS Item 2181 – Section

This is the number of the section in which the structure is located. Enter a numeric code from 01 to 36.

WSBIS Item 2183 – Township

This is the number of the township in which the structure is located. Enter a numeric code from 01 to 41. Township designations carry a directional suffix (north or south); however, since all townships in Washington are north, this directional indicator need not be entered.

WSBIS Item 2185 – Range

This is the number of the range in which this structure is located. There are two parts to this field. In the first two places, enter the number of the range in which the structure is located. Valid ranges are:

01 through 47 if the third column is E
01 through 16 If the third column is W.

In the third place, enter the directional suffix which indicates the position of the range in relation to the Willamette Meridian. Enter one of the following codes:

E	East
W	West

A map of section, township and range information is available at www.wsdot.wa.gov/data/tools/geoportal.

WSBIS Item 1276 – Federal Information Processing Standards (FIPS) Code AN(5)
NBI Item 4
NTI Item I.5

Applicable Structure Types

- **All structure records**

Code all zeroes for this 5-digit field.

NBI and NTI Commentary:

Federal Information Processing Standards were withdrawn by the National Institute of Standards and Technology on January 1, 2006, with the intent to replace them with the Geographic Names Information System (GNIS). On this basis, WSDOT has chosen not to maintain FIPS codes. See the following links for more information:
http://geonames.usgs.gov/docs/fips55_change.pdf
http://nhd.usgs.gov/gnis.html

WSBIS Item 1285 – Toll **Pulldown**
FHWA Item 20 – Toll
NTI Item C.4 - Toll

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

The toll status of the structure is indicated by this item. Interstate toll segments under Secretarial Agreement (Title 23 - United States Code - Highways Section 129 as amended by 1991 ISTEA and prior legislation) shall be identified separately. Use one of the following codes:

Table 1285 Toll Code

WSBIS Code	NBI Code	NTI Code	Description
1	1	1	Toll bridge. Tolls are paid specifically to use the structure.
2	2	2	On toll road. The structure carries a toll road, that is, tolls are paid to use the facility, which includes both the highway and the structure.
3	3	0	On free road. The structure is tollfree and carries a tollfree highway.
4	4	2	On Interstate toll segment under Secretarial Agreement. Structure functions as a part of the toll segment.
5	5	2	Toll bridge is a segment under Secretarial Agreement. Structure is separate agreement from highway segment.

NTI Commentary:
Toll codes translated for the NTI as shown in the table above.

WSBIS Item 1288 – Parallel Structure **Pulldown**
NBI Item 101

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

Code this item to indicate situations where separate structures carry the inventory route in opposite directions of travel over the same feature. The lateral distance between structures has no bearing on the coding of this item.

For pedestrian, railroad and other non-vehicular structures over public roadways, always code N.

One of the following codes shall be used:

Table 1288 Parallel Structure Code

WSBIS Code	Description
R	The right structure of parallel bridges carrying traffic in the direction of increasing mileposts.
L	The left structure of parallel bridges carrying traffic in the direction of decreasing mileposts.
N	No parallel structure exists; OR pedestrian, railroad or other non-vehicular structure over public roadway.

WSBIS Item 1289 – Temporary Structure Pulldown

NBI Item 103

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

Code this item to indicate situations where a temporary structure or conditions exist.

Table 1289 Temporary Structure Code

WSBIS Code	Description
T	Temporary structure or conditions exist.
null	No temporary structure or conditions

A temporary structure or conditions are those which are required to facilitate traffic flow. This may occur either before or during the modification or replacement of a structure found to be deficient. Such conditions include the following:

- Bridges shored up, including additional temporary supports.
- Temporary repairs made to keep a bridge open.
- Temporary structures, temporary runarounds or bypasses.
- Other temporary measures, such as barricaded traffic lanes to keep the bridge open.

Any repaired structure or replacement structure which is expected to remain in place without further project activity, other than maintenance, for more than 5 years shall not be considered temporary. Under such conditions, that structure, regardless of its type, shall be considered the minimum adequate to remain in place and evaluated accordingly.

If this item is coded T, then all data recorded for the structure shall be for the condition of the structure without temporary measures, except for the following items which shall be for the temporary structure:

WSBIS Item

1499 – Inventory Route, Minimum Vertical Clearance
1293 – Structure Open, Posted, or Closed to Traffic
1491 – Inventory Route, Total Horizontal Clearance
1370 – Minimum Vertical Clearance Over Bridge Roadway
1374 – Minimum Vertical Underclearance
1379 – Minimum Lateral Underclearance on Right
1383 – Minimum Lateral Underclearance on Left
1660 – Bridge Posting

NBI Commentary:

WSDOT has defined a 5 year time period for which temporary structures or conditions can be in place and still considered temporary. The NBI coding guide refers to “a significant period of time.”

WSBIS Item 1292 – Historic Significance – NRHP Pulldown

NBI Item 37

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

This item establishes historical significance based on a criteria established by the National Register of Historic Places (NRHP). Generally the Washington State Department of Archaeology and Historic Preservation (DAHP) performs a review based on this criteria.

Use one of the following codes:

Table 1292 Historical Significance - NRHP

WSBIS Code	NBI Code	Description
1	1	Structure is on the NRHP.
2	2	Structure is eligible for the NRHP.
3	3	Structure is possibly eligible for the NRHP but requires further investigation before determination can be made. Alternately, structure is on a State or local historic register.
4	4	Historical significance has not been determined at this time. (This code should be used for all new structures.)
5	5	Structure is not eligible for the NRHP – reviewed by the DAHP.
6	5	Structure is not eligible for the NRHP – reviewed by agency other than the DAHP.

WSBIS Item 2295 – Historic Significance – HAER Pulldown

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

This item establishes historical significance based on a criteria established by the Historic American Engineering Record (HAER).

Use one of the following codes:

Table 2295 Historical Significance - HAER

WSBIS Code	Description
1	Structure is on the HAER.
2	Structure is eligible for the HAER.
3	Structure is possibly eligible for the HAER but requires further investigation before determination can be made. Alternately, structure is on a State or local historic register.
4	Historical significance has not been determined at this time. (This code should be used for all new structures.)
5	Structure is not eligible for the HAER – reviewed by the DAHP.
6	Structure is not eligible for the NRHP – reviewed by agency other than the DAHP.

WSBIS Item 7296 – Historic Significance – Local — Pulldown

Applicable Structure Types

- **All structure records owned by local agencies**

This item establishes historical significance using a criteria established by the local agency that owns the structure.

Use one of the following codes:

Table 7296 Historical Significance - Local Agency

WSBIS Code	Description
0	Neither bridge nor crossing is on the local agencies registry or a determination has not been made.
1	Bridge is on the local agency registry.
2	Crossing is on the local agency registry.

WSBIS Item 7281 – Legislative District 1 — N(2,0)

Applicable Structure Types

- **All structure records owned by local agencies**

This field identifies the first or only State Legislative District in which the bridge is located. If the legislative district is followed by a letter (District 19A, for example), disregard the letter and enter the 2 digit number only.

WSBIS Item 7283 – Legislative District 2 — N(2,0)

Applicable Structure Types

- **All structure records owned by local agencies**

For bridges which span a State Legislative District dividing line, use this field to identify the second State Legislative District number. Use both this and the Legislative District 1 field to enter the two separate district numbers.

WSBIS Item 2615 – Special Structures Flag — Pulldown
(Inventory Managed Operation Only)

Applicable Structure Types

- **All structure records**

This code flags structures that are inspected by the BPO Special Structures group.

Y Yes, structure inspected by the BPO Special Structures group.
* Null, structure not inspected by the BPO Special Structures group.

WSBIS Item 2930 – Obsolete Structure Flag (Inv MO only) — Check Box

Applicable Structure Types

- **All structure records**

This check box can only be edited in the Inventory Managed Operation, and is used to "obsolete" a structure record. See Sections 2.02.02 and 2.03.04 for more information.

Layout Tab

WSBIS Item 1332 – Year Built **N(4,0)**
NBI Item 27
NTI Item A.1

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

Code all 4 digits of the year in which construction of the structure was completed. If the year built is unknown, code 1900. If the year built is earlier than 1900, code 1900.

WSBIS Item 1336 – Year Rebuilt **N(4,0)**
NBI Item 106
NTI Item A.2

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

Code the year of the last major rehabilitation of the structure. Code all four digits of the year in which reconstruction was completed. If there has been no reconstruction, code 0.

For a structure to be defined as rebuilt, the type of work performed, whether or not it meets current minimum standards, must have been eligible for funding under any of the federal aid funding categories. The eligibility criteria would apply to the work performed regardless of whether all state or local funds or federal aid funds were used.

Some types of work to be considered as rebuilt are widenings and retrofits designed to increase the original structural capacity.

Some types of eligible work **not** to be considered as rebuilt are:

- Safety feature replacement or upgrading (for example, bridge rail, approach guardrail or impact attenuators).
- Painting of structural steel.
- Overlay of bridge deck.
- Utility work.
- Emergency repair to restore structural integrity to the previous status following an accident.
- Retrofitting to correct a deficiency which does not substantially alter physical geometry or increase the load-carrying capacity.
- Work performed to keep a structure operational while plans for complete rehabilitation or replacement are under preparation (for example, adding a substructure element or extra girder).

WSBIS Item 1340 – Structure Length (feet) **N(6,0)**
NBI Item 49

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **For tunnel lengths, use WSBIS Item 1349**

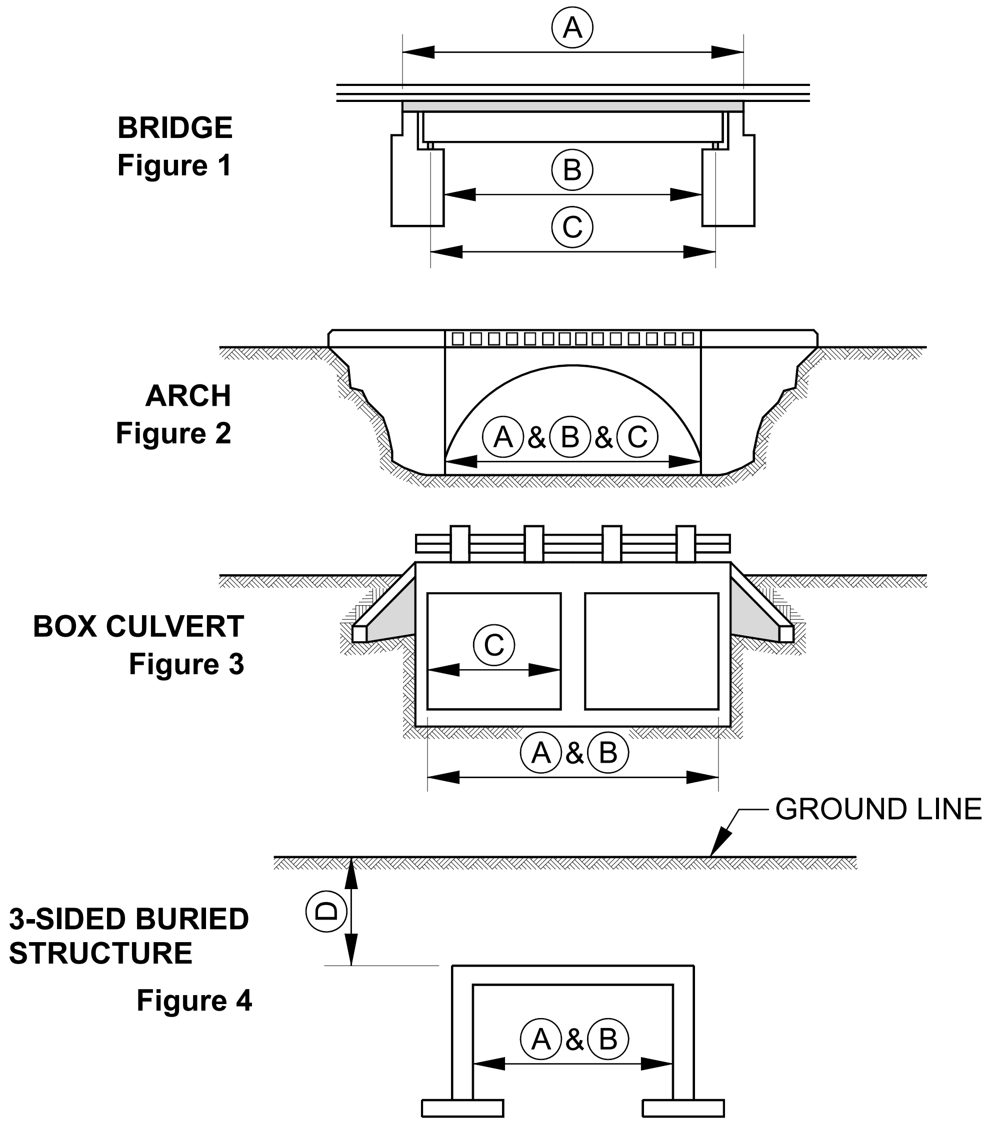
The structure length is recorded in whole feet, rounded up. For example 22.1 feet measured shall be coded as 23 feet.

Bridge lengths (vehicular, pedestrian, RR, etc) are measured along the centerline of the bridge and back to back of backwalls of abutments or from paving notch to paving notch.

Culvert lengths are measured from inside face to inside face of the exterior walls or from spring line to spring line. When the culvert is not perpendicular to the roadway, the roadway centerline length must be calculated.

Oddly configured structures over roadways (plazas, buildings, etc) should be measured to most reasonably represent the structure length.

Figure WSBIS 1340a



WHEN D $> \frac{B}{2}$ CODE STRUCTURE AS CULVERT.

WHEN D $\leq \frac{B}{2}$ CODE STRUCTURE AS BRIDGE.

A = STRUCTURE LENGTH (WSBIS ITEM 1340)

B = NBIS LENGTH (WSBIS ITEM 2346) OR MAXIMUM OPENING

C = MAXIMUM SPAN LENGTH (WSBIS ITEM 1348)

D = FILL DEPTH (Use the minimum depth measured for this)

Figure WSBIS 1340b

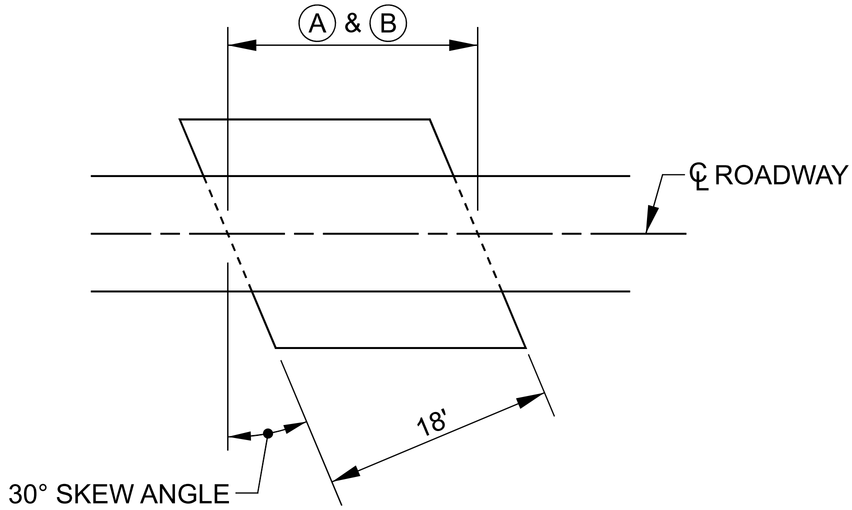


Figure 1

$$\text{A \& B} = \frac{18'}{\cos 30^\circ} = 20.78' = 21'$$

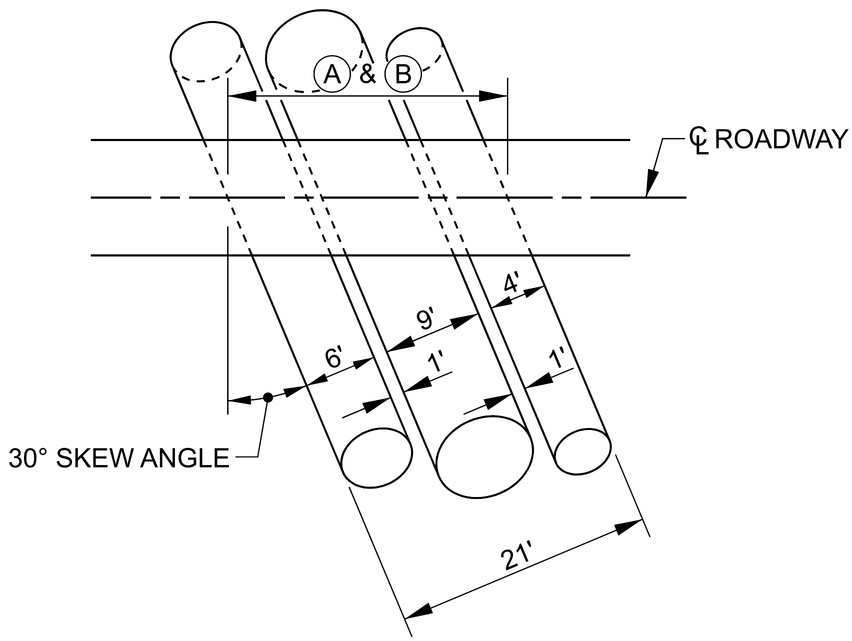


Figure 2

$$\text{A \& B} = \frac{21'}{\cos 30^\circ} = 24.25' = 25'$$

NOTE: THE DISTANCE BETWEEN CONSECUTIVE PIPES MUST BE EQUAL TO (=) OR LESS THAN (<) 1/2 THE DIAMETER OF THE SMALLEST PIPE IN THE SERIES FOR THE SERIES TO BE CONSIDERED ONE STRUCTURE.

WSBIS Item 2346 – Screening Length (feet) N(3,1)

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

If the Structure Length is between 19 and 23 feet inclusive, the NBIS length shall be coded. If the Structure Length is outside these limits, leave this field blank.

The screening length is a measurement along the center of the roadway between undercopings of abutments, spring lines of arches, or the extreme ends of openings for multiple boxes. This measurement is coded to the nearest tenth of a foot and may be different from the measurement entered in WSBIS Item 1340 – Structure Length. See Structure Length for examples on how to determine the NBIS Length. If a measurement is even very minimally over 20 feet long, round up to the next 10th of a foot.

The NBIS criteria defines a bridge as being greater than 20 feet in length. The NBIS length is used to assist in determining if the structure meets the NBIS definition and therefore reported to FHWA.

WSBIS Item 1348 – Maximum Span Length (feet) N(5,0)

NBI Item 48

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

The length of the maximum span shall be recorded in whole feet. The measurement shall be along the centerline of the bridge. Measure center to center of bearing points or clear open distance between piers, bents, or abutments otherwise.

A span that contains a drop-in span with cantilevers is counted as one span, and the length shall be measured from pier to pier.

See WSBIS Item 1340 – Structure Length for examples on how to determine the length of maximum span.

WSBIS Item 1352 – Lanes On **N(2,0)**
NBI Item 28A

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

Code the number of lanes being carried on the structure. For pedestrian, RR and other non-vehicular structures, code 0.

Include all lanes carrying highway traffic (e.g., cars, trucks, buses) which are striped or otherwise operated as a full width traffic lane for the entire length of the structure. This shall include any full width merge lanes and ramp lanes, and shall be independent of directionality of usage (e.g., a 1-lane bridge carrying 2-directional traffic is still considered to carry only one lane on the structure).

It should be noted here that for the purpose of evaluating WSBIS Item 1658 Deck Geometry, any 1-lane bridge, not coded as a ramp (WSBIS Item 1434 = 7), which has a WSBIS Item 1356 Curb-to-Curb coded 16 feet or greater shall be evaluated as 2 lanes.

Double deck bridges may be coded as 1 or 2 structures, but all related data must be compatible with the method selected.

WSBIS Item 1356 – Curb-to-Curb Width (feet) **N(4,1)**
NBI Item 51
NTI Item G.3

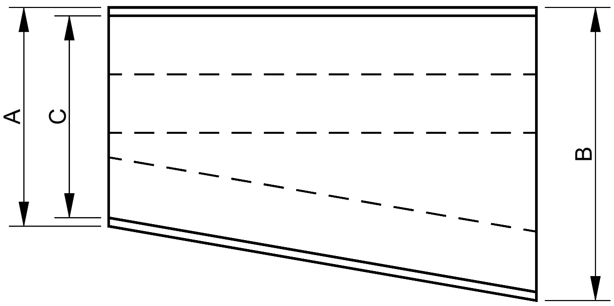
Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Tunnels carrying public roadways within**

Code the curb-to-curb width to the nearest tenth of a foot. The information to be recorded is the most restrictive minimum distance between curbs or rails on the structure roadway. The measurement should be exclusive of flared areas for ramps.

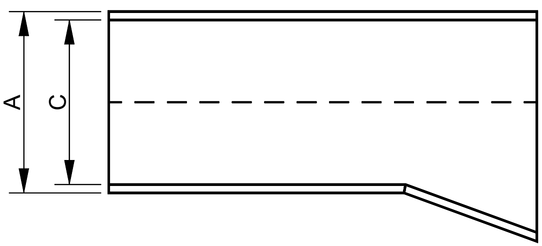
For structures with closed medians and usually for double decked structures, coded data will be the sum of the most restrictive minimum distances for all roadways carried by the structure*. The data recorded for this item must be compatible with other related route and structure data (e.g., Lanes On, Lanes Under, ADT, etc.). See examples in WSBIS Items 1364 and 1367.

Figure WSBIS 1356a



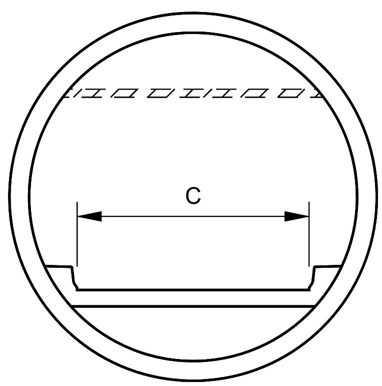
OUT TO OUT = (A + B) / 2
CURB TO CURB = C

EXAMPLE 1



OUT TO OUT = A
CURB TO CURB = C

EXAMPLE 2



CURB TO CURB = C
OUT TO OUT DOES NOT APPLY

EXAMPLE 3 (TUNNEL)

Where traffic runs directly on the top slab (or wearing surface) of a culvert-type structure (e.g., an R/C box without fill), code the actual roadway width (curb-to-curb or rail-to-rail). This will also apply where the fill is minimal and headwalls or parapets affect the flow of traffic.

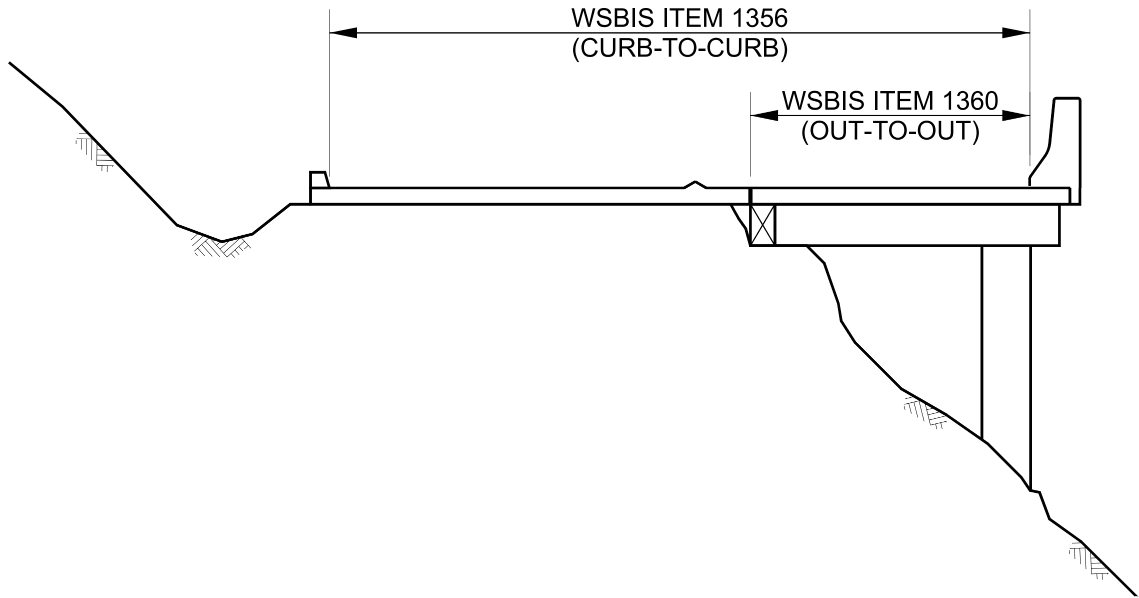
Where the roadway is on fill carried across a structure and the headwalls or parapets do not affect the flow of traffic, code 0. This is considered proper inasmuch as a filled section simply maintains the roadway cross section.

*Raised or non-mountable medians, open medians, and barrier widths are to be excluded from the summation along with barrier-protected bicycle and equestrian lanes.

For a 3 sided structure with a determined amount of fill on the deck less than B/2:
Code the curb-to-curb by using the representative roadway width. For example, this may be represented by the distance between the curbs, guardrails or edge of pavement.

Coding a sidehill viaduct (half bridge):

Figure WSBIS 1356b



WSBIS Item 1360 – Out-to-Out Deck Width (feet) **N(4,1)**
NBI Item 52

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code the out-to-out width to the nearest tenth of a foot. If the structure is a through structure, the number to be coded will represent the lateral clearance between superstructure members. See example in Figure WSBIS 1364a.

The measurement will be the most representative out-to-out width on the bridge, and should be exclusive of flared areas for ramps. See examples in Figures WSBIS 1356a and 1364b.

Where traffic runs directly on the top slab (or wearing surface) of the culvert (e.g., an R/C box without fill) code the actual width (out-to-out). This will also apply where the fill is minimal and the culvert headwalls affect the flow of traffic. However, for sidehill viaduct structures code the actual out-to-out structure width. See Figure WSBIS 1356b.

Where the roadway is on a fill carried across a pipe or box culvert and the culvert headwalls do not affect the flow of traffic, code 0. This is considered proper inasmuch as a filled section over a culvert simply maintains the roadway cross-section.

For a 3 sided structure with a determined amount of fill on the deck less than B/2:
Code the out-to-out deck width by measuring the extents of the bridge width perpendicular to the centerline of the roadway above.

WSBIS Item 1364 – Sidewalk/Curb Width Left (feet) **N(3,1)**
NBI Item 50A
NTI Item G.4

WSBIS Item 1367 – Sidewalk/Curb Width Right (feet) **N(3,1)**
NBI Item 50B
NTI Item G.5

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Tunnels carrying public roadways within**

Code the widths of the left and right curbs or sidewalks to the nearest tenth of a foot, with left and right determined by bridge orientation, not route orientation. Code 0 when there are no curbs or sidewalks.

Figure WSBIS 1364a

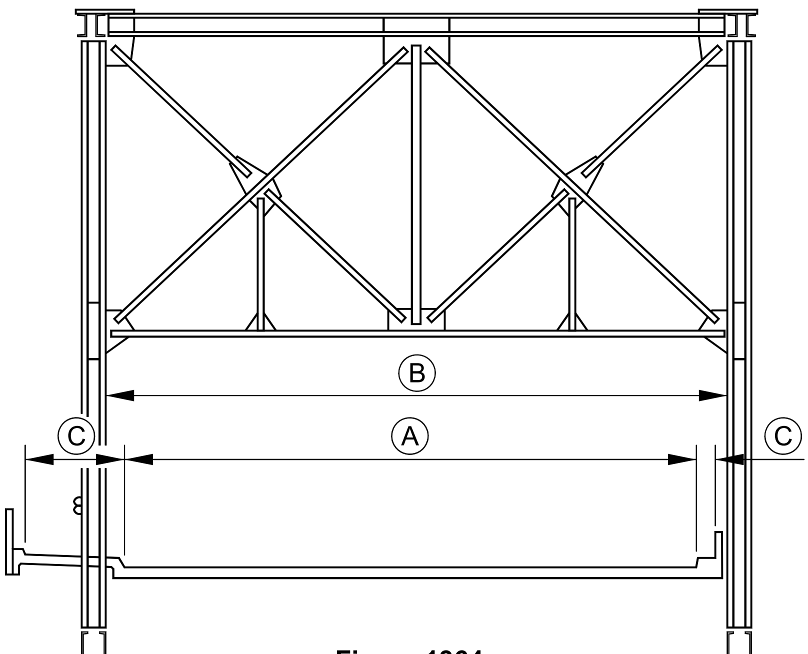


Figure 1364a

Figure WSBIS 1364b

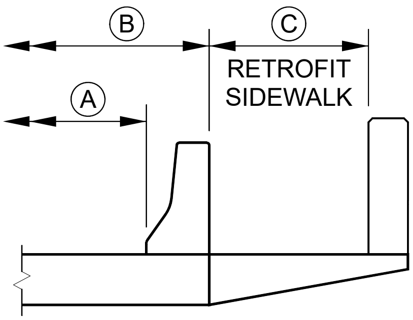


Figure 1

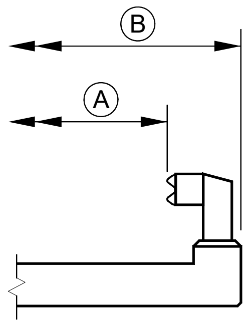


Figure 2

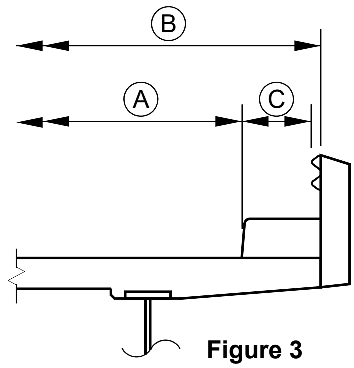


Figure 3

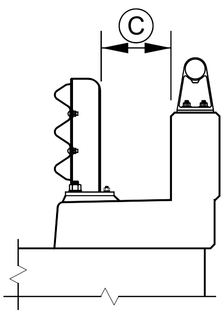


Figure 4

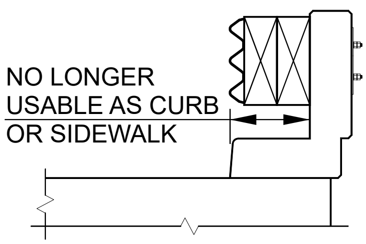


Figure 5

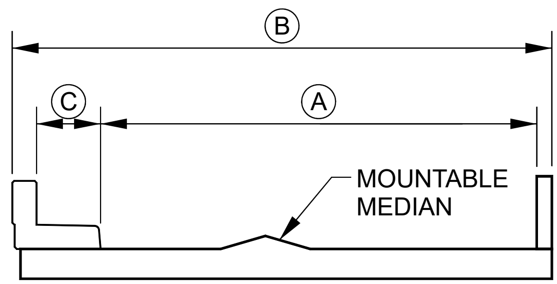


Figure 6

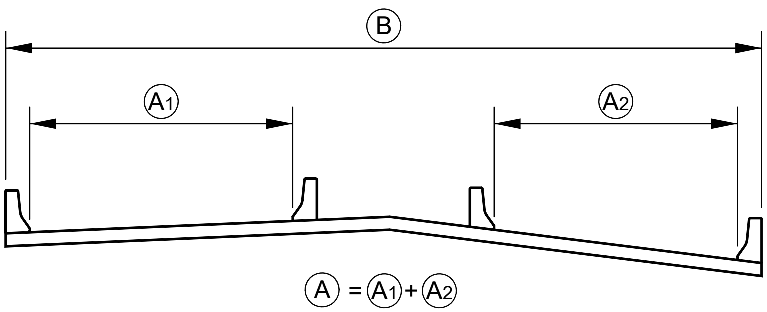


Figure 7

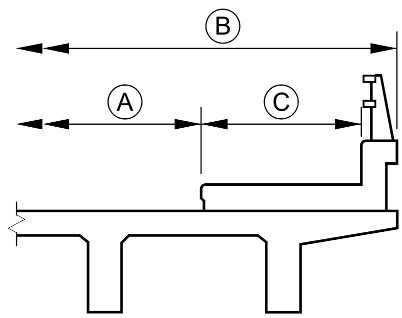


Figure 8

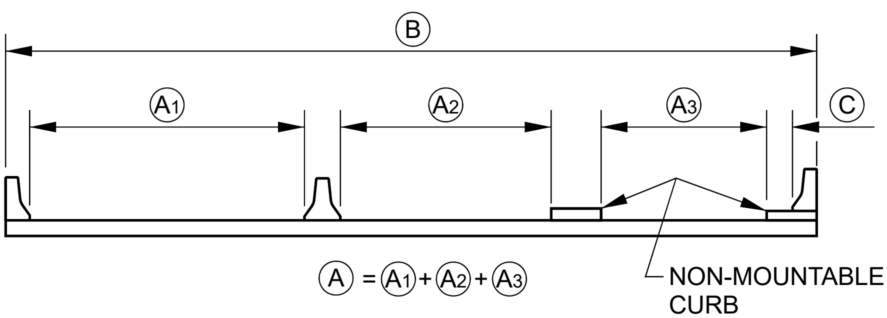


Figure 9

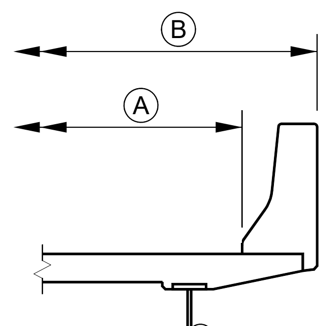


Figure 10

A WSBIS 1356 - ROADWAY WIDTH, CURB-TO-CURB

B WSBIS 1360 - DECK WIDTH, OUT-TO-OUT

C WSBIS 1364 AND 1367 - CURB OR SIDEWALK WIDTH

Figure WSBIS 1364c

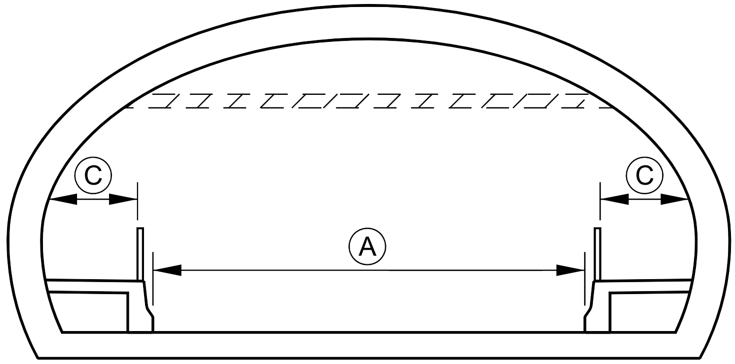


Figure 1364c

Ⓐ WSBIS 1356 - ROADWAY WIDTH, CURB-TO-CURB
Ⓑ WSBIS 1360 - DECK WIDTH, OUT-TO-OUT
Ⓒ WSBIS 1364 AND 1367 - CURB OR SIDEWALK WIDTH

WSBIS Item 1310 – Skew (degrees) N(2,0)

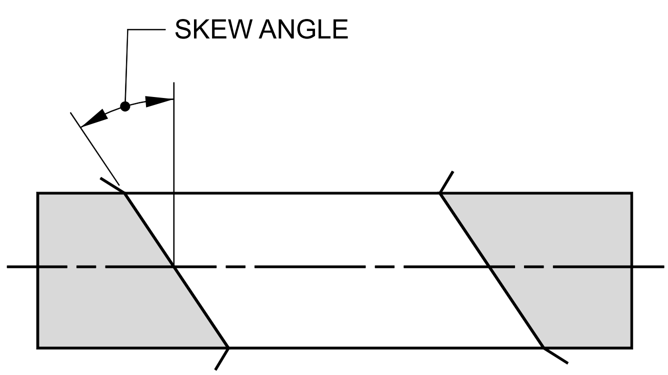
NBI Item 34

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

The skew angle is the angle between the centerline of a pier and a line normal to the roadway centerline. When plans are available, the skew angle can be taken directly from the plans. If no plans are available, the angle is to be field measured if possible. Record the skew angle to the nearest degree. If the bridge piers are perpendicular to roadway centerline, code 0. When the structure is on a curve or if the skew varies for some other reason, the average skew should be recorded, if reasonable. Otherwise, record 99 to indicate a major variation in skews of substructure units.

Figure WSBIS 1310



WSBIS Item 1312 – Flared Flag **Pulldown**
NBI Item 35

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code this item to indicate if the structure is flared (i.e., the width of the structure varies). Generally, such variance will result from ramps converging with or diverging from the through lanes on the structure, but there may be other causes. Minor flares at ends of structures should be ignored.

Table 1312 Flared Flag

WSBIS Code	NBI Code	Description
N	0	No flare
Y	1	Yes, flared

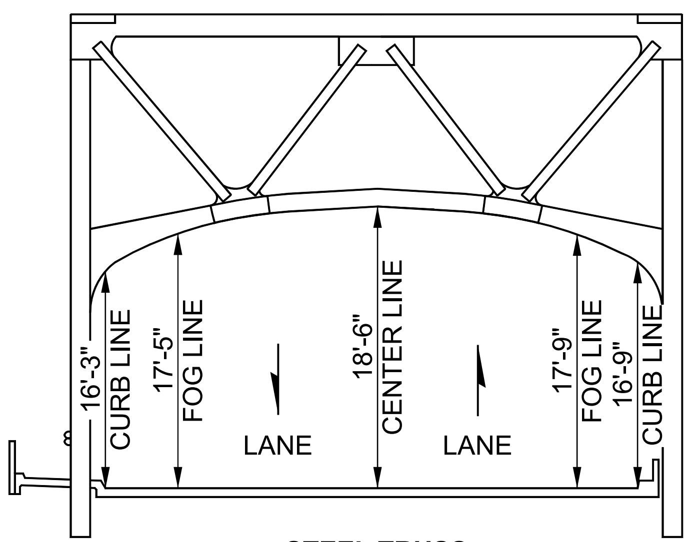
WSBIS Item 1370 – Minimum Vertical Clearance Over Deck (feet & inches) **N(4,0)**
NBI Item 53

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

The information to be recorded for this item is the actual minimum vertical clearance over the bridge roadway, including shoulders, to any superstructure restriction, in feet and inches, rounded to the lesser inch (e.g., 16′ 3¾″ is to be coded 1603). For double decked structures code the minimum, regardless whether it is pertaining to the top or bottom deck. When no superstructure restriction exists above the bridge roadway code 9999. When a restriction is 100 feet or greater code 9912.

Figure WSBIS 1370



WSBIS Item 1374 – Minimum Vertical Clearance Under Bridge (feet & inches) **N(4,0)**
NBI Item 54B

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

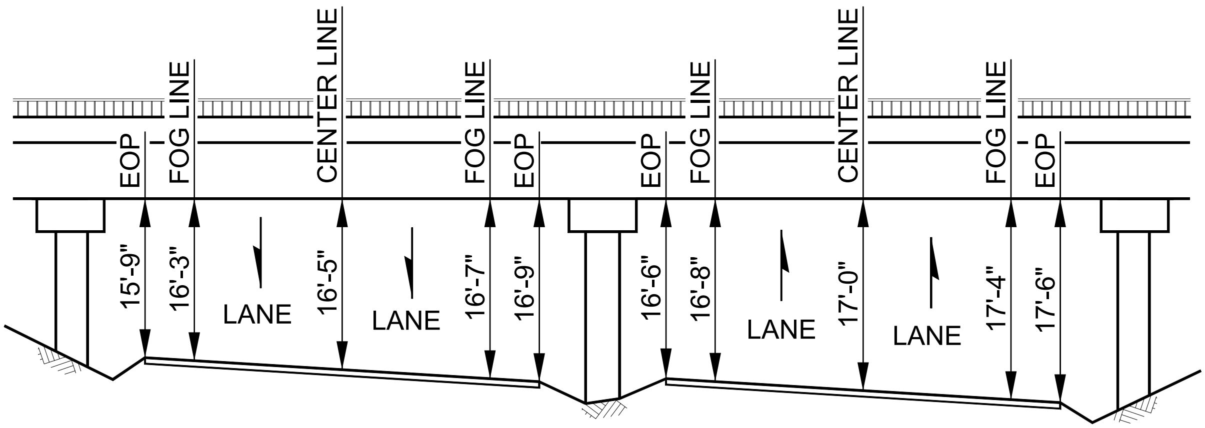
Code the minimum vertical clearance from the roadway (travel lanes only) or railroad track beneath the structure to the underside of the superstructure. Traveled way, or travel lanes, is between fog lines and excludes shoulders or gore areas.

If the bridge crosses both a highway and a railroad, code the highway clearance UNLESS the railroad has a substandard clearance based on current design criteria and the roadway is NOT substandard.

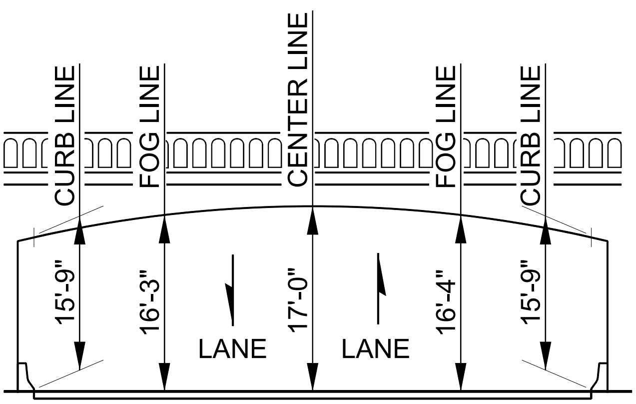
The information to be recorded is the actual minimum vertical clearance over the traveled way to the structure, in feet and inches, rounded to the lesser inch (e.g., 16′ 3¾″ is to be coded 1603). When a restriction is 100 feet or greater, code 9912.

If the feature is not a highway or railroad, code the minimum vertical clearance 0. A highway is to be considered any functionally classified, public road. Private roads are not to be included.

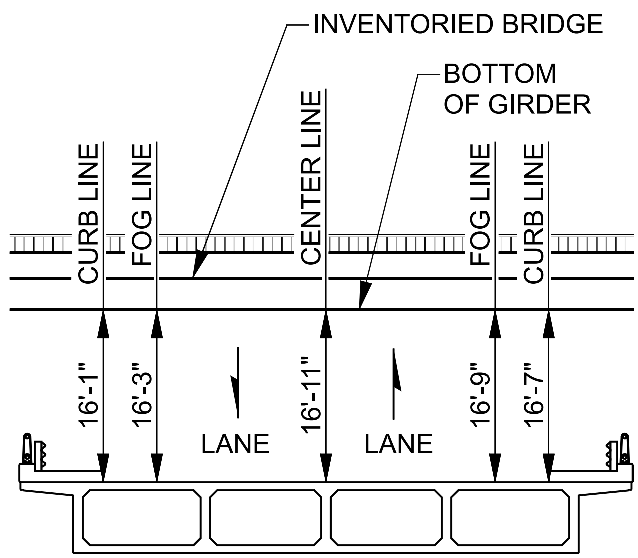
Figure WSBIS 1374



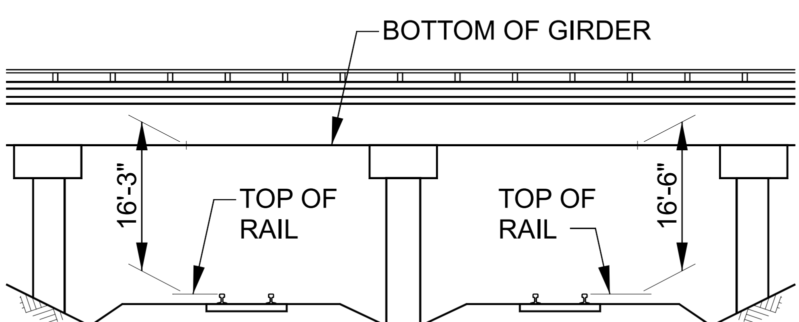
DIVIDED HIGHWAY (Fig. 1374a)
CODE: **1603**



UNDIVIDED HIGHWAY (Fig. 1374b)
CODE: **1603**



BRIDGE OVER BRIDGE (Fig. 1374c)
CODE: **1603**



RAILROAD (Fig. 1374d)
CODE: **1603**

WSBIS Item 1378 – Vertical Underclearance Code **Pulldown**
NBI Item 54A

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

Code the reference feature from which the clearance measurement is taken:

Table 1378 Vertical Underclearance Code

WSBIS Code	Description
H	Highway beneath structure
R	Railroad beneath structure
N	Feature not a highway or railroad

WSBIS Item 1379 – Minimum Lateral Underclearance Right (feet) **N(3,1)**
NBI Item 55B

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

The purpose of this item is to identify the lateral restrictions caused by the structure on the railroad or roadway underneath.

Code the minimum lateral underclearance on the right to the nearest tenth of a foot. When both a railroad and highway are under the structure, code the most critical dimension.

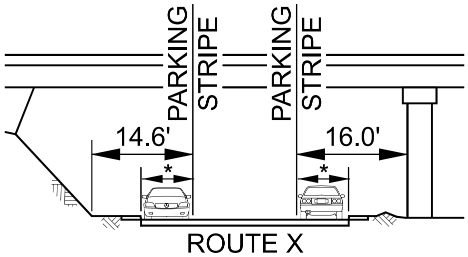
The lateral clearance should be measured from the right edge of the roadway excluding shoulders (fog line) or from the centerline (between rails) of the right-hand track of a railroad to the nearest substructure unit (pier, abutment, etc.), a retaining wall or to a slope. If no fog line exists on the roadway, assume a 12 foot lane. The right/left orientation is based on traffic direction. The clearance measurements to be recorded will be the minimum after measuring the clearance in both directions of travel, perpendicular to the centerline of the undercrossing.

If two related features are below the bridge, measure both and record the lesser of the two. An explanation should be written on the inspection form as to what was recorded. When the clearance is 100 feet or greater, code 99.9.

If the feature beneath the structure is not a railroad or highway, code 0 to indicate not applicable.

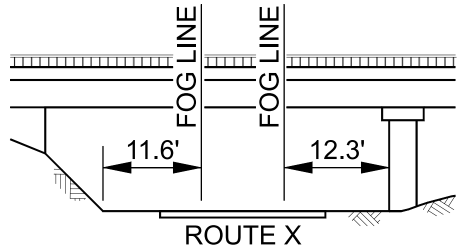
The presence of ramps and acceleration or turning lanes is not considered in this item; therefore, the minimum lateral clearance on the right should be measured from the right edge of the through roadway.

Figure WSBIS 1379a



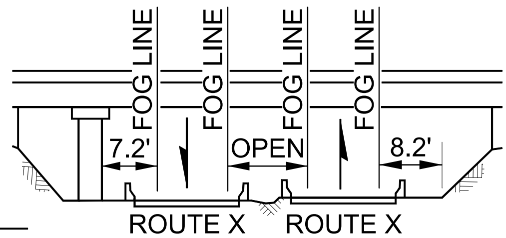
CITY STREET (Figure 1)

2-WAY TRAFFIC: RT. = 14.6 LT. = 0.0
1-WAY TRAFFIC LOOKING IN THE DIRECTION OF TRAFFIC: RT. = 16.0 LT. = 14.6
* = PARKING AREA, INSPECTORS PLEASE DOCUMENT DIMENSION.



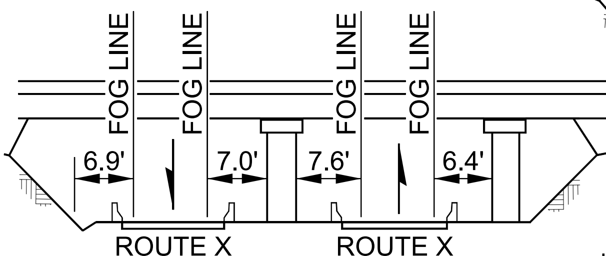
HIGHWAY (Figure 2)

2-WAY TRAFFIC: RT. = 11.6 LT. = 0.0
1-WAY TRAFFIC LOOKING IN THE DIRECTION OF TRAFFIC:
RT. = 12.3 LT. = 11.6



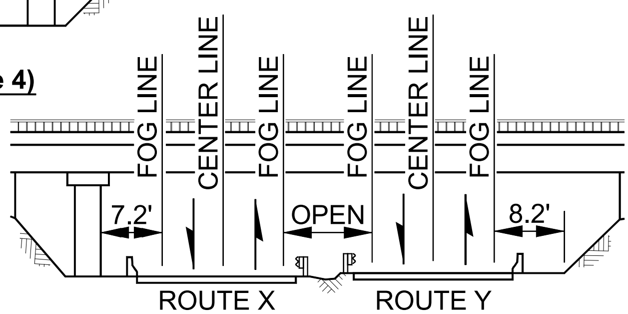
FREEWAY OPEN MEDIAN (Figure 3)

RT. = 7.2 LT. = 99.9



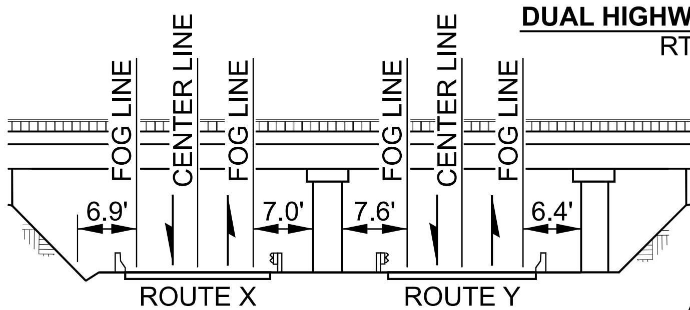
FREEWAY PIER MEDIAN (Figure 4)

RT. = 6.4 LT. = 7.0



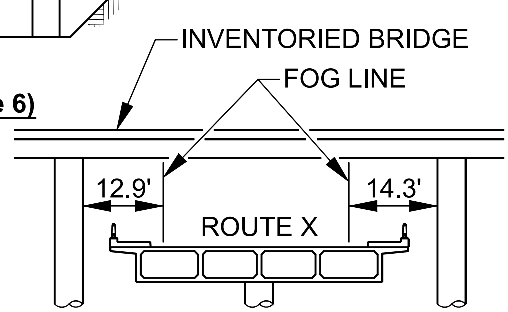
DUAL HIGHWAY OPEN MEDIAN (Figure 5)

RT. = 7.2 LT. = 99.9



DUAL HIGHWAY PIER MEDIAN (Figure 6)

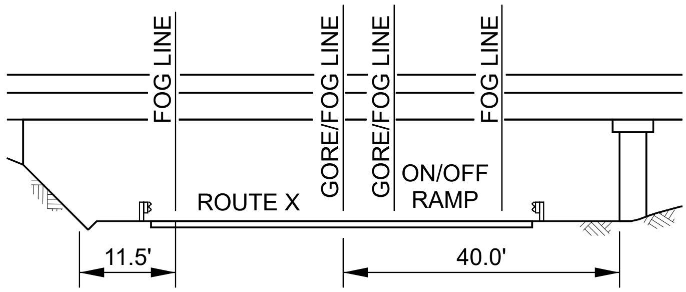
RT. = 6.4 LT. = 0.0



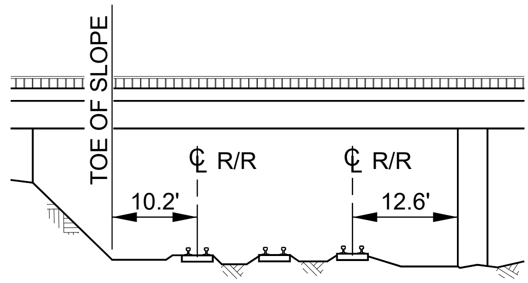
MULTIPLE LEVEL INTERCHANGE (Figure 7)

2-WAY TRAFFIC: RT. = 12.9 LT. = 0.0
1-WAY TRAFFIC LOOKING IN THE DIRECTION OF TRAFFIC: RT. = 14.3 LT. = 12.9

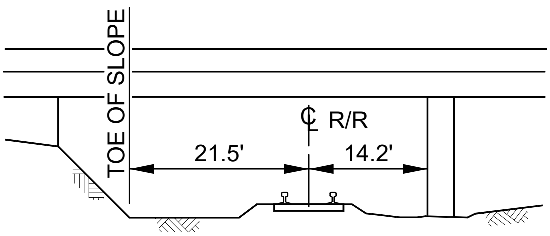
Figure WSBIS 1379b



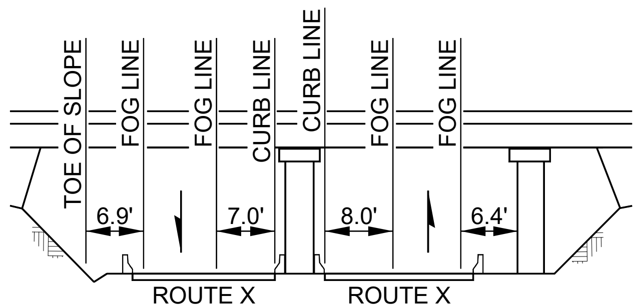
FREEWAY ON/OFF RAMP (Figure 1)
2-WAY TRAFFIC: RT. = 11.5 LT. = 0.0
1-WAY TRAFFIC LOOKING IN THE DIRECTION
OF TRAFFIC: RT. = 40.0 LT. = 11.5



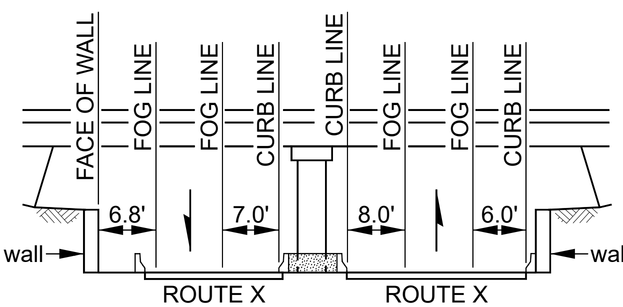
RAILROAD MULTIPLE TRACK (Figure 2)
RT. = 10.2 LT. = 0.0



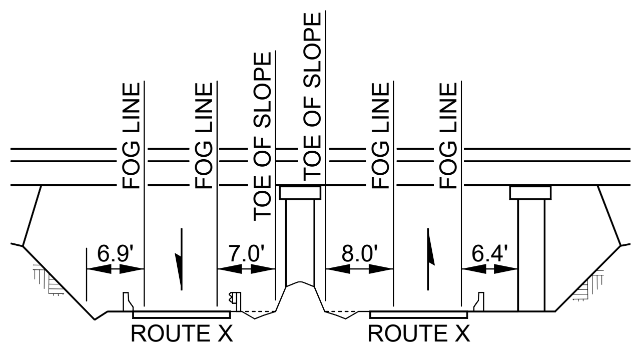
RAILROAD SINGLE TRACK (Figure 3)
RT. = 14.2 LT. = 0.0



FREEWAY PIER MEDIAN WITH BARRIER ADJACENT TO SUBSTRUCTURE (Figure 4)
RT. = 6.4 LT. = 7.0



FREEWAY PIER MEDIAN WITH CONCRETE/DIRT FILL BETWEEN BARRIERS AROUND SUBSTRUCTURE (Figure 5)
RT. = 6.0 LT. = 7.0



FREEWAY PIER MEDIAN WITH MOUNDED DIRT AROUND SUBSTRUCTURE (Figure 6)
RT. = 6.4 LT. = 7.0

NBI Commentary:

The NBI coding guide text and drawings are not clear or consistent, particularly with respect to determining whether or not the lateral measurements extend to guardrails, concrete rails, non-mountable curbs, substructure units, or slopes. Attempts to define the steepness of slopes was also problematic. This coding guide clarifies that all measurements are to substructure units or "slopes" without defining the steepness. In addition, the NBI coding guide was not entirely clear about how to code dual highways in relation to substructure units or medians. This coding guide clarifies this through illustration.

WSBIS Item 1382 – Lateral Underclearance Code — Pulldown

NBI Item 55A

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

This code identifies the type of reference feature from which the clearance measurement is taken.

Table 1382 Lateral Underclearance Code

WSBIS Code	Description
H	Highway beneath structure
R	Railroad beneath structure
N	Neither highway or railroad beneath structure

WSBIS Item 1383 – Minimum Lateral Underclearance Route Left (feet) — N(3,1)

NBI Item 56

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

The purpose of this code is to identify the lateral restrictions caused by the structure on the railroad or roadway underneath when restrictions exist to left lanes of divided highways, 1 way streets, and ramps. For all 2 direction, 2 lane routes which are undivided, code 0.

Code the minimum lateral underclearance on the left (median side for divided highways) to the nearest tenth of a foot. The lateral clearance should be measured from the left edge of the roadway (excluding shoulders) to the nearest substructure unit, or to a slope. Refer to examples for WSBIS Item 1379 – Minimum Lateral Underclearance on Right.

For clearances greater than 100 feet, code 99.8.

In cases where there is an open median (no piers in median), code 99.9.

Code 0 to indicate not applicable (railroads and other non highway undercrossings).

NBI Commentary:

See WSBIS Item 1379 NBI Commentary.

WSBIS Item 1386 – Navigation Control — Pulldown

NBI Item 38

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

Indicate for this item whether or not navigation control (a bridge permit for navigation) is required. Use one of the following codes:

Table 1386 Navigation Control Code

WSBIS Code	Description
N	Not applicable, no waterway
0	No navigation control on waterway (bridge permit not required or bridge has received advance approval by the USCG1
1	Navigation control on waterway (bridge permit required)

1. The USCG provides "advance approval" of certain navigable waters. This item should be coded 0 when Title 33, Code of Federal Regulations, Section 115.70, as amended states that the U.S. Coast Guard Commandant has given advance approval to the location and plans of bridges to be constructed across reaches of waterways navigable in law, but not actually navigated other than by logs, log rafts, rowboats, canoes and small motorboats.

For state owned structures, this item is coded by the BPO Information Group. Local agencies need to contact USCG to determine the correct coding for this field:

Commander, Thirteenth Coast Guard District

Federal Building
915 Second Avenue
Seattle, WA 98174-1067
206-220-7282

NBI Commentary:

This coding guide provides additional guidance on how to code bridges crossing advance approval waterways.

WSBIS Item 1387 – Navigation Vertical Clearance (feet) N(3,0)
NBI Item 39

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

If WSBIS Item 1386 – Navigation Control has been coded 1, record the minimum vertical clearance imposed at the site as measured above a datum that is specified on a navigation permit issued by a control agency. The measurement shall be coded to the foot. This measurement will show the clearance that is allowable for navigational purposes. In the case of a swing or bascule bridge, the vertical clearance shall be measured with the bridge in the closed position (i.e., open to vehicular traffic). The vertical clearance of a vertical lift bridge shall be measured with the bridge in the raised or open position. Also, WSBIS Item 1394 – Vertical Lift Minimum Navigation Clearance shall be coded to provide clearance in a closed position. If WSBIS Item 1386 – Navigation Control has been coded 0 or N, code 0 to indicate not applicable.

For state owned structures, this item is coded by the BPO Information Group.

WSBIS Item 1390 – Navigation Horizontal Clearance (feet) N(4,0)
NBI Item 40

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

If WSBIS Item 1386 – Navigation Control has been coded 1, record the horizontal clearance measurement imposed at the site that is shown on the navigation permit. This may be less than the structure geometry allows. If a navigation permit is required but not available, use the minimum horizontal clearance between fenders, if any, or the clear distance between piers or bents. Code the clearance to the foot. If WSBIS Item 1386 – Navigation Control has been coded 0 or N, code 0 to indicate not applicable.

For state owned structures, this item is coded by the BPO Information Group.

WSBIS Item 1394 – Vertical Lift Minimum Navigation Clearance (feet) N(3,0)
NBI Item 116

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code the minimum vertical clearance to the nearest lesser foot imposed at the site as measured above a datum that is specified on a navigation permit issued by a control agency.

For state owned structures, this item is coded by the BPO Information Group.

NBI Commentary:

Per FHWA guidance , ferry terminal structures coded as lift spans should have 0 coded in this field. See FHWA general index file.

WSBIS Item 1291 – Median **Pulldown**

NBI Item 33

Applicable Structure Types

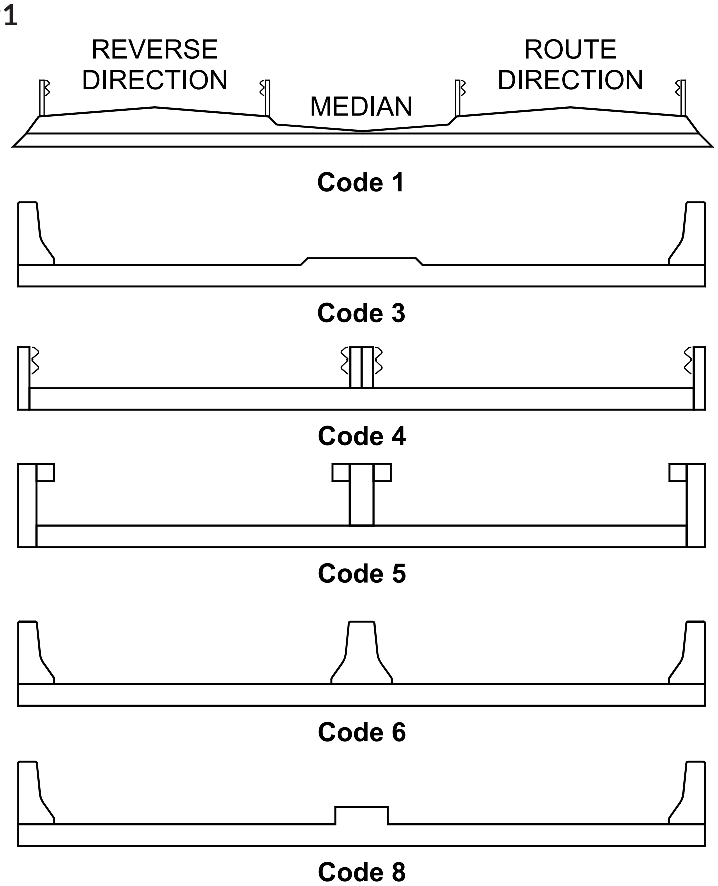
- Bridges & culverts carrying public roadways

Indicate with a 1-digit code if the median is nonexistent, open or closed. The median is closed when the area between the 2 roadways at the structure is bridged over and is capable of supporting traffic. All bridges that carry either 1-way traffic or 2-way traffic separated only by a centerline will be coded 0 for no median.

Table 1291 Median Code

WSBIS Code	NBI Code	Description
0	0	No median (undivided highway)
1	1	Open median
2	2	Closed median – painted only
3	2	Closed median – mountable curb (<6" vertical surface, or sloped surface)
4	3	Closed median – flex or thrie beam
5	3	Closed median – box beam guardrail
6	3	Closed median – concrete barrier
8	3	Closed median – non-mountable curb (6" or greater vertical surface)
9	3	Other median

Figure WSBIS 1291



NBI Commentary:

This coding guide split out various types of medians that are translated to the NBI coding guide as described above.

WSBIS Item 1397 – Approach Roadway Width (feet) N(3,0)
NBI Item 32

Applicable Structure Types

- Bridges & culverts carrying public roadways

Code the normal width of usable roadway approaching the structure measured to the nearest foot. Usable roadway width will include the width of traffic lanes and the widths of shoulders where shoulders are defined as follows:

Shoulders must be constructed and normally maintained flush with the adjacent traffic lane, and must be structurally adequate for all weather and traffic conditions consistent with the facility carried. Unstabilized grass or dirt, with no base course, flush with and beside the traffic lane, is not to be considered a shoulder for this item.

For structures with medians of any type and double decked structures, this item should be coded as the sum of the usable roadway widths for the approach roadways (i.e., all median widths which do not qualify as shoulders should not be included in this dimension). When there is a variation between the approaches at either end of the structure, code the most restrictive of the approach conditions.

If a ramp is adjacent to the through lanes approaching the structure, it shall be included in the approach roadway width.

WSBIS Item 2368 – Min. Vertical Clearance Over Deck Override (feet & inches) N(4,0)

Applicable Structure Types

- Bridges & culverts carrying public roadways for records maintained by BPO

When a bridge is located underneath one or more bridges (stacked bridges), code the actual minimum vertical clearance over the bridge roadway, including shoulders, to the superstructure restriction caused by the controlling overhead bridge, in feet and inches, rounded to the lesser inch (e.g., 16’ 3¾” is to be coded 1603).

Crossing Tab

WSBIS Items 1432, 1433, 1434, and 1435
NBI Item 5

The inventory route is composed of 4 segments.

Table 7 Inventory Route Items

WSBIS Item	NBI Item	NTI Item	Description
1432	5A	n/a	Record Type
1433	5B	I.9	Route Signing Prefix
1434	5C	n/a	Designated Level of Service
1435	5D	I.7	Route Number

WSBIS Item 1432 – Inventory Route On/Under **Pulldown**
NBI Item 5A

Applicable Structure Types

- **All structure records**

There are two types of WSBIS and NBI records: On and Under. The NTI makes no distinction for tunnels, and WSBIS treats all tunnel records as Under records.

Table 1432 - On/Under Code

WSBIS Code	NBI Code	NTI Code	Description
1	1	n/a	Route carried on a bridge (not used for routes over a tunnel)
2	2	n/a	Single route goes under a bridge or through a tunnel
A – Z	A – Z	n/a	Multiple routes go under a bridge (no provision to code multiple routes through a tunnel)
0	n/a	n/a	No route on or under a structure

On signifies that the inventory route is carried on a bridge, but not over a tunnel. All of the NBI data items must be coded, unless specifically excepted, with respect to the bridge and the inventory route on it.

Under signifies that the inventory route goes under the structure if it's a bridge, and through a structure if it's a tunnel. If an inventory route beneath a bridge is a Federal-aid highway, is a STRAHNET route or connector or is otherwise important, it must be reported to the NBI. The type code must be 2 or an alphabetic letter A through Z. Code 2 for a single route under a bridge and for all tunnels. If two or more routes go under a bridge, code A, B, C, D, etc., consecutively for multiple routes on separate roadways under the same structure. STRAHNET routes shall be listed first. When this item is coded 2 or A through Z for bridges, only selected items are coded, as specified in the item descriptions and in the list in Table 2.

It cannot be overemphasized that all route-oriented data must agree with the coding as to whether the inventory route is on or under a bridge.

There are situations of a route under a bridge, where the bridge does not carry a highway, but may carry a railroad, pedestrian traffic, or even a building. These are coded the same as any other Under record and no On record shall be coded.

For additional clarification of On and Under records, refer to the Coding Guide Instructions.

NBI Commentary:

WSDOT created code 0 to indicate the bridge does not carry nor cross over a highway. An example would be a pedestrian structure over a waterway. These are not NBI bridges but may be included in the inventory at each agency's discretion.

WSBIS Item 1433 – Inventory Route Highway Class **Pulldown**
NBI Item 5B
NTI Item I.9

Applicable Structure Types

- **All structure records**

Identify the highway class for the inventory route using one of the following codes:

Table 1433 Inventory Route Highway Class

WSBIS Code	Description
1	Interstate highway
2	U.S. numbered highway
3	State highway
4	County road
5	City street
6	Federal lands road
7	State lands road
8	Other (include toll roads not otherwise identifiable above) OR when there is no inventory route

Code 8 when there is no inventory route.

When 2 or more routes are concurrent, the highest class of route will be used. The hierarchy is in the order listed above.

WSBIS Item 1434 – Inventory Route Service Level **Pulldown**
NBI Item 5C

Applicable Structure Types

- **All structure records**

Identify the service level for the inventory route using one of the following codes, including tunnels:

Table 1434 Inventory Route Service Level

WSBIS Code	Description
1	Mainline (includes reversible routes)
2	Alternate
3	Bypass
4	Spur
6	Business
7	Ramp, Wye, Connector, etc.
8	Service and/or unclassified frontage road
0	None of the above OR when there is no inventory route

WSBIS Item 1435 – Route **AN(5)**
NBI Item 5D
NTI Item I.7

Applicable Structure Types

- **All structure records**

Code the route number of the inventory route. This value shall be a five digit number, right justified with leading zeroes filled in.

If concurrent routes are of the same hierarchy level, denoted by the highway class, the lowest numbered route shall be coded. Code 00000 for structures on roads without route numbers.

WSBIS Item 2440 – Milepost (miles) **N(5,2)**

Applicable Structure Types

- **All structure records**

The milepost is displayed on the inspection report header with the associated route (WSBIS Item 1435). Both are intended to provide information about the location of the structure on the primary route used for inspection access, and should represent the structure milepost relative to nearby milepost signs.

WSBIS Item 1445 – ADT **N(6,0)**
NBI Item 29
NTI Item A.4

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

Code the average daily traffic (ADT) volume for the inventory route. Code the most recent ADT counts available. Included in this item are the trucks referred to in WSBIS Item 1451 – Average Daily Truck Traffic. If the structure is closed, code the actual ADT from before the closure occurred.

The ADT must be compatible with the other items coded for the structure. For example, parallel bridges with an open median are coded as follows: if WSBIS Item 1352 – Lanes On the Structure and WSBIS Item 1356 – Curb-to-Curb are coded for each bridge separately, then the ADT must be coded for each bridge separately (not the total ADT for the route).

ADT information is available at www.wsdot.wa.gov/mapsdata/tools/traffictrends.

WSBIS Item 1451 – ADT Truck Percentage **N(2,0)**
NBI Item 109
NTI Item A.6

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

Code the percentage of WSBIS Item 1445 – Average Daily Traffic that is truck traffic on the inventory route. Do not include vans, pickup trucks and other light delivery trucks in this percentage.

NBI Commentary:

The NBI does not require data for Average Daily Truck Traffic if WSBIS Item 1445, ADT, is less than 100. WSDOT requires this data for all routes, regardless of ADT.

NTI Commentary:

The NTI maintains an average daily truck count, not a percentage. WSBIS translates the percentage to a total count using the following formula: ADT x ADT Truck Percentage = ADT Count

WSBIS Item 1453 – ADT Year **N(4,0)**
NBI Item 30
NTI Item A.6

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

Record the year represented by the ADT in WSBIS Item 1445. Code all four digits of the year.

ADT Year information is available at the link in WSBIS Item 1445.

WSBIS Item 1457 – Future ADT **N(6,0)**
NBI Item 114

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

Code the forecasted average daily traffic (ADT) for the inventory route. This shall be projected at least 17 years but no more than 22 years from the last year of routine inspection. If planning data is not available, use the best estimate based on site familiarity.

The future ADT must be compatible with the other items coded for the structure. For example, parallel bridges with an open median are coded as follows: if WSBIS Item 1352 – Lanes On the Structure and WSBIS Item 1356 – Curb-to-Curb are coded for each bridge separately, then the future ADT must be coded for each bridge separately (not the total for the route).

WSBIS Item 1463 – Future ADT Year **N(6,0)**
NBI Item 115

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

Code the year represented by the future ADT in WSBIS Item 1457. The projected year of future ADT shall be at least 17 years but no more than 22 years from the year of routine, short span, or safety inspection.

WSBIS Item 1467 – Linear Referencing System Route **AN(12)**
NBI Item 13A
NTI Item I.11

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

The linear referencing system (LRS) route is used to establish the location of the structure on the Base Highway Network (see WSBIS Item 1484). It must be from the same LRS route and milepost system as reported in the Highway Performance Monitoring System (HPMS).

Linear Reference is coded to correspond to the location of the crossing as it relates to the WSDOT standard Linear Referencing System (LRS), which must be used and is reported by our state's Highway Performance Monitoring System (HPMS). The HPMS reported LRS consists of both the Local Agency Public Roads (LAPR) LRS and the State Route LRS.

State Route LRS Examples:

599S500035
529SPEVERET (reported to NBI as 529SPEVERE)
005
005LX10130

LAPR Route LRS Examples

760000270 (Israel Road Over I-5)
460000700 (Taneum Creek Road Over I-90

NBI and NTI Commentary:

WSDOT maintains a 12 character, alphanumeric LRS route number, but the NBI receives only 10 digits. In most cases WSDOT does not use the 11th or 12th character. For the NBI submittal, any additional characters to the right of the 10th character are trimmed. Route numbers with fewer than 10 characters get reported with no additional leading zeroes added.

WSDOT codes LRS route numbers for all crossing records, but only routes on the Base Highway Network are submitted to the NBI.

The NTI allows up to 120 characters for this field, so complete data is submitted to the NTI.

WSBIS Item 1469 – LRS Milepost (miles) **N(5,2)**
NBI Item 11
NTI Item I.12

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

The linear referencing system (LRS) milepost is used to establish the location of the structure on the Base Highway Network (see WSBIS Item 1484). It must be from the same LRS route and milepost system as reported in the Highway Performance Monitoring System (HPMS). The milepost coded in this item directly relates to WSBIS Item 1467 – LRS Route. For local agencies, this field generally matches Milepost Item 2440.

This item records the milepost at the beginning of the structure (the lowest milepost on the structure). When the LRS Route goes under the structure (WSBIS Item 1432 coded 2 or A-Z), then code the milepost on the under passing route where the structure is first encountered.

Code to two decimal places. Code all zeroes in this field if the milepost is not available.

WSBIS Item 1483 – National Highway System **Pulldown**
NBI Item 104
NTI Item C.5

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

For the inventory route identified in WSBIS Item 1435, indicate whether the route is on the National Highway System (NHS) or not on that system. Ramps associated with NHS routes are included as NHS routes. Use one of the following codes:

Table 1483 NHS Code

WSBIS Code	Description
0	Inventory Route is not on the NHS
1	Inventory Route is on the NHS

NBI and NTI Commentary:

WSDOT codes ramps as NHS routes when the associated mainline route is also NHS, in accordance with the NBI federal coding guide, and applied to both bridges and tunnels. However, in accordance with the FHWA Highway Performance Monitoring System (HPMS), ramps are coded 0. The NTI coding guide doesn't specify how ramps in tunnels are coded.

WSBIS Item 1484 – Base Highway Network **Pulldown**
NBI Item 12

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

The Base Highway Network includes the mainline portions of the NHS (WSBIS Item 1483 is coded 1), rural/urban principal arterial system and rural minor arterial system. Ramps, frontage roads and other roadways are not included in the Base Network. For the inventory route identified in WSBIS Item 1435 – Inventory Route, use one of the following codes:

Table 1484 Base Highway Network Code

WSBIS Code	Description
0	Inventory Route is not on the Base Network
1	Inventory Route is on the Base Network

WSBIS Item 1485 – STRAHNET Highway **Pulldown**
NBI Item 100
NTI Item C.6

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

This item shall be coded for all records in the inventory that are designated as part of the Strategic Highway Network. For the purposes of this item, the STRAHNET Connectors are considered included in the term STRAHNET. For the inventory route identified in WSBIS Item 1435, indicate STRAHNET highway conditions using one of the following codes:

Table 1485 STRAHNET Highway Code

WSBIS Code	NTI Code	Description
0	0	The inventory route is not a STRAHNET route
1	1	The inventory route is on an Interstate STRAHNET route
2	1	The inventory route is on a Non-Interstate STRAHNET route
3	1	The inventory route is on a STRAHNET connector route

NTI Commentary:

Toll codes translated for the NTI as shown in the table above.

WSBIS Item 1486 – Federal Lands Highways **Pulldown**
NBI Item 105

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

0 Not applicable

1 Indian Reservation Road (IRR)

2 Forest Highway (FH)

3 Land Management Highway System (LMHS)

4 Both IRR and FH

5 Both IRR and LMHS

6 Both FH and LMHS

9 Combined IRR, FH and LMHS

For existing data in WSBIS, do not alter codes. For new records, code zero unless a data source is available.

NBI Commentary:

WSDOT has not been able to identify a source for this data, and will code zeroes for new records until an information source is identified.

WSBIS Item 1487 – Functional Classification **Pulldown**
NBI Item 26
NTI Item C.7

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

For the inventory route, code the functional classification using one of the following codes:

Table 1487 Functional Classification Code

WSDOT Code	NBI Code	NTI Code	Description
1	1	1	Rural Principal Arterial – Interstate
5	2	2	Rural Principal Arterial - Other Freeways or Expressways
2	2	3	Rural Principal Arterial – Other
6	6	4	Rural Minor Arterial
7	7	5	Rural Major Collector
8	8	6	Rural Minor Collector
9	9	7	Rural Local
11	11	1	Urban Principal Arterial – Interstate
12	12	2	Urban Principal Arterial – Other Freeways or Expressways
14	14	3	Urban Principal Arterial - Other
16	16	4	Urban Minor Arterial
17	17	5	Urban Major Collector
18	17	6	Urban Minor Collector
19	19	7	Urban Local

The structure shall be coded rural if not inside a designated urban area. The urban or rural designation shall be determined by the structure location and not the character of the roadway. The WSDOT Functional Classification Map is available at www.wsdot.wa.gov/mapsdata/travel/hpms/functionalclass.htm.

NBI and NTI Commentary:

Functional Classification codes are translated for the NBI and NTI as shown in the table above.

WSBIS Item 1489 – National Truck Network — Pulldown

NBI Item 110

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

The national network for trucks includes most of the Interstate System and those portions of Federal-aid highways identified in the Code of Federal Regulations (23 CFR 658). The national network for trucks is available for use by commercial motor vehicles of the dimensions and configurations described in these regulations. For the inventory route identified in WSBIS Item 1435, indicate conditions using one of the following codes:

Table 1489 National Truck Network Code

WSBIS Code	NBI Code	Description
N	0	The inventory route is not part of the national network for trucks
Y	1	The inventory route is part of the national network for trucks

WSBIS Item 1490 – Lane Use Direction — Pulldown

NBI Item 102
NTI Item C.3

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

Code the direction of traffic of the inventory route identified in LRS Route WSBIS Item 1467 as a 1-digit number using one of the codes below. This item must be compatible with other traffic-related items such as WSBIS Item 1352 – Lanes on the Structure, WSBIS Item 1445 – Average Daily Traffic, WSBIS Item 1491 – Total Horizontal Clearance and WSBIS Item 1356 – Curb-to-Curb.

Table 1490 Lane Use Direction Code

WSBIS Code	NBI Code	NTI Code	Description
0	0	0	No highway traffic on inventory route
1	1	1	1 way traffic on inventory route
2	2	2	2 way traffic on inventory route
3	2	3	2 way and reversible traffic on inventory route
4	1	3	Reversible traffic only on inventory route
5	3	4	2 way traffic on 1 lane bridge (curb-to-curb must be <16 ft.)

NBI and NTI Commentary:

WSDOT provides additional codes to address reversible traffic lanes, which are translated to NBI and NTI codes as shown above.

WSBIS Item 1354 – Lanes Under **Pulldown**
NBI Item 28B
NTI Item A.3

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

Code the number of lanes under the structure.

For On records, code WSBIS Item 1354 for all lanes under the bridge for all routes that are functionally classified (see WSBIS Item 1487).

For Under records, code WSBIS Item 1354 for only the lanes associated with the inventory route under.

For Tunnels, code all the lanes in the tunnel.

Include all lanes carrying highway traffic (e.g., cars, trucks, buses) which are striped or otherwise operated as a full width traffic lane under the structure. This shall include any full width merge lanes and ramp lanes, and shall be independent of directionality of usage.

WSBIS Item 1491 – Horizontal Clearance, Route Direction (feet & inches) **N(4,0)**
WSBIS Item 1495 – Horizontal Clearance, Reverse Direction (feet & inches) **N(4,0)**
NBI Item 47

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

The horizontal clearance for the inventory route should be measured and recorded for each opening between restrictive features – curbs, rails, guardrails, walls, piers, slopes, or other structural features limiting the roadway (surface and shoulders).

The purpose of this item is to give the largest available clearance for the movement of wide loads. Flush and mountable medians are not considered to be restrictions. This clearance is defined in two ways:

1. Clear distance between restrictions of the inventory route either on or under the structure.
2. Edges of roadway surface including shoulders when there are no other restrictions.

When the entire undivided inventory route passes on or under a structure, code WSBIS Item 1491 as measured and WSBIS Item 1495 is blank.

When the divided inventory route passes on or under a structure, code WSBIS Item 1491 and WSBIS Item 1495 as measured in each direction. Note that when a bridge pier separates a single route, it is always considered divided.

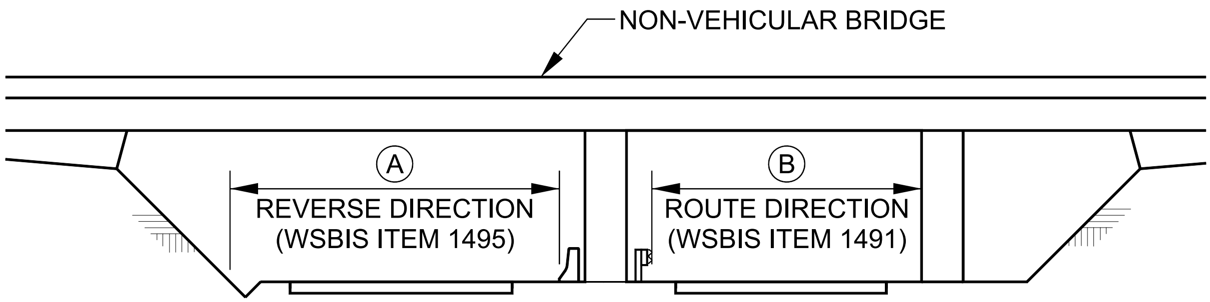
When the inventory route consists of two parallel bridges carrying a divided route, for the bridge carrying the increasing route direction code WSBIS Item 1491 as measured and WSBIS Item 1495 is blank. For the bridge carrying the decreasing route direction, WSBIS Item 1491 is blank and code WSBIS Item 1495 as measured.

When a restriction is 100 feet or greater, code 9912.

NBI Commentary:

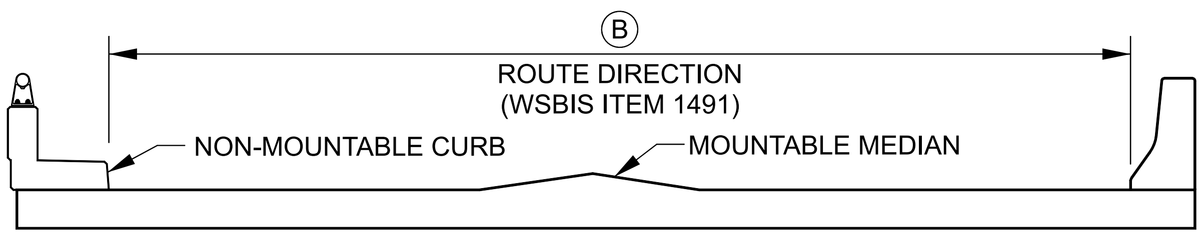
The minimum horizontal clearance for each route is reported to the NBI, regardless of route direction.

Figure 1495



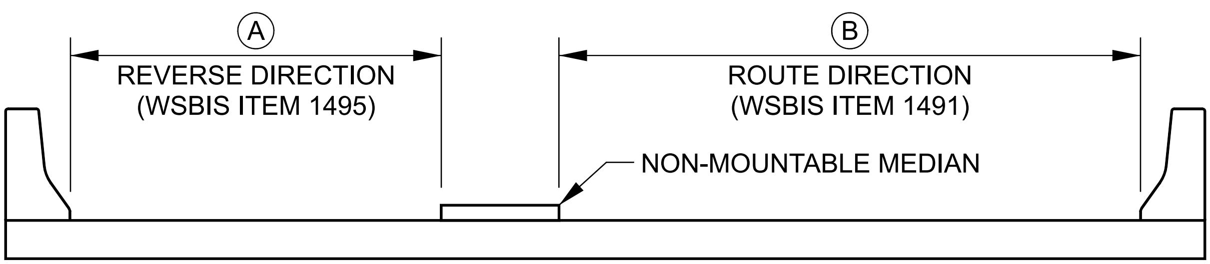
CLEARANCE A > B NBI ITEM 47 = A

Figure 1



NO MEDIAN OR FLUSH OR MOUNTABLE MEDIAN

Figure 2



RAISED MEDIAN OR NON-MOUNTABLE MEDIAN

B > A NBI ITEM 47 = B

Figure 3

NBI Commentary:

The NBI requires coding only the maximum horizontal clearance for divided highways. WSBIS has two fields. When the NBI submittal is prepared, the largest dimension is selected and reported.

WSBIS Item 1413 – Detour Length **N(2,0)**
NBI Item 19
NTI Item A.7

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

Indicate the actual length to the nearest mile of the detour length, which is considered the additional travel needed to return to the original route if the structure is closed.

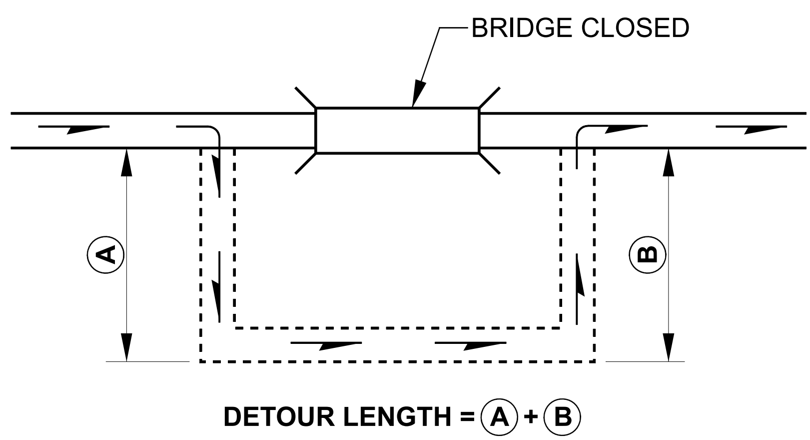
If a ground level bypass is available at the structure site for the inventory route (ramps at a diamond interchange, for example), code the detour length as 0. If the detour exceeds 99 miles, code 99. If the bridge is one of twin bridges and is not at an interchange, code 1 where the other twin bridge can be used as a temporary bypass with a reasonable amount of crossover grading.

Code 0 for routes under a bridge, on the basis that a failed bridge over the route can be removed to allow passage. Routes through tunnels should be the actual detour length.

To the extent practical, the detour route should match the capacity and functionality of the original route. When this is not possible the following minimum standards shall apply:

1. The detour route cannot have weight restrictions lower than the original route.
2. The detour route cannot have vertical clearance limits over the roadway lanes less than 14 feet 3 inches (as measured) unless the original route also has vertical clearance restrictions, in which case the detour cannot further restrict clearances.

Figure 1413



NBI Commentary:

This coding guide provides additional direction on how to code routes under the structure, and additional criteria for determining acceptable detour routes.

WSBIS Item 1499 – Maximum Vertical Clearance Route Direction (feet & inches) N(4,0)
WSBIS Item 2501 – Maximum Vertical Clearance Reverse Direction (feet & inches) N(4,0)
NBI Item 10

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

Code the practical maximum vertical clearance over the inventory route identified in WSBIS Item 1435, in the direction of increasing mileposts, whether the route is on the structure or under the structure. This field identifies the minimum vertical clearance for the lane that will carry the highest load. When no vertical clearance restriction exists leave this item blank.

To accurately code this field, all vertical clearance measurements for the inventory route must be collected over all lane stripes and at edges of pavement, recorded in a vertical clearance card, and kept on file.

When the entire undivided inventory route passes on or under a structure, code WSBIS Item 1499 as measured and WSBIS Item 2501 is blank.

When the divided inventory route passes on or under a structure, code WSBIS Item 1499 and WSBIS Item 2501 as measured in each direction.

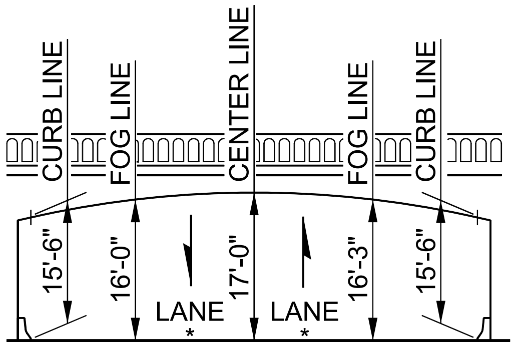
When the inventory route consists of two parallel bridges carrying a divided route, for the bridge carrying the increasing route direction code WSBIS Item 1499 as measured and WSBIS Item 2501 is blank. For the bridge carrying the decreasing route direction, WSBIS Item 1499 is blank and code WSBIS Item 2501 as measured.

When a restriction is 100 feet or greater, code 9912.

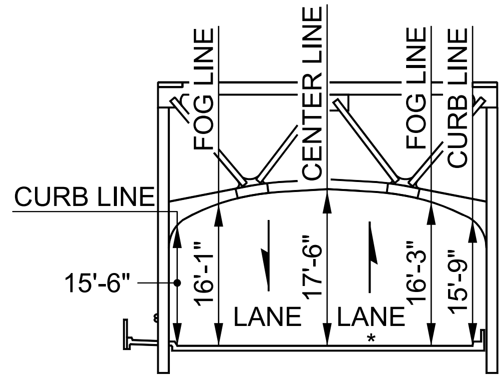
NBI Commentary:

The maximum vertical clearance for each route is reported to the NBI, regardless of route direction.

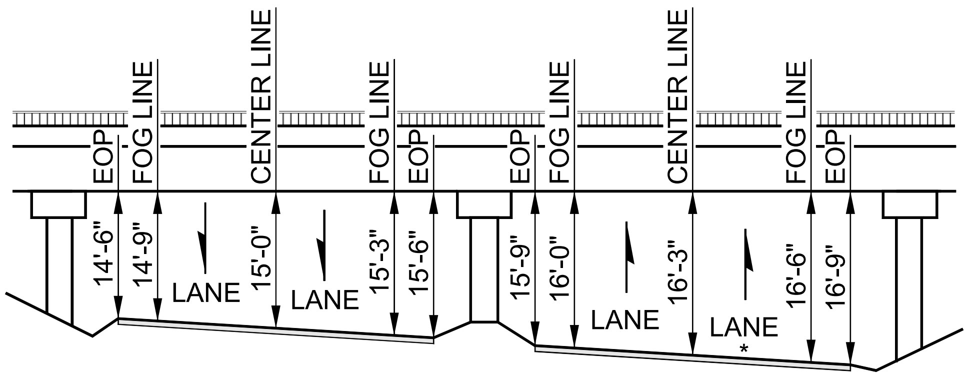
Figure 1499



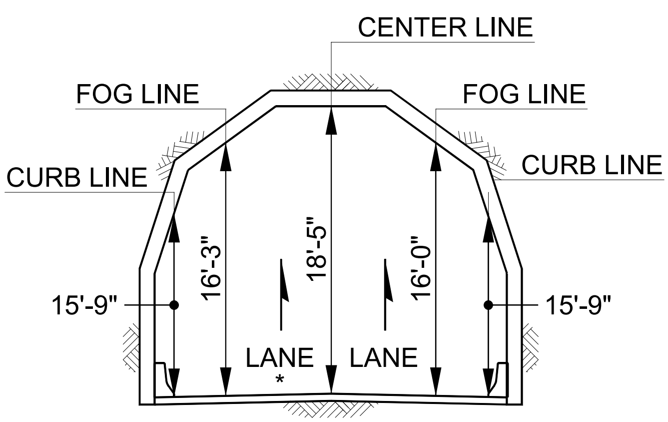
UNDIVIDED HIGHWAY EXAMPLE
Figure 1499a



STEEL TRUSS EXAMPLE
Figure 1499b



DIVIDED HIGHWAY EXAMPLE
Figure 1499c



TUNNEL
Figure 1499d

NBI Commentary:

The NBI coding guide indicates that this measurement should be the minimum clearance for a 10 foot width of pavement or travelled part of the roadway. However, from a practical perspective this has been interpreted in this coding guide as the clearance for the lane that will pass the tallest load. The lanes are defined by striping.

Null and 9912 data in WSBIS are translated to 9999 for the NBI submittal.

The NBI requires coding only the maximum vertical clearance for divided highways. WSBIS has two fields. When the NBI submittal is prepared, the largest dimension is selected and reported.

WSBIS Item 2409 – NTI Reportable Flag — Pulldown

Applicable Structure Types

- **All structure records**

Indicate if the crossing record is to be included in the National Tunnel Inventory data submittal or not.

For state owned structures, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2410 – NBI Reportable Flag — Pulldown

Applicable Structure Types

- **All structure records**

Indicate if the crossing record is to be included in the National Bridge Inventory data submittal or not.

For state owned structures, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 7479 – Federal Aid Route Number — AN(4)

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**
- **Local Agency Pedestrian, RR and other non-vehicular structures over public roadways**
- **Local Agency Tunnels carrying public roadways within**

If the route being inventoried is a federal aid highway, enter its federal aid route number in this field.

Federal Aid Route Numbers are shown on the Statewide National Functional Classification System Maps. These maps are located at local agency planning departments or at WSDOT Service Center Planning.

If the bridge is not on a federal aid highway, the field should be filled with zeros.

WSBIS Item 7441 – Speed Limit (mph) — Integer

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**
- **Local Agency Pedestrian, RR and other non-vehicular structures over public roadways**
- **Local Agency Tunnels carrying public roadways within**

Code the speed limit in miles per hour for the inventory route.

Crossing Tab Supplement

WSBIS Item 2000 – Main Listing Flag **Pulldown**

Applicable Structure Types

- **All structure records**

See Coding Guide Clarifications for a description of the Main Listing Flag.

This item is visible in the BridgeWorks Inventory Management mode.

WSBIS Item 2401– Crossing Manager **Uniqueidentifier**

Applicable Structure Types

- **All structure records**

The Crossing Manager is the Program Manager responsible for the route identified in WSBIS Item 1435, whether that route is on or under the structure.

For state owned structures, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2402 – Crossing Description **AN(30)**

Applicable Structure Types

- **All structure records maintained by WSDOT Bridge Preservation**

This item describes the bridge crossing from the perspective of the inventory route. When a bridge both carries a state route and crosses over another state route, each crossing record will have a separate crossing description:

Main listing On Record crossing description: SR 512 OVER I-5
Secondary listing Under Record crossing description: I-5 UNDER SR 512

For state owned structures, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2500 – Minimum Vertical Clearance Route Direction (feet & inches) **N(4,0)**
WSBIS Item 2502 – Minimum Vertical Clearance Reverse Direction (feet & inches) **N(4,0)**

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

Code the practical minimum vertical clearance over the inventory route identified in WSBIS Item 1435, in the direction of increasing mileposts, whether the route is on the structure or under the structure.

For state owned structures, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2411– Bridge List Pulldown

Applicable Structure Types

- **All structure records maintained by WSDOT Bridge Preservation**

Indicate if the crossing record is to be included or not in the Bridge List M 23-09.

For state owned structures, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

Table 2411 Bridge List Code

WSBIS Code	Description
1	The crossing record is included in the Bridge List.
2	The crossing record is NOT included in the Bridge List.

WSBIS Item 2436 – Route Sequencer Integer

Applicable Structure Types

- **All structure records maintained by WSDOT Bridge Preservation**

The route sequencer is a two digit number used for placement of crossing records in the *Bridge List* M 23-09.

If the inventory route is not included in the bridge list, code 0.

For state owned structures, or structures with crossings managed by the Statewide Program Manager, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2437 – Bridge List Milepost Override (miles) N(5,2)

Applicable Structure Types

- **All structure records maintained by WSDOT Bridge Preservation**

The bridge list milepost override is used for placement of crossing records in the Bridge List M 23-09.

For state owned structures, or structures with crossings managed by the Statewide Program Manager, this item is coded by the BPO Information Group and is visible in the BridgeWorks Inventory Management mode.

WSBIS Item 2438 – Milepost Sequencer Integer

Applicable Structure Types

- **All structure records maintained by WSDOT Bridge Preservation**

The milepost sequencer is a two digit number used for placement of crossing records in the Bridge List M 23-09.

If the inventory route is not included in the bridge list, code 0.

For state owned structures, or structures with crossings managed by the Statewide Program Manager, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2468 – Directional Indicator Pulldown

Applicable Structure Types

- **All structure records maintained by WSDOT Bridge Preservation**

The directional indicator specifies if the inventory route carries traffic in the direction of increasing mileposts, decreasing mileposts or both.

I	Increasing
D	Decreasing
B	Both
*	Null field, does not apply

For state owned structures, or structures with crossings managed by the Statewide Program Manager, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2470 – Ahead/Back Indicator Pulldown

Applicable Structure Types

- **All structure records maintained by WSDOT Bridge Preservation**

The ahead/back indicator specifies whether a milepost value is the ‘back’ (B) duplicate of a milepost value ‘ahead’ on the route.

B	Back milepost
*	Null field, either an Ahead milepost or does not apply

For state owned structures, or structures with crossings managed by the Statewide Program Manager, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

Design Tab

WSBIS Item 1532 – Main Span Material **Pulldown**
NBI Item 43A

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

Indicate the kind of material and/or design for the main span.

Table 1532 Main Span Material Code

WSBIS Code	Description
1	Concrete
2	Concrete continuous
3	Steel
4	Steel continuous
5	Prestressed and/or post-tensioned concrete
6	Prestressed and/or post-tensioned concrete continuous
7	Wood or Timber
8	Masonry
9	Aluminum, Wrought Iron, or Cast Iron
0	Other (also to be used when not applicable for approach spans)

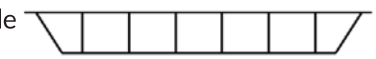
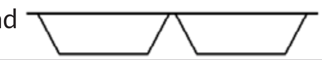
WSBIS Item 1533 – Main Span Design **Pulldown**
NBI Item 43B

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

Indicate the predominant type of design and/or type of construction.

Table 1533 Main Span Design Code

WSBIS Code	Description
01	Slab
02	Stringer/Multibeam or Girder
03	Girder and Floorbeam System
04	Tee Beam
05	Box Beam or Girders – Multiple 
06	Box Beam or Girders – Single or Spread 
07	Frame (except frame culverts)
08	Orthotropic
09	Truss – Deck
10	Truss – Thru
11	Arch – Deck
12	Arch – Thru
13	Suspension
14	Stayed Girder
15	Movable – Lift
16	Movable – Bascule
17	Movable – Swing
18	Tunnel (this code designates reporting to the NTI instead of the NBI)
19	Culvert (includes frame culverts)
20*	Mixed types
21	Segmental Box Girder
22	Channel Beam (Bathtub Unit)
00	Other (also to be used when not applicable for approach spans)

*Applicable only to approach spans – WSBIS Item 1536

Examples:

Wood or Timber Through Truss = 710
Masonry Culvert = 819
Steel Suspension = 313
Continuous Concrete Multiple Box Girders = 205
Simple Span Concrete Slab = 101
Tunnel in Rock = 018

WSBIS Item 1535 – Approach Span Material **Pulldown**
NBI Item 44A

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

Indicate the type of structure for the approach spans to a major bridge or for the spans where the structural material is different. The codes are the same as for WSBIS Item 1532. If the kind of material is varied, code the most predominant.

Code 0 if this item is not applicable.

WSBIS Item 1536 – Approach Span Design **Pulldown**
NBI Item 44B

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

Indicate the type of structure for the approach spans to a major bridge or for the spans where the structural material is different using Table 1533. Use code 20 when no one type of design and/or construction is predominant for the approach units.

Code 00 if this item is not applicable.

WSBIS Item 2537 – Alpha Span Type (INV MO only) AN(20)

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **Tunnels carrying public roadways within**

The alphabetic span type is coded in BridgeWorks application in Inventory Management mode. Use one of the following acronyms:

Table 2537 Alpha Span Type Codes

Alpha Span Type	Description
3SCCulv	3 Sided Concrete Culvert
3STCulv	3 Sided Timber Culvert
BAS	Bascule Lift Span
CA	Concrete Arch
CBox	Concrete Box Girder
CCulv	Concrete Culvert
CEFA	Concrete Earth Filled Arch
CESB	Concrete Encased Steel Beam
CFP	Concrete Floating Pontoon
CG	Concrete Girder
CLTun	Concrete Lined Tunnel
CS	Concrete Slab
CSS	Cable Stayed Span
CSTP	Concrete Slab on Timber Piling
CTB	Concrete T-Beam
CTrus	Concrete Truss
CVS	Concrete Voided Slab
LIDTun	Cut and Cover (LID) Tunnel
MCulv	Masonry Culvert
PCBTG	Prestressed Concrete Bulb-T Girder
PCG	Prestressed Concrete Girder
PCMWG	Prestressed Concrete Multi-Web Girder
PCS	Prestressed Concrete Slab
PCTG	Prestressed Concrete Trapizoidal Girder
Plaza	Park Plaza Structures
PRCB	Precast Reinforced Concrete Beam
PTCBox	Post-Tensioned Concrete Box Girder

Alpha Span Type	Description
PTCSeg	Post-Tensioned Segmental Box Girder
PTCTB	Post-Tensioned Concrete T-Beam
SA	Steel Arch
SBox	Steel Box Girder
SCulv	Steel Culvert
SFP	Steel Floating Pontoon
SG	Steel Girder (weld or rivet)
SLS	Steel Lift Span
SRB	Steel Rolled Beam
SSCG	Steel Stayed Concrete Girder
SSusS	Steel Suspension Span
SSwS	Steel Swing Span
STA	Steel Tied Arch
STrus	Steel Truss
TCulv	Timber Culvert
TLTun	Timber Lined Tunnel
TS	Timber Slab
TTC	Treated Timber (Creosote) Bridge
TTLB	Treated Timber Laminated Beam
TTS	Treated Timber (Salts) Bridge
TTTrus	Treated Timber Truss
UT	Untreated Timber Bridge
UTLB	Untreated Timber Laminated Beam
UTTrus	Untreated Timber Truss
UTun	Unlined Tunnel
WSBox	Weathering Steel Box Girder
WSG	Weathering Steel Girder

WSBIS Item 1538 – Number of Main Spans N(3,0)

NBI Item 45

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Record the number of spans in the main or major unit. This item will include all spans of most bridges, the major unit only of a sizable structure, or a unit of material or design different from that of the approach spans.

A span that contains a drop-in span with cantilevers, or two cantilever spans with a hinge, is counted as one span (from pier to pier). Cantilever end spans are counted separately.

WSBIS Item 1541 – Number of Approach Spans N(3,0)

NBI Item 46

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Record the number of approach spans to the major bridge, or the number of spans of material different from that of the major bridge.

Code 0 if this item is not applicable.

NBI Commentary:

This coding guide requires coding zeroes when there are no approach spans. The NBI coding guide doesn't provide guidance.

WSBIS Item 1544 – Service On Pulldown

NBI Item 42A

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

Table 1544 Service On Code

WSBIS Code	Description
1	Highway
2	Railroad
3	Pedestrian-bicycle
4	Highway-railroad
5	Highway-pedestrian
6	Overpass structure at an interchange or second level of a multilevel interchange
7	Third level (Interchange)
8	Fourth level (Interchange)
9	Building or plaza
0	Other

WSBIS Item 1545 – Service Under **Pulldown**

NBI Item 42B

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

Table 1545 Service Under Code

WSBIS Code	Description
1	Highway, with or without pedestrian
2	Railroad
3	Pedestrian-bicycle
4	Highway-railroad
5	Waterway
6	Highway-waterway
7	Railroad-waterway
8	Highway-waterway-railroad
9	Relief for waterway
0	Other

WSBIS Item 1546 – Deck Type **Pulldown**
NBI Item 107

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways***

Record the type of deck system on the bridge. If more than one type of deck system is on the bridge, code the most predominant. Code A for a filled culvert or arch with the approach roadway section carried across the structure.

*Main Listing Under records (e.g., railroad bridges and pedestrian bridges) are to be coded N, with the following exception: WSDOT owned pedestrian bridges are to be coded with the appropriate Deck Type.

Use one of the following codes:

Table 1546 Deck Type Code

WSBIS Code	NBI Code	Description
1	1	Concrete Cast-in-Place
2	2	Concrete Precast Panels
3	3	Steel Grating – Open
4	4	Steel Grating – Filled with Concrete
5	5	Steel plate (includes orthotropic)
6	6	Corrugated Steel
7	7	Aluminum
8	8	Treated timber
9	8	Untreated timber
0	9	Other
A	N	Filled arches / Culverts
B	9	Precast integral with beam
N	N	Bridges with no deck

NBI Commentary:

WSDOT provides additional codes which are translated to NBI codes as shown above.

WSBIS Item 1547 – Wearing Surface — Pulldown

NBI Item 108A

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways***

*Main Listing Under records (e.g., railroad bridges and pedestrian bridges) are to be coded N, with the following exception: WSDOT owned pedestrian bridges are to be coded with the appropriate Wearing Surface.

Table 1547 Wearing Surface Code

WSBIS Code	Description
1	Monolithic Concrete (concurrently placed with structural deck)
2	Integral Concrete (separate non-modified layer of concrete added to structural deck)
3	Latex Concrete or similar additive
4	Low Slump Concrete
5	Epoxy Overlay
6	Bituminous (ACP or BST)
7	Timber
8	Gravel
9	Other
0	None (no additional concrete thickness or wearing surface is included in the bridge deck)
N	Bridges with no deck

WSBIS Item 1548 – Membrane — Pulldown

NBI Item 108B

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways***

*Main Listing Under records (e.g., railroad bridges and pedestrian bridges) are to be coded N, with the following exception: WSDOT owned pedestrian bridges are to be coded with the appropriate Membrane.

Table 1548 Membrane Code

WSBIS Code	Description
1	Built-up
2	Preformed Fabric
3	Epoxy
8	Unknown
9	Other
0	None
N	Bridges with no deck

WSBIS Item 1549 – Deck Protection **Pulldown**

NBI Item 108C

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways***

*Main Listing Under records (e.g., railroad bridges and pedestrian bridges) are to be coded N, with the following exception: WSDOT owned pedestrian bridges are to be coded with the appropriate Membrane.

Table 1549 Deck Protection Code

WSBIS Code	Description
1	Epoxy Coated Reinforcing
2	Galvanized Reinforcing
3	Other Coated Reinforcing
4	Cathodic Protection
6	Polymer Impregnated
7	Internally Sealed
8	Unknown
9	Other
0	None
N	Bridges with no deck

WSBIS Item 1550 – Design Load **Pulldown**

NBI Item 31

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Use the codes below to indicate the live load for which the structure was designed. The numerical value of the railroad loading should be recorded on the form. Classify any other loading, when feasible, using the nearest equivalent of the loadings given below.

Table 1550 Design Load Code

WSBIS Code	Metric Description	English Description
0	Unknown	Unknown
1	M 9	H 10
2	M 13.5	H 15
3	MS 13.5	HS 15
4	M 18	H 20
5	MS 18	HS 20
6	MS 18 + Mod	HS 20 + Mod
7	Pedestrian	Pedestrian
8	Railroad	Railroad
9	MS 22.5 or greater	HS 25 or greater
A	HL 93	HL 93
B	Greater than HL 93	Greater than HL 93
C	Other	Other

NBI Commentary:

This field has been revised based on a February 2, 2011 FHWA memo available at www.fhwa.dot.gov/bridge/110202.cfm.

WSBIS Item 1585 – Border Bridge State Code **Pulldown**

NBI Item 98A

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Use this item to indicate structures crossing to Oregon or Idaho. Code a 3-digit number specifying the border state. See WSBIM Appendix 2-F for a listing of border bridges on the Washington State inventory.

Leave blank if the structure does not cross a state border.

The neighboring state codes are:

Oregon	410
Idaho	160

NBI Commentary:

This field has been limited to codes relevant to Washington State.
WSBIS Items 1585, 1588 and 1590 reflect the intent of the February 9, 2018 FHWA Memo entitled “Border Bridges in the NBI.”

WSBIS Item 1588 – Border Bridge Percent **N(2,0)**
NBI Item 98B

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code a 2-digit number specifying the percentage of total deck area of the existing bridge that the neighboring State is responsible for funding.

Leave blank if the structure does not cross a state border.

WSBIS Item 1590 – Border Bridge Structure Identifier **AN(15)**
NBI Item 99

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code the neighboring State's 15-digit National Bridge Inventory structure number for any structure noted in WSBIS Item 1585 – Border Bridge. This number must match exactly the neighboring State's submitted NBI structure number. The entire 15-digit field must be accounted for including zeroes and blank spaces whether they are leading, trailing, or embedded in the 15-digit field.

Leave blank if the structure does not cross a state border.

WSBIS Item 7565 – Federal Aid Project Number **AN(20)**

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This is the most recent federal aid project number under which federal funds have been used for construction or reconstruction from the year 1970 forward. Left justify and leave unused columns blank. If the construction work has been assigned more than one federal aid project number, enter the number for the most recently completed (or current) portion of the project. If federal funds have not been used, leave the field blank.

WSBIS Item 7557 – Design Exception Date **Date**

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

If a design exception has been granted by the FHWA to permit a deviation from required standards, this is the effective date of FHWA approval. For example, if approval to build a one-lane bridge on a low volume road was granted, enter the date approval was given for this exception. If no design exception has been granted, leave this field blank.

Load Rating Tab

WSBIS Item 2580 – Reference Inspection Date Date

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Tunnels carrying public roadways within**

Code the inspection report date used for the load rating calculations. Usually this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

WSBIS Item 2581 – Load Rating Date Date

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Tunnels carrying public roadways within**

Code the load rating calculation date. Usually this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

WSBIS Item 2582 – Rated By AN(16)

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Tunnels carrying public roadways within**

Code the initials or engineering firm name indicating who performed the load rating. Usually this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

WSBIS Item 1551 – Operating Rating Method **Pulldown**
NBI Item 63
WSBIS Item 1554 – Inventory Rating Method **Pulldown**
NBI Item 65
NTI Item L.1

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Tunnels carrying public roadways within**

Code theses fields with one of the following codes to indicate which load rating method was used to determine the rating for this bridge.

Table 1551 Operating and Inventory Rating Method Code

WSBIS Codes			
Used by WSDOT	Used by Local Agencies	NTI Codes	Description
N	N	N	No load rating required (only applicable to some tunnels)
0	0	0	Field evaluation and documented engineering judgment reported in tons using HS20 loading
1	1	-	Load Factor (LF) reported in tons using HS20 loading
2	2	-	Allowable Stress (AS) reported in tons using HS20 loading
-	3	-	Load and Resistance Factor (LRFR) reported in tons
4	4	-	Load Testing reported in tons using HS20 loading
5	5	5	No rating analysis or evaluation performed
-	6	1	Load Factor (LF) rating reported by rating factor using HS20 loading
-	7	2	Allowable Stress (AS) rating reported by rating factor using HS20 loading
8	8	3	Load and Resistance Factor Rating (LRFR) reported by rating factor using HL93 loading
F	-	A	Assigned rating method based on Load and Resistance Factor Design (LRFD) reported by rating factor using HL93 loading

Note: WSDOT uses codes 0, 1, 2, 4, 5, 8 and F for bridges and culverts carrying public roadways. Local Agencies uses codes 0 through 8 for bridges and culverts carrying public roadways. For tunnels carrying public roadways within, all agencies use WSBIS codes 0, 1, 2, 3, 5, A and N.

Code 0 is to be used when the load rating is determined by field evaluation and documented engineering judgment, typically done when plans are not available for concrete structures or in cases of severe deterioration. Field evaluation and engineering judgment ratings must be documented. See Chapter 5 for additional guidance.

Code 5 is to be used when the structure has not been load rated or load rating documentation does not exist.

NBI and NTI Commentary:

WSBIS Item 1551 has been modified based on a November 15, 2011 FHWA Memo available at www.fhwa.dot.gov/bridge/nbi/111115.cfm.

The NTI does not report load ratings in tons, only rating factors. This restricts load rating methods to only those that report in rating factors. Also, the NTI has only one field to assign the load rating method for both inventory and operating methods. WSBIS has chosen to use the NBI Inventory rating method for reporting to the NTI.

Codes A through E are not available in WSBIS because there are no agencies which use these methods.

WSBIS Item 1552 – Operating Rating Tons **N(3,0)**
NBI Item 64
WSBIS Item 1555 – Inventory Rating Tons **N(3,0)**
NBI Item 66

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

WSDOT enters rating data into the database as English tonnage for all cases noted in WSBIS Items 1551 and 1554 which have methods coded 0 through 4. For methods coded 5 through 8 or F, use WSBIS Items 1553 and 1556 to enter the rating factor.

WSDOT enters rating tons as a 2-digit number. For values greater than 99 tons, enter 99.

If the bridge will not carry a minimum of 3 tons of live load, the operating rating tons shall be coded 0; and, consistent with the direction of the AASHTO Manual, it shall be closed.

The use or presence of a temporary bridge requires special consideration in coding. In such cases, since there is no permanent bridge, the inventory and operating rating tons should be coded 0 even though the temporary structure is rated for as much as full legal load.

A bridge shored up or repaired on a temporary basis is considered a temporary bridge and the inventory and operating rating tons shall be coded as if the temporary shoring were not in place. See WSBIS Item 1289 – Temporary Structure Designation for definition of a temporary bridge.

For a bridge that is closed (WSBIS Item 1293 is coded K), operating and inventory rating tons shall be coded 0.

Code 99 for a structure under sufficient fill such that, according to AASHTO design, the live load stress on the structure is insignificant in the structure load capacity.

NBI Commentary:

WSBIS Items 1552 and 1555 have been modified based on a March 22, 2004, FHWA Memo available at www.fhwa.dot.gov/bridge/nbi/111115.cfm.

Note: This field is no longer restricted to reporting HS20 loads only – by WSBIS Item 1551 definition, in some cases HL93 load cases are reported here. Additional clarification on how to code these fields was also added.

When this 3-digit number is reported in the NBI submittal, the FHWA multiplies it by 32.4 and rounds it to tenths. This number represents metric tons. Due to the fact the FHWA cannot currently process metric tons greater than 99.9, any rating factor greater than 3.08 is truncated to 99.9 metric tons upon conversion.

WSBIS Item 1553 – Operating Rating Factor **N(4,2)**
NBI Item 64
NTI Item L.3
WSBIS Item 1556 – Inventory Rating Factor **N(4,2)**
NBI Item 66
NTI Item L.2

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Tunnels carrying public roadways within**

WSDOT enters rating data as factors for all cases noted in WSBIS Items 1551 and 1554 which have methods coded 5 through 8 or F. For methods coded 0 through 4, use WSBIS Items 1552 and 1555 to enter rating tonnage.

If WSBIS Item 1551 – Operating Rating Method has been coded 5, for new structures, the operating rating shall be coded with a rating factor of 1.30.

If WSBIS Item 1554 – Inventory Rating Method has been coded 5, for new structures, the inventory rating shall be coded with a rating factor of 1.00.

NBI Commentary:

When this number is reported in the NBI submittal, rating factors in excess of 9.99 will be reported to FHWA as 9.99.

WSBIS Item 2587 – Type 3 Rating Factor **N(4,2)**
WSBIS Item 2588 – Type 3S2 Rating Factor **N(4,2)**
WSBIS Item 2589 – Type 3-3 Rating Factor **N(4,2)**
WSBIS Item 2590 – Notional Rating Load (NRL) Rating Factor **N(4,2)**

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Tunnels carrying public roadways within**

Code the rating factors for the AASHTO legal load trucks as defined within the AASHTO *Manual for Bridge Evaluation* (MBE) Section 6. If the Load Factor or Working Stress method is used to rate this structure, enter the Operating Rating factor only.

Usually these fields will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

WSBIS Item 2591 – Single Unit 4 (SU4) Rating Factor	**N(4,2)**
WSBIS Item 2592 – Single Unit 5 (SU5) Rating Factor	**N(4,2)**
WSBIS Item 2593 – Single Unit 6 (SU6) Rating Factor	**N(4,2)**
WSBIS Item 2594 – Single Unit 7 (SU7) Rating Factor	**N(4,2)**

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Tunnels carrying public roadways within**

Code the rating factor for the AASHTO legal load trucks as defined within the AASHTO *Manual for Bridge Evaluation* (MBE) Section 6. If the Load Factor or Working Stress method is used to rate this structure, enter the Operating Rating factors only.

Usually these fields will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

These fields can be null if WSBIS Item 2590 (NRL) is populated and equal to or greater than 1.00.

WSBIS Item 2598 – Emergency Vehicle 2 (EV2) Rating Factor	**N(4,2)**
WSBIS Item 2599 – Emergency Vehicle 3 (EV3) Rating Factor	**N(4,2)**

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Tunnels carrying public roadways within**

Code the rating factor for the Emergency Vehicle legal load trucks as defined within the *Bridge Design Manual* M 23-50.14, Chapter 13. If the Load Factor or Working Stress method is used to rate this structure, enter the Operating Rating factors only.

Usually these fields will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

These fields can be null if the structure has not been rated for these loads.

WSBIS Item 2596 – Overload 1 (OL-1) Rating Factor N(4,2)
WSBIS Item 2597 – Overload 2 (OL-2) Rating Factor N(4,2)

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Tunnels carrying public roadways within**

Code the rating factor for the WSDOT permit loads as defined within the *Bridge Design Manual* Chapter 13. If the Load Factor or Working Stress method is used to rate this structure, enter the Operating Rating factors only.

Usually this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

For local agencies, the following fields are mirrored in other tabs:

ADT	crossing tab
Truck percent	crossing tab
Design load code	design tab
Superstructure	NBI tab
Substructure	NBI tab
Culvert	NBI tab
Asphalt depth	NBI tab
Revise rating	NBI tab
Load rating note	(see Chapter 3)
Operating level note	NBI tab
Revise rating note	NBI tab

For these fields, see the applicable tab for field definitions.

Waterway Tab

WSBIS Item 7832 – Water Type — Pulldown

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This field describes the type of water the bridge crosses over.

B	Brackish (a mixture of fresh and salt water).
F	Fresh water.
S	Salt water.
T	Tidal.

Leave blank if not over water.

WSBIS Item 7833 – Flood Plain Intrusion — Pulldown

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This code indicates whether or not the structure's approach roadway or abutment intrude into the flood plain of the waterway (i.e., whether or not previous or possible flooding could cause or has caused water to rise so it touches the structure's approach roadway embankment or abutment).

A	No intrusion into the flood plain.
B	Bridge or approaches intrude into the waterway causing minor backwater.
C	Overtopping of approach roadway has occurred.
D	A portion of the superstructure has been under water.
U	Flood plain intrusion is unknown.

Leave blank if not over water.

WSBIS Item 7834 – Flood Control — Pulldown

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This field indicates if there is any existing type of flood control on the waterway under the bridge. To be considered, this flood control must be in place either upstream or downstream from the bridge and must be near enough to have an effect on the bridge. Flood control may be provided by dams, dikes, fill, or other means.

B	Both upstream and downstream.
U	Upstream.
D	Downstream.
N	No flood control.

Leave blank if not over water.

WSBIS Item 7835 – Scour History Pulldown

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This code describes scour conditions at the bridge site.

C	Current scour problems.
H	History of scour problems but scour conditions are now stable.
N	No history of scour.
U	Scour history is unknown.

Leave blank if not over water.

WSBIS Item 7836 – Streambed Material Type Pulldown

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This code describes the composition of the streambed at the bridge site.

Enter one of the following codes to indicate the predominant type of material that is evident.

1	Bedrock
2	Sediment
3	Gravel
4	Sand
5	Cobbles
6	Lined Canal
7	Vegetation
8	Alluvial Fan
9	Unknown

Leave blank if not over water.

WSBIS Item 7837 – Substructure Stability Pulldown

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This code describes the type of material upon which the bridge's substructure rests. This code is used to determine the degree of stability that can be expected in the bridge substructure.

Code the lower number value If different sections of a continuous span bridge are supported by different materials.

1	Spread footing, simple spans.
2	Spread footing, continuous spans.
3	Pile foundation, simple spans.
4	Pile foundation, continuous spans.
5	Bedrock, simple spans.
6	Bedrock, continuous spans.
7	Unknown, simple spans.
8	Unknown, continuous spans

Leave blank if not over water.

WSBIS Item 7838 – Waterway Obstruction — Pulldown

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This code indicates any conditions in the waterway which affect the flow of water beneath the bridge.

A	Debris accumulates at the bridge.
B	Ice accumulates at the bridge.
C	The waterway is overgrown with vegetation.
D	A and C above.
E	A and B above.
F	B and C above.
G	A, B, and C above.
N	No obstruction to the flow of water beneath the bridge.

Leave blank if not over water.

WSBIS Item 7839 – Streambed Stability — Pulldown

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This code describes any existing stream conditions which may influence scour at the bridge site.

A	Sharp bends.
B	Significant lateral shifts.
C	Steep slopes.
D	High water velocity.
E	Degradation.
F	Aggredation.
G	No conditions influencing scour exist.
H	Streambed conditions are unknown.

Leave blank if not over water.

WSBIS Item 7840 – Streambed Anabranch — Pulldown

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This field indicates whether or not confluences or shifting anabranches are present in the waterway. A confluence is a flowing together of two or more streams. An anabranch is a river branch that re-enters the main stream, creating an island in the waterway.

Code only those conditions which exist near the bridge site.

A	Anabranches are present.
B	Both anabranches and confluences are present.
C	Confluences are present.
N	Neither anabranches nor confluences are present.
U	Waterway configuration is unknown.

Leave blank if not over water.

WSBIS Item 7841 – Piers in Water Pulldown

Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This field contains the number of the structure's piers in the water at normal yearly high water.

If the bridge is inspected at low water, look for evidence that the piers or pile bents have been in the water.

0	No piers in the water.
1-9	Number of piers in the water.
M	More than nine piers in the water.

Leave blank if not over water.

Proposed Improvements Tab

WSBIS Item 2883 – Proposed Improvement Calculation **Check Box**

This checkbox directs the WSBIS system to compute costs for any proposed bridge improvements. It is checked by default for all structures. To prevent automatic calculation and to perform manual entry, uncheck the box.

The following method is used to perform the automatic calculation:

If Work Type 31 or 32 is chosen:

Work Method = 1
Structure Length = Bridge Length + 10 feet
Roadway Width = (Lanes On x 12 feet) + 14 feet
Cost per SF of Deck = $800 (as of 2014)
Structure Cost = 0.50 x Total Cost
Roadway Cost = 0.10 x Total Cost
Engineering & Misc Cost = 0.4 x Total Cost
Total Cost = (Structure Imp Length x Prop Roadway Width) x Cost Per SF of Prop Deck
Estimate Year = (current year)

If Work Type 33 through 38 is chosen:

Work Method = 1
Structure Length = Bridge Length
Roadway Width = Approach Roadway Width + 2 feet
Cost per SF of Deck = $400 (as of 2014)
Structure Cost = 0.50 x Total Cost
Roadway Cost = 0.10 x Total Cost
Engineering & Misc Cost = 0.40 x Total Cost
Total Cost = (Structure Imp Length x Prop Roadway Width) x Cost Per SF of Prop Deck
Estimate Year = (current year)

WSBIS Item 1844 – Work Type Pulldown
NBI Item 75A

Applicable Structure Types
- **Bridges & culverts carrying public roadways**

Use one of the following codes to represent the proposed work type:

Table 1844 Work Type Code

WSBIS Code	Description
38	Other structural work, including hydraulic replacements.
37	Bridge deck replacement with only incidental widening.
36	Bridge deck rehabilitation with only incidental widening.
35	Bridge rehabilitation because of general structure deterioration or inadequate strength.
34	Widening of existing bridge with deck rehabilitation or replacement.
33	Widening of existing bridge or other major – structure without deck rehabilitation or replacement; includes culvert lengthening.
32	Replacement of bridge or other structure because of relocation of road.
31	Replacement of bridge or other structure because of substandard load carrying capacity or substandard bridge roadway geometry.

WSBIS Item 1846 – Work Method Pulldown
NBI Item 75B

Applicable Structure Types
- **Bridges & culverts carrying public roadways**

Use one of the following codes to indicate whether the proposed work is to be done by contract or by force account:

Table 1846 Work Method Code

WSBIS Code	Description
2	Work to be done by owner's forces
1	Work to be done by contract

WSBIS Item 1847 – Structure Length (feet) N(6,0)
NBI Item 76

Applicable Structure Types
- **Bridges & culverts carrying public roadways**

Code the length of the proposed bridge improvement to the nearest foot. For replacement or rehabilitation of the entire bridge, the length should be back to back of backwalls of abutments or from pavement notch to pavement notch. For replacement or rehabilitation of only part of the structure, use the length of the portion to be improved.

For culvert improvements, use the proposed length measured along the centerline of the barrel regardless of the depth below grade. The measurement should be made between the inside faces of the top parapet or edge-stiffening beam of the top slab.

WSBIS Item 2853 – Roadway Width (feet) **N(6,0)**

Code the curb-to-curb width of the roadway on the proposed bridge. This measurement is coded to the nearest foot.

WSBIS Item 2860 – Cost per S.F. of Deck (dollars) **N6,0)**

Code the estimated cost per square foot of proposed deck. For State bridges, this number is provided by the WSDOT Bridge Management Engineer.

WSBIS Item 1867 – Structure Cost (thousand dollars) **N(7,0)**
NBI Item 94

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code a number to represent the estimated cost of the proposed bridge improvements (including replacement) in thousands of dollars. This cost does not include roadway, right of way, detour, demolition, or preliminary engineering costs.

NBI Commentary:

WSBIS allows up to seven digits each for Structure, Roadway and Total Costs (in thousands of dollars). Amounts coded greater than six digits will be converted to 999999 for the NBI data submittal.

WSBIS Item 1873 – Roadway Cost (thousand dollars) **N(7,0)**
NBI Item 95

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code a number to represent the cost of the proposed roadway improvement in thousands of dollars. This shall include only roadway construction costs, excluding bridge, right-of-way, detour, extensive roadway realignment costs, preliminary engineering, etc. Do not use this item for estimating maintenance costs.

NBI Commentary:

WSBIS allows up to seven digits each for Structure, Roadway and Total Costs (in thousands of dollars). Amounts coded greater than six digits will be converted to 999999 for the NBI data submittal.

WSBIS Item 2870 – Engineering and Miscellaneous Cost (thousand dollars) **N(7,0)**

Code the estimated cost of engineering and other miscellaneous items. For State bridges, this number is provided by the WSDOT Bridge Management Engineer.

WSBIS Item 1861 – Total Cost (thousand dollars) **N(7,0)**
NBI Item 96

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code a number to represent the total project cost in thousands of dollars, including incidental costs not included in Structure Cost and Roadway Cost. This item should include all costs normally associated with the proposed bridge improvement project. The Total Project Cost will therefore usually be greater than the sum of Structure and Roadway Costs.

NBI Commentary:

WSBIS allows up to seven digits each for Structure, Roadway and Total Costs (in thousands of dollars). Amounts coded greater than six digits will be converted to 999999 for the NBI data submittal.

WSBIS Item 1879 – Estimate Year **N(4,0)**
NBI Item 97

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code the year that the costs of proposed work were estimated. The data provided for these items must be current; that is, the estimate year shall be no more than 8 years before the current year.

Tunnel Supplement Tab

WSBIS Item 1992 – Routine Inspection Target Date **Date**
NTI Item D.1

Applicable Structure Types

- **Tunnels carrying public roadways within**

The target date is set by the program manager and cannot be modified without prior notification to the FHWA division office.

This date is intended to provide the baseline for scheduling future routine inspections. Routine inspection dates should be within 2 months (+/-) of this target month. The year represents the target date was set.

Tunnel ID Tab

WSBIS Item 1022 – Urban Code Pulldown

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record the urbanized area code:

Table 1022 Urban Code

WSBIS Code	Urban Area Name
	Urban Areas with Populations of 50,000 or more as of 2017
06652	Bellingham-Ferndale
09946	Bremerton-Port Orchard-Bainbridge Island
44479	Kennewick-Pasco-Richland
49312	Lewiston-Clarkston
51283	Longview-Kelso
55333	Marysville-Tulalip
60490	Mount Vernon-Burlingto-Sedro-Woolley
65242	Olympia-Lacey-Tumwater
80389	Seattle-Tacoma-Everett
83764	Spokane-Spokane Valley
71317	Vancouver-Camas-Battle Ground
91405	Walla Walla-Milton-Freewater
93862	Wenatchee-East Wenatchee
97507	Yakima-Selah-Union Gap
	Urban Areas with Populations of 5,000 - 49,000 as of 2017
99998	Aberdeen-Hoquiam
99998	Anacortes
99998	Birch Bay-Blaine
99998	Camano Island
99998	Centralia-Chehalis
99998	Chelan-Manson
99998	Cheney
99998	Ellensburg
99998	Ephrata
99998	Grandview
99998	Granite Falls
99998	Indianola-Kingston
99998	Lynden
99998	Montesano-Elma
99998	Moses Lake
99998	Oak Harbor
99998	Ocean Shores
99998	Omak-Okanogan
99998	Othello
99998	Port Angeles
99998	Port Townsend
99998	Pullman

Table 1022 Urban Code

WSBIS Code	Urban Area Name
99998	Quincy
99998	Sequim
99998	Shelton
99998	Snoqualmie-North Bend
99998	Stanwood
99998	Sultan-Gold Bar
99998	Sunnyside
99998	Toppenish-Zillah
99998	Wapato
99998	Woodland
99998	Yelm
All Other Locations	
99999	Non Urbanized area

Load Rating Tab Supplement

WSBIS Item 1560 – Posted Load – Gross **N(2,0)**
NTI Item L.5
WSBIS Item 1561 – Posted Load – Axle **N(2,0)**
NTI Item L.6
WSBIS Item 1562 – Posted Load – Type 3 **N(2,0)**
NTI Item L.7
WSBIS Item 1563 – Posted Load – Type 3S2 **N(2,0)**
NTI Item L.8
WSBIS Item 1564 – Posted Load – Type 3-3 **N(2,0)**
NTI Item L.9

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record the gross weight limits shown on the load posting sign or signs rounded down to the nearest US ton. Leave this item blank if there is no load posting sign.

Layout Tab Supplement

WSBIS Item 1543 – Service In Tunnel **Pulldown**
NTI Item A.8

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record the type of service for the route in the tunnel using one of the following codes:

Table 1543 Service In Tunnel Code

WSBIS Code	Description
1	Highway
2	Highway and Railroad
3	Highway and Pedestrian
4	Highway, Railroad, and Pedestrian
5	Other

Use code 0 when the tunnel carries both directions of a divided highway, and when the roadway is undivided. Route direction is considered the designated direction of the route, not geographic orientation.

WSBIS Item 1349 – Tunnel Length (feet) **N(5,0)**
NTI Item G.1

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record the length of the tunnel to the nearest foot measured along the centerline of the roadway.

When a tunnel is divided into segments, record the length of the segment. For example: if a 1000 foot tunnel is divided into 4-250 foot segments, each segment will have a tunnel length of 250 feet.

When multiple bores are reported as a single tunnel, record the length of the longest bore.

WSBIS Item 1510 – Number of Tunnel Bores **Pulldown**
NTI Item S.1

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record the number of bores in the tunnel.

Figure WSBIS 1510a Two Bores

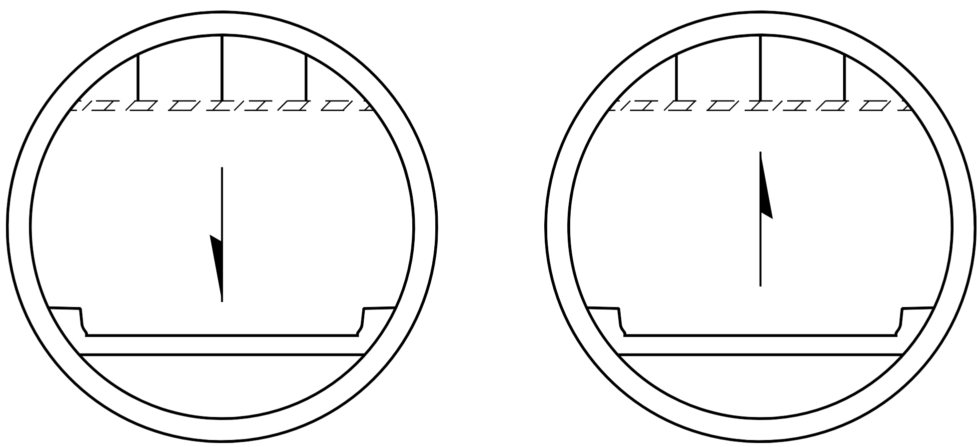
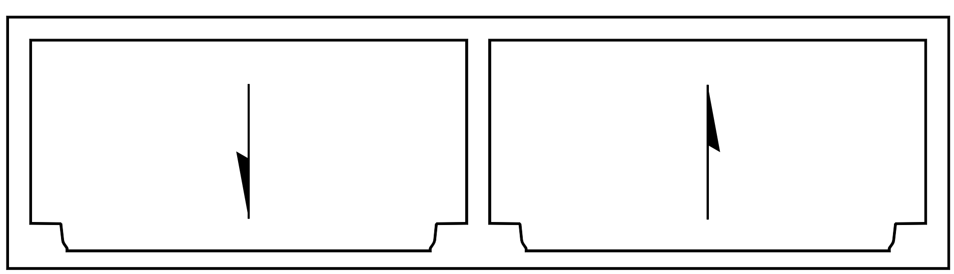


Figure WSBIS 1510b One Bore



WSBIS Item 1511 – Tunnel Shape **Pulldown**
NTI Item S.2

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record the tunnel shape using one of the following codes:

Table 1511 Tunnel Shape Code

WSBIS Code	Description
1	Oval
2	Horseshoe
3	Rectangular
4	Circular

Figure WSBIS 1511a Circular Tunnel

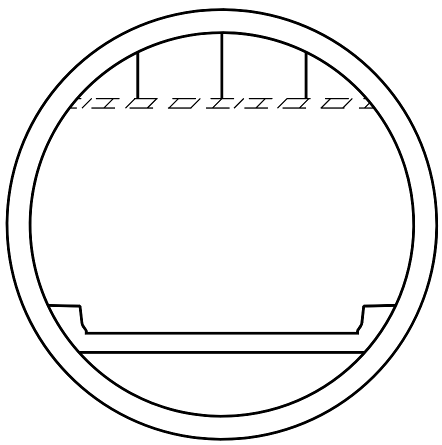


Figure WSBIS 1511b Horseshoe Tunnel

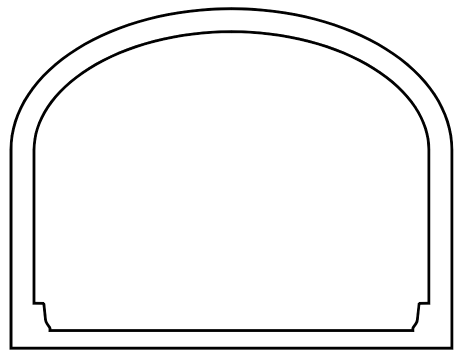


Figure WSBIS 1511c Rectangular Tunnel

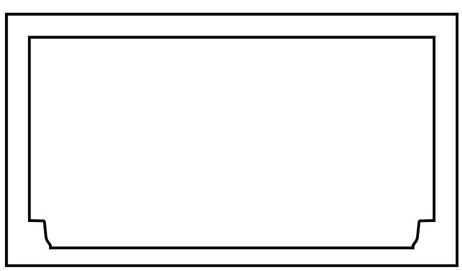
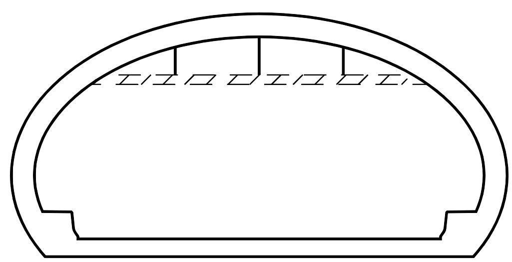


Figure WSBIS 1511d Oval Tunnel



WSBIS Item 1512 – Portal Shape **Pulldown**

NTI Item S.3

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record the portal shape using one of the following codes:

Table 1512 Portal Shape Code

WSBIS Code	Description
1	Oval
2	Horseshoe
3	Rectangular
4	Circular
5	Other

See example shapes shown for WSBIS 1511 Tunnel Shape.

WSBIS Item 1513 – Ground Conditions **Pulldown**

NTI Item S.4

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record the ground conditions using one of the following codes:

Table 1513 Ground Conditions Code

WSBIS Code	Description
1	Soil
2	Rock
3	Mixed Face

Soil is used to define ground conditions consisting primarily of clay, silt, sand, gravel or a mixture. Rock is used to define ground conditions consisting primarily of material that has rock structure in weathered to sound condition. The term “mixed face” usually refers to a situation where the soil conditions vary along the length and/or height of the tunnel.

WSBIS Item 1514 – Complex Tunnel Pulldown
NTI Item S.5

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record whether the tunnel is complex using one of the following codes:

Table 1514 Complex Tunnel Code

WSBIS Code	Description
0	The tunnel is not complex
1	The tunnel is complex

A complex tunnel is characterized by advanced or unique structural elements or functional systems. Complex tunnels may include mechanical or fire suppression equipment to ventilate exhaust from the tunnel or provide protection against tunnel fires. A non-complex tunnel in contrast is typically shorter, not actively ventilated, and may or may not have lighting installed.

WSBIS Item 1401 – Minimum Vertical Clearance Over Tunnel Roadway (feet) N(5,1)
NTI Item G.2

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record the minimum vertical clearance between the mainline tunnel roadway surface and any overhead restriction, i.e. tunnel ceiling, overhead signs, lighting, etc. The roadway surface includes any surface on which a vehicle can travel, including shoulders. Ramps should be excluded when included as part of a tunnel system. The intent is to determine the restrictions of the primary route of the tunnel.

WSBIS Item 1402 – Tunnel Height Restriction Pulldown

NTI Item L.10

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record the height restriction status for the route in the tunnel using one of the following codes:

Table 1402 Tunnel Height Restriction Code

WSBIS Code	Description
1	Yes, there is a height restriction
2	No, there is no height restriction

Figure WSBIS 1402a

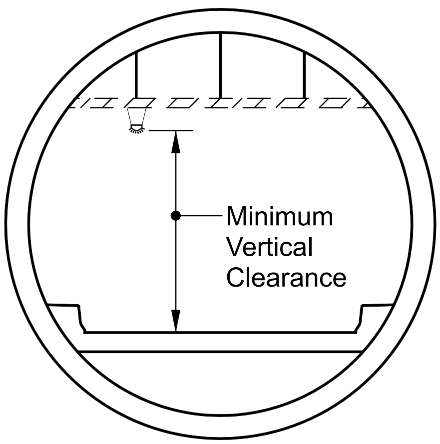
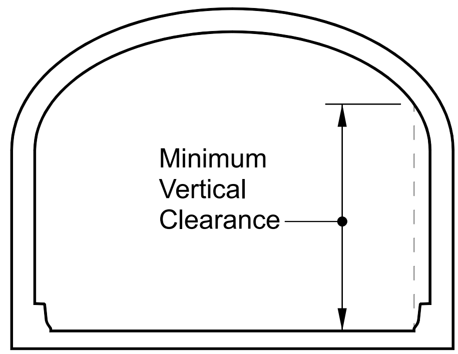


Figure WSBIS 1402b



WSBIS Item 1408 – Tunnel Hazardous Material Restriction Pulldown

NTI Item L.11

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record the hazardous material restriction status for the route in the tunnel using one of the following codes:

Table 1408 Tunnel Hazardous Material Code

WSBIS Code	Description
1	Yes, there is a hazardous material restriction
2	No, there is no hazardous material restriction

WSBIS Item 1409 – Other Tunnel Restrictions Pulldown

NTI Item L.12

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record any other restriction status (not including height or hazardous material restrictions) for the route in the tunnel using one of the following codes:

Table 1409 Other Tunnel Restriction Code

WSBIS Code	Description
1	Yes, there are other restrictions
2	No, there are no other restrictions

Route Tab Supplement

WSBIS Item 1436 – Tunnel Route Direction **Pulldown**
NBI Item I.8

Applicable Structure Types

- **Tunnels carrying public roadways within**

Record the route direction for the route in the tunnel using one of the following codes:

Table 1436 Tunnel Route Direction Code

WSBIS Code	Description
4	West
3	South
2	East
1	North
0	Two route directions

Use code 0 when the tunnel carries both directions of a divided highway, and when the roadway is undivided. Route direction is considered the designated direction of the route, not geographic orientation.

NBI and NTI Items not maintained in the WSBIS

FHWA Item 1 and NTI Item I.3 – State Code
The Washington State Code is 530, and is created automatically for insertion in NBI reports. This data field is not maintained in the Washington State Bridge Inventory.

NBI Item 5E – Route Directional Suffix
Washington State does not maintain directional suffixes to route numbers, so this information is not maintained in the Washington State Bridge Inventory. This code is automatically generated as 0 (not applicable) to the NBI.

FHWA Item 112 – NBIS Bridge Length
The NBIS bridge length = Y for all On records reported to the NBI by definition, and is created automatically for insertion in NBI text file. This data field is not maintained in the Washington State Bridge Inventory.

NTI Items I.15 through I.18– Border Tunnel Data
Washington State has no tunnels across it’s borders. These 4 fields are automatically reported as null to the NTI.

NTI Items N.1 through N.3 – Navigable Waterway Data
Washington State has no tunnels under navigable waters. These 3 fields are automatically reports as 0 to the NTI.

Appendix 2-F Border Bridge Information

Oregon

Send all reports and any requests for their reports to

Erick Cain, OPMA, Erick.j.cain@odot.state.or.us
Bridge Inventory Coordinator
4040 Fairview Industrial Dr. SE MS #4
Salem, OR 97302
Phone: 503 986 3384 Fax: 503 986 3407

Region 1 - (Longview to Hood River) –
Joel Boothe, Joel.E.BOOTHE@odot.state.or.us
Office 503-652-5691, Cell 503-969-1091, Fax 503-653-3085

Inspected by Oregon:
5/1E – 000000PR – Columbia R Interstate (Oregon #01377A)
5/1W – 0005216A – Columbia R Interstate (Oregon #07333)
205/1 – 0010833A – Glen Jackson Bridge (Oregon #09555)
0259228300 – 08712700 – Br of the Gods (Oregon # 02592)

Inspected by Washington:
433/1 – 0003760A – Lewis & Clark (Oregon #02046)

Region 2 -
Bill Burns, 503-986-2659, Robert.W.BURNS@odot.state.or.us

Inspected by Oregon:
101/1 – 0007666A - Megler (Oregon #07949D) – Spans 1-4
101/1(A) – 0007666B - Megler(A) (Oregon #07949A) – Spans 5-19
101/1(B) – 0007666C - Megler(B) (Oregon #07949B) – Spans 20-159
101/1(C) – 0007666D - Megler(C) (Oregon #07949C) – Span 160

Region 4 - (Hood River to Biggs Jct.) –
Mike Pulzone, James.M.PULZONE@odot.state.or.us
Office 541-388-6188, Cell 541-419-1688, Fax 541-388-6108

Inspected by Oregon:
197/1 – 000000PC – The Dalles (Oregon #06635Q)

Inspected by Washington:
97/1 – 0006539A – Biggs Rapids-Sam Hill (Oregon #00849A)

Inspected by Consultants
06645 – 000000PH – Hood River (Oregon #06645)

Region 5 -
Kelley McAlister, Kelley.T.MCALISTER@odot.state.or.us
541-963-1371

Inspected by Washington:
82/280N – 0012819A – Umatilla (Oregon #16424)
82/280S – 000000PD – Umatilla (Oregon #02230A)

Oregon Underwater Reports –
Rick Shorb, Rick.L.SHORB@odot.state.or.us

Idaho

Patty Fish, patty.fish@itd.idaho.gov, 208-334-8847
cc to Kathleen Slinger, Kathleen.Slinger@itd,idaho.gov

Inspected by Washington
12/915 – 0002348A – Snake R Clarkston (ID SID 000000000010360)

Inspected by Idaho
41/10 – 00000LLV – BNRR OC (ID SID 000000000014255)
90/594N – 00200520 – Spokane River (ID SID 000000000016735)
90/594S – 00200519 – Spokane River (ID SID 000000000016740)
5700-1 – 08374400 – Southway Bridge (ID SID 000000000021495) – Local Agency owned (Asotin County) – Idaho works directly with Asotin County

3-1 General

This chapter provides guidelines to inspect bridges*, including documentation.

The guidelines presented herein are those in use by the WSDOT Bridge Preservation Office (BPO). Local Agencies are encouraged to follow these guidelines so as to provide a consistent basis for evaluation and reporting of inspection data. Coding for non-mandatory items may deviate according to the needs of an individual agency. Agencies are encouraged to document such deviations in a manner so as to aid in the evaluation of the associated inspection data.

The basis for bridge inspection policies and procedures are referenced throughout the chapter by the updated versions of the two following manuals: The AASHTO *Manual for Bridge Evaluation* (MBE), Section 4, provides uniformity in the procedures and policies for determining the physical condition, maintenance needs, and load capacity of the nation's highway bridges.

The FHWA NHI 12-049 *Bridge Inspector's Reference Manual* (BIRM) is a manual on programs, procedures, and techniques for inspecting and evaluating a variety of in-service bridges. It provides guidelines regarding what preparation is necessary, how to inspect, what to look for, what equipment and tools are needed, how to document the results of the inspections, and provide appropriate follow-up to the inspection.

Depending on the inspection type, bridges submitted to the NBI and NTI have regular inspection intervals that must adhere to the intervals as defined within the NBIS and NTIS. When a bridge is inspected late, the agency must document a justifiable cause that pushed the inspection beyond the required interval. The justifiable cause, identified as an unusual circumstance in the preamble of the NBIS and NTIS regulation, should be documented within the inspection report. Some examples of unusual circumstances are as follows: severe weather, concern for inspector safety, concern for inspection quality, the need to optimize scheduling with other bridges, or other unique situations. The agency must also ensure that the next inspection is scheduled for the original inspection month during subsequent inspection cycles.

3-2 Inspection Types and Reporting

A number of different types of inspections have been developed to address specific needs. This section will identify and describe the inspection types used by both the state and local agencies. Below is a list of inspection types followed by a description of each inspection/ report type.

- Routine (A)
- Fracture Critical (B)
- Underwater (C)
- Special Feature (D)
- Interim (E)
- Underwater Interim (F)
- Damage (G)
- Primary Safety (H)
- Secondary Safety (I)
- Condition Safety (J)
- Short Span (K)
- Two-Man UBIT (L)
- Informational (M)
- Inventory (N)
- In-Depth (O)
- Geometric (P)
- Feature (Q)

*Bridge is intended to mean all reportable structures which includes bridges, culverts and tunnels.

(A) Routine

1. **Initial Routine Inspection** – The first routine inspection performed on any bridge is the Initial Routine Inspection. It verifies the data entered into BridgeWorks via the "Inventory" Report type. An Initial Routine Inspection is also performed after rehabilitation work that changes a bridge's dimensions or clearances, or when there is a change in bridge ownership. The initial inspection is the first inspection of a bridge and is typically reported to the NBI and NTI as a Routine inspection.

   The purpose of this inspection is to add the bridge to the inventory of bridges and to establish certain baseline information.

   a. **Gathering Inventory Data** – Establishing baseline information about the bridge from the original construction plans or as-built plans can be performed in the office prior to the site inspection. Agencies shall record the required WSBIS data into BridgeWorks along with the applicable Bridge Management System (BMS) elements for the structure. Any information not known or which cannot be determined from the plans can be left blank until the site inspection.

      Depending on the type of structure built, one or more of the following inspection types may also be required to be performed with the initial inspection:

      - A Fracture Critical Inspection if the bridge contains fracture critical members, see (B) Fracture Critical.
      - An Underwater Inspection is needed to inspect underwater portions of the bridge, see (F) Underwater Interim Inspection.
      - A Special Features inspection if the bridge contains unique design or construction elements, see (D) Special Feature.

      Conclusions and findings from these items should be incorporated into the Bridge Inspection Report (BIR) to support the applicable codes and ratings.

      Team Leaders should coordinate the planning and timing of the inspection with the appropriate project or construction offices prior to visiting the site.

   b. **Site Inspection** – After the bridge has been built, and preferably before it is placed into service, the Team Leader must visit the bridge site to verify the inventory information that has been coded and to establish any information that was not known. At the bridge site, the Team Leader can review the information to confirm the actual bridge dimensions and clearance measurements and to verify the condition of all bridge elements.

      Changes or additions to the WSBIS data, the BIR form, or BMS elements, must be noted on the inspection form and entered into BridgeWorks.

   c. **Check Coding** – The BIR form should note any inconsistencies found between the planned and the as-built bridge and should provide an explanation of any coding changes made. For example, if surface cracks have been found in a newly-poured bridge deck but these cracks do not warrant lowering the condition coding for the deck, the Team Leader should note the location and extent of the cracking so that it can be looked for and further evaluated during future inspections.

As part of the Initial Routine Inspection, two photographs of the bridge shall be taken: an elevation and a deck photograph. The elevation photograph should be taken (looking north or east) when possible to show a view from one side of the bridge. The deck photograph should be taken (ahead on station) to show a view of the bridge looking onto the bridge deck.

See (A) Routine for instructions on completing the remainder of the BIR form.

d. **Updating the Bridge File** – The Inventory Record, the BIR, and the two photographs provide a record of the Initial Routine Inspection. In addition to being stored within BridgeWorks, these items must be placed in the bridge file created for the given bridge. Each time the bridge is revisited, additional inspection reports, any new photos, and any updates to the WSBIS and to the BIR form are added to the file so that the bridge records remain current. See Section 2-2 for further details.

2. **Routine Inspections** – Routine Inspections are regularly scheduled inspections consisting of observations, measurements, or both, needed to determine the physical and functional condition of the bridge, to identify any changes from "Initial" or previously recorded conditions, and to ensure that the structure continues to satisfy present service requirements. Generally, a regular inspection of the entire bridge is to be performed on regular intervals not to exceed 24 months throughout the life of the bridge. However, the NBIS does allow for extended inspection frequencies of up to 48 months provided the bridge meets specific criteria submitted by the State and approved in writing by the FHWA. Inspection intervals less than 24 months for specific reasons can be developed and documented by the inspecting agency if necessary. Routine Inspections are reported to the NBI and NTI.

   a. **Inspecting Bridge Components** – The BIRM describes the general inspection procedures to be followed for inspecting any concrete, steel, or timber bridge, and the specific procedures to follow for inspecting a given bridge element (i.e., the bridge abutments). These steps can be used by the Team Leader as a checklist to help accomplish the inspection and to help spot particular types of problems a given bridge or bridge element will be prone to. Following these procedures will help ensure that a thorough and comprehensive inspection is achieved.

   However, specific problems not covered in these general procedures may be encountered. If that is the case, the Team Leader may contact their respective WSDOT Bridge Program Support personnel.

   b. **Inspecting for Scour** – The Routine Inspection of any bridge over water should include an assessment of existing scour conditions, the effect of scour on the bridge, effectiveness of countermeasures, and recommendations for repair, if appropriate. The following manuals, as well as the BIRM, discuss inspection procedures for bridges over water:

      - *HEC 18 Evaluating Scour at Bridges*

        The field inspection is used in conjunction with the scour analysis, see Section 5-3, to identify and verify the potential of harmful effects of scour to the bridge.

The field inspection includes the specific location and extent of any deterioration, damage, or undermining in:

- The stream channel and stream banks.
- The substructure elements (i.e., intermediate piers, pier walls, web walls, columns, or shafts).
- The foundation (i.e., footings and seals).
- Channel protection devices (i.e., dams and levees).
- Scour countermeasures (i.e., riprap or shielding).

Measure and record the extent of foundation exposure and undermining.

Recommend any repairs, replacement, or maintenance required.

Perform soundings on bridges as identified by the Scour Engineer using the Scour Field Evaluation form.

The Scour Field Evaluation form was developed to supplement the BIR for water crossings by measuring the streambed cross-section (soundings) at a bridge to document observations related to scour. A copy of this form is shown in Section 3-5.

Soundings of streambed elevations should be taken during the Initial Routine Inspection and during subsequent inspections as required. The form should note the location and depth of the streambed at each point where a sounding was taken. This information should then be plotted in order to identify long term changes in the channel cross section over time.

c. **Bridge Inspection Report** – A Bridge Inspection Report must be prepared at the completion of each Routine Inspection to record the inspection findings, provide a narrative description of conditions at the bridge site, and note any changes in the WSBIS coding information. The Team Leader shall record and submit the findings of the Routine Inspection into BridgeWorks. A Routine Inspection will be included with a Fracture Critical Inspection and a Special Feature Inspection. Bridge Inspection Reports must be completed within 90 days from the start of the inspection. A completed report is defined as a report that has been "Released" in the BridgeWorks program.

The Bridge Inspection Report form will have the following preprinted information that will identify the bridge:

- **Bridge Number** – The bridge number given by the owner agency that is associated with the particular structure.
- **Bridge Name** – The bridge name given by the owner agency that is associated with the particular structure.
- **Structure ID** – The unique federal structure identification number associated with the particular structure in the NBI and NTI assigned by WSDOT for the life of the bridge.
- **Route** – The number of the inventory route carried on or under the bridge.
- **Milepost** – The bridge's milepost location on the inventory route.
- **Intersecting** – The feature or features which intersect with the bridge.
- **Location** – The physical location of the bridge.
- **Structure Type** – The structure type (for local agency bridges, this field may be blank).

d. **Completing the Bridge Inspection Report**

(1) At the conclusion of the Routine Inspection, confirm the condition and adequacy coding for the various bridge elements and make any changes as necessary. Review the Adequacy Appraisal codes, NBI condition codes, BMS and SNTI elements and their respective condition states, and complete the narrative describing the existing conditions. Verify that the correct Program Manager is listed on the inspection report.

(2) Enter onto the inspection report: Team Leader initials, Team Leader identification number, Assistant Inspector initials, date of inspection, and total number of crew hours at the bridge site. The Team Leader and Assistant Inspector are required to sign the approved and released copy of the BIR that is placed in the bridge file.

(3) Prepare a list of any bridge elements in need of repair and recommend the type of repair that should be done. A photo of repair areas should be taken with each type of recommended repair. See Section 6-4 for additional repair instructions and procedures.

(4) If it is determined that a critical bridge deficiency has been identified resulting in an emergency load restriction, lane closure, bridge closure or a failed bridge, a Damage Inspection and/or a subsequent In-Depth Inspection may have to be performed, see (G) Damage for Damage Inspections, and (O) In-Depth for In-Depth Inspections.

e. **Updating the Inventory Record** – Any changes that need to be made to the Inventory Record shall be entered into BridgeWorks.

After the data is processed and updated, a new Inventory Record is generated for each bridge that has changes. On all Routine Inspections, all changes/updates to NBI and NTI data shall be released into the inventory within 90 days of the date of inspection.

The updated SI&A Report and other applicable reports shall be filed in their respective bridge file.

3. **Routine Inspections with Extended Intervals** – Routine Inspections with extended inspection intervals are structures with inspection frequencies greater than 24 months not exceeding 48 months, and only with written FHWA approval. Reportable structures that have administrative load ratings (WSBIS ITEM NUMBERS 1551 & 1554 = 0) are not eligible for 48 month frequencies.

The criteria approved by FHWA shall be re-evaluated after every inspection. Refer to the WSDOT letter sent to FHWA, dated July 28, 1998, see Appendix 3-C for further details. The Coding and Appraisal Unit will run an automated check annually on the entire database to ensure that the extended inspection interval is still valid and meets the criteria agreed upon between FHWA and WSDOT. Team Leaders for the State shall place the following note in the zero (0) note of the BIR within BridgeWorks for existing extended interval bridges and candidate bridges:

"Continue to validate the status of this bridge each inspection as a 48-month inspection candidate. Verify condition ratings, load ratings, vertical clearances, ADT, scour codes when applicable, and that no major maintenance has been completed in the last two years."

The procedures and guidelines used for Routine Inspections at 24 month intervals shall be used for these structures as well.

4. **Routine Inspections with Frequencies Less than 24 Months** – Bridges or culverts should be considered for more frequent inspections if the NBI Superstructure, Substructure or Culvert code is equal to or less than a 3 and where there are multiple elements with deficiencies that reduce capacity. The SPM will approve the need to perform routine inspections more frequently than 24 months.

(B) Fracture Critical

The National Bridge Inspection Standards (NBIS) require that a Fracture Critical Inspection be performed on regular intervals not to exceed 24 months on bridge members identified as fracture critical. According to the MBE, a fracture critical member (FCM) is a steel tension member in a bridge whose failure could result in the partial or total collapse of the bridge.

This section provides information to assist the Team Leader in identifying fracture critical bridge members, preparing written procedures, planning and performing effective Fracture Critical Inspections and completing the required inspection report. The information presented here is meant as a summary of the main points of the Fracture Critical Inspection. A complete description of fracture critical members and Fracture Critical Inspection procedures are provided in the BIRM. Fracture Critical Inspections are reported to the NBI.

1. **General** – Each agency shall identify the bridges within its jurisdiction which contain fracture critical members. The agency can then identify, through documentation, the particular fracture critical members within each bridge. For the member to be considered fracture critical, two conditions must exist.

   a. The member must be a steel member in tension. The area of the bridge where the member is located is subject to tensioning (expanding) forces.

   b. There is no redundancy in the member or the bridge. There must be no other structural elements able to carry the load of the member if the given member fails.

      There are three types of redundancy: load path, structural, and internal. Only load path redundancy is evaluated to determine whether a member is fracture critical. Load path redundancy is the number of supporting elements, usually parallel, such as girders or trusses. AASHTO neglects structural and internal redundancies in determining whether a member is fracture critical. For a bridge to be redundant, it must have more than two load paths. An exception to this is where steel three girder systems have pin and hangers. In this case, the pin and hangers are fracture critical.

2. **Bridge Types** – The following is a list of the types of bridges in which fracture critical members will be found. Figures are also shown which illustrate these bridge types and note the location of the fracture critical areas.

   a. **Steel Two-Beam or Two-Girder Systems (Exhibit 3-1)**

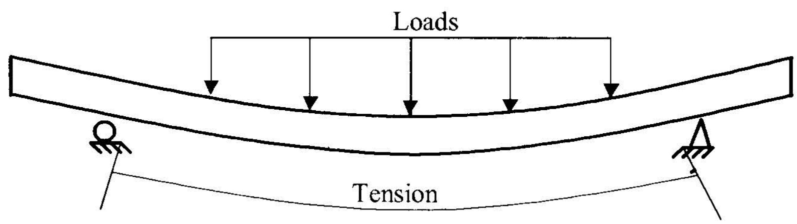
      (1) **Simple Spans** – Each beam or girder should be considered fracture critical as failure of either one could cause the bridge to collapse (Example A).

      (2) **Continuous Spans** – In general, at the midpoint of the span, the bottom of the girder should be considered fracture critical and over the pier, the top of the girder should be considered fracture critical. A structural engineer may need to assess the bridge to determine the actual redundancy and presence of fracture critical elements (Example B).

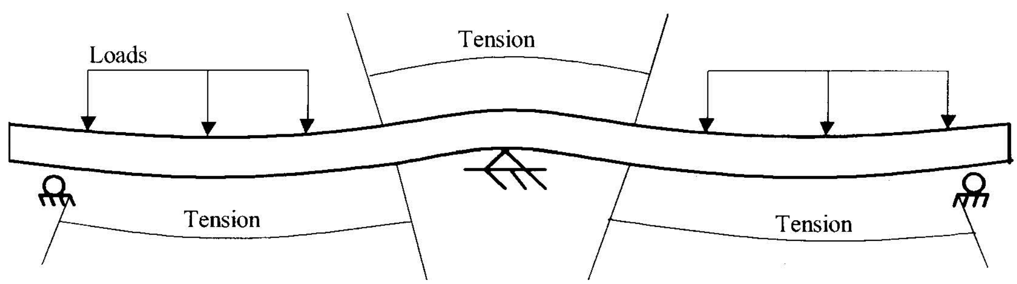
      (3) **Cantilever-Suspended Span** – In addition to the bottom of the girder at mid-span and the top of the girder over the pier, the top flange and adjacent portion of the web in the area of the cantilevered support should be considered fracture critical (Example C).

Exhibit 3-1 Steel Two-Beam or Two-Girder Systems

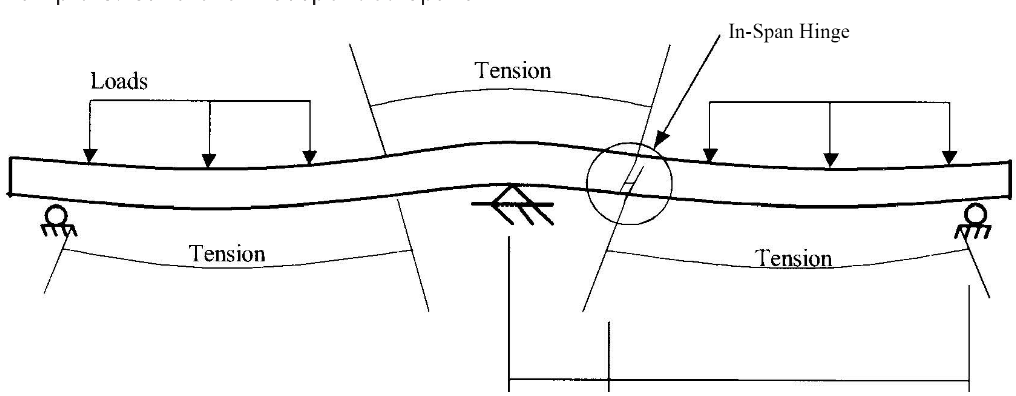
Example A: Simple Beam



Example B: Continuous Spans



Example C: Cantilever - Suspended Spans



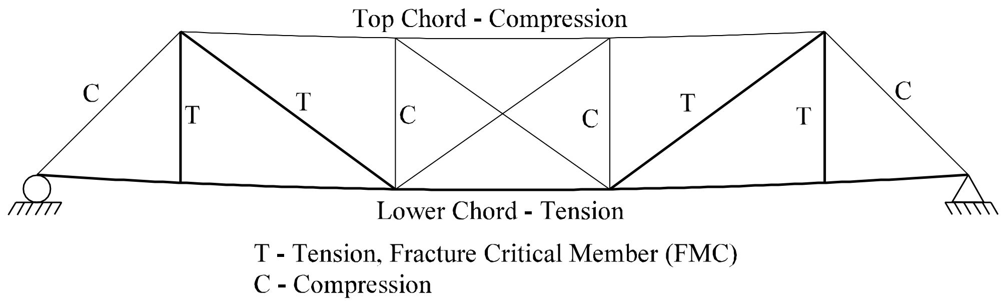
b. **Steel Truss Systems (Exhibit 3-2)** – Most truss bridges employ only two trusses and are thus considered fracture critical. All truss members in tension should be regarded as fracture critical. The exception is, when a detailed analysis by an experienced structural engineer, verifies loss of a member would not result in collapse of the bridge or major component.

The following elements within any truss bridge should also warrant special attention:

(1) **Pin-Connections** – Any load bearing pin connection in a fracture critical member or steel three girder system is considered fracture critical.

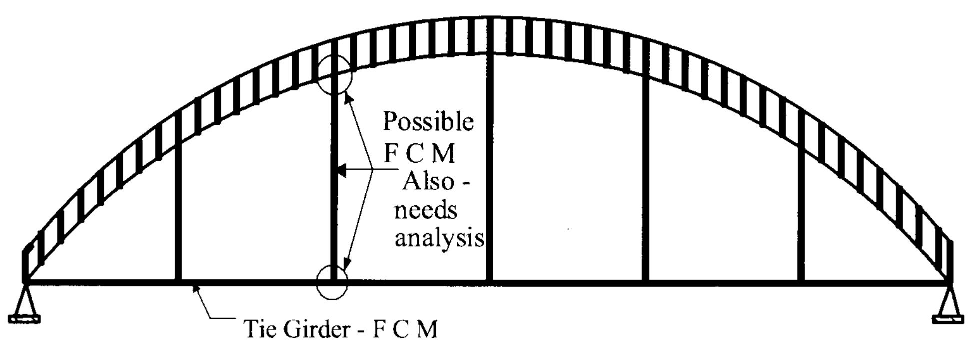
(2) **Category D and E Welds** – On a truss bridge, any tension member containing a Category D or E weld.

Exhibit 3-2 Steel Truss Systems



c. **Tied Arches (Exhibit 3-3)** – The tie girder which keeps the supports from spreading apart is in tension and should be considered fracture critical.

Exhibit 3-3 Tied Arches



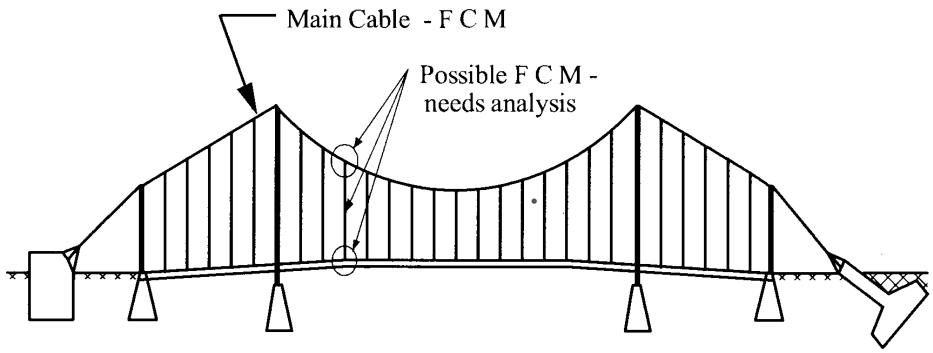
d. **Suspension Spans (Exhibit 3-4)**

(1) **Cables** – If the main suspension member is a cable, the cable should be considered fracture critical (Example A).

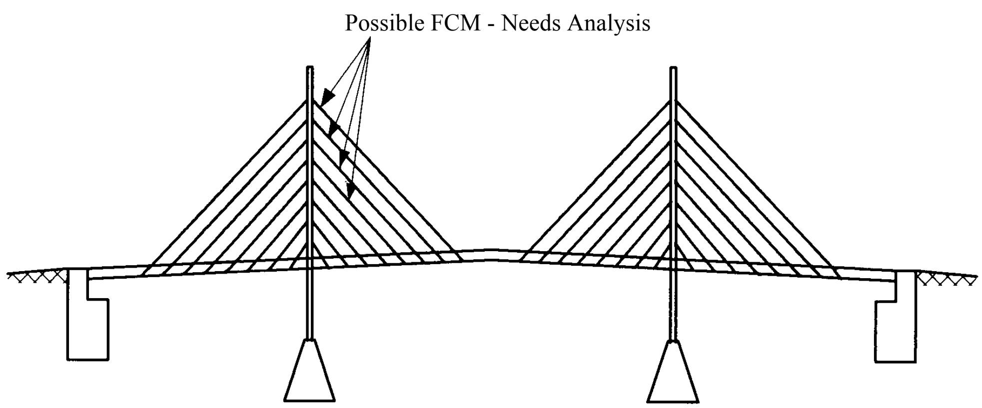
(2) **Cable Stayed Bridge** – The bridge is of such complexity that it should be reviewed by a structural engineer to determine the criticality of the various stays to fracture (Example B).

Exhibit 3-4 Suspension Spans

Example A: Cable Suspension Bridge



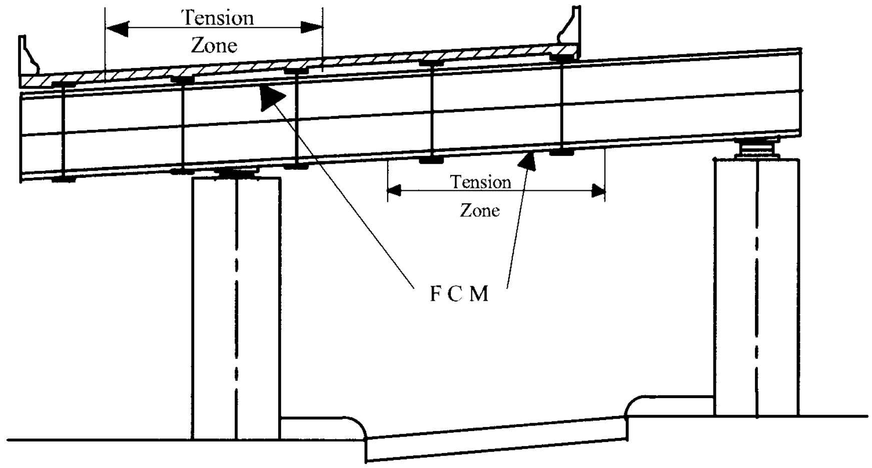
Example B: Cable Suspension Bridge



e. **Other Fracture Critical Bridge Details**

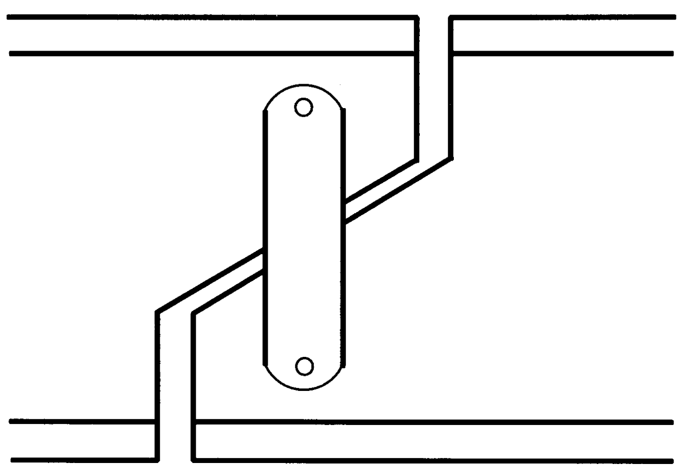
(1) **Steel Cross Beams and Caps** – Tension zones of the I section or box beam should be considered fracture critical (Exhibit 3-5).

Exhibit 3-5 Steel Cross Beams and Caps



(2) **Pin and Hanger Supports** – The pin and hanger connection used to support a suspended span from a cantilever span should be considered fracture critical if the member is non-redundant. The pin connection and hanger support in a two-girder or three-girder system is fracture critical as the bridge has no built in redundancy. The same connections in a multi-beam system (more than 3 beams) are not fracture critical as the bridge has a high degree of redundancy. Pin connections in such bridges should be inspected with the same techniques and methods as fracture critical pins (Exhibit 3-6).

Exhibit 3-6 Pin and Hanger Supports



3. **Prepare Written Procedures** – Once the fracture critical members within a bridge have been identified, the agency must prepare a detailed plan as to how it will accomplish the Fracture Critical Inspection. This written procedure may be developed by others being hired to perform the Fracture Critical Inspection. However, if this is done, a qualified designee from the owner agency should carefully review the written plan to ensure that a sufficient analysis of the member will be made and that the task will be accomplished in a reasonable manner. These written inspection procedures are to be kept in each bridge file.

   Fracture Critical Inspections can prove costly; therefore, in the development of the inspection plan, particular attention should be given to each of the following:

   a. **Scheduling** – Generally, it will be best to schedule a Fracture Critical Inspection during cold weather (as cracks will be more visible), at low water (if the fracture critical member is underwater at high water), during daylight hours, and when traffic on the bridge will be lightest (as some form of traffic control may be necessary).

   b. **Equipment** – The Team Leader will require close access to each fracture critical member; thus, some type of equipment may be needed to provide sufficient access. Ladders, scaffolding, aerial work platforms, or UBITs may be deemed appropriate for a given situation. The choice of equipment will depend on the cost of rental, the time needed to perform the inspection using that equipment, and equipment availability. If a UBIT is used, it should be determined, before its use, whether it could overload the bridge, operate on the bridge grade, has sufficient reach, and if it might damage the deck. Use of a UBIT may also create a need for traffic control.

   c. **Workforce** – In order to keep the amount of time spent at the bridge site to a minimum, consideration should be given to the level of manpower needed. Once the number of individuals needed is determined, the duties to be performed by each individual should be clearly defined.

   d. **Tools** – The standard tools common to any Routine Inspection should be on hand for the Fracture Critical Inspection. In particular, a wire brush, a magnifying glass, and a light source able to provide 50 to 100 lumens should be considered. In addition, specialized tools for carrying out nondestructive testing may also be warranted (i.e., a dye penetrant kit or ultrasonic testing device).

   e. **Inspection Procedures** – The fracture critical member inspection plan should identify the inspection frequency and method(s) to be used. These should be developed depending on the criticality of the feature based on experience with other similar details or structures, calculated remaining fatigue life, current indications, material properties, consequences and likelihood of rapid failure, etc.

      If several types of inspection are employed, identify when, where and how they are to be used. For example, a pinned truss bridge may require each of the pins to be examined visually during each inspection, supplemented by ultrasonic testing of ⅓ of the pins during each inspection. Therefore, all of the pins would be inspected ultrasonically in a 72-month period, if the inspection frequency was 24 months.

4. **Perform the Fracture Critical Inspection** – The purpose of the Fracture Critical Inspection is to assess the structural condition of each bridge member identified as fracture critical. When inspecting these members, it is always best to err on the side of conservatism. The consequences of dismissing or failing to note a blemish on a fracture critical member are too great. Therefore, the inspection should be conducted carefully and thoroughly. Such close inspection of single members can be tedious; however, the Team Leader should work in a manner that insures the same degree of care and attention to the last area inspected as the first. The previous pages described the general areas within a bridge where fracture critical members will be located. The following pages describe the particular features to note.

   First, the Team Leader must gain access to the fracture critical area. The Team Leader should be no further than 24 inches from the surface being inspected and should work with a light source of at least 50 to 100 lumens. The best viewing angle is at approximately 120°. The Team Leader will want to look for deteriorated surfaces or surface cracks. The BIRM discusses inspection procedures and the types of problems that may be found.

   The following areas or members should be checked:

   - Areas vulnerable to corrosion (under deck joints, on surfaces where water collects and in places where dissimilar materials meet).
   - Areas where there is a change in the bridge cross section, where stress is concentrated, or which show out-of-plane bending.
   - Web stiffeners (especially at the ends).
   - Coped sections and/or re-entrant corners.
   - Eyebars.
   - Shear connectors.
   - Pin and hanger assemblies.
   - Punched holes.
   - Rivet and bolt heads.
   - Tack welds and field welds (especially at weld ends or returns).

   If any cracks, blemishes, or other irregularities are found, the Team Leader will need to evaluate these further, which may include the use of a magnifying glass. A dye penetrant kit can be used to establish the limits of a crack. Use of magnetic or ultrasonic testing devices may be required to detect internal problems not apparent to the eye. The agency will need to determine which devices will be the most cost effective and reliable for the given situation.

   Finally, the Team Leader will need to record the location and size of any cracks found. Mark and date the crack ends in permanent marker for follow up on the structure. In most cases, it will be helpful to take a photograph of such cracks to provide visual documentation. This information and the photographs are to be included in the Visual Fracture Critical Inspection Report.

5. **Prepare the Visual Fracture Critical Inspection Report** – At the conclusion of the Fracture Critical Inspection, a Visual Fracture Critical Inspection Report should be prepared to provide detailed verification of the inspection findings. The report should provide qualitative and quantitative information concerning the fracture critical member. This information is important for a number of reasons: it can offer insight about the condition of the member, it can provide a history of the bridge, and it can be used to substantiate the thoroughness of the inspection effort in the event of litigation arising from a bridge failure. See Section 3-5 for a copy of the Visual Fracture Critical Inspection Report form.

   The inspection report should:

   - Identify what parts of the bridge were inspected and the location of each fracture critical bridge member. (This can be shown on a photograph or sketch of the bridge.)
   - Describe the procedures followed to inspect the fracture critical member.
   - Describe the condition of the fracture critical member.
   - Provide the following details about any defects found:
     - What the defect is.
     - Where the defect is located (a sketch may be used to illustrate its location relative to the ends of the member, and its position in the cross section of the member).
     - Summarize the inspection findings (addressing how individual defects affect the member's overall condition).
     - Make any appropriate recommendations (i.e., repair the fracture critical member, recalculate load ratings, close the bridge).

6. **Updating the Inventory Record** – Any changes that need to be made to the Inventory Record shall be entered into BridgeWorks.

   On all Fracture Critical Inspections, all changes/updates to NBI data shall be released into the inventory within 90 days of the date of inspection.

7. **Updating the Bridge File** – Place the signed and completed Visual Fracture Critical Inspection Report within the bridge file. This report can be referred to if necessary to help determine the appropriate inspection frequency for the bridge, evaluate the degree to which bridge conditions have changed from one inspection to the next, and determine what maintenance or repair may be required on the bridge.

8. **Fracture Critical Inspections with Frequencies Less than 24 Months** – Fracture Critical Bridges should be considered for more frequent inspections if the NBI Superstructure or Substructure code is equal to or less than a 4 and where there are multiple elements with deficiencies that reduce capacity. The SPM will approve the need to perform Fracture Critical Inspections more frequently than 24 months.

(C) Underwater

Bridges over water have special inspection requirements. If the bridge has members in water too deep to permit a visual or tactile (hands-on and/or wading) inspection from the surface at low water or during seasonal low stream flows, an underwater bridge inspection diver must conduct an Underwater Inspection. An evaluation of the bridge's susceptibility to scour also needs to be conducted, see Section 5-3. Many bridge failures are due to underwater or scour problems; therefore, the importance of these types of inspection cannot be overemphasized. There may be environmental restrictions that need to be taken into consideration prior to conducting an Underwater Inspection.

An Underwater Inspection of submerged bridge elements is required on an interval not to exceed 60 months. The purpose of the Underwater Inspection is to examine the underwater elements to the extent necessary to determine their structural condition and adequacy. At a minimum, an underwater bridge inspection diver must swim by and examine all underwater portions of the bridge. If the underwater elements are covered with marine growth, portions of the structure need to be cleaned in order to positively ascertain the condition of the element. For concrete piers, this consists of cleaning 1 square foot patches near the surface, mid height, and bottom of all piers. For multiple pile bents, a one foot band must be cleaned near the surface, mid-height and bottom of one pile per bent, but no less than 10 percent of the piles. The underwater bridge inspection diver must also perform a visual or tactile inspection of the entire bridge footing at ground line to identify if any undermining of the footing exists, as well as probing to determine if scour holes are being filled in. If significant problems are encountered during the course of the inspection, a more detailed inspection of the bridge may be needed.

Existing scour conditions must be evaluated during an Underwater Inspection. The Team Leader must assess condition and depth of the streambed, determine the susceptibility of the streambed to scour, and determine what countermeasures can be taken to safeguard the bridge. The primary requirement of the scour inspection is to establish a cross-section of the streambed. This is accomplished by sounding and can be carried out with either a fathometer (also known as a "fish finder") or a lead line. See the BIRM and the MBE for guidance on performing Underwater Inspections. Underwater Inspections are reported to the NBI.

1. **Prepare Written Procedures** – Written inspection procedures need to be developed for each bridge requiring an underwater inspection. The inspection plan should detail as a minimum:
   - Type and frequency of required inspection.
   - Location of members to be inspected.
   - Type(s) of foundation.
   - Bottom of foundation elevation or pile tip elevation.
   - Identification of scour critical substructure units.
   - Special equipment requirements.
   - Follow-up actions taken on findings of last inspection.

2. **Document the Underwater Inspection** – Prepare a Daily Site Dive Log for each dive and prepare an Underwater Inspection Report when inspection of the entire underwater portion of the bridge is concluded.

   a. **Daily Site Dive Log** – The Daily Site Dive Log must be completed by the inspection Team Leader (in concert with the diver). Section 3-5, provides a sample of the Daily Site Dive Log form. The form should summarize what equipment was used in the dive, what procedures were employed, what problems were encountered (such as strong currents or underwater obstructions or accumulations of debris), and should provide any information which may be helpful for planning future dives. At the conclusion of every dive, the diver must go over the inspection findings with the Team Leader in order to verify that the notes taken by the staff on the surface are a correct representation of what the diver found. The diver should also go over all underwater photos, making sure that the photo numbers and descriptions are correct.

   b. **Underwater Inspection Report** – The Underwater Inspection Report must be completed by the underwater inspection Team Leader and reviewed by the diver. The report should be thorough and include the following information for the various levels of inspection performed.

      (1) For a Routine Underwater Inspection, note:
      - What conditions were found as a result of the visual inspection or cleaning.
      - The condition of any protective coatings.
      - Evidence of any significant defects or damage.
      - Evidence of scour or the build-up of debris at the piers.
      - The location of exposed foundation elements.
      - Ground line elevations at the base of all piles or pile groups, elevations of the tops of all exposed footings and/or seals, and ground line elevations of all footings or seals at their corners.
      - The condition of the streambed around each pier, including a description of any placed rock.
      - The water flow (whether high, medium, or low) and an approximation of the velocity (ft/sec.).
      - The influence of any significant environmental conditions (i.e., corrosive pollutants, salt water, etc.).
      - Any changes to the surrounding area which have or may alter the flow characteristics around the pilings or piers (i.e., logs upstream, construction going on nearby).
      - Any discrepancies between the bridge design and its actual configuration.
      - Any recommendations for repairs, a subsequent scour inspection, a change in inspection frequency, or an in-depth inspection.

      (2) For an Interim Inspection, note:
      - The specific areas inspected.
      - The amount and type of testing performed.
      - Testing results and/or findings.
      - Any recommendations for repair

In addition to the written information provided in the Underwater Inspection Report, problem areas in the bridge should be carefully identified and documented with drawings, photographs, and/or video recordings. Although underwater photos and video recordings are often preferred, they may not always offer clear views of the problem areas so sketches and drawings are always needed to document findings.

3. **Updating the Inventory Record** – Any changes to the applicable inventory coding information (the date of underwater inspection, Team Leader initials, inspection hours and changes to the condition coding for the substructure) shall be entered so that the Inventory Record can be updated accordingly. On all Underwater Inspections, all changes/updates to NBI data shall be released into the inventory within 90 days of the date of inspection.
4. **Updating the Bridge File** – The completed Underwater Inspection Report and an updated copy of the Inventory Record shall be placed in the bridge file. These reports can be referenced to as necessary to help determine the appropriate inspection frequency for the bridge, to evaluate the degree to which bridge conditions have changes from one inspection to the next, and to determine what maintenance or repair may be required.
5. **Underwater Inspections with Frequencies Less than 60 Months** - Bridges that require an Underwater Inspection should be considered for more frequent inspections if the NBI Substructure code is equal to or less than a 4, or the Scour code is equal to or less than a 2 and where there are underwater elements with deficiencies that reduce capacity. The SPM will approve the need to perform Underwater Inspections more frequently than 60 months.

(D) Special Feature

Bridges with special features include structures such as movable bridges, floating bridges, suspension and cable-stayed bridges, and ferry terminals. Also included are bridges built with special materials such as high strength steel, and bridges that were built using techniques such as segmentally constructed post-tensioned concrete boxes. Bridges with pin and hanger connections are also considered to be special feature bridges. Written procedures must be developed and included in the bridge file for all Special Features Inspections. Procedures should include:

- Type, detail, and frequency of required inspection.
- The location of members to be inspected.
- Special equipment required.

The first four bridge types listed below are considered “Complex Bridges” according to the NBIS. The remaining types are inspected as suggested by FHWA. See Appendix 3-D on FHWA letter for Bridge Special Feature Inspections. Special Feature Inspections are performed on regular intervals not to exceed 24 months. Special Feature Inspections are reported to the NBI.

1. **Movable Bridges (Code ‘1’ in BridgeWorks)** – There are three basic types of movable bridges: vertical lifts, bascules, and swings. All of these structures are operated by either electro-mechanical drive systems or hydraulic systems. See the BIRM and the MBE for guidance on performing inspections on movable bridges.

2. **Suspension Bridges (Code '3' in BridgeWorks)** – Suspension bridges consist of a pair of main cables hanging between and passing over two towers and anchored by backstays into large counterweights on opposite shores. Suspender ropes hang from the main cables and support a pair of stiffening trusses or girders that run the length of the suspended spans. The stiffening trusses or girders support floor beams, stringers, and a roadway deck. Orthotropic decks may be used in place of the stringers and roadway deck. See the BIRM and the MBE for guidance on performing inspections of suspension bridges.
3. **Cable-Stayed Bridges (Code '9' in BridgeWorks)** – Cable-stayed bridges are very distinct structures with many unique details that require special inspection. On a cable-stayed bridge the longitudinal structural components that support the road deck are supported by inclined cables or stays that extend directly into anchors or saddles in one or two towers. One cantilevered component is balanced by another cantilevered component on the opposite side of the support tower. Typically, the deck is anchored to the ground in at least one spot to resist seismic forces and any unbalance in the cantilevered spans. See the BIRM and the MBE for guidance on performing inspections on cable-stayed bridges.
4. **Segmental Bridges (Code '5' in BridgeWorks)** – Segmental bridges are unique due to their construction. A segmental girder is a single or multiple box girder that is formed from segments post-tensioned together. This type of construction takes advantage of the standardization of the manufacturing process. See the BIRM and the MBE for guidance on performing inspections of concrete segmental bridges.
5. **Floating Bridges (Code '2' in BridgeWorks)** – Floating bridges in Washington State consist of concrete pontoons that are bolted together longitudinally and are held in position by steel cables connected to anchors on the bottom of the waterway. Some of the bridges are reinforced with prestressing steel. Two of Washington State's floating bridges contain movable spans that have unique operating characteristics.
6. **Ferry Terminals (Code '6' in BridgeWorks)** – Ferry Terminals (Code '6' in BridgeWorks) – Ferry terminals usually have a dock or holding area built over the water and a transfer span to carry traffic onto the ferry deck. The holding area can be constructed of treated timber, concrete, or steel components. The vehicle holding area or "dock" is typically considered a standard bridge structure and receives a Routine and Underwater Inspection. The transfer spans generally are steel trusses or girders with one end supported on the fixed pier and a free end which can be raised or lowered onto the boat to accommodate tidal changes. Transfer spans typically have their own structure I.D. and these structures are the ones with unique features which require the "Special Feature" inspection. Ferry Terminal transfer spans have enough unique features that specific BMS elements and inspection procedures have been developed to help the inspector navigate through a ferry terminal inspection. The *Ferry Terminal Inspection Procedures Manual* is published as a stand-alone document and can be found as publication M 3105 at wwwi.wsdot.wa.gov/publications/manuals/m3105.htm.
7. **Pin and Hanger Connections (Code '4' in BridgeWorks)** – A pin and hanger is a system used to connect suspended spans to cantilevered spans. The hanger is connected to a beam or girder by a pin on one or both ends. In two-girder and three-girder systems, the pin and hanger connection is fracture critical. Even when used in a multi-beam system where the bridge has a high degree of redundancy, the connection should still be inspected as closely as any fracture critical element. This is due to problems experienced in other states with pins in multi beam suspended spans. See the BIRM and the MBE for guidance on performing inspections of pin and hanger assemblies.

8. **A-514 High Performance Steel (Code '7' in BridgeWorks)** – A-514 steel is used in high stress areas of larger steel bridges to reduce member size and total weight of steel. A typical location would be the top and bottom flanges of plate girders over the intermediate piers.

   Bridges fabricated from A514 steel have suffered from hydrogen cracks which occurred during fabrication. Also, higher strength steels generally are subject to larger stress ranges than the lower strength steels. In tension zones, cracks may initiate and propagate faster than in the lower strength steels. It is important that Team Leaders check tension zones closely for cracks particularly at welds, bolt holes, copes, and other fatigue prone locations.

   The Team Leader and Assistant Inspector are required to sign the approved and released copy of the Special Feature Report that is placed in the bridge file.

(E) Interim

Special inspections as defined in the MBE are called Interim inspections in the state of Washington. This inspection type is scheduled when a particular known or suspected deficiency needs to be monitored between Routine Inspections. Interim Inspections are not reported in the NBI or NTI.

1. **Identifying Need** – The Interim Inspection is performed to monitor a particular known or suspected deficiency and is carried out between regularly scheduled Routine Inspections. For example, if noticeable settling has occurred in the foundation, or if a particular bridge member shows signs of rapid deterioration. The Team Leader should observe and monitor this condition to determine the effect on the bridge or the danger posed to the bridge. Bridges or culverts should be considered for an Interim Inspection if the NBI Superstructure, Substructure or Culvert code is equal to or less than a 3.

   The inspection interval may vary depending on the type of deficiency being inspected. Interim Inspections may occur between regularly scheduled Routine Inspections on 24 month intervals, typically on the off year of the Routine Inspection. There are cases where Interim Inspections may occur several times during a calendar year on three or six month intervals. The inspecting agency along with the Team Leader will determine the appropriate inspection interval.

   Consider performing an Interim Inspection for load posted bridges. The Interim Inspection should occur in the year that the Routine Inspection is not due.

2. **Performing Inspection** – The Team Leader is free to schedule an Interim Inspection as the need arises. This type of inspection can be accomplished by any Team Leader who has some familiarity with the bridge. If someone other than the Team Leader who performed the Routine Inspection is scheduled to perform the Interim Inspection, they should be carefully instructed as to what to look for, what measurements to take, what results might be expected, and/or how the problem can affect the structural integrity of the bridge.

3. **Reporting** – A BIR documenting the inspection findings should be prepared by the individual who performed the inspection. Any of the following information may be appropriate to include:
   - The date of Interim Inspection.
   - The Team Leader's name.
   - The applicable inspection interval.

- The location of the element or elements inspected.
- Any measurements taken.
- The procedures utilized to analyze and assess the given bridge element(s).
- The results of any testing performed.
- Any recommendations for maintenance or repair.

4. **Updating the Inventory Record** – Any changes that need to be made to the Inventory Record shall be entered into BridgeWorks. The Routine inspection date should not be changed due to an Interim Inspection. On all Interim Inspections, all changes/updates to NBI and NTI data shall be released into the inventory within 90 days of the date of inspection

5. **Updating the Bridge File** – A copy of the report and an updated copy of the Inventory Record (if applicable) must be placed in the bridge file at the completion of the Interim Inspection and must be cross referenced to the current Bridge Inspection Report.

(F) Underwater Interim

This inspection type is scheduled when a particular known or suspected deficiency needs to be monitored between the regularly scheduled Underwater Inspections. Underwater Interim Inspections are not reported in the NBI.

1. **Identifying Need** – Common examples of findings requiring a change in the Underwater Inspection frequency are extensive scour or rapidly progressing deterioration. For example, spread footings normally buried and not visible for inspection which become exposed, or pile founded footings which become undermined need to be monitored closely. Foundation deterioration or damage may also warrant a visual inspection at a frequency less than the mandatory 60 months. Bridges should be considered for an Interim Underwater Inspection if the NBI Substructure code is equal to or less than 3.

   The inspection interval will vary depending on the type of deficiency being monitored, and how rapidly the deterioration may be progressing. For scour related findings where a normally buried spread footing is found exposed, or in the case of a pile supported footing which becomes undermined, the Interim Inspection is placed on a 12 month frequency. During subsequent Interim Inspections, the frequency may be adjusted upwards if the scour is determined to be stable and non-threatening to the structure. Adjusting a scour related Interim Inspection frequency upwards is done slowly over time, i.e., 12 months, 24 months, 36 months ect., until the maximum 60 month inspection frequency is reached. For non-scour related Underwater Inspection findings (i.e., foundation damage or deterioration) the Underwater Interim Inspection frequency will usually be set at 24 months. There may be cases where Interim Inspections should occur several times during a calendar year on three or six month intervals. The inspecting agency along with the Team Leader will determine the appropriate inspection interval.

   Consideration should be given to performing an Underwater Interim Inspection for load posted bridges, provided the load restriction is due to element's that are only visible by Underwater Inspection techniques.

2. **Performing Inspection** – The underwater BIR will have specific language pertaining to the portions of the bridge needing the Interim Inspection, and what measurements need to be made. The Team Leader should carefully review the past inspection reports to become familiar with the bridge, and to assure that the correct portions of the bridge receive the Interim Inspection.
3. **Reporting** – A BIR documenting the inspection findings should be prepared by the individual who performed the inspection. Any of the following information may be appropriate to include:
   - The date of Interim Inspection.
   - The Team Leader's name.
   - The applicable inspection interval.
   - The location of the element(s) inspected.
   - Any measurements taken.
   - The procedures utilized to analyze and assess the given bridge element(s).
   - The results of any testing performed.
   - Any recommendations for maintenance or repair.
4. **Updating the Inventory Record** – Any changes that need to be made to the Inventory Record shall be entered into BridgeWorks. The Underwater Inspection date should not be changed due to an underwater Interim Inspection. On all Interim Inspections, all changes/updates to NBI data shall be released into the inventory within 90 days of the date of inspection.
5. **Updating the Bridge File** – A copy of the report and an updated copy of the Inventory Record (if applicable) must be placed in the bridge file at the completion of the Interim Inspection and must be cross referenced to the current bridge inspection report.

(G) Damage

A Damage Inspection is an unscheduled one-time inspection to assess structural damage resulting from an environmental or human event. The scope of inspection should be sufficient to determine the need for emergency load restrictions or closure of the bridge to traffic, and to assess the level of effort necessary to define a repair. Depending on the specific situation, a Damage Inspection may be cause to initiate Interim inspections. This determination is typically made by the Team Leader or their supervisor. Damage Inspections are not reported to the NBI or NTI.

Damage Inspections are categorized by type based on the damage received or how it was found or is being reported. Team Leaders should create a Damage Inspection Report in BridgeWorks and choose one of the following events:

- A – Over Height
- B – Lateral Damage to Vertical Member
- E – Flood
- G –Earthquake
- H – Bridge Rail
- O – Other
- S – Reported by Others - Overheight
- T – Reported by Others – Lateral
- U – Reported by Others - Bridge Rail

Damage Inspections do not have scheduled inspection frequencies but subsequent In-Depth and/or Interim Inspections may be scheduled as a result of the damage to monitor the structure over time.

If called upon to perform a Damage Inspection, Team Leaders should get familiarized with the type of bridge and the location of the damage. Office review of as-built plans and photos should take place prior to inspecting the damaged structure.

1. **Assess Damage** – When damage occurs as a result of collision, earthquake, or other forces, a thorough examination of the damaged areas should be made, along with an assessment of any residual damage to other bridge components. The amount of time and effort required to make this assessment will depend upon the extent and seriousness of the damage.

   If significant damage has occurred, the Team Leader will need to:

   - Identify any fractured members.
   - Determine any loss of foundation support.
   - Compute the amount of any section loss.
   - Measure the amount any member is out of alignment.
   - Inform the bridge owner that an updated load rating may be necessary.

   Any time flooding has occurred on the waterway the bridge crosses, an inspection should be conducted both during and immediately after the flooding to assess what effects the increased water flow is having, or had, on the bridge. The following explains these procedures:

   (a) **During Event Inspection** – An inspection during the flood can provide information about the structure's safety and condition under adverse conditions. Observations made during the flood may help the Team Leader recommend appropriate measures to protect the bridge from failure or damage due to any future flooding.

   To the extent possible during the flood, the Team Leader should look for the suggestion or the presence of any of the following:

   - Streambed scour around underwater bridge elements.
   - Bank erosion.
   - Lateral migrations in the channel.
   - Sediment transport or accumulation.
   - Debris transport or accumulation (especially around piers).

   (b) **Follow-up Inspection** – The bridge should be revisited immediately after the flood to assess any damage to the bridge and to provide information about the actual impact of the flood. The Team Leader should assess the impact of any of the following:

   - Streambed scour around underwater bridge elements.
   - Bank erosion.
   - Lateral migrations in the channel.
   - Sediment transport or accumulation.
   - Debris transport or accumulation (especially around piers).

2. **Critical Damage-Bridge Repair Report (CDBRR)** – If the bridge has been damaged to the extent that has resulted in an emergency load restriction, lane closure, or a bridge closure, a CDBRR, which is part of the Bridge Damage Report, shall be used, see Section 6-2 for further instructions. A copy of this report shall be entered into BridgeWorks and another copy shall be sent to FHWA for initial report and any subsequent updates.

3. **Reporting** – After a Damage Inspection Report has been created within BridgeWorks, descriptions and comments shall be added under the appropriate BMS elements describing the damage. A Bridge Damage Report is also required for all Damage Inspections performed by the state, See Section 6-2 for further instructions.

   Add the damage photos and revise the BMS condition state codes if necessary. The following information should also be noted:

   - The location, extent, and type of any damage found.
   - The amount of any section loss.
   - The degree to which any members are out of alignment.
   - The need for new load ratings, if applicable.
   - Any recommendations for repair or maintenance.
   - Vertical clearance at the point of impact and at the minimum opening of the span on over height damage inspections.

   For prestressed concrete or steel bridges fill out the Prestressed Concrete and Steel Damage Report form or equivalent to supplement the Bridge Damage Report, see Section 3-5.

   If the bridge is damaged as a result of the flood or if conditions have changed at the bridge site, a Bridge Damage Report and a new Scour Field Evaluation form must be completed. If the bridge is a scour critical structure, the instructions within the Plan of Action (POA) should be followed, see Section 5-3.2.

   The report should provide the following information:

   - Flood stage at which the bridge was visited. This information can be found at the NOAA National Weather Service website.
   - Approximate streamflow volume and velocity at the time of the visit. This information can be found at the NOAA National Weather Service website.
   - Location and extent of any damage to the bridge.
   - Current condition of any bridge elements affected by the flood.
   - Any recommendations for scour countermeasures, bank protection, channel protection, etc., which may protect the bridge from damage during future flooding or reduce the potential for future flooding.

   When printing Bridge Damage Reports, only include the BMS elements, photos, repairs and files that pertain to the damage.

4. **Updating the Inventory Record** – If any changes to the Inventory Record (the inventory or load ratings, for example) are needed, they must be entered into BridgeWorks. On all Damage Inspections, all changes/updates to NBI and NTI data shall be released into the inventory within 90 days of the date of inspection.

5. **Updating the Bridge File** – A copy of the BIR and an updated copy of the Inventory Record (if applicable), a copy of the Bridge Damage Report and all other applicable forms and drawings shall be placed in the bridge file at the completion of the Damage Inspection.

(H) Primary Safety

A Primary Safety Inspection (H) is used by an agency that chooses to inspect a structure owned by another agency. Some examples include:

- a railroad bridge over a state or local agency route
- a local agency owned pedestrian bridge over a state route
- a state owned bridge carrying traffic over a local agency route

Agencies that own the structure and maintain a record in WSBIS cannot use the primary safety report types.

This inspection is performed at the discretion of the agency which has an interest in the structure, and the inspection scope and frequency is also entirely determined by that agency. These inspections are not reported to the NBI or NTI, and are not subject to the NBIS or NTIS. Generally speaking these 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.

The agency performing a primary safety inspection should limit inspection notes to BMS element 378 – Undercrossing Primary Safety. Repair recommendations should be limited to only those findings that directly affect the safety for users of the route under the bridge. In cases where the bridge owner also maintains an inspection record in WSBIS, the repair can be added to the repair report. In cases where the bridge owner doesn't use WSBIS (most railroads for example), entering repairs into the repair report will need to be supplemented with direct contact with the structure owner.

(I) Secondary Safety

A Secondary Safety Inspection is used by an agency that chooses to inspect a structure owned by another agency in cases where 3 agencies have an interest in the structure – the owning agency and two agencies with routes under the structure. The only current example is a sound transit structure with a record maintained in WSBIS that crosses over both state and local agency routes. In this case, the state would maintain the primary safety report type and the local agency would maintain the secondary safety report type.

Agencies that own the structure and maintain a record in WSBIS cannot use the secondary safety report types. All notes for the secondary safety inspection should be located in BMS Element 379 – Undercrossing Secondary Safety.

In all other respects, the primary safety and secondary safety report types are similar, see the primary safety report type for additional information.

(J) Condition Safety

A Condition Safety inspection is used in cases where an agency owns a structure that is not reportable to the NBI or NTI but is using WSBIS to maintain a comprehensive record of the structure for both public safety and long term maintenance. Examples include:

- A state or local agency pedestrian bridge, regardless of whether or not it crosses over a state or local agency route.
- A bridge that is undergoing phased construction and may require an inspection before final configuration.
- A transit structure where the owner chooses to maintain a record in WSBIS, again regardless of whether or not it crosses over a state or local agency route.

Short Span Inspections and Report types are separate from Condition Inspection and Report Types. See (K) Short Span.

This inspection is performed at the discretion of the agency which owns the structure, and the inspection scope and frequency is also entirely determined by that agency. These inspections are not reported to the NBI or NTI, and are not subject to the NBIS or NTIS. Generally speaking these inspections are intended to ensure both public safety and long term maintenance of the entire structure. In this regard they are similar to routine inspections, but without specific federally mandated requirements for inspection frequency, level of detail, or appraisal coding.

(K) Short Span

Short Span (I) – This inspection type is used for bridges/culverts that have an opening of 20 feet or less. This is measured along the center of the roadway between undercopings of abutments, spring lines of arches, or extreme ends of openings for multiple boxes. Short Span bridges may also include multiple pipe culverts, but the clear distance between openings must be less than half of the smaller contiguous opening. Short Spans are not reported to the NBI.

Even though short span bridges are not reported to the NBI, there remains concern about their deterioration and performance. Therefore, it is recommended that agencies inspect short span bridges similar to a full NBI inspection for informational purposes. The frequency of the inspections for these bridges will be at the discretion of the owner agency. An Assistant Inspector who has 3 years of bridge condition inspection or the approval of their supervisor and has successfully completed a FHWA approved comprehensive bridge inspection training course can perform as a Team Leader for Short Span Inspections.

1. **Inspection Criteria** – Inspections are recommended for the following short span bridges:
   - Timber structures that meet the criteria in Appendix 3-A1 and Appendix 3-A2.
   - Single span concrete or metal structures, other than metal corrugated pipes that meet the criteria in Appendix 3-A1 and Appendix 3-A2.
   - Multiple span structures that meet the criteria in Appendix 3-A3.
   - Metal corrugated pipes with an opening greater than 8 feet.
   - Multiple pipes with a structure length from 10 feet to 20 feet, see (1340) in Appendix 2-C for structure length definitions.

   This criteria is presented as a guideline and is not intended to replace sound engineering judgment. When in doubt, a conservative approach should be taken.

   a. **Short Span Bridges Inspected** – If the short span bridge is inspected, agencies should follow these guidelines on reporting:

      (1) Fill in all the applicable fields listed on the WSBIS coding form. The bridge number should be unique for short span bridges.

      (2) Take deck and elevation photographs.

      (3) Fill out the Scour Field Evaluation form (if applicable).

      (4) Complete a BIR.

(5) Determine the frequency of inspection needed. Recommended frequencies are as follows:

- **12 Months** – Timber with red/yellow tags, any other material in poor condition needing monitoring, scour issues, load posting, etc.
- **24 Months** – All other timber structures, any other material that has BMS elements in Condition States 3 or 4.
- **48 Months** – Metal structures in good condition and concrete structures with minor problems.
- **72 Months** – Concrete structures in good condition.

(6) Submit the data through normal bridge inspection reporting procedures.

b. **Short Span Bridges Not Inspected** – If the short span bridge is not inspected, the following are some guidelines to follow:

(1) WSDOT Team Leaders should note the milepost, type of bridge, features carried, features intersected, take elevation and deck photographs, and notify maintenance personnel that future inspections of the bridge are their responsibility.

(2) Local Agency Team Leaders should note the milepost, type of bridge, features carried, features intersected, take elevation and deck photographs, and determine if the need for any future inspection of the bridge is necessary and coordinate with their maintenance personnel.

2. **Performing the Inspections** – The inspection procedures for short span bridges are the same as those for NBI bridges.

   An Underwater Inspection is performed on short span bridges with structural elements underwater. If the Team Leader is unable to assess the condition of the elements either visually or by probing, an underwater bridge inspection diver must conduct the Underwater Inspection. This inspection determines the structural condition and adequacy of the short span bridges underwater elements.

3. **Updating the Inventory Record** – Following the inspection procedures used on NBI bridges insures consistency of reporting. State-owned bridges are added to the WSDOT Bridge List while local agency bridges are added to their own local inventories.

   After the bridges are inspected, the procedures for creating and updating the Inventory Record are followed. On all short span inspections, all changes/updates to the data shall be released into the inventory within 90 days of the date of inspection.

4. **Updating the Bridge File** – The minimum information maintained in the bridge file for short span bridges should include:

   a. Inventory data, including location maps.

   b. Completed inspection forms.

   c. A sketch of the bridge showing dimensions and depth of fill (barrel length should be taken as one pass distance, regardless of the number of barrels).

   d. Deck and elevation photographs

   e. Scour Field Evaluation Form (if applicable).

   f. Correspondence.

(L) Two-Man UBIT

This inspection type is used when the UBIT, its driver and the UBIT operator are supplied to an outside agency by the BPO, but the responsibility for the inspection and reporting resides with the Team Leader. The sole purpose of this inspection type is to facilitate the scheduling of future inspections and the internal accounting and billing of current inspection work. The frequency for Two-Man UBIT inspections is set by the Local Agencies. This inspection type is not reported to the NBI.

1. **Identify Need** – Through signed agreements between the State and Local Agencies, the State can assist those agencies with inspections requiring the use of specialized equipment by performing two-man UBIT inspections.

   The inspection interval may vary depending on terms of the agreement between the State and the Local Agency. The Local Agency shall determine the level and inspection interval for their structures within the agreement.

2. **Performing the Inspection** – Typically, an Assistant Inspector and UBIT driver will make up the inspection team that represents the State. A Local Agency Team Leader will accompany the state team to perform the inspection. The Assistant Inspector will coordinate with the Local Agency Team Leader as to how the work will proceed for the time period assigned.

3. **Updating the Inventory Record** – The responsibility of generating the BIR and editing the WSBIS and any applicable inspection forms and entering the data into BridgeWorks shall reside with the Team Leader from the Local Agency.

4. **Assistant Inspector/Local Agency Team Leader Responsibilities** – The Assistant Inspector from the State or the Local Agency Team Leader under advisement of the State Assistant Inspector shall ensure that the following items are completed during and after the inspection of each local agency bridge.

   a. While at the bridge site, take a Deck and Elevation photo of the structure.

   b. Log the actual UBIT hours on site.

   c. Create a Two-Man inspection type within BridgeWorks.

   d. Enter the Local Agency Team Leader's initials as ZZZ and a certification number of Z9999.

   e. The bucket operator's initials will be entered as the Assistant Inspector. The Assistant Inspector should attach the deck and elevation photos taken at the site into BridgeWorks.

   f. Add the appropriate resources and dates for future inspections.

(M) Informational

This report type is used as a means to add notes, data, files or photos to a report between scheduled inspections. Additionally the Informational Report can be used to change the inspection frequency if necessary or to just assign a next scheduled inspection date without having to change the normal inspection frequency. An Informational Report type does not involve field work and is typically used by inspection staff and the Bridge Information Group. Data that is updated through an Informational Report can be accessed from the SI&A report on BEISt. Depending on the type of data updated through an Informational Report, it may be necessary to print out and sign a new report for scanning into BEISt. This will be determined by the Team Leader and their supervisor. An example of an Informational Report that may require a signature is one that changes the NBI or Bridge Management System (BMS) or SNTI codes. In these cases, a statement in the applicable area of the notes section of the report should state why the changes made were made. Informational Reports are not reported in the NBI or NTI. An Assistant Inspector who has 3 years of bridge condition inspection experience or the approval of their supervisor and has successfully completed a FHWA approved comprehensive bridge inspection training course can create an Information Report.

(N) Inventory

This report type is used to notify the inspection team that a structure is either new or altered and needs field verification to track construction progress and update the record when the work is completed. This report type will also provide detailed information on the new or altered structure to assist the inspection team in field verification. This report type is intended to stay in the bridge record until the construction work is completed, then removed thereafter.

For WSDOT structures, the Inventory report type is always created and removed by the BPO Information Group, and is closely coordinated with the ContractHistory database. BPO inspection teams shall always review the information in an inventory report type and update the record as needed, including clearly indicating when the construction work is completed.

Examples of construction work that tracked by this report type include:

- New structures
- Retrofits and rehabilitation (deck replacement, seismic retrofits, strengthening, etc)
- Any new or replaced BMS elements (new joints, rails, overlays, etc)
- Utility work
- Roadway alterations UNDER bridges that affect vertical and horizontal clearances (new pavement, roadway widening, etc)
- Functional changes (bridge changed from 2 way to 1 way traffic due to construction of new parallel bridge, for example)

Examples of construction work NOT tracked by this report type include:

- Repair work tracked in the Repair List
- Any changes to the structure record which are not performed in the field by inspectors (updated ADT, NHS designation, etc)

An Assistant Inspector who has 3 years of bridge condition inspection experience or the approval of their supervisor and has successfully completed a FHWA approved comprehensive bridge inspection training course can create an Inventory Report. This report type is not reported to the NBI or NTI.

(O) In-Depth

Any time a bridge element or portion of the bridge requires further evaluation, analysis, or investigation to accurately assess its condition, complete an In-Depth Inspection. This inspection may involve testing, monitoring, or conducting specific analyses of given bridge elements. In-Depth Inspections are performed as needed and do not have a set inspection frequency. They are not reported in the NBI or NTI.

1. **Identify Need** – Any time the structural condition of an element cannot be determined in the course of a Routine Inspection, an In-Depth Inspection may be required. The In-Depth Inspection is performed to obtain more sophisticated data, perform special testing, and/or bring in other experts to assess a particular problem.

   The need for an In-Depth Inspection generally arises as a result of a Routine Inspection; however, such a need may also be the result of a damage, flood, or Interim Inspection. Whenever such a need is discovered, an In-Depth Inspection should be performed.

   In-Depth Inspections do not have inspection intervals and are treated as one-time only inspections. If the inspecting agency feels that subsequent inspections are needed on regular intervals, Interim Inspections should be utilized instead.

2. **Performing the Inspection** – The In-Depth Inspection should include as detailed analysis as necessary to determine the condition of the given bridge element. There can be no standard set of procedures to follow or observations to be made. Many factors will influence the depth and extent of analysis required. To facilitate accomplishment of the inspection, the Team Leader should make sure that any traffic control measures or necessary special equipment will be available.

3. **Reporting** – There is no standard form to be completed for reporting In-Depth Inspection findings. When the inspection is concluded, the Team Leader should prepare a BIR along with any additional documentation to note:
   - The location of each bridge element inspected.
   - The procedures used to analyze and assess the particular bridge element.
   - The names, titles, and observations made by any specialists who were consulted.
   - The results of any testing performed.
   - Any recommendations for maintenance or repair.

4. **Updating the Inventory Record** – Any changes that need to be made in the Inventory Record shall be entered into BridgeWorks.

   On all In-Depth Inspections, all changes/updates to NBI or NTI data shall be released into the inventory within 90 days of the date of inspection.

5. **Updating the Bridge File** – A copy of the report and an updated copy of the Inventory Record.

   Record (if applicable) shall be placed in the bridge file at the completion of the In-Depth Inspection and must be cross referenced to the current Bridge Inspection Report.

(P) Geometric

This inspection type is used to collect vertical and horizontal roadway clearances for routes both on and under bridges and would also include a complete review and update of all the vertical clearance cards associated with the bridge. An Assistant Inspector can perform as a Team Leader for Geometric Inspections. Geometric data that has been collected using LIDAR can be used to update bridge inventory data as a Geometric Inspection as long as the Team Leader has reviewed the LIDAR data. This inspection type is not reported to the NBI or NTI.

(Q) Feature (Local Agency use only)

This inspection type is used for certified and non-certified inspectors to document time spent in bridge inspection activities. It is also used for scheduling non-reoccurring inspections. When a new UCD is created in BridgeWorks over top of a Feature Inspection, the Feature Inspection report tab will not be perpetuated.

Examples:

- A Co-inspector working on road crew documents bridge rail damage ob-served while in the area of the bridge.
- One time only chain drag of deck
- Evaluation of bridge for overload permit.

3-3 Bridge Inspection Orientation

Designation of the bridge orientation and a component numbering system for the bridge elements are needed for consistency within the inspection reports. Typical bridge orientation convention has the structure beginning at and going from the west end of the structure to the east, or from the south to the north, or in some cases, the direction of increasing mile post. The subcomponents of a structure are typically numbered from the left to the right looking ahead on stationing. The orientation and component numbering system typically follows the convention of the inspecting agency. If the State inspects bridges for other agencies, they will follow State convention (see Exhibit 3-7 through Exhibit 3-10) or follow established agency orientation.

Exhibit 3-7 Title

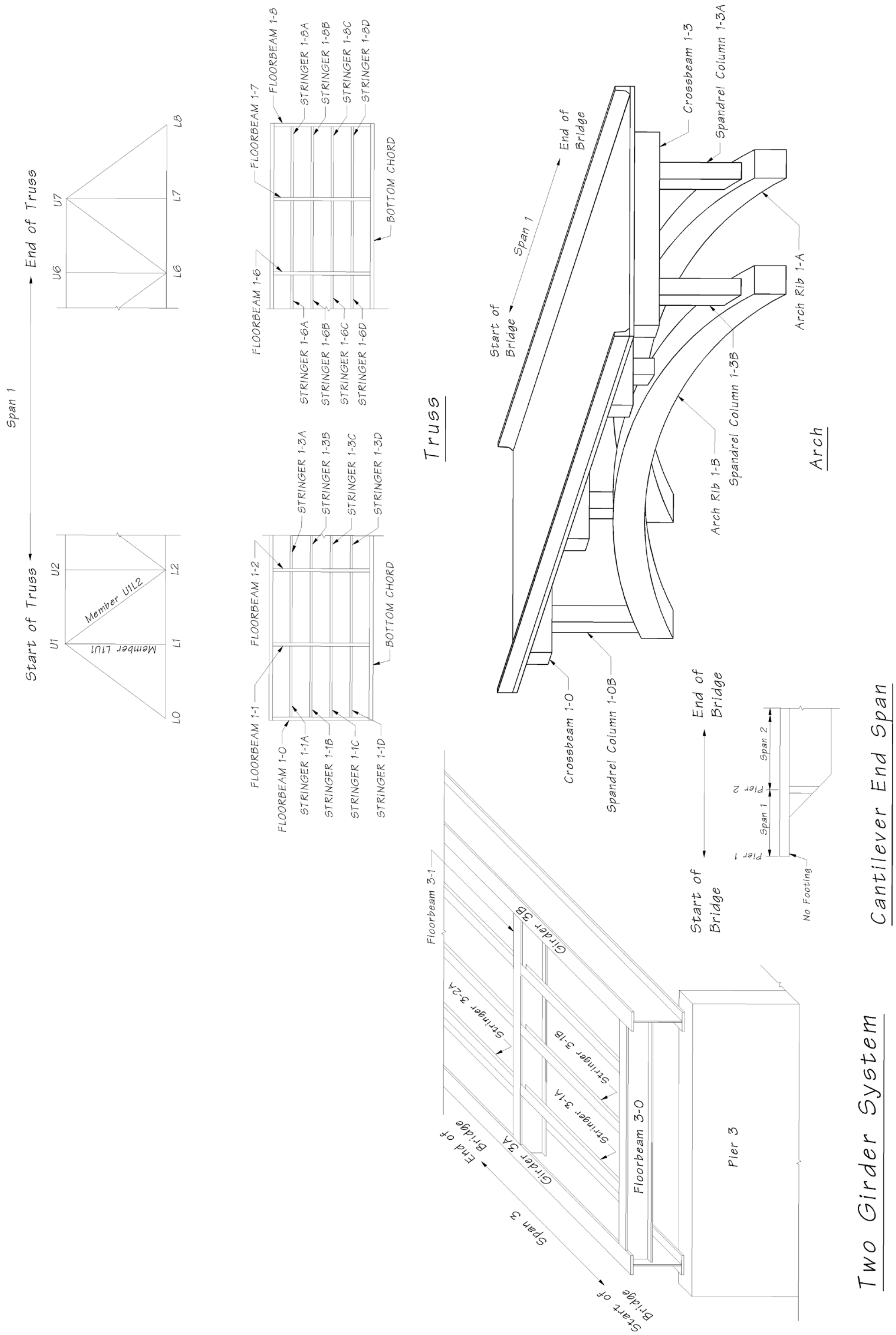
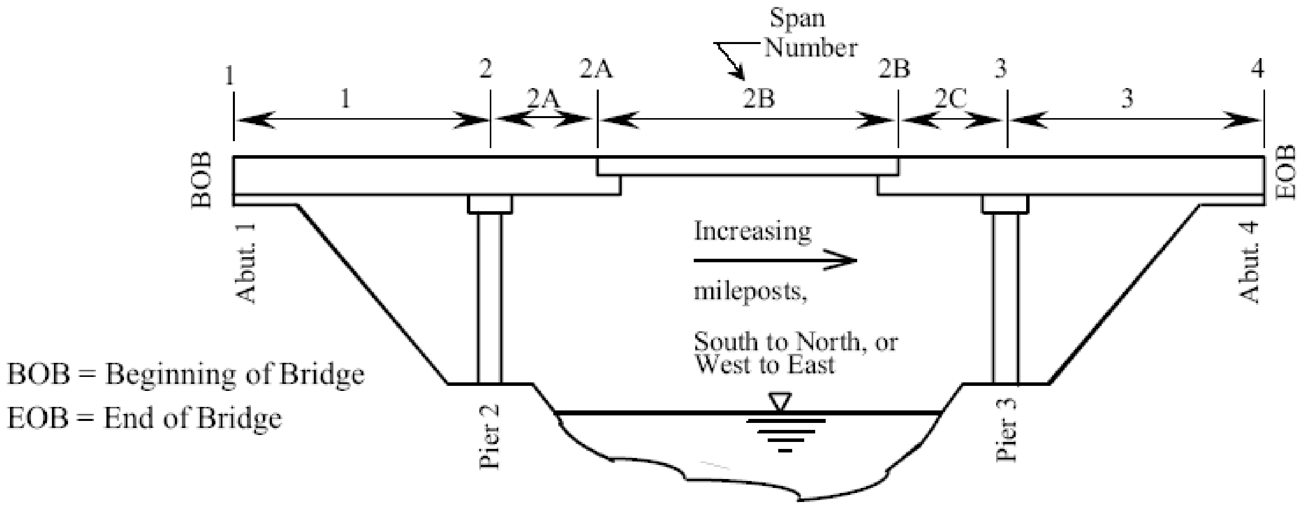


Exhibit 3-8 Component Location



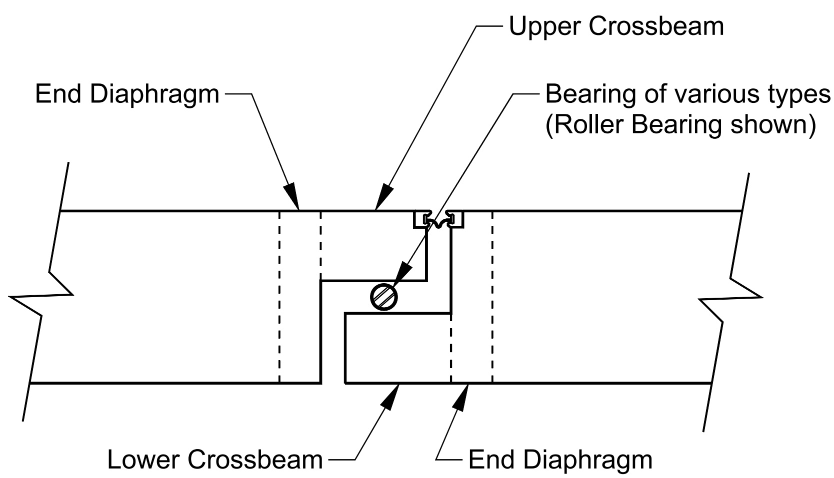
Orientation:
B.O.B. normally south or west ends following route orientation.

Exceptions Include:
One way ramps – B.O.B. = First end to receive traffic.

Selected bridges that follow plan orientation.

There is no golden rule about orientation except that B.O.B. Must always be identified in the '0' note along with basis for this assumption. It is helpful to refer to geographical markers (streets, rivers, etc) when describing the B.O.B.

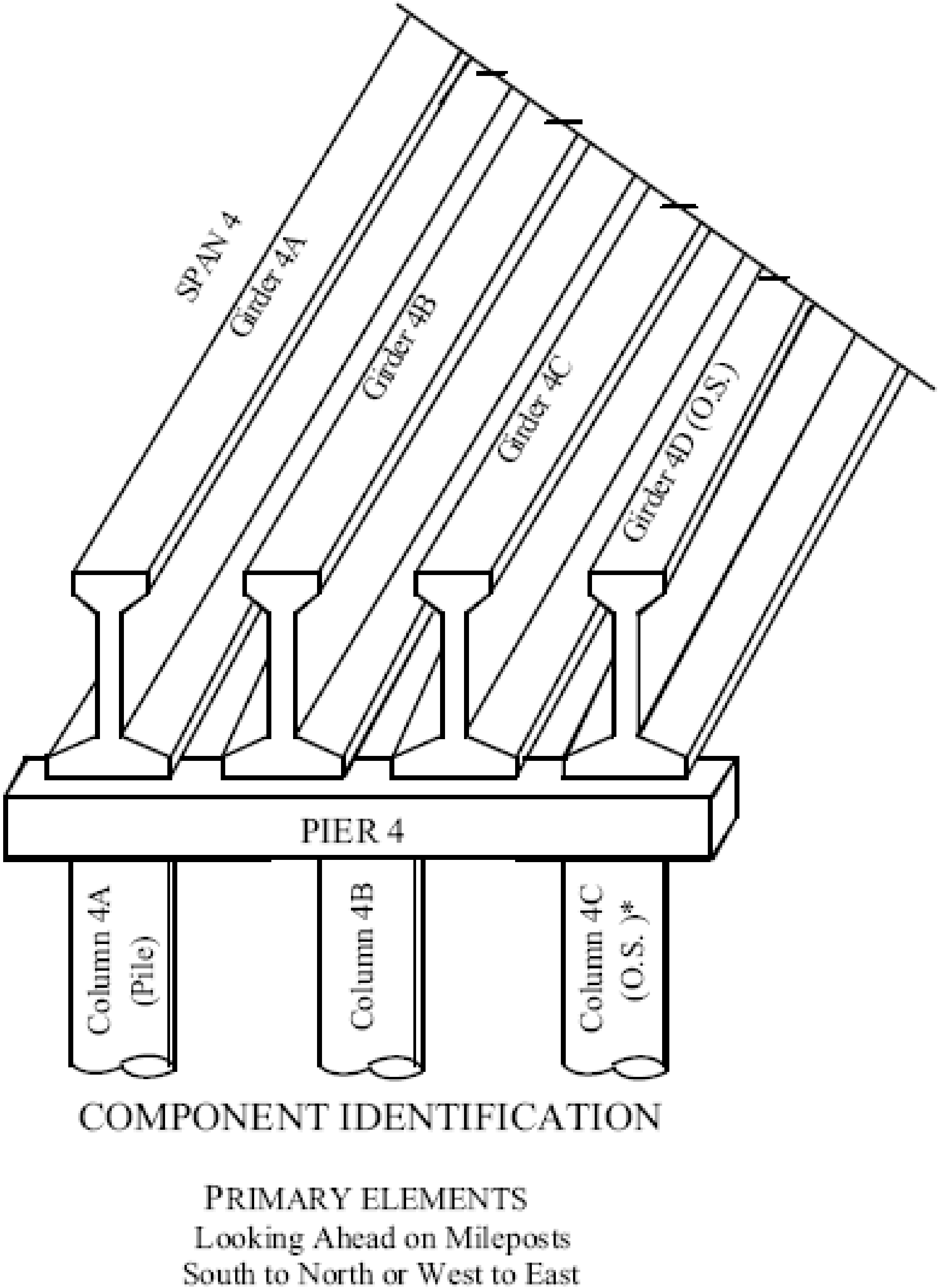
Exhibit 3-9 In-Span Hinge Callout



IN-SPAN HINGE CALLOUT

(Do not Quantify Crossbeams in BMS for Box Girder)

Exhibit 3-10 Component Identification



Section 3-4 provides guidelines for inspection processes and procedures specific to the State and the Office of Local Programs. These guidelines can be used as a reference or can be implemented.

3-4 Policy and Procedures

This section discusses the specific policies and procedures that are utilized in BPO or LP that are supplementary guidelines for field work and inspection report writing. These best management practices are utilized by inspection teams and are specific to each program.

3-4.1 *BPO Policy and Procedures*

3-4.1.A General Inspection and Report Writing

- Columns on the first page of the BIR contain NBI and agency specific items with associated coding information for each structure within the inventory. The numbers within parenthesis next to these item titles are WSBIS item numbers and are unique to the BridgeWorks program that corresponds to FHWA items and/or agency specific items. For example, the first code at the top of the BIR form is the Structural Adequacy Appraisal code and is denoted by WSBIS item number (1657).
- When circumstances (including obstruction of bridge elements) prevent any required work from being completed at the time of inspection, report this fact to your supervisor so a determination can be made whether or not the bridge needs to be rescheduled in the current inspection year. It is the responsibility of the Team Leader to ensure that the bridge inspection is completed unless the supervisor delegates the responsibility. Bridges that cannot be inspected due to high water will be rescheduled in the current inspection year during lower flows. Bridges that need cleaning or vegetation removed will require coordination with maintence for dirt and/or vegetation removal prior to re-inspection. If the supervisor determines that the bridge does not need to be rescheduled in the current inspection year, clearly identify why the work wasn't completed and what is required of the next team leader to achieve the task.
- Traffic lanes on a structure are numbered from right to left looking in the direction of traffic on one-way multilane routes. For reversible lanes assumed orientation should be described in the report.
- Whenever an in-span hinge separates two bridges, the bearings, restrainers, and joint are to be coded with the "dependent" structure. Explain any exceptions to this rule in the 0 note.
- Whenever measurements are taken, for joint openings, monitored conditions, or anything else, include in the report the date and the air temperature when the measurements were taken. Unless there is a warranted condition, only measurements from the last three inspections need to be maintained.
- Refer to specific joints by pier or span numbers instead of joint numbers. There may be unique circumstances where using joint numbers are justified. Under these circumstances, justification for using joint numbers must be documented in the report.
- Investigate fully and report any and all joint noises and their origination.
- Compare Curb to Curb Deck Width (1356) with Horizontal Clearance (1491 and 1495) and investigate differences (typically they should be the same, except for non-mountable medians).
- Detailed notes are to be entered separately under each Bridge Management System (BMS) element. NBI notes should reference the appropriate BMS element note. Maintain any details of flagged defects or damage within the BMS element note.

- Inspection report summary comments are required for any BMS element in Condition State (CS) 2, 3 or 4.
- Avoid using phrases for significant defects such as "open crack" without a further description such as width, and any repetitive nature. Mark the specific defect location on the bridge with any measurement and the date. Consider taking a photo of the marked defect to include in the inspection report. For concrete crack size guidelines, see the table in Section 4-4.
- When submitting reports for initial review, include field notes in the review package along with a clean copy of the report, the WSBIS sheet, the inspection photographs, and other relevant reports (fracture critical, soundings, etc.). The WSBIS sheet is required to reflect all current changes associated with the inspection.
- Describe photos with respect to bridge orientation, not geographic direction. Photos should identify the orientation, location, and what is photographed. All photos, except deck and elevation photos, must be numbered and referenced in the notes or in an attached file such as a Fracture Critical Report.
- Photos no longer relevant to the report should be deleted. Keep repair photos in the report for an additional inspection cycle so the Bridge Preservation Supervisor can compare them.
- Deck and Elevation Photos should be assessed at each inspection. Update photos if there are new conditions or changes to the structure.

3-4.1.B Bridge Inspection Notes Standard Practice

A. Cardinal directions (north, south, east, and west) are never capitalized, except at the beginning of a sentence. These directions are also not abbreviated. The directions northeast, southeast, northwest, and southwest may be abbreviated NE, SE, NW, and SW.

B. For acronyms, follow the standard practice of spelling out the first time use with the acronym in parenthesis following (e.g., Local Programs (LP)).

C. Use of abbreviations should be limited. Common abbreviations:

F	Fahrenheit	A.M.	a.m.
in. or ″	inch (inches)	P.M.	p.m.
ft. or ‘	foot (feet) ‘ symbol only used when followed by a dimension in inches.	NW NE SW SE	directions
L	length	D	depth
W	width	etc.	etcetera
sq. ft.	square feet or SF	LF	linear feet
psi	pounds per sq. in.	YT	Yellow tagged
psf	pounds per sq. ft.	RT	Red tagged
ACP	asphalt concrete pavement	LMC	latex modified concrete
BST	bituminous surface treatment	HMA	hot mix asphalt
SR	State Route	US	National Highway
I	Interstate	Jan	January, etc.

D. Limit the use of symbols to ° for degrees and % for percent.

E. Dimensions are noted with a space or hyphen between feet and inches, and a hyphen between whole inches and fractions of an inch. When combined with other dimensions, a ‘0’ should precede bare fractions of an inch. Measurements greater than 12″ may be listed in inches, if appropriate. Decimal inches may also be used. For example:

1′ 1-1/16″ × 6′ 0-7/8″
6″ × 14″ timber stringers
8″ × 14″ × 1/2″ deep spall
3 ft. wide × 14 ft. long × 2.5 ft. tall bridge corbel
12 ft. (L) × 15′ 6″ (W) × 3″ (D) popout in south face of Pier 2
1′ 0-3/4″(l) × 0.125″(w) crack in east face of Girder 2F
42.2″ long anchor bolts

3-4.1.C Report Notes Within BridgeWorks

0 Note – Orientation

- Bridge orientation and identification of the pier/span numbering system is always required, stating the basis of orientation such as “increasing mileposts,” “ramp direction,” or per plans. Any potentially confusing orientation issues or deviations from standards (west to east or south to north) must be clearly identified. Identifiable physical features at beginning or end of bridge may also be used. See Section 3-3 for bridge orientation examples.
- Place any special instructions and information that doesn’t fit anywhere else under the 0 note.
- Use the following note for bridges eligible for a 48 month frequency:

  Continue to validate the status of this bridge each inspection as a 48-month inspection candidate. Verify condition ratings, load ratings, vertical clearances, ADT, scour codes and that no major maintenance has been completed in the last two years.

1 Note – This note is maintained by the Team Leader and is used for explanatory information regarding bridges that are Fracture Critical and/or require a Special Feature Inspection. Use this note to explain any special features, procedures, areas to be inspected or complicated scheduling. Do not use this note to redundantly repeat resource information or dates that an inspection occurred.

5 Note – Program Management Engineer maintains this note. It contains information regarding scheduled rehabilitation or replacement, and other upcoming program management items.

9 Note – The 9 note is used to create the executive summary for an Underwater Inspection Report.

11 Note – The Load Rating Engineer maintains this field. It is used to explain any load posting placed on a bridge. This note is closely associated with the Revise Rating flag (2688), see Section 3-4.1.E.

3-4.1.D Operating Level Code (1660)

Verify that load posting signs are in place at the bridge and in advance of the bridge. Advance load postings must be placed in advance of the nearest intersecting road, ramp or wide point in the road where a driver can detour or turn around. Verify that load posting signs and advance load posting signs match the posting requirements in Note 11 and write a note within BridgeWorks under Operating Level Code (1660) to that effect. Take a photo of any existing posting signs and advance posting signs. Ensure that (1293) (open or closed) is coded appropriately.

3-4.1.E Revise Rating Flag (2688)

For State owned bridges, any load rating issues should be addressed within the body of the BIR in the (2688) note. Delete any notes that don't have relevance to the existing condition of the bridge.

3-4.1.F Scour Code (1680)

The Scour Engineer maintains the Scour code (1680) field and notes. Any scour comments by the Team Leader should be placed in BMS Element (#361) Scour Flag or Channel Protection (1677), depending upon which is most appropriate.

3-4.1.G Soundings Resource

When preparing for an inspection that requires soundings, print any existing stream profile file to include in your inspection field packet. The Scour Engineer determines which State bridges need stream cross sections (soundings) by placing a "Y" in the Soundings Flag (2693). When this is required as part of the inspection, perform the following:

1. Enter data into the Scour Field Evaluation Form, see Section 3-5.
   a. If you could not take soundings on the initial inspection trip, plan on getting them on another trip, either by coordinating with another Team Leader or by doing it yourself.
   b. If there is a reason soundings should be taken at a different time of the year (e.g. low water, low tide, or fish windows), add a resource with an explanation under the Report Types Tab.
2. Save the file under the bridge number (e.g., 5_24S.xls) in the appropriate year "Soundings" folder found on the W drive at W:\Data\Bridge\RegionalInsp\Common\Soundings.
3. Attach the completed form to the appropriate bridge inspection report File Tab, replacing any already existing form and remove the old one.
4. Change the Soundings Flag (2693) from "Y" to "*" for State bridges only.
5. When you return to the office submit an email to the Scour Engineer stating that the soundings have been completed and that the findings are in the soundings folder for his review.
6. The Scour Engineer will email an electronic stream profile file that you will attach to the report Files tab.
   a. Replace any existing stream profile file with the updated one and remove the old one.
   b. Print the new stream profile file and include it with your inspection review packet.

3-4.1.H Timber Structures

- Yellow Tagged (YT) members have rot and a shell greater than or equal to 1-½”. A YT member requires a Priority 2 repair. The need for Interim Inspections is determined by the lead.
- Red Tagged (RT) members have rot and a shell less than 1-½”. A RT member requires a Priority 1 repair. Schedule an Interim Inspection. Determine the extent, location and significance of decay. Provide details for the Load Rating Engineer.

3-4.1.I Culverts

- Structure Length, NBI Length and Maximum Span are determined in accordance with (1340), (2346), and (1348).
- The BMS quantity is determined by measuring from inlet to outlet of one barrel/pipe and is not dependent upon the number of barrels or pipes.

3-4.1.J Vertical Clearances (1370 and 1374)

Every Routine, Short Span, Safety or Condition inspection shall include verification of the vertical clearance (VC) card comparing it with the current condition and any significant changes (new asphalt, additional lanes, new curb/gutter, etc). Verification will also include at least one vertical clearance measurement if traffic allows, and ideally at the low point if possible. If changes in conditions or conflicts with the VC card are identified, note discrepancies and collect all new clearances if possible. If no changes or discrepancies are identified, no further action is required.

For structures in excess of 16’-6”, with no other noted changes or discrepancies, the verification of a vertical clearance measurement is optional.

Each Inspection,

- Check for all postings on bridge, and in advance, are in place.
- Check that Posted clearances are consistent with existing conditions and documentation.
- Update 2694 as applicable
- Update the WSBIS as applicable.

When to Collect or Verify Vertical Clearances

- Whenever a clearance card is missing, incomplete or inaccurate. High traffic volumes may prevent the ability to acquire this information without traffic control.
- When changes in alignments, geometry or conditions affecting current measurements are identified.
- At bridges where the clearances box has been populated with a “V”.
- When Team Leader feels that over height hit damage is occurring significantly enough to check the existing clearance information.
- As a part of over height load damage inspections.

Where to Collect or Verify Vertical Clearances

- Minimum clearances along all lane stripes, edges of pavement/curb or controlling grade breaks between these points.
- Appurtenances (lights, signs, utilities) that control minimum vertical clearances should be documented as well, but in most circumstances will be used only to create a repair recommendation to relocate appurtenance. Provide vertical clearance information to the Sign Bridge Engineer.
- For existing postings verify lowest accessible clearance location first and verify other locations as required.
- For Damage Inspections, measure all accessible lane stripe locations in the area of the damage and at the point of impact.

Documenting Vertical Clearances

- Document all measured clearances. Drawings should be neatly transcribed and turned in to the Bridge Geometry Engineer. Photos are to be placed in the Photos/2694 Clearance folder in BridgeWorks.
- 2694 Note should reference: Vertical clearances taken or checked on (date). Minimum clearance below the bridge measured to be (measured minimum clearance) below (exact location). See photo #. REPAIR #00000. In situations where multiple structures are controlled by one structure that requires posting, the recommended posting locations and the presence or omission of signage shall be appropriately documented in the 2694 notes of each of the involved structures.
- Update WSBIS fields (1370), (1374) and (1499). Appurtenances are not coded. Consult with the Bridge Geometry Engineer for questions.

Posting Requirements and Recommendations

- Bridges with field measured minimum clearances over the traveled lanes equal to 14’ 3” up to and including 15’ 3” require posting on the structure at the controlling location and advance warning signs at one or both shoulders.
- All bridges with field measured minimum clearances less than 14’ 3” require additional advance posting signs in advance of nearest intersecting roads, ramps or a wide point in the road where a driver can detour or turn around.
- All posted clearances shall be 3” less than the actual lowest measured clearance, except as follows:

  1. In some cases, WSDOT intentionally posts clearances with more than a 3” buffer. This decision will be documented in the 2694 note, identifying the posting clearance required.
  2. The City of Spokane has a 1” buffer rule, so bridges are intentionally posted only 1” less than measured. This will be documented in the 2694 note for all affected bridges inspected by BPO staff.
  3. A bridge posting is allowed when it is 4” less than measured.

  There are situations where bridges should be posted for minimum vertical clearances in the shoulders (outside traveled way). Check with the Bridge Geometry Engineer for details. Appurtenances such as lights or signs that suspend below those bridge elements are to be noted. Those that are 15’3” or less within a traveled path or have evidence of traffic impact damage are to be written up as a repair to be removed or relocated.

Vertical Clearance (V) Repair

- A Priority 1 or 2 Vertical Clearance (V) Repair is warranted as follows:
- Priority 1: When vertical clearance posting is found deficient (for example less than 3" buffer), missing, or where the signage on and in advance of the bridge do not match.
- Priority 2: When a vertical clearance posting on and in advance of the bridge is found conservative (more than 4" buffer) without prior documentation from the Region or other authorized authority.
- Each repair written should identify and include the following language:
- (Minimum clearance measured to be (measured clearance) located at (controlling location) on (date measured). Post for (3" less than measured clearance) in accordance with the most current WSDOT Low Vertical Clearance Signing Policy. Contact Bridge Geometry Engineer at Bridge Preservation 360-570-2544 with any questions.

3-4.1.K Horizontal Clearances

- Collect minimum shoulder widths on both sides of roadway and edge of traveled way (fog line) to permanent obstruction (columns, abutments, retaining walls, toe of slopes). See Item 1379 for ramps, gores and other more complex configuration examples.
- Collect horizontal clearances where the clearance flag has been populated with an "H".
- Update WSBIS fields (1379) and (1383) (Minimum Lateral under Clearance Right & Left).

3-4.1.L Inspection of Structures Under Contract

- Information organized by the Bridge Inventory Technician will include the Project Office contact and contract numbers.
- For structures under contract, the BPO inspector MUST make contact with the Project Office (Project Engineer if possible) prior to performing inspection. Do not directly talk to contractor.
- If construction defects or safety issues are found during inspection:

  Emergency contacts: 1st – Region Project Engineer
2nd – BPO
3rd – HQ Bridge Construction Office
- Routine Maintenance, contact the Project Office and Regional Maintenance Staff.

3-4.1.M Bridge Scour for Local Agency Bridge Inspections

- Bridges with Scour Code (1680) of 2 and 3 are scour critical. For reports with a scour code of "6","U"or "T" the bridge is assumed to be scour critical.
- Bridges with a scour code of "6", "U", or "T" need a priority 1 repair called out in the (1680) note.

  The call out in the (1680) note should read as follows: "This inspection report assumes the bridge is scour critical. REPAIR #XXXXX"

  The Repair should read as follows: "(1680) is coded ["U", "T", or "6"] indicating that the bridge foundation is not known, is tidal, and/or has not been evaluated. Perform evaluation of scour potential and any required mitigation. Indicate determination and any requirements under the (1680) note."

- Scour critical bridges, and those that are assumed to be scour critical, that have exposed footings or have a history of exposed footings due to scour, REQUIRE a priority 1 scour repair documented in the BMS Element (#361) – Scour flag note in BridgeWorks. This repair should read as follows: “Scour mitigation needs to be evaluated.”
- All scour critical bridges need soundings at every Routine Inspection. The (2693) note needs the following comment: “Take soundings every Routine Inspection on this scour critical bridge.” Also ensure that the (2693) flag is set to “Y” at all times. This will help the process stay in place over time.
- Bridges that are not scour critical do not need cross sections unless there is some specific need that is documented in the report.

3-4.1.N Rental Equipment

The Enterprise and Risk Management Office has declared that equipment damage insurance must be purchased when renting access equipment. If the rental company does not offer insurance, insurance can be purchased through the Department of Enterprise Services (DES). The DES insurance option can take up to two weeks to process so plan accordingly.

For rented access equipment the following is required:

- Review the paperwork, when receiving the equipment, to insure that it reflects insurance for the rented equipment.
- Review the invoice when you receive it from the BPO Accountant, making sure that the rate and time used are correct.
- Notify the rental office of any discrepancies found.
- Write the bridge number and dates used on the invoice.
- Return it to the BPO Accountant for processing.

3-4.1.O Bridge Inspection Safety

See Pre-Activity Safety Plan (PASP) for details. See Section 3-5.

3-4.1.P Identifying The Purpose Of Inspections in the Bridge Inspection Report

Indicate the purpose and schedule of any Interim or Special Inspections that are required, similar to the following format: “Interim Inspections of RT timber are done in odd numbered years and Routine Inspections of the entire bridge are done in even numbered years.” Statement should briefly describe what is to be accomplished during the Interim or Special Feature Inspection. This information is placed in the “Notes” box under the specific inspection tab, but may sometimes be more completely explained here. It can additionally be placed in the 0 note.

3-4.1.Q Agreements Inspections

Team Leader will provide the complete submittal package for each bridge inspected, which includes the signed inspection report, the SI&A sheet, the inventory sheet, all photos and files is given to the Bridge Resource Technician (BRT) who checks them against the scope of work. If there is anything missing, the BRT needs to check with the inspectors and follow up with the Bridge Preservation Accountant (BPA) if there are problems with providing a complete submittal package. The complete submittal package for each bridge is scanned and loaded onto BEIST, and a hardcopy filed in the unofficial letter file in the resource room. The complete submittal packages for each bridge are sent to the agency via USPS to the address in the agreement along with a transmittal letter listing all inspection reports provided. A copy of the transmittal letter is given to the BPA for filing with the invoices and agreements.

3-4.2 *LP Policy and Procedures*

Local Agency Policy and Procedures are detailed in the *Local Agency Guidelines* (LAG). Electronic copies of the LAG are available on the WSDOT Local Programs website at www.wsdot.wa.gov/localprograms.

Local agencies are encouraged to review the BPO Policies and Procedures in the preceding section and adopt or modify the advice to the benefit of their Bridge Program. Local Agency bridge personnel are encouraged to contact the WSDOT Local Programs personnel for guidance and advice on bridge program questions.

3-5 Forms

This section contains inspection forms typically used by the State. Local agencies have the option of developing their own forms with similar information or utilizing the forms in this section.

Exhibit 3-11	Bridge Inspection Report
Exhibit 3-12	WSBIS Form
Exhibit 3-13	Scour Field Evaluation
Exhibit 3-14	Daily Site Dive Log
Exhibit 3-15	Visual Fracture Critical Inspection Report
Exhibit 3-16	DOT Form 234-030 Prestressed Concrete Damage Drawing Template
Exhibit 3-17	DOT Form 234-048 Girder Elevation Template
Exhibit 3-18	DOT Form 750-001 Fall Protection Plan – Emergency Action Plan
Exhibit 3-19	DOT Form 750-060 Lead Exposure Control Work Plan
Exhibit 3-20	DOT Form 750-090 Respirator Record
Exhibit 3-21	DOT Form 750-094 Confined Space Entry Permit
Exhibit 3-22	Ultrasonic UT Inspection Report
Exhibit 3-23	UT Inspection Schedule
Exhibit 3-24	Pins Summary Sheet
Exhibit 3-25	Pin and Hanger Visual Inspection Report
Exhibit 3-26	Special Features Inspection Report
Exhibit 3-27	Vertical Clearance Card Generic
Exhibit 3-28	Vertical Clearance Card Steel
Exhibit 3-29	Vertical Clearance Card Tunnel
Exhibit 3-30	Pre-Activity Safety Plan (PASP)

Exhibit 3-11 Bridge Inspection Report

BRIDGE INSPECTION REPORT

Page 1 of 1

WO CC WE PD

BAM

Status: Printed On: Agency:

CD Guid: CD Date: Program Mgr:

Br. No. **SID** **Br. Name**

Carrying **Route On** **Mile Post**

Intersecting **Route Under** **Mile Post**

Inspector's Signature Cert # Cert Exp Date Co-Inspector's Signature

Structural Eval (1657)	Operating Tons (1552)	No Utilities (2675)	**Inspections Performed:**
Deck Geometry (1658)	Op RF (1553)	Bridge Rails (1684)	**Freq** **Hrs** **Date** **Rep Type**
Underclearance (1659)	Inventory Tons (1555)	Transition (1685)	Routine
Alignment (1661)	Inv RF (1556)	Guardrails (1686)	Fract Crit
Deck Overall (1663)	Operating Level (1660)	Terminals (1687)	UW
Superstructure (1671)	Open/Closed (1293)	Asphalt Depth (2610)	Special
Substructure (1676)	Waterway (1662)	Des Curb Ht (2611)	Interim
Culvert (1678)	Scour (1680)	Bridge Rail Ht (2612)	UWI
Chan/Protection (1677)	Soundings Flag (2693)	Year Built (1332)	Damage
Pier/Abut/Prot (1679)	Revise Rating (2688)	Year Rebuilt (1336)	Safety
	Photos Flag (2691)		Short Span
	Measure Clrnc (2694)	Sufficiency Rating	In Depth
		Risk Category	Geometric

BMS Elements

Element	Element Description	Total	Units	State 1	State 2	State 3	State 4

Notes

Repairs

Repair No	Pr	R	Repair Descriptions	Noted	Maint	Verified

Inspections Performed and Resources Required

Report Type	Date	Frq	Hrs	Insp	CertNo	Coinsp	Note

Exhibit 3-12 WSBIS Form

WSBIS Field Inventory Report

Washington State Department of Transportation

Approved		
Revised		
RFC		
AAN		
Not Reviewed		

Bridge ID WB71

1001 Structure ID	2009 Bridge Number	2132 Bridge Name	1019 Owner	1021 County	2023 City	1156 Location	1188 Latitude	1196 Longtitude

Facilities WB72

1232 Feature Intersected	1256 Facilities Carried	1274 Region	1286 Custodian	1288 Parallel	1289 Temporary

Shaded fields are to be reviewed each inspection.

Fields in *italics* are for information only & are not editable.

Layout WB73

1332 Year Built	1336 Year ReBuilt	1340 Bridge Length	2346 NBIS Length	1348 Maximum Span Length	1352 Lanes On	1356 Curb to Curb Deck Width	1360 Out to Out Deck Width	1364 Sidewalk Left	1367 Sidewalk Right	1370 Min Vert Over Deck	1374 Min Vert Under	1378 Vert Code	1379 Min Lat Under Right	1382 Lat Code	1383 Min Lat Under Left	1386 Navigation Control Code	1397 Approach Roadway	1310 Skew Angle	1312 Flared	1291 Median

Crossing Route On WB74

2000 Main Code	1432 On Under	1433 Hwy Class	1434 Service Level	1435 Route Number	2440 Milepost	1445 ADT	1451 Truck %	1157 Crossing Description	1487 Funct. Class	1490 Lane Use Direction	1354 Total Lanes Under	1491 Horizontal Clearance Route Dir	1495 Horizontal Clearance Reverse Dir	1499 Max Vert Clearance Route	2500 *Min Vert Clearance Route*	2501 *Max Vert Clearance Reverse*	2502 *Min Vert Clearance Reverse*	1413 Detour Length

Route On

Crossing Route Under WB74

2000 Main Code	1432 On Under	1433 Hwy Class	1434 Service Level	1435 Route Number	2440 Milepost	1445 ADT	1451 Truck %	1157 Crossing Description	1487 Funct. Class	1490 Lane Use Direction	1354 Crossing Lanes Under	1491 Horizontal Clearance Route Dir	1495 Horizontal Clearance Reverse Dir	1499 Max Vert Clearance Route	2500 *Min Vert Clearance Route*	2501 *Max Vert Clearance Reverse*	2502 *Min Vert Clearance Reverse*	1413 Detour Length

Route Under

Control Data Date:

Design WB75

1532 Main Span Material	1533 Main Span Design	1535 Appr Span Material	1536 Appr Span Design	1538 Number Main Spans	1541 Number Appr Spans	1544 Service On	1545 Service Under	1546 Deck Type	1547 Wearing Surface	1548 Membrane	1549 Deck Protect	1551 Oper Rating Method	1552 Oper Rating Tons	1553 Oper Rating Factor	1554 Inv Rating Method	1555 Inv Rating Tons	1556 Inv Rating Factor

Sufficiency Rating:	
	Item 2710 SR
	Item 2711 SD/FO

Printed Date

Inspection Report Types

2920 Inspection	1990 Date	2646 Inspector	2649 Cert No	2654 Co-Inspector
Routine				
Fracture Critical				
Special Feature				
Underwater				

Inspection	Date	Inspector	Cert No	Co-Inspector
UW Interim				
Interim				
In Depth				
Damage				

Inspection	Date	Inspector	Cert No	Co-Inspector
Safety				
Short Span				
Geometric				
Info				
Inventory				

Control Data Guid:

Exhibit 3-13 Scour Field Evaluation

Washington State Department of Transportation

Scour Field Evaluation

Bridge Number	Bridge Name	Structure ID

Date	Lead Inspector	Co-Inspector

- ☐ Heavy Growth Along Banks
- ☐ Ice/Debris in Channel
- ☐ Channel/Embankments are Eroding/Sloughing
- ☐ Damage to Riprap/Abutments/Piers
- ☐ Scour Holes Near Piers/Abutments
- ☐ Riprap in Place at Piers/Abutments

- ☐ Boat Required
- ☐ Divers Required
- ☐ UBIT Required
- ☐ Winter Inspection
- ☐ Repair Required
- ☐ Monitoring Required

Soundings
(Taken from top of the upstream bridge rail)

Location	Measurement (ft)

Thalweg (ft):	
Distance to thalweg (ft):	
Distance was measured from:	
Rail Height from Deck (ft):	

Inspector's Remarks:

Repairs Warranted:

Exhibit 3-14 Daily Site Dive Log

Washington State Department of Transportation

Daily Site Dive Log

Inspector Generic WSDOT UBITOperator **Date** 1/1/2001

Bridge No. 00000000 **Bridge Name** XGOCOUGS

Bridge Type **Waterway Name**

Dive Objective

Diving Operation

Type of Operation ☐ SCUBA ☐ Snorkel ☐ ROV ☐ Other ______________

Equipment

Suit ______________

Air Supply ______________

Site Access ______________

Inspection Tools ______________

Conditions

Water	☐ Salt	☐ Fresh	☐ Brackish	Temperature ______ °F	Visibility ______ ft	
Surface	☐ Calm	☐ Choppy	☐ Rough			
Surf	☐ Small	☐ Medium	☐ Large	☐ N/A		
Tide	☐ High	☐ Low	☐ Flood	☐ Ebb	☐ N/A	
Current	☐ Fast	☐ Moderate	☐ Slow	Velocity ________ ft/sec		
Weather	☐ Sunny	☐ Cloudy	☐ Overcast	☐ Rain	Air Temp ________ °F	
Thermocline	Temperature ________ °F		Depth ________ ft			

Diver Checks

☐ First Aid Equipment on Site

☐ Communication for EMS

☐ Dive Gear Inspected

☐ Air Source Checked

☐ Pre-Activity Safety Plan Reviewed

☐ ______________

☐ Physical Condition of Diver(s) Checked

☐ Communications for Diver(s) Checked

☐ Team Briefed and Understands Dive Plan

☐ Special Site Hazards Noted

☐ ______________

Dive Plan and Dive Team Procedures

Assess site conditions and determine type of dive operation. Hold on-site pre-dive safety meeting to discuss and plan dive operation, determine roles and responsibilities, review emergency procedures, and check physical condition of diver(s). Assemble and check dive gear. Check communication for diver(s). After completion of dive, review notes, check condition of diver(s), take soundings and photos as required.

Exhibit 3-15 Visual Fracture Critical Inspection Report
(Page 1 of 2)

Washington State Department of Transportation

VISUAL FRACTURE CRITICAL INSPECTION REPORT

Bridge Name:
Bridge No:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector Intials:
Co-Inspector Intials:

Lead Inspector Signature: ____________________

Inspected items:

Co-Inspector Signature: ____________________

Procedures:

FCM Location	FCM Type	FCM Per Girder or Truss Line	Rivet Server Plans		
			Sh. No.	Contract	Sh. Name

Note: FCM = Fracture Critical Member

Visual Fracture Critical Inspection Report.xlsx 1 of 2

Exhibit 3-15 Visual Fracture Critical Inspection Report (Page 2 of 2)

Washington State Department of Transportation

VISUAL FRACTURE CRITICAL INSPECTION REPORT

Bridge Name:
Bridge No.:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector:
Co-Inspector:

Truss / Girder	Span	Location	Feature Inspected	Detail Description	Remarks

Visual Fracture Critical Inspection Report.xlsx 2 of 2

Exhibit 3-16 DOT Form 234-030 Prestressed Concrete Damage Drawing Template

Bridge Number:__________________ Inspected By:____________________

Bridge Name:____________________ Notes:____

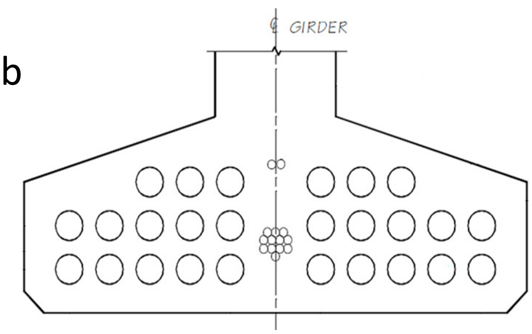
Date: ___________________________ ____

Looking:_________________________ ____

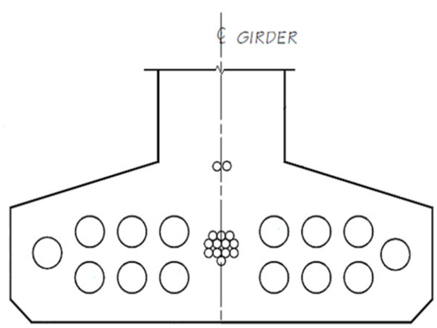
Location:_________________________ ____

____

Bulb



W



WF

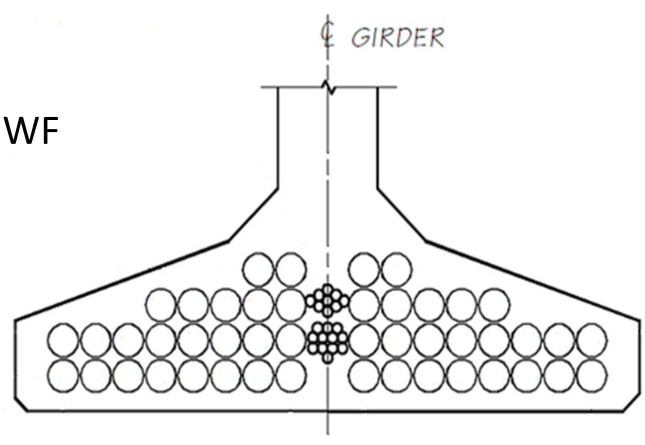
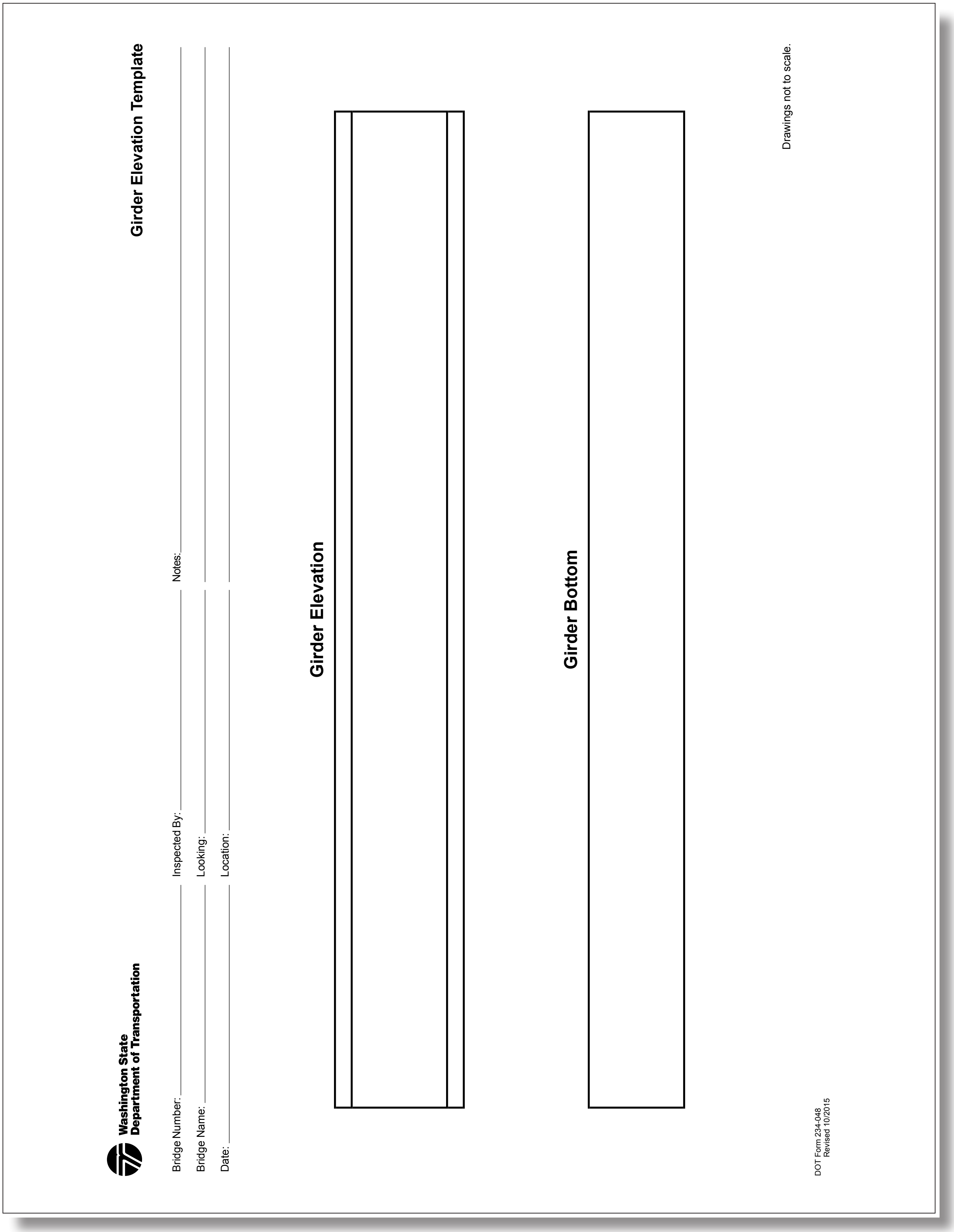


Exhibit 3-17 DOT Form 234-048 Girder Elevation Template



Washington State Department of Transportation

Girder Elevation Template

Bridge Number: ______ Inspected By: ______ Notes: ______

Bridge Name: ______ Looking: ______

Date: ______ Location: ______

Girder Elevation

Girder Bottom

Drawings not to scale.

DOT Form 234-048
Revised 10/2015

Exhibit 3-18 DOT Form 750-001 Fall Protection Plan – Emergency Action Plan (Page 1 of 2)

Washington State Department of Transportation

Fall Protection Plan

Date	Location	Supervisor

Description of Work

Recognized Fall Hazards 10' or more above ground or lower level

(check all that apply)

- ☐ Catwalks
- ☐ Sloped access
- ☐ Work over water
- ☐ Welding at height
- ☐ Set girders
- ☐ Leading edge
- ☐ Bridge deck
- ☐ Drilling shafts
- ☐ Work decks
- ☐ Floor opening
- ☐ Wall openings
- ☐ Open-sided ramps
- ☐ Open-sided walking/working surface (i.e. roofs, open-sided floors)*
- ☐ Skylight openings
- ☐ Surfaces that do not meet the definition of a walking/working surface (i.e. top plate beam)*
- ☐ Overhead hazards (If checked, specify hazards) ....

* Walking/working surface = any area whose dimensions are 45 inches or greater in all direction, through which workers pass or conduct work.

Other Recognized Hazards

Environmental

☐ Sun ☐ Rain ☐ Snow ☐ Heat/Ice ☐ Cold ☐ Noise ☐ Darkness

Live hazards

☐ Birds ☐ Insects ☐ Reptiles ☐ Human ☐ Other ....

Method of Fall Protection to be Used (check all that apply)

- ☐ Guardrail system
- ☐ Warning line (LSO)**
- ☐ Warn line w/ safety monitor (LSO)**
- ☐ Catch platform
- ☐ Safety net
- ☐ Personal fall arrest system
- ☐ Personal fall restraint system
- ☐ Positioning device system
- ☐ Covers (floor holes and openings)
- ☐ Horizontal life lines
- ☐ Vertical life lines and rope grab
- ☐ Appropriate anchors for system used

* Warn line other than (LSO) shall be erected not less than fifteen feet from unprotected sides of edges of the open side surface

** LSO = (low slopes only 4:12 or less)

Other Standards that Apply

☐ Boom lift ☐ Scaffold w/ guardrail ☐ Aerial lift ☐ Excavation/Trenching
☐ Scissor lift ☐ Ladders ☐ Forklift

Personal Protection Equipment (PPE) to be used at the worksite

☐ Hard hat ☐ Rain Gear ☐ Gloves ☐ Work boot
☐ Safety eyewear ☐ Face protection ☐ Protective clothing

Securing tools

☐ Tool belts ☐ Tool bucket ☐ Toe boards ☐ Other ....

Procedure for Assembly, Maintenance, Inspection, and Disassembly of System

Assembly, disassembly, and maintenance of all equipment will be done according to manufacturer's recommended procedures.
A visual inspection of all safety equipment will be done daily or before each use.
Any defective equipment will be tagged and removed from service immediately.

DOT Form 750-001
Revised 10/2013

A Copy of This Work Plan Must Be On Job Site

Exhibit 3-18 DOT Form 750-001 Fall Protection Plan – Emergency Action Plan (Page 2 of 2)

Emergency Action Plan

First Aid / CPR

Names of Trained Personnel on Site	
Location of First Aid Equipment	

Emergency Services (call or radio 911 if available)

Location of Phone	Phone Number of Sheriff or Police	Phone No. of Emergency Resp. Team

Describe Procedure for Removal of Injured Employee
(Note: No removal will be attempted without supervision of qualified emergency rescue personnel)

Crane ◯ Yes ◯ No Location ____________

Hoist ◯ Yes ◯ No Location ____________

Winch ◯ Yes ◯ No Location ____________

Block / Tackle ◯ Yes ◯ No Location ____________

Other (Describe)

Verification of Compliance

Employee Signature	Employee Signature
Employee Signature	Employee Signature

DOT Form 750-001
Revised 10/2013

A Copy of This Work Plan Must Be On Job Site

Exhibit 3-19 DOT Form 750-060 Lead Exposure Control Work Plan (Page 1 of 2)

Washington State Department of Transportation

Lead Exposure Control Work Plan

Date	Project Location	*Supervisor/Competent Person	No. of People on Crew

Description of Work (e.g. equipment used, materials involved, special procedures/practices, responsibilities)

*Supervisor/Competent Person means one who is capable of identifying existing and predictable lead hazards in the surrounding or working conditions and who has authorization to take prompt corrective measures to eliminate them.

When lead is present if doing these "trigger tasks" (check all that apply)	Treat as if exposed at this level[1]	Use appropriate respiratory protection[2] for exposure level (check protection used)	Methods to Reduce/Control Lead Exposure (check all that apply)[3].
☐ Torch burning ☐ Cutting ☐ Welding ☐ Abrasive blasting	≥2,500 µg/m3 (50 times the PEL or more)	☐ Full-face PAPR (tight fitting) ☐ Hood or helmet PAPR with manufacturer confirmed APF of 1000 ☐ Full-face airline respirator in continuous flow or positive pressure mode	☐ Prior removal with tool equipped with dust control ☐ Ventilation (mechanical)
☐ Rivet busting ☐ Lead burning ☐ Power tool cleaning without dust collection systems ☐ Using lead containing mortar ☐ Abrasive blasting enclosure movement and removal	≥500 µg/m3 (10 times the PEL or more)	☐ Any of the respirators listed above ☐ Full-face respirator ☐ Hood or helmet PAPR ☐ Half-face airline respirator in continuous flow or positive pressure mode	☐ Employee rotation to distribute lead exposed work ☐ Dust suppression/wet methods ☐ Prior removal with chemical stripper ☐ Encapsulation
☐ Manual demolition of structures ☐ Manual scraping ☐ Manual sanding ☐ Heat gun applications ☐ Power tools cleaning with dust collection systems ☐ Spray painting with lead paint.	≥50 µg/m3 to 500 µg/m3	☐ Any of the respirators listed above ☐ Half-face respirator	☐ Other, describe:
☐ Inspections ☐ Any item not listed	Contact your safety office for guidance prior to job	Contact the safety office prior to job	

1 If you have recent air monitoring on a similar job (e.g. tasks, equipment, environmental conditions, paint lead content), you can use that to determine exposure.
2 Other appropriate options may be available. Contact your safety office for more information. APF = assigned protection factor (see WAC 296-842-13005)

DOT Form 750-060
Revised 05/2013

Exhibit 3-19 DOT Form 750-060 Lead Exposure Control Work Plan (Page 2 of 2)

3 All feasible control options must be implemented to reduce exposures below the PEL. If respirators are the only method used to reduce exposures, describe in detail why other controls are not feasible.

____

____

____

Requirements for all lead work

- ☐ All employees trained in lead-safe work practices
- ☐ Soap, water (drinking water quality), and towels available and used before eating, drinking, smoking, or other "hand to face" activities
  ☐ on site or ☐ at facility no futher than three minutes away
- ☐ Area for lunch and breaks that is free of lead contamination. List location: ______________________________
- ☐ All employees have been offered/had access to initial blood testing
- ☐ Other PPE (as applicable) gloves, hardhat, welding gloves, work boots, eye protection/hearing protection
- ☐ No eating, drinking, smoking, or other hand to face activities conducted in lead work zone
- ☐ Equipment, tools, work surfaces where lead dust may accumulate are cleaned with HEPA vacuum and/or wet cleaning methods at end of
  ☐ shift ☐ project
- ☐ Job will be routinely inspected by Supervisor/Competent person
- ☐ Air monitoring has been performed in the last 12 months on similar job or will be treated as "trigger task" exposures levels listed on previous page

All items below are also required if exposures are at or above the PEL (50 micrograms per cubic meter of air) or doing trigger tasks with no monitoring within previous 12 months showing exposures are below the PEL

- ☐ Coveralls: worn during all lead work, removed or HEPA vaccumed before entering lunch/break area or leaving work site, and removed at end of shift and placed in sealed and labeled bag or other container that will prevent dispersion of dust. Coveralls or other exposed garments must never be taken home.
- ☐ Respiratory protection used selected based on either:
  1. __________ As required by trigger task level
  2. __________ Recent air monitoring: contact the Safety Office to identify applicable air monitoring
- ☐ Employees medically cleared for respirator use and fit tested

All employees on job site must sign the lead control plan

⇨	⇨	⇨	⇨
⇨	⇨	⇨	⇨
⇨	⇨	⇨	⇨
⇨	⇨	⇨	⇨

Supervisor/Competent Person Printed Name	Supervisor/Competent Person Signature	Date Signed

DOT Form 750-060
Revised 05/2013

Exhibit 3-20 DOT Form 750-090 Respirator Record

Washington State Department of Transportation

Respirator Record

Name	Employee ID Number	Organization Code
Supervisor's Name	Telephone Number	

Exposure

- ☐ Welding/Cutting/Brazing
- ☐ Spray Painting
- ☐ Vehicle Body Repair
- ☐ Pavement Marking
- ☐ Lead
- ☐ Pestcides
- ☐ Asbestos
- ☐ Silica
- ☐ Solvents
- ☐ Bridge Maintenance
- ☐ Abrasive Blasting
- ☐ Grinding/Sanding
- ☐ Pigeon Droppings
- ☐ Other (Specify) ____________

Fit Test

Date of Fit Test	Type of Fit Test Used ☐ Qualitative ☐ Quantitative ☐ N/A
Tester	○ Pass ○ Fail

Respirator

Size
☐ Small ☐ Medium ☐ Large

Facepiece
☐ 1/2 Mask ☐ Full Face ☐ Hood/Helmet

Type
- ☐ SCBA
- ☐ PAPR
- ☐ Air Line
- ☐ Dust / Mist
- ☐ Other (Describe) ____________
- ☐ Chemical Cartridge
- ☐ Gas Mask
- ☐ Combination

Manufacturer
- ☐ North
- ☐ MSA
- ☐ Willson
- ☐ Survivair
- ☐ 3M
- ☐ Bullard
- ☐ Northstar
- ☐ American Optical
- ☐ Scott
- ☐ Glendale
- ☐ Uvex
- ☐ Other ____________

Model Number	Approval Number

Comments

DOT Form 750-090
Revised 02/2012

Exhibit 3-21 DOT Form 750-094 Confined Space Entry Permit (Page 1 of 2)

Washington State Department of Transportation

Confined Space Entry Permit

Location, Description and Classification of Confined Space

Date	Purpose of Entry/Work to be done	Time Started
Division/Unit		Time Completed
Supervisor(s) in Charge of Crew	Type of Crew	Phone

Hazards in Confined Space
Check all that apply and ensure each hazard is eliminated or controlled before and during entry:

- ☐ (Potentially) Hazardous atmosphere
- ☐ Material with potential to engulf
- ☐ Electrical shock
- ☐ Moving parts
- ☐ Temperature extremes
- ☐ Trapping or asphyxiation hazard (inwardly coverging walls or floor which slopes downwards and tapers to a smaller section)
- ☐ Any Other hazard that is capable of impairing self rescue or presents immediate danger to life or health (describe):

Requirements Completed (All applicable must be completed before entry)	Completed	N/A
Lockout - De-energize	☐	☐
Line(s) Broken, Capped or Blanked	☐	☐
Purge, Flush, and Vent	☐	☐
Ventilation	☐	☐
Lighting (explosion proof as necessary)	☐	☐
Respirator (list type)	☐	☐
Protective Clothing	☐	☐
Standby Safety Personnel	☐	☐
Full Body Harness with "D" Ring	☐	☐
Emergency Escape/Retrieval/Rescue/ Equipment	☐	☐
Lifelines	☐	☐

Requirements Completed (All applicable must be completed before entry)	Completed	N/A
First Aid/CPR Equipment & Trained Personnel	☐	☐
Communication Equipment	☐	☐
Secure area (post, flag and protect from falling objects)	☐	☐
Hot Work Permit	☐	☐
Add any other requirements necessary for entry		

Atmospheric Checks	Acceptable Conditions	Initial Checks	Checks After Isolation and Ventilation	Periodic Checks Hr 1	Hr 2	Hr 3	Hr 4	Hr 5	Hr 6	Hr 7	Hr 8
% of Oxygen	19.5% to 23%										
L.E.L. [1]	$\leq$ 10%										
Carbon Monoxide	< 35 ppm										
Hydrogen Sulfide	< 10 ppm										

Atmospheric monitoring conducted by:

Note: continuous/periodic tests shall be performed throughout the job. Contact Region Safety Office with questions.

[1] L.E.L. Lower Explosive Limit, also referred to as lower flammable limit (LFL).
Records must be maintained for at least one year.

DOT Form 750-094 Revised 08/2011

Distribution: Original to Division/Unit, Copy to Regional Safety Office

Exhibit 3-21 DOT Form 750-094 Confined Space Entry Permit (Page 2 of 2)

Sampling Equipment	Name	Model/Type	Date Calibrated	Identification Number

Communication procedures between entrants and attendants

Emergency Services

Emergency services must be arranged **prior** to **permit-required** confined space entry (**including 911 services**). Only persons who have been trained and equipped for entry rescue may enter the space to perform rescue services. Do **not** attempt an entry rescue if you are not trained and equipped to do so. If a person is down for no apparent cause, you must assume that toxic gases or an oxygen deficiency exist.

Emergency/Rescue Service Provided by

Phone Number/Contact Information

Describe Procedures (include necessary equipment):

Print Name	Initial	Authorized Role [2]
		◯ Entrant ◯ Attendant
		◯ Entrant ◯ Attendant
		◯ Entrant ◯ Attendant
		◯ Entrant ◯ Attendant
		◯ Entrant ◯ Attendant
		◯ Entrant ◯ Attendant
		◯ Entrant ◯ Attendant

2 Check the person's authorized role. Remember, a person cannot be both an attendant and entrant; they can only serve one role.

Entry Supervisor Authorization - All Entry Conditions Satisfied

Signature	Date

Permit expiration date and time (may not be longer than required to perform work)

Date Time

Post entry review of permit conducted by	Date

Post entry reviews must be done within one year of entry.

DOT Form 750-094
Revised 08/2011

Distribution: Original to Division/Unit, Copy to Regional Safety Office

Exhibit 3-22 Ultrasonic UT Inspection Report
(Page 1 of 2)

Washington State Department of Transportation

UT INSPECTION REPORT

Bridge Name:
Bridge No:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector Intials:
Co-Inspector Intials:

Inspected items:

Procedures:

Pins
1. When possible, test from both ends of pins.
2. Verify pin length shown on back reflection with plans. If back reflection does not match the plans, conduct manual length measurement and document correct pin length.
3. Start test with transducer at or near pin center for back reflection check, then run transducer around full perimeter of pin, searching for indications or significant loss of back reflection.
4. Whenever the test suggests that there is a defect in a pin, store and print out the indication with all associated equipment and settings documented. The location of the transducer shall also be documented using a clock hand convention (1 O'clock to 12 O'clock).

UTM Location	UTM Type	UTM Per Girder or Truss Line	Rivet Server Plans		
			Sh. No.	Contract	Sh. Name

Note: UTM = Ultrasonic Tested Member

Ultrasonic (UT) Inspection Report.xlsx 1 of 2

Exhibit 3-22 Ultrasonic UT Inspection Report
(Page 2 of 2)

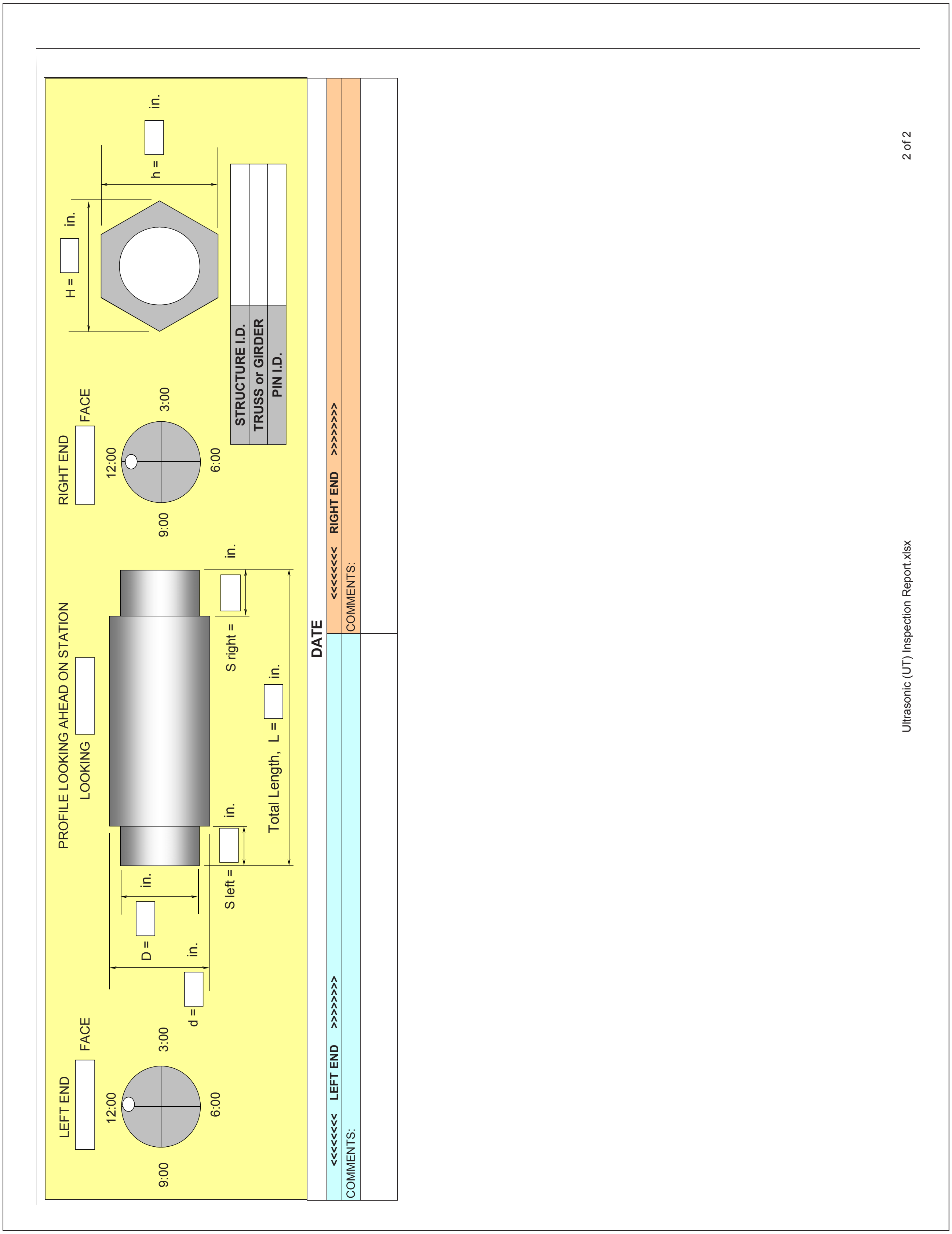


Exhibit 3-23 UT Inspection Schedule

Washington State Department of Transportation

UT INSPECTION SCHEDULE

Bridge Name:
Bridge No.:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector:
Co-Inspector:

Truss / Girder	Span	Location	Detail Description	Redundant	Condition State		Freq. (Months)	UT Inspection Date	Next Inspection Date
					VT	UT			

UT Inspection Schedule.xlsx

1 of 1

Exhibit 3-24 Pins Summary Sheet

Washington State
Department of Transportation

PINS SUMMARY SHEET

Bridge Name:
Bridge No.:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector:
Co-Inspector:

Truss / Girder	Location	Detail Description	Condition State								
			2005	2007	2009	2011	2013	2015	2017	2019	2021

Pins Summary Sheet.xlsx

1 of 1

Exhibit 3-25 Pin and Hanger Visual Inspection Report (Page 1 of 2)

Washington State Department of Transportation

PIN AND HANGER VISUAL INSPECTION REPORT

Bridge Name:
Bridge No:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector Intials:
Co-Inspector Intials:

Lead Inspector Signature: ____________________

Inspected Items: Pins & Hanger Assemblies

Co-Inspector Signature: ____________________

Procedures:

Hangers

1. As required, use mirrors or other equipment to check inside surfaces of members.
2. Check for loose or unevenly loaded member sub-elements.
3. Check all rivets at connection plates, with emphasis on first row. The first row is the row closest to the edge of the connection or gusset plate.
4. Check for any welds, including plug, tack, or repair welds. Record location of welds, regardless of condition, and document weld type and category.
5. Check members and associated connection or gusset plates for areas of heavy or pitted corrosion, nicks, gouges, sharp bends, and collision damage. Record location of all these conditions and estimated section loss, if applicable.
6. Check all heat straightened or repaired areas. Record location of these areas, regardless of condition.

Pins and Anchor Bolts

1. As required, use mirrors or other equipment to check inside surfaces of members.
2. Check for pitting, laminar rust, surface deformation, and pack rust. It is important to check the pin, pin nuts, and all members surrounding the pin for this kind of steel deterioration.
3. Check for mobility and noise of pin and surrounding members. If the pin is physically “frozen” it is important to note this because the added stress can affect other members in the structure.
4. Observe and record abnormalities like; alignment, pin wear, loose pin nuts, and amount of nut engagement. It’s important to note that full nut engagement is when the nut is flush with the pin or the pin is extending past the nut.
5. Check for paint system failure on pin nuts, pin, and surrounding members.

Location	Type	Member Per Girder or Truss Line	Rivet Server Plans		
			Sh. No.	Contract	Sh. Name

Pin and Hanger Visual Inspection Report.xlsx 1 of 2

Exhibit 3-25 Pin and Hanger Visual Inspection Report
(Page 2 of 2)

Washington State Department of Transportation

PIN AND HANGER VISUAL INSPECTION REPORT

Bridge Name:	Date:
Bridge No.:	Hours:
Structure ID:	Inspector ID #:
Structure Type:	Lead Inspector:
Agency:	Co- Inspector:
Milepost:	

Truss / Girder	Span	Location	Feature Inspected	Detail Description	Remarks
Pins					
Hangers					

Pin and Hanger Visual Report Form.xls 2 of 2

Exhibit 3-26 Special Features Inspection Report (Page 1 of 2)

Washington State Department of Transportation

SPECIAL FEATURES INSPECTION REPORT

Bridge Name:
Bridge No:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector Intials:
Co-Inspector Intials:

Lead Inspector Signature: ____________________

Inspected items:

Co-Inspector Signature: ____________________

Procedures:

Special Features	Specail Features Type	FCM Per Girder or Truss Line	Rivet Server Plans		
			Sh. No.	Contract	Sh. Name

Note: FCM = Fracture Critical Member

1 of 2

Exhibit 3-26 Special Features Inspection Report
(Page 2 of 2)

Washington State Department of Transportation

SPECIAL FEATURES INSPECTION REPORT

Bridge Name:
Bridge No.:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector:
Co-Inspector:

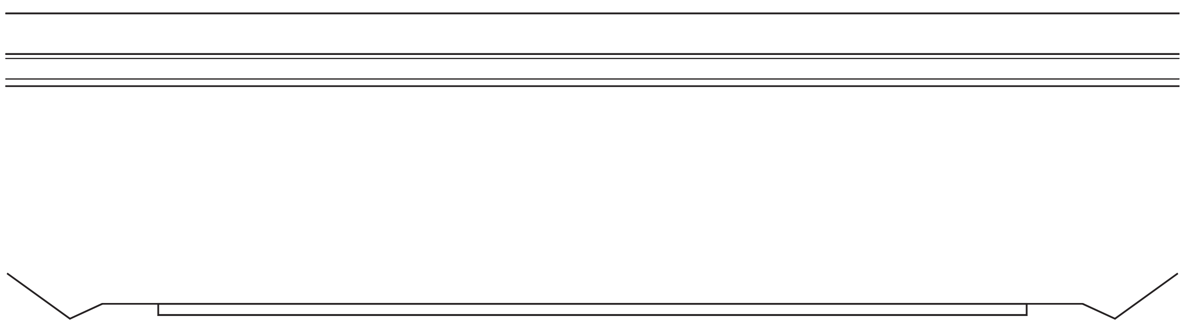
Girder	Pier	Location	Feature Inspected	Detail Description	Remarks

2 of 2

Exhibit 3-27 Vertical Clearance Card Generic

Bridge Number:	
Structure ID:	
Looking:	
Measurement Date:	
Photo Date:	
Inspection/Co Initials:	
Minimum Vertical Clearance Posted For:	
Posting on Structure:	
Posting on Shoulder:	
Advance Detour Intersection Posting for Vertical Clearance 14'-0" or less:	

Note:
Vertical measurements are actual measures rounded down to the nearest inch. Posted clearances are typically 3 inches less than the lowest clearance for a particular through movement.



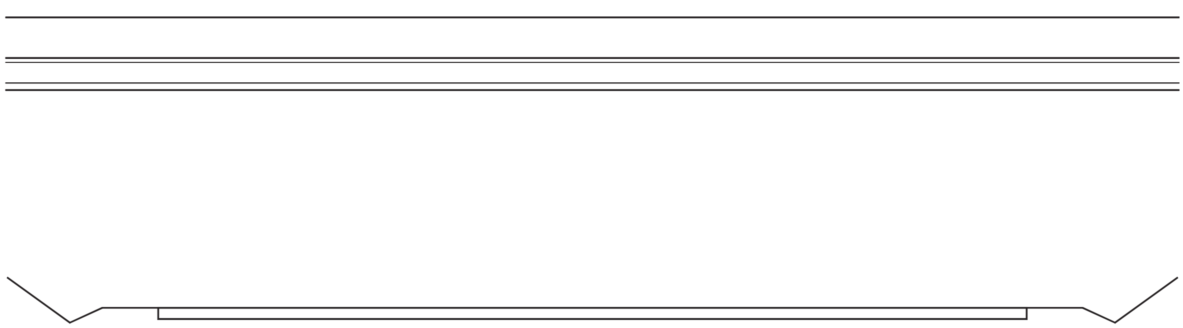
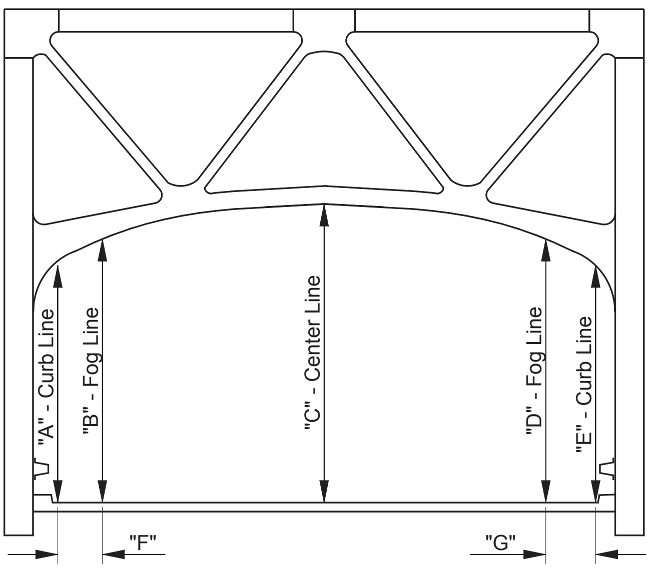


Exhibit 3-28 Vertical Clearance Card Steel

Bridge Number:	
Structure ID:	
Looking:	
Measurement Date:	
Photo Date:	
Inspection/Co Initials:	
Minimum Vertical Clearance Posted For:	
Posting on Structure:	
Posting on Shoulder:	
Advance Detour Intersection Posting for Vertical Clearance 14'-0" or less:	

Note:
Vertical measurements are actual measures rounded down to the nearest inch. Posted clearances are typically 3 inches less than the lowest clearance for a particular through movement.

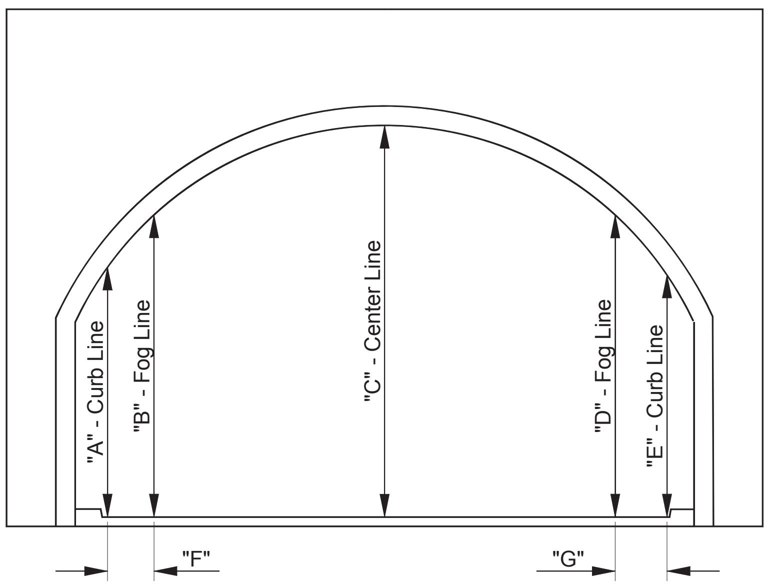


Location	Field Measurement						
	A	B	C	D	E	F	G

Exhibit 3-29 Vertical Clearance Card Tunnel

Bridge Number:	
Structure ID:	
Looking:	
Measurement Date:	
Photo Date:	
Inspection/Co Initials:	
Minimum Vertical Clearance Posted For:	
Posting on Structure:	
Posting on Shoulder:	
Advance Detour Intersection Posting for Vertical Clearance 14'-0" or less:	

Note:
Vertical measurements are actual measures rounded down to the nearest inch. Posted clearances are typically 3 inches less than the lowest clearance for a particular through movement.



Location	Field Measurement						
	A	B	C	D	E	F	G

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 1 or 23)

Bridge Inspection Pre-Activity Safety Plan Cover Sheet

This pre-activity safety plan covers all bridge inspection activities as indicated below for the WEEK/WEEKEND OF ____________ TO ____________.

LOCATION: BR NOs & MPs ____.

COUNTIES ____.

Our signatures below indicate that we have read the safety plan, that we understand the hazards related to the activities to be conducted, and that we will apply the appropriate controls to minimize the risks of accident and injury during the inspections.

LEAD INSPECTOR: ____________________________________DATE:____________
(Name/Signature/Initials)
CO-INSPECTOR: ______________________________________DATE:____________
(Name/Signature/Initials)
UBIT DRIVER: ____DATE:____________
(Name/Signature/Initials)

Our initials below indicate that we have discussed and reaffirmed the hazards, risks and control measures prior to the start of daily activities (Tailgate Safety Meetings) *[For use on multiple-day inspections]*

	DATE				
LEAD INSPECTOR					
CO-INSPECTOR					
UBIT DRIVER					

Activities to be conducted during the above inspection dates (check all that apply):

☐ **General Bridge Inspection Activities** ☐ Routine Inspection ☐ Short Span Inspection ☐ Safety Inspection ☐ Interim Inspection ☐ Special Inspection	☐ **Equipment Bridge Inspection using a Bucket Truck, Man Lift, or other Boom Truck** ☐ Attach Fall Protection Plan
☐ **UBIT Bridge Inspection** ☐ Attach Fall Protection Plan	☐ **Bridge Climbing Inspection** ☐ Attach Fall Protection Plan
☐ **Damage Inspection** ☐ Attach Fall Protection Plan	☐ **Confined Space Entry** ☐ Attach Confined Entry Plan
☐ **Scour Site Visit Bridge Inspection**	☐ **Underwater Inspection**
☐ **Boat Inspection**	☐ **Nondestructive Testing**
☐	☐

Fill out the cover page to the Pre-Activity Safety Plan for each inspection trip. For multiple crew inspections fill out a sheet for each crew. For multiple bridges where more room is needed to list the bridges above attach a list of the bridges. This cover sheet must be filled out before the activities starts and must be present on site during the activities. Maintain these coversheets in chronological order in front of the Pre-Activity Safety Plan section of the Safety Binder and keep in the inspection vehicle. The lead inspector is responsible for all on site safety matters.

1

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 2 of 23)

Bridge Inspection Pre-Activity Safety Plan

Goal: The Washington State Department of Transportation (WSDOT) is committed to providing a healthy and safe workplace for all personnel; zero injuries, accidents, exposures, and the control of occupational hazards are key components of the goal.

Purpose: The purpose of the Pre-Activity Safety Plan is to provide a tool for inspection crews and supervisors to use in conducting safety training and tailgate briefings in order to identify hazards, assess the risks, and to implement control measures to minimize the risk of accidents and injuries while performing bridge inspection activities.

General: Bridges have many different hazards that may be encountered during inspection. There are two major types of inspection that generally occur, ROUTINE inspections and EQUIPMENT inspections using a UBIT (Under Bridge Inspection Truck), Bucket Truck, Man Lift, and other boom trucks.

Routine inspection entails a quick (generally <1 hour) inspection of a bridge by doing a walk-around and checking various bridge components. Routine inspections are generally a part of all inspections. Safety and Short Span inspections are special type inspections similar to routine inspections. The hazards associated with the Routine Inspections are inherent in these as well. Special Inspections and Interim Inspections can be in the form of a walking inspection similar to routine inspections and/or an equipment inspection.

Equipment inspections are performed in addition to routine inspections on bridges that require a close in depth inspection of areas that cannot be reached or safely reached on foot, ladder, or by remote devices such as fiber optic devises. Fracture Critical bridges are almost always inspected with equipment as are most of the Special Inspections and Damage Inspections. Equipment inspections are almost always in the form of a UBIT Inspection (see Figure 1) and are often accompanied by the use of a bucket truck, Genie Lift, and/or other man lift/boom trucks. They may also be performed without a UBIT truck based on the requirements of the inspection.

Lift trucks are often rented. Because there are many different brands and types of lift trucks, it is the responsibility of the inspection crew to inspect the equipment for serviceability and to ensure training on the particular piece of equipment is received prior to its use.

Equipment inspections almost always require a traffic control plan, flagging operations, and/or Truck Mounted Attenuators (TMAs) often referred to an ‘Attenuator’. In most cases the region maintenance crew will develop the traffic control plan and provide flagging and attenuators as needed. This does not relieve the inspection crew of ensuring safety regarding these activities.

Bridge Climbing is an inspection technique used when a close in depth look of areas are required and an equipment inspection is not feasible such as when the areas may be out of reach of the equipment, load restrictions prohibit the use of equipment, or traffic control issues might prohibit the use of equipment. Climbing inspection activities may include rope access, in which a rope

2

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 3 of 23)

access plan shall be developed for the specific bridge and supplement this Pre-activity Safety Plan (PASP).

Figure 1 Typical multi-crew UBIT inspection

Scour inspections are performed on bridges over waterways and can be performed by walking, wading, boat, and or SCUBA diving (Underwater Inspection). Many times a scour evaluation is conducted in conjunction with routine and/or equipment inspections and requires measuring the depth and profile of the channel from the bridge deck with a rod or an incremented line and weight. Traffic and fall hazards are of concern in these cases, both of which have to be addressed simultaneously. When wading, or boating operations are performed, water safety needs to be addressed.

Bridge Preservation Office personnel are highly trained in the performance of their field activities. This PASP addresses all inspections that may occur on any bridge throughout the state. Hazards that are specific to a particular bridge will be addressed on-site. Discussion notes and mitigation measures are to be added to this PASP whenever specific hazards not already covered are found at a particular bridge site.

3

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 4 of 23)

Typical Procedures:

Routine Inspections: Lane closure is seldom necessary. There are two inspectors working out of one vehicle. The passenger navigates as the driver drives to the bridge. When arriving at the bridge, the inspector turns on the overhead beacons and finds a safe place to park near the bridge and out of traffic. Inspectors get out and inspect the abutments and walk the deck on foot.

Equipment Inspections: Closure of a lane is performed by maintenance crews. When the work zone is set up, maintenance will radio the inspection crew that they are ready. The UBIT and/or other equipment trucks will then enter the work zone. The engineers' inspection vehicle will follow behind. The engineers will then get in the UBIT truck (or other equipment) and start the inspection. After the UBIT inspection is complete, the engineers will finish the bridge by walking the deck and inspecting the abutments on foot.

For bucket truck operations without region traffic control (off the shoulder work), the inspectors will establish a safety zone and cone off the shoulder. Early warning signs may be required in accordance with Work Zone Traffic Control Guidelines, M 54-44.04

Scour Site Visit: A lane closure is seldom necessary. There are generally two inspectors working out of one vehicle. The passenger navigates as the driver drives to the bridge. When arriving at the bridge, the inspector turns on the overhead beacons and finds a safe place to park near the bridge and out of traffic. Inspectors get out and inspect the abutments, intermediate piers, and the associated waterway. When required, soundings from the bridge rail to the channel bed will be measured to create a stream cross section sketch.

Tasks, Hazards, and Controls:

TASK	HAZARDS	CONTROL When controls cannot be met as specified below or by readily available equivalent mitigating measures, the activity will be aborted and rescheduled after a specific plan of action is devised to mitigate the specific circumstances.
All Inspection Activities	Noise	Hearing conservation education. Wear hearing protection.

4

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 5 of 23)

All Inspection Activities	Traffic	If accident occurs, dial 911. If joint measurements are required, one inspector watches traffic to ensure the other can safely measure joints. Always walk the bridge decks in teams of two with one person inspecting and the other having the duties as a safety monitor.
All Inspection Activities	Needles/feces	Stay alert for these and avoid. See Appendix C.
All Inspection Activities	Pigeon guano	Avoid disturbance of guano
All Inspection Activities	Transients	Avoid transients and travel in pairs using the buddy system. Announce presence to transients.
All Inspection Activities	Weather	Not inspecting during thunderstorms and icy conditions.
All Inspection Activities	Walking the deck (moving Traffic)	Walk in a direction facing oncoming traffic. Be aware of escape routes in case of emergency.
All Inspection Activities	Walking the deck (Fall Hazard)	Bridge decks with rails less than 39” will be protected against inadvertent falls using a safety monitor. Using the 2-man inspection crew, one is the inspector, the other is the safety monitor. The safety monitor’s only duty is to ensure the inspector’s safety by watching the hazards and alerting the inspector as necessary when the risk increases.

5

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 6 of 23)

All Inspection Activities	Hazardous Materials	Review MSDS for all hazardous materials being used or expected to be encountered.
All Inspection Activities	Snake and spider bites	Provide first aid and drive to hospital if bitten. Take the offending animal with you ONLY if doing so does not create further hazard (i.e. the animal is dead). Be prepared to describe the animal if it cannot be taken. See Appendix D for the hospital list.
All Inspection Activities	Struck by falling objects	Avoid walking and working under suspended loads. Hard hats must be worn when working around backhoes, cranes, excavators, etc.
All Inspection Activities	Weather related illness	Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
All Inspection Activities	Strains and sprains due to Lifting	Proper lifting techniques shall be used. Get help or use lifting/hoisting equipment if necessary.

6

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 7 of 23)

All Inspection Activities	Slips trips and falls (General)	Be aware of loose materials, excavation drop-off, tripping hazards and other obstructions. Keep walk spaces and work areas free from loose materials or tools. Avoid dangerous terrain when possible. Use alternate route.
All Inspection Activities	Slips trips and falls (Steep Slopes)	Steep slopes (typically 2 vertical to 1 horizontal) are to be assessed on-site. A plan will be discussed to protect inadvertent falls before negotiating the slope. Surface conditions and weather are part of the assessment which can turn a lesser slope into a hazard.
Confined Space Inspection Activities	Confined space entry in box girders.	Complete confined space entry plan (Appendix A) if the confined space is permit required. Carry gas monitors while performing inspection. Use the buddy system. If asphyxiation of person in confined space occurs, partner dials 911 instead of entering the space.
All Inspection Activities requiring the use of Ladders	Falling from ladder.	Find stable footing for ladder. Have co-inspector help with anchoring ladder base.
All Inspection Activities requiring Wading	Falling, drowning	Use probe to help balance and to avoid drop-offs.
All Inspection Activities requiring the use of Hand Tools (Power and Manual)	Cuts, pinches and debris in eyes.	Follow operating instructions. Use appropriate PPEs.

7

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 8 of 23)

All Inspection Activities requiring the negotiation of Fences and Barriers	Falling, strains and cuts	Use fence climber tool. Cut fence if required. Attempt to find alternate route.
All Inspection Activities requiring reaching across Bridge Rails	Falling	When inspection activities require reaching or looking over the bridge rail the following requirements will be met: The deck surface will be free of debris that may pose a slipping or tripping hazard. Three points of contact (minimum) will be maintained at all times, two of which will be both feet flat on the bridge deck or sidewalk (the third can be a hand or arm) such that the body is braced at all times to prevent falling over. And, a safety Monitor will be used. The second person in the inspection team will be designated as a safety monitor and will have only the duties of observing for and alerting the inspector of hazards.
All Inspection Activities around and near Railways	Railroad beneath the bridge	Obtain flagging from the Railroad. If RR flagging is not present, maintain a minimum of 25 ft. clear distance from the track centerline.
Bucket truck or manlift inspection.	The hazards present are the same for UBIT inspection except that this equipment is often rented.	Careful inspection of manlift equipment before use.
Work Boat	Struck by, drowning	Perform pre-operational checks, PFD.
Fences	Falling, strains and cuts	Use fence climber tool. Cut fence if required. Attempt to find alternate route.
Nondestructive testing: Dye Penetrant, Ultrasonic	Paint/ dye penetrant inhalation	Taking care not to inhale fumes. Not smoking while handling these products.

8

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 9 of 23)

UBIT and Equipment Inspections	Falling	Complete fall protection plan (Appendix B). Use and follow fall protection plan.
UBIT and Equipment Inspections	Power lines	Maintain distances on power lines as called out on safety placard posted on UBIT bucket. Shut down power in lines when bridge is unable to be inspected without maintaining a safe distance. If electrocution occurs, dial 911 on cell phone.
UBIT and Equipment Inspections	Traffic	Set up flagging on bridge to take the lane (performed by maintenance).
UBIT and Equipment Inspections	Hydraulic failure in UBIT	If total failure occurs, use Rollgliss.
UBIT and Equipment Inspections	Weather	Not inspecting during thunderstorms and icy conditions.
UBIT and Equipment Inspections	Struck by falling objects	Avoid walking and working under suspended loads. Hard hats must be worn when working around backhoes, cranes, excavators, etc.
UBIT and Equipment Inspections	Weather related illness	Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
UBIT and Equipment Inspections	Overhead hazards.	Wearing hard-hats while inspecting in and around equipment.
UBIT and Equipment Inspections	Lead exposure	When grinding occurs, use dust masks to prevent inhalation of dust. Wear coveralls to keep dust off clothes. Use eye protection.
UBIT Inspections	Hydraulic failure in UBIT	If total failure occurs, use Rogliss.

9

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 10 of 23)

Scour Inspections	Taking Soundings from the bridge rail.	When inspection activities require reaching or looking over the bridge rail the following requirements will be met: The deck surface will be free of debris that may pose a slipping or tripping hazard. Three points of contact (minimum) will be maintained at all times, two of which will be both feet flat on the bridge deck or sidewalk (the third can be a hand or arm) such that the body is braced at all times to prevent falling over. And, a safety Monitor will be used. The second person in the inspection team will be designated as a safety monitor and will have only the duties of observing for and alerting the inspector of hazards.

10

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 11 of 23)

APPENDIX A: CONFINED SPACE ENTRY

Washington State Department of Transportation

Confined Space Entry and Hot Work Permit

NOTE: This form is required to be completed, appropriately signed prior to, and utilized during entry into any confined space.

Confined Space ID No.	Region	Region Safety Manager
Type of Work: ☐ Overhead ☐ Under Foot	Location	
Purpose of Entry		
This space entered ________ times per ☐ Day ☐ Week ☐ Month ☐ Year		
Description of Work		
Employees Assigned Entry		Date / Time Issued
Authorized Attendants		Date / Time Expired

Have the Following Precautions Been Taken?	Yes	No	N/A
Were hazards, testing, and emergency procedures discussed?			
Have authorized entrants and attendants been trained regarding confined spaces?			
Has safety equipment been properly calibrated and checked?			
Have the duties of the authorized entrants and attendants been discussed?			
Have emergency response or rescue procedures been discussed?			

What are the Potential Work Hazards? (Check all that apply)

☐ Corrosives ☐ Flammable Materials ☐ Hazardous Atmosphere ☐ Mechanical ☐ Ladders Over 10 F
☐ Hot Work (riveting, welding, grinding, burning) ☐ Dust ☐ Electrical ☐ Biological ☐ Temperature
☐ Other (specify):

Personal Protective and Safety Equipment? (Check all that apply)

☐ Atmosphere Monitoring (complete next section) ☐ Communications Equipment ☐ Respiratory Protection ☐ Hearing
☐ Life Lines and Harness ☐ Ventilation Equipment ☐ Head, Hand, Foot, and Eye
☐ Other (specify):

DOT Form 750-004 EF
Revised 2/2000

APPENDIX A –PAGE 1

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 12 of 23)

APPENDIX A: CONFINED SPACE ENTRY

Atmospheric Monitoring Equipment/Instrument

Make	Model	Serial No.
Date of Calibration	Other	

Atmospheric Monitoring Equipment - Equipment Check and Calibration

Concentration of Calibration Gases and Instrument Readings: Gas Concentration | Instrument Reading

Oxygen	Flammables	Carbon Monoxide	Other: ______
|	|	|	|

Note: Make sure calibration gas cylinders have not expired. If the instrument readings are not within 5-10% of the known gas concentrations, recalibrate or send in to manufacturer for recalibration.

Atmospheric Test Results

Date / Time	Oxygen	Flammability	Carbon Monoxide	Other

Is "hot work" (riveting, welding, cutting, brazing, burning, grinding) to be performed in the confined space? ☐ Yes ☐ No
If Yes, complete the Hot Work Section. If No, skip to Page 3, Qualified Person Verification and Signature Section

Hot Work

Description of Work or Equipment Presenting a Potential Ignition Source or Generating a Hazardous Atmosphere

Have employees been properly trained, advised, and monitored with regards to hot work performed in confined spaces?
☐ Yes ☐ No ***IF YOU ANSWERED NO, STOP ALL WORK ACTIVITIES AND CONSULT WITH MANAGERS.***

Does the working surface or equipment being used have a potential of generating toxic gases, fumes, dust, or vapors? Check all that apply:

☐ Welding Rods and Flux ☐ Silica or Respirable Dusts ☐ Oxygen Displacement ☐ Other ______
☐ Lead Paint / Paint ☐ Animal Wastes ☐ Carbon Monoxide ______

Describe in detail the type of ventilation (volumes, air exchanges, air intakes, that will be used to remove the gases, fumes, dust, or vapors.

DOT Form 750-094 EF
Revised 2/2000

APPENDIX A –PAGE 2

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 13 of 23)

APPENDIX A: CONFINED SPACE ENTRY

Hot Work - Continued

Describe in detail the personal protective equipment to be used during the hot work activities:

Respiratory Requirements:
Atmosphere Monitoring Equipment:
Rescue Equipment or Rescue Team:
Fire Extinguishing Media:
Head, Foot, Hand, Eye:
Other:

Atmospheric Monitoring Data During Hot Work ***(must be continuous)***

Date / Time	Oxygen	Flammability	Carbon Monoxide	Other

Is employee exposure monitoring being performed during the hot work activities? ☐ Yes ☐ No If yes, describe the monitoring:

Qualified Person Verification and Signature

I have verified the procedures and work activities and have briefed the Authorized Entrants and Attendants on the proper practices and associated hazards of confined spaces and the associated work activities.

Name of Qualified Person	Phone	Date
Signature of Qualified Person	Organization	

This Confined Space Entry and Hot Work Permit serves as a master record for data and information collected during the field operations and confined space entry. The qualified person shall annually provide copies of the completed forms to their respective Region Safety Manager. It is recommended that all completed forms be kept on file for at least five years.

DOT Form 750-094 EF
Revised 2/2000

APPENDIX A –PAGE 3

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 14 of 23)

APPENDIX B: TOWER AND BRIDGE FALL PROTECTION PLAN

Washington State Department of Transportation

Tower and Bridge Fall Protection Plan

Date	Location	Prepared By
Description of Work		

Recognized Fall Hazards

☐ Tower ☐ Self-Support ☐ Guyed ☐ Monopole ☐ Light Pole ☐ Wooden Pole ☐ Walkway w/o Fall Restraint ☐ Staircase w/o Fall Restraint ☐ Weakened or Damage (e.g., missing member/hardware)

☐ Bridge ☐ Suspension ☐ Cantilever ☐ Arch ☐ Draw ☐ Other ______

☐ Non-Standard ☐ Roof Top ☐ Building Side ☐ Highway Sign Structure ☐ Other ______

☐ Ladder w/o Fall Restraint ☐ Step Bolts w/o Fall Restraint ☐ Work Deck w/o Fall Restraint ☐ Rest Platform w/o Fall Restraint ☐ Other ______

☐ Motorized Vehicular Traffic

Recognized Environmental Hazards

☐ Sun ☐ Rain ☐ Snow ☐ Heat/Ice ☐ Cold ☐ Noise ☐ Darkness

Recognized Live Hazards

☐ Birds ☐ Insects ☐ Reptiles ☐ Human ☐ Other ______

Other Recognized Hazards

☐ Electrical ☐ Rf Exposure

Method of Fall Restraint and/or Arrest (PFAS) to be Used

☐ Work Deck ☐ Railing ☐ Positioning Lanyard ☐ Ladder Safety Climb ☐ Warning Signs Lines

☐ Full Body Harness ☐ Shock Absorbing Lanyard ☐ Self Retracting Lanyard ☐ Vertical Life Line ☐ Horizontal Life Line

☐ Work Platform ☐ Rest Platform ☐ Walkway ☐ Tie-Off Point
Capable of 5,000 Lbs. per Person

Personal Protection Equipment (PPE) to be Used

☐ Hard Hat ☐ Safety Eyewear ☐ Rain Wear ☐ Face Wear

☐ Gloves ☐ Heaving Clothing ☐ Heavy Footwear ☐ Other ______

Tool Handling:
☐ Tool Belts ☐ Tool Bucket ☐ Other ______

Method of Hoisting Used

☐ Winch ☐ Block and Tackle ☐ Capstan ☐ Manual ☐ Crane ☐ Boom Truck

Method of Manriding Line Used

☐ Descent/Suspension w/PFAS ☐ Ascending/Decending w/PFAS

Note: Upon hearing the sound of **thunder, caused by lightening strike activity,** all high structure climbing and work shall cease and all climbing personnel are to immediately mobilize safely off the structure and seek shelter below the tower. Work shall not resume until it is deemed safe.

DOT Form 750-001A EF
1/2005

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 15 of 23)

APPENDIX B: TOWER AND BRIDGE FALL PROTECTION PLAN

Emergency Action Plan

☐ First Aid ☐ CPR ☐ Call 911

Location of First Aid Equipment Left tool box of UBIT

Location of Phone	Phone Number of Sheriff or Police	Phone No. of Emergency Resp. Team
Cell phone - cab of truck		

List Other Contact Names and Phone Numbers, if any:

Contact Name	Phone Number(s)

Describe Procedure of Rescue Plan

☐ Manual ☐ Outside Services ☐ Winch
☐ Ascending/Descending ☐ Descending/Suspension ☐ Other (Describe)
☐ Rollgliss Rescue System

Always be connected to eye bolt in work platform.
If you must climb onto bridge structure use appropriate attachment point for fall arrest.

Note: Installation, relocation, removal, maintenance, and inspection of equipment on job site shall be performed in accordance with industry and agency training policies and manufacturers recommended practices.
Use of fall protection, PPE, and PFAS equipment shall be in accordance with OSHA, WISHA, and agency training policies.

Verification of Compliance

Employee Signatures	
▶	▶
▶	▶
▶	▶
▶	▶

DOT Form 750-001A EF
1/2005

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 16 of 23)

APPENDIX C: BLOODBORNE PATHOGENS

BLOODBORNE PATHOGENS EXPOSURE CONTROL PLAN

Facility Name: Bridge Preservation Office

Date of Preparation: February 21, 2007

A. Purpose

The Bloodborne Pathogens Exposure Control Plan is to reduce or eliminate occupational exposure to bloodborne pathogens.

B. Exposure Determination

Employees that may come into contact with human blood or other potentially infectious materials (OPIM) are listed on Page 5 of this appendix.

C. Methods of Compliance

Universal Precautions will be utilized in the handling of all human blood and OPIMs. Please refer to WSDOT's Bloodborne Pathogens Policy, Chapter 7 of Safety Procedures and Guidelines Manual, M75-01.

D. Engineering Controls

1. Employees will wash their hands and any other exposed skin thoroughly with soap and hot water immediately or as soon as possible after contact with blood or OPIM in a manner causing friction on both inner and outer surfaces of the hands.

2. Employees will be provided with antiseptic hand cleaner and paper towels when hand washing is not feasible. However, hand washing must still take place as soon as possible after exposure.

3. Eating, drinking, smoking, applying cosmetics or lip balm and handling contact lenses is prohibited in work areas where there is the potential for exposure to bloodborne pathogens.

4. If professional medical attention is required, a local ambulance will be the first choice; a personal car will be the second. If a personal car is taken, impervious material should be used to prevent contamination of the vehicle.

5. New employees or employee being transferred to other sections will receive training about any potential exposure from the Regional Safety Manager.

6. This Exposure Control Plan will be a part of the BPO office Pre-activity Safety Plans when exposure to bloodborne pathogens is recognized during pre-job hazard assessment.

APPENDIX C –PAGE 1

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 17 of 23)

APPENDIX C: BLOODBORNE PATHOGENS

E. Personal Protective Equipment

All personal protective equipment, such as gloves, contaminated materials handling tools or equipment, biohazard bags used will be provided without cost to employees. Personal protective equipment will be chosen based on the anticipated exposure to blood or OPIM. The protective equipment will be considered appropriate only if it does not permit blood or OPIM to pass through or reach the employees' clothing, skin, eyes, mouth, or other mucous membranes under normal conditions of use.

F. Disposal of Contaminated Items and Communication of Hazard

1. Employees must:

    a. use bleach to disinfect any blood or OPIM.

    b. apply the bleach with single-use gloves and allow contact for at least 15 minutes.

    c. place any single-use gloves that have been contaminated in a biohazard bag and cover.

        i. contact your Regional Safety Managers for the proper disposal of biohazard bags or other impervious containers.
        ii. regulated waste should be placed in appropriate containers, label and disposed of in accordance with Chapter 296-823, WAC

2. Employees will be warned of biohazard bags by labels attached to the disposal bags. Labels used will be orange-red and marked with the work **BIOHAZARD** or the biohazard symbol.

G. Housekeeping

Maintaining our work areas in a clean and sanitary condition is an important part of WSDOT's Bloodborne Pathogens Compliance Program. Employees must decontaminate working surfaces and equipment with an appropriate disinfectant after completing procedures involving blood or OPIM. All equipment, environmental surfaces and work surfaces shall be decontaminated immediately or as soon as feasible after contamination.

1. Employees must clean and disinfect when surfaces become contaminated and after any spill of blood or OPIM.

2. Employees will use a solution of one part bleach to ten parts water for cleaning and disinfecting.

3. Working surfaces and equipment will be cleaned, disinfected and maintain.

4. Potentially contaminated broken glass will be picked up using mechanical means, such as dustpan and brush, tongs, etc.

APPENDIX C –PAGE 2

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 18 of 23)

APPENDIX C: BLOODBORNE PATHOGENS

5. Use universal precautions for handling of all soiled laundry.

6. Laundry contaminated with blood or OPIM will be handled as little as possible. Employees who handle contaminated laundry will utilize personal protective equipment to prevent contact with blood or OPIM from coming into contact skin or street clothes.

7. Contaminated clothing will remain on the premises, or will be sent directly to a laundry facility for cleaning. Employees will be given the option of reimbursement for the cost of contaminated clothing and the clothing will be disposed.

H. Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-Up

1. WSDOT shall make available within 24 hours of possible exposure the Hepatitis B vaccine and vaccination series to all employees who have occupational exposure. Vaccination is not required if:

   a. Employee has previously received the completed Hep B vaccination series.
   b. An antibody test has revealed that the employee is immune to hepatitis B.
   c. There are medical reasons not to give the vaccine, usually determined by the employee's physician.

2. An employee who refuses the vaccination is required to sign a Hepatitis B Vaccination Declination Form, Appendix 7-C in Chapter 7 of the Safety Manual which will be retained indefinitely in the employee's Safety and Health file located at the HQ Safety Office.

3. An exposure incident means a specific eye, mouth, other mucous membrane, non-intact skin or parenteral contact with blood or OPIM that result from the performance of an employee's duties. Examples of non-intact skin include skin with dermatitis, hangnails, cuts, abrasions, chafing or acne. Any employee having an exposure incident shall contact the Regional Safety Manager immediately. All employees who have an exposure incident will be offered a confidential post-exposure evaluation and follow-up in accordance with the DOSH standard. This includes a visit to a physician selected by the employee where an L&I claim can be initiated. The health care professional written opinion will be provided to the employee within 15 days of the evaluation.

I. Training

Training is provided at the time of initial assignment to tasks where occupational exposure may occur, and that it shall be repeated within twelve months of the previous training. Training shall be tailored to the education and language level of the employee, and offered during the normal work shift. The training will be interactive and cover the following:

1. a copy of the standard and an explanation of its contents;

2. a discussion of the epidemiology and symptoms of bloodborne diseases;

APPENDIX C –PAGE 3

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 19 of 23)

APPENDIX C: BLOODBORNE PATHOGENS

3. an explanation of the modes of transmission of bloodborne pathogens;
4. an explanation of the WSDOT Bloodborne Pathogen Exposure Control Plan (this program), and a method for obtaining a copy;
5. the recognition of tasks that may involve exposure;
6. an explanation of the use and limitations of methods to reduce exposure, for example engineering controls, work practices and personal protective equipment;
7. information on the types, use, location, removal, handling, decontamination, and disposal of PPE;
8. explanation of the basis of selections of PPE;
9. information on the Hepatitis B vaccination, including efficacy, safety, method of administration, benefits, and that it will be offered free of charge;
10. information on the appropriate actions to take and persons to contact in an emergency involving blood or OPIM;
11. explanation of the procedures to follow if an exposure incident occurs, including the method or reporting and medical follow-up;
12. information on the evaluation and follow-up required after an employee exposure incident;
13. an explanation of the signs, labels, and color-coding systems.

J. Exposure Reporting and Recordkeeping

1. Exposures, including first aid incident exposures that involve the presence of blood or OPIM must be reported to the supervisor and the Regional Safety Manager before the end of the work shift. An Accident Form, 750-100 must be completed to include the names of all the first-aid providers who rendered assistance, the time and date of the first-aid incident and a description of the first-aid incident.
2. Medical records shall be maintained in accordance with DOSH Standards. These records shall be kept confidential, and must be maintained at the HQ Safety and Health Office for at least the duration of employment plus 30 years.

APPENDIX C –PAGE 4

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 20 of 23)

APPENDIX D: HOSPITALS

NAME	ADDRESS	CITY	COUNTY	PHONE
Grays Harbor Community Hospital	915 Anderson Drive	Aberdeen	Grays Harbor	(360) 532-8330
Island Hospital	1211 - 24th	Anacortes	Skagit	(360) 299-1300
Cascade Valley Hospital and Clinics	330 S. Stillaguamish Avenue	Arlington	Snohomish	(360) 435-2133
Auburn Regional Medical Center	202 N. Division Street	Auburn	King	(253) 833-7711
Overlake Hospital Medical Center	1035 - 116th NE	Bellevue	King	(425) 688-5000
St. Joseph Hospital	2901 Squalicum Parkway	Bellingham	Whatcom	(360) 734-5400
Harrison Medical Center	2520 Cherry Avenue	Bremerton	Kitsap	(360) 377-3911
Naval Hospital	HP 01 Boone Road	Bremerton	Kitsap	(360) 475-4210
Okanogan Douglas District Hospital	507 Hospital Way	Brewster	Okanogan	(509) 689-2517
Highline Medical Center	16251 Sylvester Road SW	Burien	King	(206) 244-9970
Providence Centralia Hospital	914 South Scheuber Road	Centralia	Lewis	(360) 736-2803
Lake Chelan Community Hospital	503 E. Highland Avenue	Chelan	Chelan	(509) 682-3300
St. Joseph's Hospital	500 East Webster	Chewelah	Stevens	(509) 935-8211
Tri-State Memorial Hospital	1221 Highland Ave.	Clarkston	Asotin	(509) 758-5511
Whitman Hospital and Medical Center	1200 West Fairview	Colfax	Whitman	(509) 397-3435
Mount Carmel Hospital	982 E. Columbia	Colville	Stevens	(509) 684-2561
Whidbey General Hospital	101 N. Main Street	Coupeville	Island	(360) 678-5151
Lincoln Hospital	10 Nicholls Street	Davenport	Lincoln	(509) 725-7101
Dayton General Hospital	1012 S. Third Street	Dayton	Columbia	(509) 382-2531
Deer Park Hospital	1015 E. "D" Street	Deer Park	Spokane	(509) 276-5061
Stevens Healthcare	21601 76th Avenue West	Edmonds	Snohomish	(425) 640-4000
Kittitas Valley Community Hospital	603 S. Chestnut	Ellensburg	Kittitas	(509) 962-9841
Enumclaw Regional Hospital	1450 Battersby Avenue	Enumclaw	King	(360) 825-2505
Columbia Basin Hospital	200 Nat Washington Way	Ephrata	Grant	(509) 754-4631
Providence Everett Medical Center	1321 Colby	Everett	Snohomish	(425) 261-2000
St. Francis Hospital	34515 9th Avenue South	Federal Way	King	(253) 944-8100
Forks Community Hospital	530 Bogachiel Way	Forks	Clallam	(360) 374-6271
Klickitat Valley Health	310 S. Roosevelt	Goldendale	Klickitat	(509) 773-4022
Coulee Community Hospital	411 Fortuyn Road	Grand Coulee	Grant	(509) 633-1753
Ocean Beach Hospital	174 - 1st Avenue North	Ilwaco	Pacific	(360) 642-3181
Kennewick General Hospital	900 S. Auburn	Kennewick	Benton	(509) 586-6111
Evergreen Healthcare	12040 NE 128th Street	Kirkland	King	(425) 899-1000
Fairfax Hospital	10200 N.E. 132nd Street	Kirkland	King	(425) 821-2000

APPENDIX D –PAGE 1

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 21 of 23)

APPENDIX D: HOSPITALS

NAME	ADDRESS	CITY	COUNTY	PHONE
Cascade Medical Center	817 Commercial Street	Leavenworth	Chelan	(509) 548-5815
PeaceHealth, St. John Medical Center	1615 Delaware Street	Longview	Cowlitz	(360) 414-2000
Mark Reed Hospital	322 South Birch Street	McCleary	Grays Harbor	(360) 495-3244
Valley General Hospital	14701 - 179th SE	Monroe	Snohomish	(360) 794-7497
Morton General Hospital	521 Adams Street	Morton	Lewis	(360) 496-5112
Samaritan Healthcare	801 E. Wheeler Road	Moses Lake	Grant	(509) 765-5606
Skagit Valley Hospital	1415 E Kincaid Street	Mount Vernon	Skagit	(360) 424-4111
Newport Hospital & Health Services	714 West Pine	Newport	Pend Oreille	(509) 447-2441
Odessa Memorial Healthcare Center	502 E. Amende Drive	Odessa	Lincoln	(509) 982-2611
Capital Medical Center	3900 Capital Mall Drive S.W.	Olympia	Thurston	(360) 956-2550
Providence St. Peter Hospital	413 Lilly Road N.E.	Olympia	Thurston	(360) 491-9480
Mid-Valley Hospital	810 Jasmine	Omak	Okanogan	(509) 826-1760
Othello Community Hospital	315 N. 14th Avenue	Othello	Adams	(509) 488-2636
Lourdes Medical Center	520 N. 4th Avenue	Pasco	Franklin	(509) 547-7704
Garfield County Public Hospital District	66 North Sixth Street	Pomeroy	Garfield	(509) 843-1591
Olympic Medical Center	939 Caroline Street	Port Angeles	Clallam	(360) 417-7000
Jefferson Healthcare	834 Sheridan	Port Townsend	Jefferson	(360) 385-2200
Prosser Memorial Hospital	723 Memorial Street	Prosser	Benton	(509) 786-2222
Pullman Regional Hospital	835 SE Bishop Boulevard	Pullman	Whitman	(509) 332-2541
Good Samaritan Community Healthcare	407 14th Avenue S.E.	Puyallup	Pierce	(253) 697-4000
Quincy Valley Medical Center	908 10th Avenue S.W.	Quincy	Grant	(509) 787-3531
Group Health Cooperative/Eastside Hosp	2700 152nd N.E.	Redmond	King	(425) 883-5151
Valley Medical Center	400 S. 43rd Street	Renton	King	(425) 228-3450
Ferry County Memorial Hospital	36 Klondike Road	Republic	Ferry	(509) 775-3333
Kadlec Medical Center	888 Swift Boulevard	Richland	Benton	(509) 946-4611
Lourdes Counseling Center	1175 Carondelet Drive	Richland	Benton	(509) 943-9104
East Adams Rural Hospital	903 S. Adams	Ritzville	Adams	(509) 659-1200
Children's Hospital and Reg Med Ctr	4800 Sand Point Way N.E.	Seattle	King	(206) 987-2000
Group Health Cooperative/Central Hosp	201 16th Avenue East	Seattle	King	(206) 326-3000
Harborview Medical Center	325 Ninth Avenue	Seattle	King	(206) 731-3000
Kindred Hospital Seattle	10631 8th Avenue N.E.	Seattle	King	(206) 364-2050
Northwest Hospital & Medical Center	1550 North 115th Street	Seattle	King	(206) 364-0500
Regional Hosp for Resp & Complex Care	12844 Military Road South	Seattle	King	(206) 248-4604
Seattle Cancer Care	825 Eastlake E	Seattle	King	(206) 288-1400

APPENDIX D –PAGE 2

Exhibit 3-30 Pre-Activity Safety Plan (PASP) (Page 22 of 23)

APPENDIX D: HOSPITALS

NAME	ADDRESS	CITY	COUNTY	PHONE
Alliance				
Swedish Medical Center/Ballard	5300 Tallman Avenue NW	Seattle	King	(206) 782-2700
Swedish Medical Center/First Hill	747 Broadway	Seattle	King	(206) 386-6000
Swedish Medical Center/Providence	500 17th Avenue	Seattle	King	(206) 320-2000
University of WA Medical Center	1959 N.E. Pacific Street	Seattle	King	(206) 598-3300
VA Puget Sound Health Care System	1660 South Columbian Way	Seattle	King	(206) 762-1010
Virginia Mason Medical Center	1100 Ninth Avenue	Seattle	King	(206) 624-1144
West Seattle Psychiatric Hospital	2600 SW Holden Street	Seattle	King	(206) 933-7000
United General Hospital	2000 Hospital Drive	Sedro-Woolley	Skagit	(360) 856-6021
Mason General Hospital	901 Mt. View Drive, Bldg. 1	Shelton	Mason	(360) 426-1611
Snoqualmie Valley Hospital	9575 Ethan Wade Way SE	Snoqualmie	King	(425) 831-2300
Willapa Harbor Hospital	800 Alder Street	South Bend	Pacific	(360) 875-5526
Deaconess Medical Center	800 West Fifth Avenue	Spokane	Spokane	(509) 458-5800
Holy Family Hospital	N. 5633 Lidgerwood Street	Spokane	Spokane	(509) 482-0111
Sacred Heart Medical Center	101 West Eighth Avenue	Spokane	Spokane	(509) 474-3131
Shriners Hospital for Children	911 West Fifth Avenue	Spokane	Spokane	(509) 455-7844
St. Luke's Rehabilitation Institute	711 South Cowley Avenue	Spokane	Spokane	(509) 473-6298
Valley Hospital & Medical Center	12606 E. Mission Avenue	Spokane Valley	Spokane	(509) 924-6650
Sunnyside Community Hospital	1016 Tacoma Avenue	Sunnyside	Yakima	(509) 837-1500
Allenmore Hospital	S. 19th & Union	Tacoma	Pierce	(253) 459-6633
Madigan Army Medical Center	9040 A Reid Street	Tacoma	Pierce	(253) 968-1210
Mary Bridge Children's Hosp & Hlth Ctr	317 Martin Luther King Jr. Way	Tacoma	Pierce	(253) 403-1400
St. Clare Hospital	11315 Bridgeport Way S.W.	Tacoma	Pierce	(253) 588-1711
St. Joseph Medical Center	1717 South "J" Street	Tacoma	Pierce	(253) 426-4101
Tacoma General Hospital	315 Martin Luther King Jr. Way	Tacoma	Pierce	(253) 403-1000
North Valley Hospital	203 South Western Avenue	Tonasket	Okanogan	(509) 486-2151
Toppenish Community Hospital	502 West Fourth Avenue	Toppenish	Yakima	(509) 865-3105
Highline Medical Center/Specialty Campus	12844 Military Road South	Tukwila	King	(206) 244-0180
Legacy Salmon Creek Hospital	2211 NE 139th Street	Vancouver	Clark	(360) 487-1000
Southwest Washington Medical Center	400 NE Mother Joseph Place	Vancouver	Clark	(360) 256-2000

APPENDIX D –PAGE 3

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 23 of 23)

APPENDIX D: HOSPITALS

NAME	ADDRESS	CITY	COUNTY	PHONE
St. Mary Medical Center	401 W. Poplar	Walla Walla	Walla Walla	(509) 525-3320
Walla Walla General Hospital	1025 S. Secord Avenue	Walla Walla	Walla Walla	(509) 525-0480
Central Washington Hospital	1201 South Miller Street	Wenatchee	Chelan	(509) 662-1511
Wenatchee Valley Hospital	820 North Chelan Avenue	Wenatchee	Chelan	(509) 663-8711
Skyline Hospital	211 Skyline Drive	White Salmon	Klickitat	(509) 493-1101
Yakima Regional Med & Cardiac Ctr	110 S. Ninth Avenue	Yakima	Yakima	(509) 575-5000
Yakima Valley Memorial Hospital	2811 Tieton Drive	Yakima	Yakima	(509) 575-8000

APPENDIX D –PAGE 4

3-6 Appendices

Appendix 3-A1	Bridge With Fill on Deck
Appendix 3-A2	Bridge With No Fill on Deck
Appendix 3-A3	Culvert With Fill on Deck
Appendix 3-B	UBIT Inspections and Procedures
Appendix 3-C	FHWA Letter for Routine Extended Frequency Inspections
Appendix 3-D	FHWA Letter for Bridge Special Feature Inspections

List of WSDOT Elements by Number

Bridge Decks

Superstructure

Substructure

Culverts

Sidewalk and Supports

Bearings

Approach Slab

Bridge Rail

Pedestrian Rail

Smart Flags

Expansion Joints

Movable Bridges

Other Bridge Elements

Overlays

Protective Coatings

List of WSDOT Elements by Subject

Bridge Decks

Bridge Deck Overlays

Expansion Joints

Approach Slab

Bridge Rail

Pedestrian Rail

Sidewalk and Supports

Seismic Retrofit

Reinforced Concrete

Prestressed Concrete

Structural Steel

Pin & Hangers

Timber

Cables

Bearings

Reinforced Concrete

Prestressed Concrete

Structural Steel

Timber

Substructure - Other

Culverts

Movable Bridges

Other Bridge Elements

Protective Coatings

Smart Flags

4-1 Introduction

This chapter defines the Washington State Department of Transportation (WSDOT) elements for recording the structural condition evaluation of bridges. Local Agencies are encouraged, but not required to use the WSDOT Bridge Elements as defined in this chapter in order to use WSDOT management strategies and lessons learned. The basic intent of any element data is to supplement the National Bridge Inventory (NBI) structural evaluation of the Deck, Superstructure, and Substructure. Most of the other NBI information such as location, traffic, and geometry is still useful, but element conditions are a practical necessity to identify and manage bridge needs.

Though the NBIS did provide a consistent standard for the collection of bridge data, it was not comprehensive enough to provide performance-based decision support that included economic considerations. Among the problems with the NBIS are:

- Each bridge is divided into only three major parts for condition assessment: superstructure, substructure, and deck. This level of detail is not sufficient to identify appropriate repair strategies, or to estimate costs.
- Each of the three major parts was rated on a 0-9 scale by severity of deterioration, without identifying the deterioration process at work or the extent of deterioration.
- NBI condition ratings vary based on the vague language of the condition definitions. Because the bridges include multiple distress symptoms and ratings to describe the overall or “average” condition of the bridge, is often difficult to decide what the “average” condition is when a bridge has mainly localized problems.
- NBI does not provide a method to inspect or track the performance of items such as paint, overlays, and expansion joints.

WSDOT recognized a different strategy towards future bridge preservation was needed in the early 1980’s. A comprehensive deck testing program existed at the time and obviously the testing should have a connection to the NBI deck condition rating. WSDOT elements have been in use since 1992 and were designed to be practical for the inspector, useful to a bridge manager, and accurately capture bridge conditions. WSDOT elements have matured since 1992 and so have the national element philosophies:

- 1985 – NCHRP Project 12-28: Bridgit and Pontis Management software
- 1987 – NCHRP Report 300: Element based Bridge Management System (BMS)
- 1993 – FHWA CoRe Element Report recommendations
- 1996 – AASHTO CoRe Element Guidelines adopted
- 2011 – AASHTO Guidelines for Bridge Element Inspection
- 2014 – FHWA requirement to collect element level bridge inspection data for NHS bridges.
- 2015 – As a supplement to the National Bridge Inventory (NBI) data submission due April 1, 2015, and every year thereafter, each State and Federal agency will also provide element level bridge inspection data for bridges on the NHS to the FHWA for inclusion in the NBI. Today, a successful Bridge Management System must use supplemental bridge condition data to ensure the effective use of available funds. WSDOT element data has supported WSDOT Bridge needs with minor changes since the year 2008 in the follow ways:
  - Element data is used to identify current bridge condition, need, and cost.
  - Provided a logical and realistic method to prioritize bridge projects.

- Realistic and reliable forecasts of future preservation need and cost.
- Adapted changes in management philosophies without changing elements.
- Tracks the performance of desired bridge needs.

Elements represent parts of a structure that are relevant to document structural conditions with clearly defined condition states or to manage. Elements that carry primary design loads are considered structural elements and all follow the same condition state philosophy.

"Smart Flags" are elements used to track supplemental information that may or may not be included in other elements or exist at the time of original construction. Smart Flag condition states are defined as necessary to collect useful information and may be significantly different than other element definitions. Examples of Smart Flags are Steel Fatigue (cracks in steel elements), Scour, and Pack Rust.

WSDOT elements presented herein are used by both the WSDOT Bridge Office and Local Programs (LP). Local Agencies are encouraged to follow these guidelines so as to provide a consistent basis for management, evaluation, and reporting of inspection data.

4-1.1 *Identifying Elements Prior to Inspection*

Details about the design of the bridge are important when identifying the elements. As-built plans should be used to determine the correct elements, and then field verified during the inspection. If as-built plans are not available, then the elements will have to be defined or assumed at the bridge site. Many of the element dimensions for the element total quantity are difficult to determine in the field and it is highly recommend the total quantities be calculated based on contract plan dimensions.

For example, looking at the contract Plans is the only practical way to determine if a bridge deck has plain reinforced steel which is element 12, or epoxy coated steel which is element 26 because this information is not visible to the inspector. Likewise, field measuring the deck length and width in traffic would not be necessary and usually less accurate than if plan dimensions are available.

An average bridge made of the same material will have six to ten elements. A large or complex bridge may have up to 20 elements. A typical bridge will have a bridge deck, possibly a deck overlay, bridge rails, a primary load carrying member like a prestressed concrete girder, primary substructure support like concrete columns, other elements like abutments, expansion joints and/or bearings.

In order to maintain quality element data, the Inspector is responsible for updating the elements and quantities as they change with time by maintenance or by contract. Many bridges will have construction work that changes the joints, asphalt depth, rail, concrete overlay, or widens the structure, etc. These activities can change elements that apply to the bridge and must be updated accordingly. WSDOT uses a Contract History database to log contract work and for reference. See Section 2-2 for more information on the Contract History database.

4-1.2 *Element Units and the Total Quantity*

Every element has assigned units that are necessary for the inspector to quantify the element defects. The units are "SF" for Square Feet, "LF" for Lineal Feet, "EA" for Each, or in the case of concrete pontoons the units are per Cell.

"SF" units apply to elements where the surface area provides the better method to document element condition and manage the element, such as deck and paint elements.

The total quantity for an element with “LF” units should represent the total length of an element and is based on the way it was constructed. For example: A bridge may have been built using five “Prestressed Concrete Girders.” Each one was individually pre-cast and then put into place at the bridge site. If each girder were 100 feet in length then the total element quantity would be “500 LF.” If the same bridge was a “Concrete Box Girder” then the total quantity would be “100 LF” since the box girder was constructed as one unit.

“EA” units are used to determine the number of members in a condition state. For example: A bridge may 5 piles at 3 piers for a total quantity of 15 for the pile element. Then, each pile is inspected, evaluated, and recorded in the appropriate condition state. Elements with units of “EA” code the entire member in one condition state, such as piles, where the entire pile is in one of the defined condition states. Other element units, such as “LF” or “SF” may have all or portions of the element in one or all of the condition states in order to describe the existing element conditions.

4-1.3 *Quantifying Element Defects*

In order to quantify the condition of an element, the first step is to review the condition state language for the elements. A complete list of the condition state descriptions is provided in this chapter and summarized in this section.

Element condition state (CS) language is based on four condition states for all primary structural members, regardless of the materials. Similar to the NBI system of evaluation, element condition requires the inspector to evaluate defects and also quantify the defect’s impact to the element or possibly the bridge. A defect evaluation may result in element quantities in CS1, CS2, CS3, or CS4 depending on the location, size, structural importance or element units.

4-1.3.A Affected Quantity

The concept of the “Affected quantity” is relied on heavily when quantifying the defects in the primary structural elements and should be applied in two ways. Condition State 3 defines “Affected Quantity” of the defect as local damage to a member and the “Affected Quantity” is the actual length of the defect. Whereas, Condition State 4 defines “Affected Quantity” as a reduced capacity of the member and the “Affected Quantity” is the length of the span. In the case of prestressed girders, damage that does not “Affect” capacity of a prestressed girder would only quantify the length of damaged concrete in CS3. Whereas, Condition State 4 does “Affect” the capacity of the girder and the quantity is the span length, not just the length of damaged concrete. Using this same rational to quantify repairs in CS2, a patch that covers damage to the concrete only is quantified as the length of the visible patch and a patch that covers repaired strand is quantified as the span length in CS2. In other words, the patch is quantified in CS2 based on the “Affected length” of the damage.

This philosophy applies directly to all beam type elements including concrete slab structures with side-by-side beam elements using square foot quantities. It is less obvious where there can be significant redistribution of stresses such as a timber deck or cast-in-place concrete slab. In these cases a defect, such as a hole in the deck, would have to be evaluated as to whether the capacity of the span is “Affected” or not. Trusses are the most difficult because the linear feet quantities represent a 3 dimensional member with chords, verticals, horizontals, sway bracing, etc. Trusses should quantify CS3 defects by panel length of truss and CS4 truss capacity defects by span length of the truss.

4-1.3.B WSDOT Condition States for Structural Members

The following summarizes the WSDOT element condition state philosophy for primary structural members. Different condition philosophies apply to the non-primary structural elements such as deck/overlays, joints, paint, and smart flags which are specified for each element in Chapter 4, but not discussed in this section.

Condition State 1: Good Condition – Most parts of a bridge will be in this condition state for all WSDOT elements. The element may have some defects, but is in good condition. Many times new bridges have insignificant defects and older bridges will acquire insignificant defects with time. In order to determine if the defect is insignificant, the inspector must decide if the defect will impact the element load carrying capacity with time. Inspectors are cautioned to look at new construction that may not be CS1.

Condition State 2: Repaired Condition – This condition state documents repairs to structural members. A repair is defined as a defective member partially modified to carry design loads and still dependent on the remaining portions of the defective member, such as an in-span splice, helper member, or column splice. Generally, these are easy to identify and report. Common repairs do not have the same integrity or longevity as original construction. Many times members are difficult to access and prohibit a good quality repair. Inspectors are cautioned to verify repairs to make sure they are functioning as intended. When a damaged or defective member has been entirely replaced, the member quantity is CS1 or considered a new member. If a repair is not completed correctly or is not functioning properly, then the repair should be coded as CS3 or CS4. For example:

- A timber helper stringer/pile that does not properly transfer design loads is not considered sufficient to be considered in CS2. A repair must properly block, brace, or connect to the stringer/pile as required by repair design.
- Timber pier caps are assumed to be designed as simple spans. Even though the member that has been partially replaced is not continuous at a support, as long as there is a positive connection to the supporting columns, the replaced portion may be considered in CS1.

The amount of repaired quantity to be coded in CS2 depends on the affected length of the repair for all primary structural members. In general terms, the quantity to be coded in CS2 is the quantity that was in CS3 or CS4 and is now repaired. For example:

- A prestressed girder with a high load hit that did not damage strand would code the length of the concrete patch as the repair quantity for CS2. If a strand is damaged, then the span length is the repair quantity for CS2.
- A repaired crack in a steel member that did not threaten capacity would code the minimum length or 1 foot for CS2. If the repaired crack did threaten capacity, then the span length is the repair quantity for CS2.

Condition State 3: Fair Condition – This condition state records any significant defect noticed by the inspector, but the defect does not significantly impact the capacity of the element. Capacity is not currently threatened, but if left unchecked, it could be threatened in the future. Repairs may apply to the elements in CS3 because the defects are more economical address now than to wait and repair later.

Condition State 4: Poor Condition – This condition state documents members with defects that have impacted the structural capacity of the element. Based on the visual inspection, the owner of the bridge must address this deficiency in order to preserve or restore the capacity of the member and/or structure. Generally, these defects have reduced the structural capacity of the element, but are still within safe operating limits of design.

4-1.4 *Reporting Structural History*

There are times when structural information may be known but not visible; or visible and then at a later time not visible to the inspector. This can happen to submerged piles/foundations that are buried one inspection and exposed the next. This also applies to asphalt overlays where the deck patching is not visible to the inspector. This type of element information should remain in the element notes until the element condition is known to have changed. An example of element change would be deck delaminations recorded in CS4 are not visible to the inspector and are removed by hydromilling during construction of a concrete overlay. The CS4 data does not apply after the concrete overlay is completed and WSDOT element 376 should be deleted from the report and the concrete deck CS4 quantity should be zero.

4-1.5 *Concrete Element Cracking*

The following table is reproduced from the Bridge Inspector's Reference Manual (BIRM), Volume 1, Table 2.2.3; and should be used to distinguish between different sizes of concrete cracks.

Exhibit 4-1 WSDOT Element Concrete Crack Width Guidelines

	Reinforced Concrete		Prestressed Concrete	
	English	Metric	English	Metric
Hairline (HL)	< 0.0625"	< 1.6 mm	< 0.004″	< 0.1 mm
	< 1⁄16″			
Narrow (N)	0.0625″ to 0.125″	1.6 to 3.2 mm	0.004″ to 0.009″	0.1 to 0.23 mm
	1⁄16″ to 1⁄8″			
Medium (M)	0.125″ to 0.1875″	3.2 to 4.8 mm	0.010″ to 0.030″	0.25 to 0.75 mm
	1⁄8″ to 3⁄16″			
Wide (W)	> 0.1875″	> 4.8 mm	> 0.030″	> 0.76 mm
	> 3⁄16″			

Concrete Structural Cracking – For the purpose of evaluating element condition, concrete structural cracks are narrow (or wider) in regions of high shear or moment (see BIRM). Crack width is significant to the extent that it indicates exposure of rebar to water and/or a structural problem in a concrete element. Generally, most concrete elements have hairline cracking and not considered significant structurally.

4-1.6 *WSDOT Deck Element to NBI Deck Table*

WSDOT began testing concrete decks in the early 1980s and discovered a very poor correlation to the traditional assumptions of deck deterioration. In addition, the deck testing and crack surveys did not prioritize deck preservation projects in a fashion acceptable to the inspectors, maintenance, or management. Today, WSDOT recommends the use of the deck and soffit elements and Table 4.1.6 to evaluate the NBI Item 058, NBI Deck Overall Condition Code. This table originates from the 1973 FHWA Coding Guidelines and has been modified to reflect WSDOT's primary bridge deck management philosophies since the early 1990s.

Secondary and more subjective concrete deck conditions such as cracking, scaling, leaching, rebar cover, chloride content, Half-cell potential, etc. may be documented in the deck element notes, but not applied to the deck element evaluation of structural condition. These secondary conditions are applied during annual prioritization of the concrete bridge decks and should not determine the NBI code. To be clear, these types of secondary conditions visible below the deck in the soffit or other structural elements below the deck element require an evaluation of:

Exhibit 4-2 WSDOT Deck Condition to NBI Deck Overall

Percent of Concrete Deck Patches, Spalls, and Delaminations (CS2 + CS3 + CS4)	Percent of Concrete Deck Soffit in CS3 (CS3 only)	NBI Deck Condition Code
N/A	N/A	9
None	None	8
None	None	7
< 1%	< 1%	6
1% to 2%	1% to 2%	5
2% to 5%	2% to 5%	4
> 5%	> 5%	3

4-2 Bridge Decks

The intent of the bridge deck elements is to record the top surface deterioration. The Concrete Deck Soffit, slab, or deck-girder elements record the structural deterioration. Deck elements 12, 13, 14, 20, and 26 record deck patches in CS2, deck spalls in CS3, and delaminations in CS4. Other deck top surface distress such as cracking, scaling, and rutting are not tracked in the deck BMS condition states. These items should be described in the notes at the inspector's discretion. Do not count filling in of the rut as a patch. These locations have filled in a rut with Liquid Concrete or Ure-Fast and are not considered a deck structural repair.

All asphaltic patching material on a concrete bridge deck shall be considered a spalled area and since this is unacceptable patching material. These materials can be picked out of the spall and will smell like tar.

All bridges will have at least one deck element, even though some bridges do not have a traditional deck and use elements 13 or 14. (The one exception is a Luten Arch structure that is earth filled with an asphalt pavement only.)

Traditional concrete bridge decks use elements 12, 20, or 26 to record the top surface deterioration; and have the WSDOT Soffit Element (35) to record the structural deterioration. It should be noted for element 26 that epoxy coated rebar in bridge decks became an industry standard in Washington State in the early 1980s.

Non-Traditional concrete decks use elements 13 or 14 to record the top surface deterioration and the slab or deck-girder elements record the structural deterioration.

Steel and Timber decks use elements 28, 29, 30, 31 to record structural deterioration of the top and bottom surface.

Inspectors are encouraged to take the time to locate and describe the patches and spalls on larger structures using photos and descriptions. The preferred documentation format for patching is the number and SF per span. This format is easiest for the next inspector to identify quantity changes.

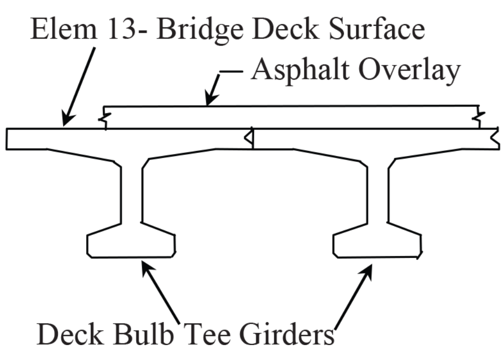
Quantity estimates must be based on the sum of the estimated length and width of the patched or spalled areas. Approximations based on the percent of area are not useful.

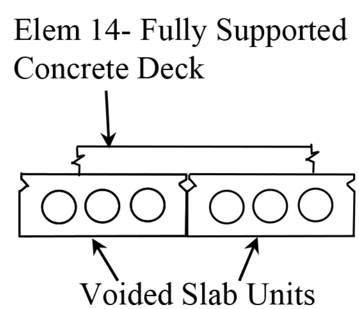
Note: The total quantity for deck elements is the actual bridge deck area. Do not use the NBI Item 051, **"Bridge Roadway Width Curb-to-Curb" (or WSBIS Item 1356 "Curb-to-Curb Width")** when deck curb-to-curb dimensions vary.

12 Concrete Deck Units – SF

This element defines a concrete bridge deck constructed with uncoated steel reinforcement. The total quantity for this element is the actual bridge deck area from curb line to curb line.

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have hairline cracks or rock pockets. Wear and rutting may expose aggregate or reinforcing.
2. Deck area with repairs or patches. Do not include the rare case rutting filled with patching material.
3. Deck area with spalling. Do not add delaminations found in the field, see condition State 4.
4. Record the delaminated area (CS4) from WSDOT element 376 in the deck CS4. If new delaminations are found, do not add delaminations found in the field unless approved by Bridge Management. Chain Drag testing by the Bridge Inspector must chain the entire deck, record the results in a Chain Drag Report available on the Bridge Website under Bridge Overlays, and send the file to Bridge Management.





13 Bridge Deck Surface Units – SF

This WSDOT element defines a surface of a bridge deck that consists of a slab or girder without a traditional deck. Usually there is a deck protection system (overlay) present, but in some cases, traffic may be driving directly on the girder or slab. The Bridge Deck Surface consists of precast or prestressed girders with no span between the flanges. This WSDOT element is generally used with superstructure elements 38, 49, 50, 51, 52, 54, 108, 109, or 114. The total quantity for this element is the actual bridge deck area from curb line to curb line.

14 Fully Supported Concrete Deck Units – SF

This WSDOT element defines a fully supported concrete bridge deck constructed with one layer of coated reinforcement (epoxy, galvanizing, stainless steel, etc.). The bridge support surface consists of precast or prestressed girders with no span between the flanges. This WSDOT element may apply to superstructure WSDOT elements 50, 51, 108, 109, or 114. The total quantity for this element is the actual bridge deck area from curb line to curb line.

Condition States for WSDOT Elements 13 and 14

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces have no exposed reinforcing. The deck surfaces may have hairline cracks, rock pockets and/or be worn exposing aggregate.
2. If the top of the slabs or girders are visible, area of deck with repairs.
3. Deck area with spalling. Do not add delaminations found in the field, see condition State 4.
4. Record the delaminated area (CS4) from WSDOT element 376 in the deck CS4. If new delaminations are found, do not add delaminations found in the field unless approved by Bridge Management. Chain Drag testing by the Bridge Inspector must chain the entire deck, record the results in a Chain Drag Report available on the Bridge Website under Bridge Overlays, and send the file to Bridge Management.

15 Post Tensioned Concrete Deck Units – SF

This element is defined by a concrete bridge deck that has transverse or longitudinal post tensioning; and includes the deck on elements 100 Post Tensioned Segmental and 104 Post Tensioned Concrete Box. These decks require a higher level of care for maintenance, special attention by management, and have a higher replacement cost. This element does not include the deck of elements 105 Concrete Box and 97 Trapezoidal. The total quantity for this element is the actual bridge deck area from curb line to curb line.

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have hairline cracks or rock pockets. Wear and rutting may expose aggregate or reinforcing.
2. Deck area with repairs or patches. Do not include the rare case rutting filled with patching material.
3. Deck area with spalling. Do not add delaminations found in the field, see condition State 4.
4. Record the delaminated area (CS4) from WSDOT element 376 in the deck CS4. If new delaminations are found, do not add delaminations found in the field unless approved by Bridge Management. Chain Drag testing by the Bridge Inspector must chain the entire deck, record the results in a Chain Drag Report available on the Bridge Website under Bridge Overlays, and send the file to Bridge Management.

20 Concrete Deck – Lightweight Aggregate Units – SF

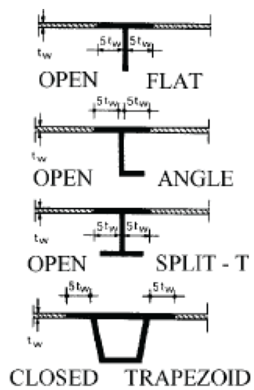
This WSDOT element defines a lightweight concrete bridge deck constructed with lightweight aggregate and steel reinforcement. The total design weight of the deck is approximately 120 lbs./C.Y. The total quantity for this element is the actual bridge deck area from curb line to curb line.

26 Concrete Deck w/Coated Bars Units – SF

This WSDOT element defines a concrete bridge deck constructed with coated (epoxy, galvanizing, stainless steel, etc.) reinforcement. The total quantity for this element is the actual bridge deck area from curb line to curb line.

Condition States for WSDOT Elements 20 and 26

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have hairline cracks or rock pockets. Wear and rutting may expose aggregate or reinforcing.
2. Deck area with repairs or patches. Do not include the rare case rutting filled with patching material.
3. Deck area with spalling. Do not add delaminations found in the field, see condition State 4.
4. Record the delaminated area (CS4) from WSDOT element 376 in the deck CS4. If new delaminations are found, do not add delaminations found in the field unless approved by Bridge Management. Chain Drag testing by the Bridge Inspector must chain the entire deck, record the results in a Chain Drag Report available on the Bridge Website under Bridge Overlays, and send the file to Bridge Management.



27 Steel Orthotropic Deck Units – SF

This WSDOT element defines a bridge deck constructed of a flat, deck plate stiffened either longitudinally or transversely, or in both directions. See BIRM, Volume 1, Figure P.1.2.7 The total quantity for this element is the actual bridge deck area curb to curb.

28 Steel Deck – Open Grid Units – SF

This WSDOT element defines a bridge deck constructed of steel grids that are open and unfilled. The total quantity for this deck WSDOT element is the actual bridge deck area from curb line to curb line.

29 Steel Deck – Concrete Filled Grid Units – SF

This WSDOT element defines a bridge deck constructed of steel grids with either all of the openings or just those in the wheel lines filled with concrete. The total quantity for this element is the actual bridge deck area from curb line to curb line.

30	Deck – Corrugated or Other Steel system	Units – SF

This WSDOT element generally defines a bridge deck constructed of corrugated metal filled with Portland cement concrete or asphaltic concrete. This element may also be used to identify other non-standard steel decks. The total quantity for this element is the actual bridge deck area from curb line to curb line.

Condition States for WSDOT elements 27, 28, 29, and 30 (Structural Decks)

1. Defects are superficial. The connectors (such as welds, rivets, etc.) or concrete/asphalt filler are functioning as designed.
2. Deck area with repairs or replaced panels.
3. Deck area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Deck area with damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

31	Timber Deck	Units – SF

This WSDOT element defines a bridge deck constructed of timber. The deck may be longitudinally or transversely laminated or of planks. The deck may have an overlay or may be constructed with runners of metal or timber. The total quantity for this element is the actual bridge deck area from curb line to curb line.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Timber deck area with repairs, plates, or replaced timbers.
3. Timber deck area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. These areas are typically marked with a YELLOW TAG by inspectors.
4. Timber deck area with damage in locations or quantity and has reduced the structural capacity of the WSDOT element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. These areas are typically marked with a RED TAG by inspectors.

32	Fiber Reinforced Polymer (FRP) – Deck	Units – SF

This WSDOT element defines a bridge deck constructed of fiber reinforced polymer. The total quantity for this element is the actual bridge deck area from curb line to curb line.

1. Defects are superficial. Cracking or delamination of layers may be present.
2. FRP Deck area with repairs, patches, or plated.
3. FRP Deck area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. FRP Deck area with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

35 Concrete Deck Soffit Units – SF

This WSDOT element defines the bottom (or undersurface) and edge of a concrete deck and is to be included with concrete WSDOT deck elements 12, 20, and 26. It is extremely valuable when an asphalt overlay exists on the top surface of the deck. The purpose of the element is to identify decks that may have a reduced structural capacity through visual inspections of the deck soffit. Element 35 does not apply if steel stay-in-place forms are present since the soffit is not visible. To be consistent with the deck quantity, the total quantity for this element the actual bridge deck area from curb line to curb line. Delaminations on concrete soffits over roadways may pose a danger to traffic below the bridge. In this situation, a repair should be recommended to correct the condition.

1. The undersurface of the deck is not showing signs of distress. There may be rust stains from rebar chairs, spalls without exposed rebar, or cracks with efflorescence.
2. Deck soffit area with repairs or patches.

3. Deck soffit area showing signs of reduced structural capacity. Typical indications include areas with heavy to severe rust staining from deck reinforcement; Spalling with corroded rebar indicating active corrosion; Cracks that are full depth, severe, or leaking water.

36 Deck Rebar Cover Flag Units – SF

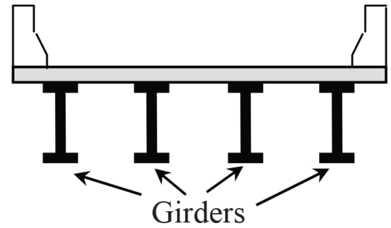
This does not apply to deck spalling with exposed rebar. This element is used to identify the top surface of bridge decks with concrete cover less than 1 inch and having rebar exposed. This condition results from either lack of cover during construction or general rutting that has exposed rebar. Deck patching is often difficult at these locations. This flag will determine method of deck rehabilitation. Report square foot of visible deficiency in CS2. The total quantity for this element is the actual bridge deck area curb to curb.

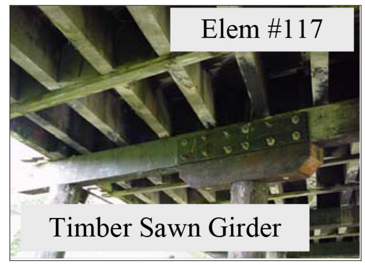
1. Deck top surface area with adequate concrete cover.
2. Concrete deck area with visible lack of cover due to construction or general rutting that has exposed rebar.

4-3 Superstructure

4-3.1 Girders

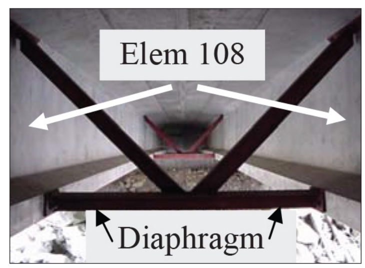
A girder is defined as any longitudinal structural member (single web or box section) that directly supports the bridge deck. A girder type bridge will typically have two or more girders. Girders may be constructed of the following typical materials: Rolled, welded, bolted (riveted), steel sections; Post tensioned, prestressed or reinforced concrete sections; or Timber sections.





4-3.2 Diaphragms

Diaphragms are structural members used to tie adjoining girders together to improve the strength and rigidity of the girder and to distribute forces in the lateral direction. Diaphragms do not have an element but if a diaphragm has advanced deterioration, it should be noted in the element comments of the associated girder.



4-3.3 Pedestrian Bridges

The same WSDOT elements used for bridges that carry vehicular traffic can be used for pedestrian bridges. Do not use the WSDOT sidewalk elements (#260 through #266) for pedestrian bridges.

4-3.4 *Slab Bridges*

Slab bridges can have precast segments or cast in place concrete. The bridge in the picture is a cast in place concrete slab and will have a deck element for the deterioration of the top surface. Structural deficiencies of the slab bottom and edge are documented in WSDOT element 38 “Concrete Slab.”

Note: The total quantity for slab elements is the actual bridge deck area. Do not use the NBI Item 051, **“Bridge Roadway Width Curb-to-Curb” (or WSBIS Item 1356 “Curb-to-Curb Width”)** when a deck curb-to-curb dimensions vary.

38	**Concrete Slab**	**Units – SF**

This element defines a concrete slab bridge and edge that has been constructed with uncoated reinforcement. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

49	**Concrete Hollow Slab**	**Units – SF**

This element defines a concrete slab bridge and edge that has been constructed with sono-tubes and uncoated reinforcement. Structural deficiencies of the edge and bottom surface are addressed in the condition states. This type of bridge was typically built in the 50’s and 60’s on the state highway system. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

50	**Prestressed Concrete Slab**	**Units – SF**

This element defines a concrete slab bridge that has been constructed with prestressed concrete and uncoated steel reinforcement. This element may be solid or have built in voids. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

51	**Prestressed Concrete Slab w/Coated Bars**	**Units – SF**

This element defines a concrete slab bridge that has been constructed with prestressed concrete and coated steel reinforcement (epoxy, etc.). This element may be solid or have built in voids. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

52 Concrete Slab w/Coated Bars Units – SF

This element defines a concrete slab bridge and edge that has been constructed with coated (epoxy, etc.) reinforcement. This element may or may not contain a hollow core. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

Condition States for WSDOT Elements 38, 49, 50, 51, and 52

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Concrete slab area with repairs or patches.
3. Concrete slab area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Concrete slab area with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. For slabs made with beam units, the affected area should be based on the span length.

54 Timber Slab Units – SF

This element defines a slab that is constructed of timber. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Slab area with repairs, plates or replaced timbers.
3. Slab area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. These areas are typically marked with a YELLOW TAG by inspectors.
4. Slab area with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. These areas are typically marked with a RED TAG by inspectors.

89 Prestressed Concrete Girder w/Coated Strands Units – LF

This element defines a girder constructed of precast prestressed concrete and epoxy coated strand that supports the bridge deck. The element quantity should equal the sum of each girder length. The element total quantity for this element is the sum of each girder length.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Girder length affected by repair or patch. Capacity repairs such as a strand splicing should record girder span length.
3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.

4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

90 Steel Rolled Girder Units – LF

This element defines a girder unit of structural steel that has an integral web and flanges and was fabricated in a steel mill by the rolling process. This element may have bolted, riveted or welded cover plates. This element directly supports the bridge deck and is part of a two or more longitudinal girder system. The total quantity for this element is the sum of each girder length.

91 Steel Riveted Girder Units – LF

This element defines a girder unit of structural steel that directly supports the bridge deck. This element has a web and flanges that are connected with rivets. This element is part of a two or more longitudinal girder system. The total quantity for this element is the sum of each girder length.

92 Steel Welded Girder Units – LF

This element defines a girder unit of structural steel that directly supports the bridge deck. This element has a web and flanges that are connected with welds. This element is part of a two or more longitudinal girder system. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Elements 90, 91, and 92

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Girder length affected by repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Girder length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

96 Concrete Encased Steel Girder Units – LF

This element defines a steel girder that is encased in concrete. The total quantity for this element is the sum of each girder length.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking.
2. Girder length affected by repairs or patches.
3. Girder length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth), concrete delaminations or spalls in a tension zone.
4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

97 Prestressed Concrete Tub Girder Units – LF

This element defines a prestressed concrete box girder or Tub Girder as defined in the *Bridge Design Manual* M 23-50. Post-tensioning and span field splices may or may not be present. The total quantity for this element is the sum of each girder length.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Girder length affected by repair or patch. Capacity repairs such as a strand splicing should record girder span length.
3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.

4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

98 Thin Flange Girder Units – LF

This element defines a precast prestressed concrete girder unit where the top flange is not designed to carry live load and must have a concrete deck. There may be asphalt or a concrete overlay on the concrete slab. This element represents the WSDOT - WFxxTDG girder sections: WF36TDG, WF42TDG, WF50TDG, WF58TDG, WF66TDG, WF74TDG, WF83TDG, WF95TDG, and WF100TDG. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this element is the sum of each girder length.

100 Post Tensioned Concrete Segmental Box Girder Units – LF

This element defines a post-tensioned concrete box girder constructed using the segmental precast process. The total quantity for this element is the length of segmental box girders.

Condition States for WSDOT Elements 97, 98, and 100

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Girder length affected by repair or patch. Capacity repairs such as a strand splicing should record girder span length.
3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.

4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

102 Steel Box Girder Units – LF

This element defines a box girder unit constructed with structural steel. This element directly supports the bridge deck. The total quantity for this element is the sum of each girder length.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Girder length affected by repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Girder length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

103 Prestressed Concrete Super Girder Units – LF

This element defines a prestressed WSDOT girder WF83G, WF95G, WF100G, WF83PTG, WF95PTG, WF100PTG. Girders may or may not be post-tensioned. The total quantity for this element is the sum of each girder length.

104 Post Tension Concrete Box Girder Units – LF

This element defines a box girder unit constructed of post-tensioned, cast in place concrete. The total quantity for this element is the sum of each girder length.

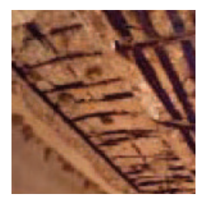
105 Concrete Box Girder Units – LF

This element defines a box girder superstructure unit constructed with cast in place reinforced concrete. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Elements 103, 104, and 105

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Girder length affected by repair or patch. Capacity repairs such as a strand splicing should record girder span length.
3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.

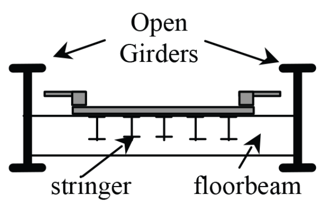
4. Girder span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

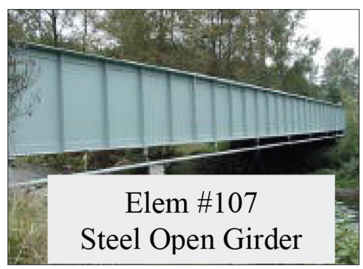


107 Steel Open Girder Units – LF

This element defines an open girder unit that is constructed of structural steel. An open or "through" girder is part of a two girder system with stringer and floor beam elements that support a bridge deck. Open girders are located on the outside of the bridge. The bridge deck and any sidewalks are contained between the open girders. Bridges with open girders were generally built prior to 1950 and usually have built up riveted steel members. The total quantity for this element is the sum of each girder length.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Steel open girder length affected by repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Steel open girder length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Steel open girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.





108 Prestressed Concrete Bulb-T Girder Units – LF

This element defines a precast prestressed concrete Bulb-Tee girder unit which has little or no span between the top flange. There may be asphalt, a concrete slab, a concrete overlay, or nothing on the top flange. This element represents the following WSDOT girder sections: W35DG, W41DG, W53DG, W65DG, WF39DG, WF45DG, WF53DG, WF61DG, WF69DG, WF77DG, WF86DG, WF98DG, WF103DG. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this element is the sum of each girder length.

109 Prestressed Concrete Multiple Web Girder Units Units – LF

This element defines a precast prestressed concrete girder that has more than one web. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this element is the sum of each girder length.

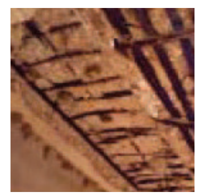
110 Concrete Girder Units – LF

This element defines a girder (including T-Beams) constructed of non-prestressed reinforced concrete. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Elements 108, 109, and 110

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Girder length affected by repair or patch. Capacity repairs such as a strand splicing should record girder span length.
3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.

4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



111 Timber Glue-Lam Girder Units – LF

This element defines a girder unit constructed of glue-lam timber. This element directly supports the bridge deck. The total quantity for this element is the sum of each girder length.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Glue-Lam girder length affected by repairs, patches, or plated.
3. Glue-Lam girder length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. These areas are typically marked with a YELLOW TAG by inspectors.
4. Glue-Lam girder span length with damage in locations or quantity and has reduced the structural capacity of the girder or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. These areas are typically marked with a RED TAG by inspectors.

113 Steel Stringer Units – LF

This element defines a stringer constructed of structural steel that supports the deck in a stringer-floor beam system. A stringer is connected to a floor beam and directly supports a bridge deck. A steel stringer and floor beam combination is commonly used in steel truss and steel open girder bridges. The total quantity for this element is the sum of each girder length.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Stringer length affected by repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Stringer length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Stringer span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

114 Concrete Multiple Web Girder Unit Units – LF

This element defines a girder constructed of non-prestressed reinforced precast concrete. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this element is the sum of each girder length. Check the NBIS main span type.

115 Prestressed Concrete Girder Units – LF

This element defines a girder constructed of precast prestressed concrete that may or may not be post-tensioned and supports the bridge deck. The total quantity for this element is the sum of each girder length.

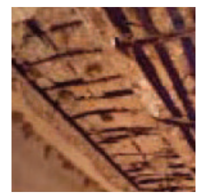
116 Concrete Stringer Units – LF

This element defines a stringer constructed of reinforced concrete that supports the bridge deck in a stringer-floor beam system. The total quantity for this element is the sum of each stringer length. See Steel Stringers and Floor Beams for a more general description.

Condition States for WSDOT Elements 114, 115, and 116

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Girder length affected by repair or patch.
3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.

4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



117 Timber Sawn Girder Units – LF

This element defines a girder constructed of sawn timber that supports the bridge deck. The total quantity for this element is the sum of each girder length.

118 Timber Stringer Units – LF

This element defines a stringer constructed of timber that supports the bridge deck. The element total quantity is the sum of each stringer length. See Steel Stringers, WSDOT Element 113, for a more general description.

Condition States for WSDOT Elements 117 and 118

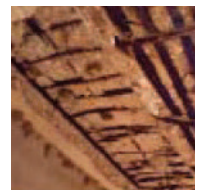
1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Girder or stringer length affected by repairs or plates.
3. Girder or stringer length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½″ are marked with a YELLOW TAG.
4. Girder or stringer span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1½″ shell thickness are marked with a RED TAG.

119 Concrete Truss Units – LF

This element defines all members in a truss that is constructed of concrete. There is only one concrete truss on the state highway system. The total quantity for this element is the sum of each concrete truss length, which is two times the truss span length.

1. Truss panel length with superficial defects that have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Truss panel length with repairs or patches.
3. Truss panel length affected with structural defects. The defects do not significantly affect structural capacity. Defects do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.

4. Length of truss span affected with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



126 Steel Thru Truss Units – LF

This element includes all structural steel truss members. Code this element for through and pony trusses only. The total quantity for this element is the sum of each truss length, which is two times the truss span length.

131 Steel Deck Truss Units – LF

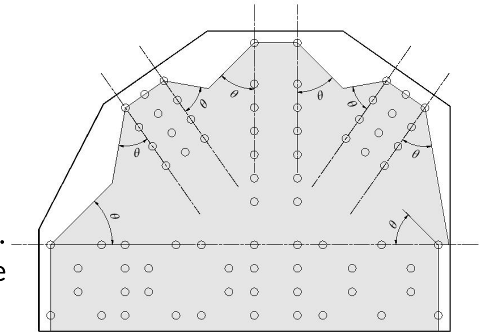
This element includes all truss members of a structural steel deck truss. The top and bottom chords are included in this element. The total quantity for this element is the sum of each truss length, which is two times the truss span length.

Condition States for WSDOT Elements 126 and 131

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Truss panel length with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Truss panel length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Truss span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

133 Truss Gusset Plates Units – EA

This element documents structural defects on gusset plates at the panel points of a truss element. Gusset plates are defined as any plate attached to primary members that transfer primary or secondary load at the panel joint. Significant defects should be considered when they are within the stress zones of the gusset. Stress zones are approximately illustrated as the shaded portion in Figure at right. The total quantity for a truss is the total number of all node points of all trusses



1. Defects are superficial and have no effect on the structural capacity of the element.
2. Number of panel points with repairs or have been reinforced.
3. Number of panel points with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Number of panel points with structural deficiencies in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

135 Timber Truss Units – LF

This element defines a truss constructed of timber members. The total quantity for this element is the sum of each truss length, which is two times the truss span length.

1. Truss panel length with defects that are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Truss panel length with repairs or plates.
3. Truss panel length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½″ are marked with a YELLOW TAG.
4. Truss span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1½″ shell thickness are marked with a RED TAG.

139 Timber Arch Units – LF

This element includes all members of an arch constructed of Timber. The total quantity for this element is the length measured from one arch support to the other.

1. Arch panel length with defects that are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Arch panel length with repairs or plates.
3. Arch panel length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½″ are marked with a YELLOW TAG.
4. Arch span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1½″ shell thickness are marked with a RED TAG.

141 Steel Arch Units – LF

This element includes only the arch constructed of structural steel. When coding NBI, pier caps, cross beams, and any other coded substructure elements within the arch span are considered superstructure elements. The total quantity for this element is the length measured from one arch support to the other.

142 Steel Tied Arch Units – LF

This element includes all members of a tied arch constructed of structural steel. The bottom and top chords are included in this element. The total quantity for this element is the length measured from one arch support to the other.

Condition States for WSDOT Elements 141 and 142

1. Arch panel length with defects that are superficial and have no effect on the structural capacity of the element.
2. Arch panel length with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Arch panel length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Arch span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

143 Steel Suspender Units – EA

This element defines a steel suspender member used hang a bridge deck from an arch or truss. The total quantity for this element is the total number of suspenders.

1. Number of suspenders with defects that are superficial and have no effect on the structural capacity of the element.
2. Number of suspenders with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Number of suspenders with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Number of suspenders with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

144 Concrete Arch Units – LF

This element only defines the arch (open/closed spandrel, bowstring, etc.) and is constructed of non-prestressed reinforced concrete. When coding NBI, pier caps, cross beams, and any other coded substructure elements within the arch span are considered superstructure elements. The total quantity for this element is the length measured from one arch foundation to the other.

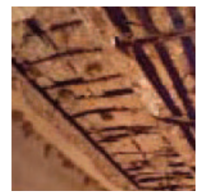
1. Arch panel length with defects that are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Arch panel length with repairs or patches.
3. Arch panel length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Arch span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

145 Earth Filled Concrete Arch — Units – LF

This element defines an earth filled arch constructed of reinforced concrete. The total quantity for this element is the length measured from one arch foundation to the other. If there is a concrete deck constructed on the fill, WSDOT element 14 applies. If there is an ACP wearing surface, WSDOT element 800 or 801 applies.

1. Arch span length with defects that are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Arch span length with repairs or patches.
3. Arch span length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.

4. Arch span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



146 Suspension – Main Cable — Units – EA

This element defines a main steel cable used to support the superstructure in a suspension bridge. The total quantity for this element is the number of cables.

147 Suspension – Suspender Cable — Units – EA

This element defines a suspender steel cable that connects the bridge superstructure to the main suspension cable. Suspender cables include the anchor device at the ends and the zinc protection on the wires. The outer protection system is usually a form of a paint element. The total quantity for this element is the number of steel cables.

149 Cable Stayed Bridge – Cable Units – EA

This element defines a steel cable used to support the superstructure in a cable stayed bridge. The cable stays include the anchor device at the ends. The total quantity for this element is the number of steel cables.

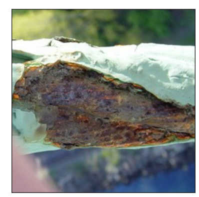
Condition States for WSDOT Elements 146, 147, and 149

1. Number of cables with no defects. Zinc coating may be dull gray showing early signs/stages of zinc oxidation. New replacement cables are coded in this condition state.

2. Number of cables with defects that are insignificant and do not affect the capacity of the cable. Zinc coating has white spots or areas of the surface which indicate corrosion of the zinc protection.

3. Number of cables or anchors with defects that are beginning to affect the capacity of the cable, but are within acceptable design limits. Localized areas of zinc depletion and showing rust spots, but there is no visible section loss.

4. Number of cables or anchors with defects that have clearly affected the capacity. This includes broken wires or localized section loss due to other defects. The zinc protective coating is largely depleted with ferrous rust prevalent in many locations along the cable length.

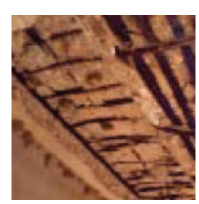


150 Concrete Column on Spandrel Arch Units – EA

This element defines the column supports on a spandrel arch bridge. The total quantity for this element is the number of columns supported by the arch.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Number of columns with repairs or patches.
3. Number of columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.

4. Number of columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



152 Steel Floor Beam Units – LF

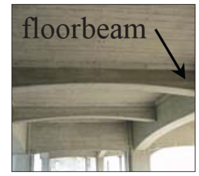
This element defines a floor beam constructed of structural steel that supports stringers in a stringer-floor beam system. Floor beams are load carrying elements located transversely to the general bridge alignment. Floor beams transmit the loads from the deck and/or stringers to the outside open girders or to the bottom chord of a truss bridge. The total quantity for this element is the sum of each floorbeam length.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Floorbeam length affected by repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Floorbeam length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Floorbeam span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

154 Prestressed Concrete Floor Beam Units – LF

This element defines a floor beam constructed of prestressed concrete that supports the bridge deck in a stringer-floor beam system. The total quantity for this element is the sum of each floorbeam length.

155 Concrete Floor Beam Units – LF

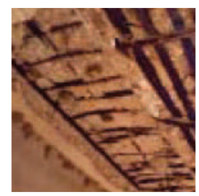


This element defines a floor beam constructed of reinforced concrete that supports the bridge deck in a stringer-floor beam system. Floor beams are load carry elements located transversely to the general bridge alignment. Floor beams transmit the loads from the deck and/or stringers to the outside open girders. The total quantity for this element is the sum of each floorbeam length.

Condition States for WSDOT Elements 154 and 155

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Floorbeam length affected by repairs or patches.
3. Floorbeam length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.

4. Floorbeam span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



156 Timber Floor Beam Units – LF

This element defines a stringer constructed of timber that supports the bridge deck. The total quantity for this element is the sum of each floorbeam length. See Steel Floorbeam, WSDOT Element 152, for a more general description.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Floorbeam length affected by repairs or plates.
3. Floorbeam length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½″ are marked with a YELLOW TAG.
4. Floorbeam span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1 ½ shell thickness are marked with a RED TAG.

160 Steel Column on Spandrel Arch Units – EA

This element defines the column supports on a spandrel arch bridge. The total quantity for this element is the number of columns supported by the arch.

161 Steel Hanger Units – EA

This element defines the hanger portion of a pin and hanger usually on a steel girder. Truss "hanger" members are not included in this element. The total quantity for this element is the number of steel hangers on the bridge. Generally there will be two hangers at each location.

Condition States for WSDOT Elements 160 and 161

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Number of steel columns or hangers with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Number of steel columns or hangers with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Number of steel columns or hangers with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

162 Steel Pin Units – EA

This element defines a structural pin used in any connection joint in a girder or truss. The total quantity for this element is the number of pins on the bridge. Zero force and construction pins are not included in the quantity. Pins in bearing elements are not included unless they have uplift loadings.

1. Number of pins and associated connection plates are in good condition. Visual Inspection: There may be minor rust or shallow surface deformations on the exposed pin surfaces. Minor amounts of rust powder or paint damage may be present suggesting minor pin rotation in place. No pack rust is present between associated connection plates. There is no noise associated with the pin connection. Ultrasonic Testing (UT): Transducer can be applied to both ends of pin allowing a complete scan of pin grip surfaces, there are strong shoulder and end reflections, and there are no UT indications. UT indications are defined as pips in the grip area that are three times larger (3:1) than the background noise when the GAIN is adjusted to produce a 90 to 100 percent reflection height for the far shoulder.
2. Number of pins and associated connection plates have defects that do not affect the strength or serviceability of the bridge. Visual Inspection: Corrosion with pitting or laminar rust may be present. Minor abnormalities may be observed in alignment, pin wear, or deck joint movement. Pack rust may be present between connection plates, but is not judged to put a jacking force between the pin nuts. The connection may have some rust powder and/or make noise under loading. Ultrasonic Testing (UT): For pins UT inspected from both ends, there may be non-coincident indications between 10 and 20 percent of the far shoulder reflection height. There may be loss in shoulder or back reflections which can be explained by pin end conditions (dents, holes, corrosion). Pins that can be UT inspected from one end only are considered CS2, even if they have no indications or have indications less than 10 percent of the far shoulder reflection height.
3. Number of pins and associated connection plates have defects that may affect the strength or serviceability of the bridge. Visual Inspection: Significant corrosion may be present, suggesting that pin is “frozen” in place. Measurable abnormalities may be observed in alignment, pin wear, or deck joint movement. Pack rust may be present between connection plates that place a jacking force between the pin nuts. The connection may have significant amounts of rust powder and/or make noise under loading. Ultrasonic Testing (UT): For pins UT inspected from both ends, there may be coincident indications (of any size) or non-coincident indications greater than 20 percent of the far shoulder reflection height. There may be loss in shoulder or back reflections that cannot be explained by pin end conditions (dents, holes, corrosion). Pins that can be UT inspected from one end only are considered CS3 if there are indications greater than 10 percent of the far shoulder reflection height.
4. Number of pins and associated connection plates have defects that are judged to affect the strength or serviceability of the bridge. Visual Inspection: There may be “frozen” pins designed for free rotation as part of normal bridge movement. Pack rust may be present between connection plates that are causing distortion/displacement of plates or pins.

163 Tension Hold Down Anchor Assembly Units – EA

This is a fracture critical component of the bridge that carries uplift loads from the superstructure to the substructure. The anchorage may consist of several parts with built-up steel members. Each location has anchor bolts in tension that must be evaluated and included in a Fracture Critical Report. The element is defined as all parts in tension between the lower tip of the anchor bolts to the first pin or truss member. A pin is usually present and included in element 162 because it carries uplift loads. The total quantity for this element is the number of Tension Hold Down Anchor Assemblies on the bridge.

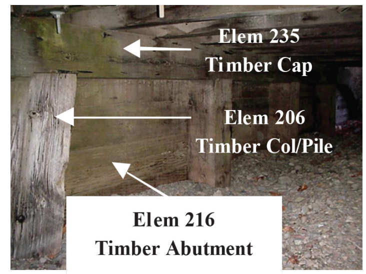
WSDOT bridges known to have Tension Hold Down Anchor Assemblies are: 97/420, 25/130, 2/35, 99/560, 305/10, 82/280S.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Number of Tension Hold Down Anchor Assemblies with repairs.
3. Number of Tension Hold Down Anchor Assemblies with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Number of Tension Hold Down Anchor Assemblies with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

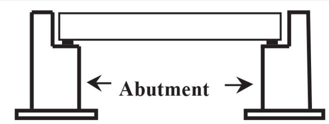
4-4 Substructure

The evaluation of the substructure elements are based on those portions of the member that are exposed for visual inspection and included in the element quantity. If an element is added to a bridge or quantities are changed due to exposure or discovery by other means, do not delete the historical information in subsequent inspections. Simply note the prior exposure or those members not visible and document the current condition.

4-4.1 *Abutments*

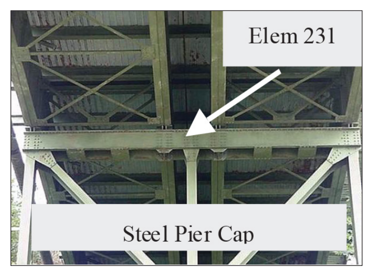


An abutment is a substructure unit located at the end of a bridge that is designed to retain the fill supporting the roadway, and support the bridge superstructure. Bridges that terminate in mid-span or at a pier that is not at grade do not have an abutment substructure unit and do not have abutment elements. These cases will use other appropriate structural elements to evaluate condition.



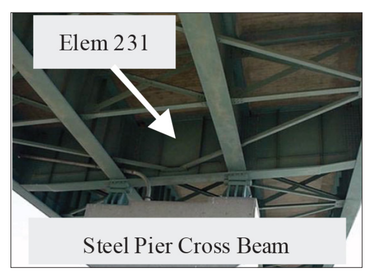
All abutments shall be evaluated for the capacity to transfer design loads to a foundation thru structural elements. The roadway embankment with non-monolithic concrete wingwalls, timber planking, or other abutment retaining systems are included in the evaluation of the WSDOT Abutment Fill element 200 (EA) where the evaluation is limited to no more than 25 feet from the abutment. Timber Abutment element 216 (LF) and Cantilever Abutment element 219 (EA) are elements equivalent to element 200.

4-4.2 *Pier Cap/Cross Beam*



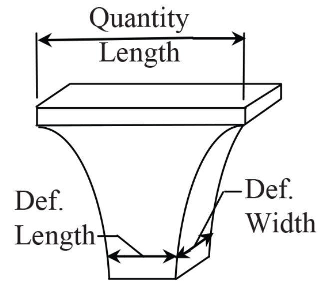
A pier cap is an element that is attached to the top of a pier and is used to support the superstructure of a bridge. A pier cross beam is generally attached to the girders and is used to distribute the loads from the girders to the pier.

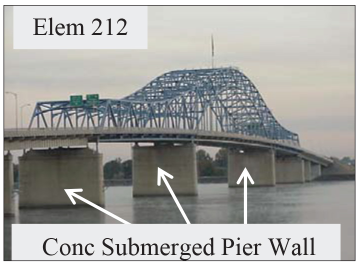
One WSDOT element is used to define either a cap or cross beam constructed of the same material.

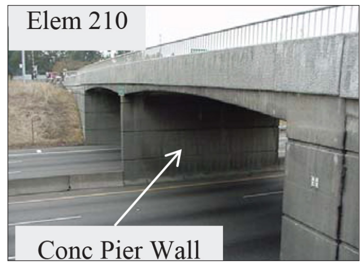


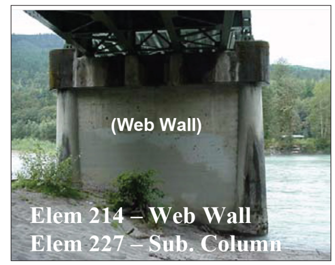
4-4.3 *Pier Wall Definition*

A pier wall is a substructure pier element. For WSDOT elements, a pier wall is defined using two criteria: if the length (transverse direction) is 3 times greater than the width (longitudinal direction) at the bottom; and the wall extends full height from the foundation to the superstructure. If the pier does not meet these two criteria, then the element would be coded as a column or other pier.









4-4.4 *Pile/Column Elements*

These long slender members transfer load normally as a part of the bridge substructure. The bottom of a column element may be visible or supported on unknown foundations. For element and inspection purposes, a pile is inspected as a designed column for the visible portion above ground or if visible in the past. Single columns supported on a single shaft are to be considered the same as one column or column length even though a part of the shaft is visible.

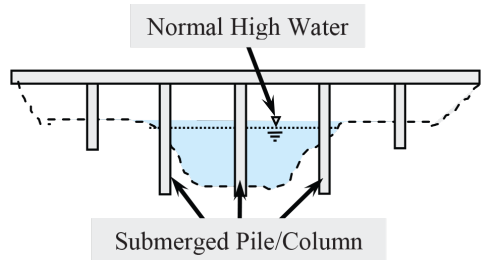
4-4.5 *Foundation Elements*

WSDOT Timber Foundation and Concrete Foundation elements document that a foundation is visible, and the structural condition may or may not be related to scour. The foundation may be a spread footing, or a footing supported by piles or drilled shafts. The foundation element is based on the footing material and the piles may be of any material. The condition of the foundation is the focus of these elements, not the pile design or material.

If the supporting piles are visible, then the pile element should be added to the bridge. Do not delete the pile element in subsequent inspections. The total quantity is the quantity of piles supporting the exposed foundation, not just the number of exposed piles. When scour threatens or reduces the condition, the scour documentation and condition is recorded separately in WSDOT element 361 and not recorded in the foundation element.

4-4.6 *Submerged Element Definition (Column, Pier Wall, Foundation)*

A Submerged element in BMS is defined as a substructure element located within the normal high water banks of a waterway channel. Repair or replacement of these elements may have special construction requirements as outlined in the environmental permits.



200	Abutment Fill	Units – EA

This element is defined as the soil retained behind a concrete or steel abutment and includes the materials retaining the embankment such as non-monolithic concrete wing walls or other retaining wall system. The evaluation of the fill or retaining systems should not extend beyond 25 feet or the approach slab, whichever is greater.

Normally structures have two abutments at grade. When bridges terminate at intermediate piers or in mid-span (not on the ground), then this element does not apply. In addition, WSDOT Element 200 is equivalent to and does not apply to structures with WSDOT Timber Abutment 216 (LF) or Cantilever Abutment Element 219 (EA).

Erosion outside of the abutment/wingwalls can be documented in the notes, but is not included in the evaluation or condition of the element.

1. Defects are superficial and have no effect on the structural capacity or performance of the fill.
2. Number of abutments that have been repaired.
3. Number of abutments with a fill problem which does not significantly affect the support of the traveled lanes. Deficiencies do not warrant analysis, but may require repairs.
4. Number of abutments with a fill problem in locations or quantity and has reduced the structural capacity of the soil to support the approach or roadway. It is a threat to traffic. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

202 Steel Pile/Column Units – EA

This element defines a column or column portion of a pile constructed of structural steel visible for inspection.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Number of pile/columns with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Number of pile/columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

203 Prestressed Hollow Concrete Pile/Column Units – EA

This element defines a column or column portion of a pile constructed of prestressed concrete and hollow. Inspection includes the visible portion above ground line.

204 Prestressed Concrete Pile/Column Units – EA

This element defines a column or column portion of a pile constructed of prestressed concrete visible for inspection.

205 Concrete Pile/Column Units – EA

This element defines a column or column portion of a pile constructed of reinforced concrete visible for inspection. Usually, WSDOT concrete piles are designed and constructed inside a sacrificial steel pipe.

Condition States for WSDOT Elements 203, 204 and 205

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Number of pile/columns that has been repaired or patched.
3. Number of pile/columns has structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

206 Timber Pile/Column Units – EA

This element defines a column or column portion of a pile constructed of timber visible for inspection.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Number of pile/columns with repairs, plates, or splices.
3. Number of pile/columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½″ are marked with a YELLOW TAG.
4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1½″ shell thickness are marked with a RED TAG.

207 Concrete Pile/Column w/Steel Jacket Units – EA

This element defines a column or column portion of a concrete pile where the exposed surface has been retrofitted top to bottom with a steel jacket visible for inspection. This changes the deterioration and management of the pile. Element 207 replaces existing pile elements 204, 205, 226, or 227 where the exiting pile quantities decrease and Element 207 quantities increase by the number of steel jacketed piles. Construction of the steel jacket also rehabilitates any pre-existing defects and the quantities are initially coded in condition state one.

Pile/columns that are not jacketed top to bottom are considered a repair and Element 207 does not apply; such as a timber pile steel splice. Code these repairs as CS2 in the existing pile element.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Number of pile/columns with repairs.
3. Number of pile/columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member.

208 Concrete Pile/Column w/Composite Wrap Units – EA

This element defines a concrete column or column portion of a pile where the exposed surface has been retrofitted top to bottom with a composite wrap. Examples of composite material are carbon fiber and fiberglass. This changes the deterioration and management of the pile. Element 208 replaces existing pile elements 204, 205, 226, or 227 where the existing pile quantities decrease and Element 208 quantities increase by the number of composite piles. Composite wrapping also rehabilitates any pre-existing defects and the quantities are initially condition state one.

Pile/columns that are not wrapped top to bottom are considered a repair and Element 208 does not apply, such as a fiberglass repair to a timber pile at the ground line. Code these repairs as CS2 in the existing pile element.

The structural condition should be based on the quantity and location of visible defects. Defects should be documented well enough to determine a change in condition. Defects include cracked or damaged composite reinforcement, abrasions, or seepage of moisture. Sounding with a rock hammer should use caution and not damage the resin materials.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, superficial cracked resin, debonding, or blisters on the surface.
2. Number of composite wrapped Pile/Columns with repairs.
3. Number of composite wrapped Pile/Columns with structural defects. The defects do not significantly affect structural capacity of the wrap or pile/column. Deficiencies do not warrant analysis, but may require repairs.
4. Number of composite wrapped Pile /Columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

209 Submerged Concrete Pile/Column w/Steel Jacket Units – EA

This element defines a submerged column or column portion of a pile that is constructed of reinforced concrete and has been seismically retrofitted with a steel jacket visible for inspection.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Number of steel jacketed Pile/Columns with repairs.
3. Number of steel jacketed Pile/Columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Number of steel jacketed Pile/Columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

210 Concrete Pier Wall Units – LF

This element defines a pier wall constructed of reinforced concrete. The total quantity for this element is the length at the top of the wall.

211 Other Pier Wall Units – LF

This element defines a pier wall that is constructed of a non-standard material (rock and mortar) or non-standard construction. The total quantity for this element is the length at the top of the wall.

212 Concrete Submerged Pier Wall Units – LF

This element defines a submerged pier wall constructed of reinforced concrete. The total quantity for this element is the length at the top of the wall.

213 Other Submerged Pier Wall Units – LF

This element defines a submerged pier wall that is constructed of a non-standard material (rock and mortar) or non-standard construction. The total quantity for this element is the length at the top of the wall.

Condition States for WSDOT Elements 210, 211, 212, and 213

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Length of pier wall with repairs.
3. Length of pier wall with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Entire length of pier wall with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

214 Concrete Web Wall between Columns Units – LF

This element defines a secondary concrete wall constructed between pier columns. This element includes railroad crash barriers. The total quantity for this element is the length at the top of the wall.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Affected length of Web wall with repairs.
3. Length of Web wall with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Entire length of Web wall with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

215 Concrete Abutment Units – LF

This element is defined as a concrete abutment or a concrete cap at the abutment which are designed to carry design loads to a foundation. A concrete abutment is a short or tall wall supporting the superstructure. An abutment cap is generally a rectangular beam supporting the superstructure. An abutment cap is included in this element and excluded from the quantity of element 234, Concrete Caps, elsewhere in the bridge. An abutment cap may be supported with concrete, steel, or timber columns or piles and the columns are coded separately and not included in this element, but are included with the quantity and evaluation of the other the similar columns in the bridge. The columns are only coded if they are visible or have been visible in the past.

The element quantity is measured along the skew and includes concrete monolithic wingwalls up to the first open joint or expansion joint. Wingwalls monolithic with the abutment shall be included evaluation of the abutment. The length of monolithic wingwall shall not exceed 20 feet per corner,

The embankment and retaining system, or retaining system beyond a monolithic wingwall, are documented in WSDOT element 200.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Affected length of abutment with repairs.
3. Length of abutment with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Entire length of abutment when damage exists in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

216 Timber Abutment Units – LF

This element defines the roadway embankment fill behind a timber cap includes the sheet materials retaining the embankment. The total quantity is the length of the timber cap. Timber caps at the abutment and the piles supporting the caps are not included in this element. The caps are included in the element 235 with other timber caps and the piles are included with the other pile elements in the bridge.

Erosion outside of the abutment/wingwalls can be documented in the notes, but is not included in the evaluation of the element condition states.

1. Defects are superficial and have no effect on the structural capacity or performance of the fill.
2. Length of abutment that has been repaired.
3. Length of abutment with a fill problem which does not significantly affect the support of the traveled lanes. Deficiencies do not warrant analysis, but may require repairs.
4. Length of abutment with a fill problem in locations or quantity and has reduced the structural capacity of the soil to support the approach or roadway. It is a threat to traffic. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

217 Other Abutment Units – LF

This element defines an abutment not constructed of steel,timber, or concrete such as rock/mortar. The element quantity is the length of abutment measured along the skew. The element quantity includes monolithic wing walls but not to exceed 20 feet per corner.

Document the condition of the embankment and the embankment retaining system conditions in WSDOT element 200.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Affected length of abutment with repairs
3. Affected length of abutment with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Entire length of abutment when damage exists in locations or quantity and has reduced the structural capacity of the abutment. Structural analysis is warranted or has determined repairs are essential to restore the full abutment capacity.

218 Steel Abutment Units – LF

This element defines an abutment constructed of structural steel which is usually a steel cap at the abutment. Similar to concrete abutment caps, steel abutment caps are included in this element and are not included in the quantity of element 233, steel cap/crossbeam. The columns supporting the steel cap are coded separately or included with other similar columns in the bridge. The element quantity is the length of steel abutment cap measured along the skew.

Document the embankment conditions and the embankment retaining system conditions in WSDOT element 200.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Length of abutment with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Length of abutment with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Entire length of abutment affected when damage exists in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

219 Concrete Cantilevered Span Abutment Units – EA

The WSDOT Cantilever Span Abutment element was created to keep this abutment type separate from the typical abutment elements. This element defines an abutment for the end of a bridge span that is cantilevered from the first or last pier at grade. The default notation assumes the pavement seat (abutment 1) is Pier 1; the cantilever span is Span 1; the first pier is Pier 2. These abutments do not carry load but do retain fill where the defects of structural members are evaluated as part of the superstructure elements.

The definition, condition evaluation, and units are the same as for the WSDOT element 200 where this element is defined as the soil retained behind the abutment and wing walls or retaining walls that support an asphalt roadway or approach slab. The fill evaluation should not extend beyond 25 feet or the approach slab, whichever is greater. Erosion outside of the abutment/wingwalls can be documented in the notes, but is not included in the evaluation of the element condition states.

1. Defects are superficial and have no effect on the structural capacity or performance of the fill.
2. Number of abutments that have been repaired.
3. Number of abutments with a fill problem does not significantly affect the support of the traveled lanes. Deficiencies do not warrant analysis, but may require repairs.
4. Number of abutments with a fill problem in locations or quantity and has reduced the structural capacity of the soil to support the approach or roadway. It is a threat to traffic. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

220 Concrete Submerged Foundation Units – EA

This element defines a reinforced concrete foundation footing supported by shafts, piles, or soil (spread footing) that is visible for inspection and may be always, or seasonably covered by water. Do not delete the element from the bridge because the foundation is no longer visible. Scour deficiencies at a concrete abutment are included in WSDOT element 361 and are not included in this element.

The piles may be timber, concrete or steel. If the supporting piles become visible, then the pile element should be added to the bridge. The total quantity is the quantity of piles supporting the exposed foundation, not just the number of exposed piles. Do not delete the element in subsequent inspections. The total quantity of foundations/piles will increase each time a new location is exposed and visible.

221 Concrete Foundation Units – EA

This element defines a reinforced concrete foundation footing supported by shafts, piles, or soil (spread footing) that is visible for inspection. Scour deficiencies at a concrete foundation are included in WSDOT element 361 and are not included in this element. Plinths are a form of spread footing and included in this element which are a small concrete base that supports a column.

The piles may be timber, concrete or steel. If the supporting piles become visible, then the pile element should be added to the bridge. The total quantity is the quantity of piles supporting the exposed foundation, not just the number of exposed piles. Do not delete the element in subsequent inspections. The total quantity of foundations/piles will increase each time a new location is exposed and visible.

Condition States for WSDOT Elements 220 and 221

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Number of foundations with repairs.
3. Number of foundations with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Number of foundations with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

222 Timber Foundation Units – LF

This element defines a timber foundation element that includes a mud sill which is a spread footing and the rare case of a pile supported footing. A timber pile supported footing is a where timber horizontal footing member is a support for columns and the timber member is supported by piles. The total quantity for this element is the length of timber foundation.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Total length of foundation if repairs exist.
3. Total length of foundation if structural defects exist, but the defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½″ are marked with a YELLOW TAG.
4. Total length of foundation where damage exists in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1½ shell thickness are marked with a RED TAG.

225 Steel Submerged Pile/Column Units – EA

This element defines a column or column portion of a pile constructed of steel and is visible for inspection and may be always or seasonably covered by water. Do not delete the element from the bridge because the element is no longer visible. The exposure may be intentional or caused by scour.

226 Prestressed Concrete Submerged Pile/Column Units – EA

This element defines a submerged column or column portion of a pile constructed of prestressed concrete and is visible for inspection and may be always or seasonably covered by water. Do not delete the element from the bridge because the element is no longer visible. The exposure may be intentional or caused by scour.

227 Concrete Submerged Pile/Column Units – EA

This element defines a submerged column or column portion of a pile constructed of reinforced concrete and is visible for inspection and may be always or seasonably covered by water. Do not delete the element from the bridge because the element is no longer visible. The exposure may be intentional or caused by scour.

Condition States for WSDOT Elements 225, 226, and 227

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Number of pile/columns with repairs.
3. Number of pile/columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

228 Timber Submerged Pile/Column Units – EA

This element defines a submerged column or column portion of a pile constructed of reinforced timber and is visible for inspection and may be always or seasonably covered by water. Do not delete the element from the bridge because the element is no longer visible. The exposure may be intentional or caused by scour.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Number of pile/columns with repairs, plates, or splices.
3. Number of pile/columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½″ are marked with a YELLOW TAG.
4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1½″ shell thickness are marked with a RED TAG.

229 Timber Cap Rehab with Steel Units – LF

This element consists of a timber cap rehabilitation where alternate load paths to piling are provided by steel members on the exterior of the cap and the timber cap remains in place. The timber conditions are excluded from the condition evaluation. The total quantity for this element is the length of the existing timber pier cap, where this quantity is deducted from the total quantity of Element 234.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Steel span length of pier cap rehabilitation with repairs.
3. Steel length of pier cap rehabilitation with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Steel span length of pier cap rehabilitation with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

231 Steel Pier Cap/Crossbeam Units – LF

This element defines a steel pier cap or crossbeam. The total quantity for this element is the length at the top of the crossbeam.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Steel span length of pier cap/crossbeam with repairs.
3. Steel span length of pier cap/crossbeam with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Steel span length of pier cap/crossbeam with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

232 Submerged Hollow Prestressed Concrete Pile/Column Units – EA

This element defines a column or column portion of a pile constructed of prestressed concrete pile that has an interior void or is hollow. Inspection includes the visible portion above ground line and may be always or seasonably covered by water.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Number of pile/columns that have been repaired or patched.
3. Number of pile/columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

233 Prestressed Concrete Pier Cap/Crossbeam Units – LF

This element defines a prestressed concrete pier cap or crossbeam. The total quantity for this element is the length at the top of the crossbeam.

234 Concrete Pier Cap/Crossbeam Units – LF

This element defines a reinforced concrete pier cap or crossbeam. Integral pier caps with girders framed directly into the crossbeam are also included in this element. The total quantity for this element is the length at the top of the crossbeam.

Condition States for WSDOT Elements 233 and 234

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Length of pier cap/crossbeam affected by repair or patch. Capacity repairs such as a strand splicing should record girder span length.
3. Length of pier cap/crossbeam affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Concrete span length of pier cap/crossbeam affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

235 Timber Pier Cap Units – LF

This element defines a timber pier cap that directly supports the superstructure. The total quantity for this element is the length at the top of the crossbeam.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of pier cap with repairs, plates, or splices.
3. Length of pier cap with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½″ are marked with a YELLOW TAG.
4. Timber span length of pier cap with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1 ½ shell thickness are marked with a RED TAG.

236 Concrete Floating Pontoon Units – Cell

A concrete floating bridge is a series of post-tensioned floating pontoons which are subdivided into internal compartments called cells. Traffic may ride directly on the top of the pontoon or the roadway may be elevated above the pontoon and supported by columns. This element includes all pontoons regardless of size or configuration and all cells shall be evaluated at the same risk to the bridge condition. Deck elements will apply for the entire length of the pontoon structure. Pontoon condition will include the top slab where the deck /soffit elements exist on the pontoon. The deck/soffit elements are not included where the deck is elevated above the pontoon. The total quantity for the Concrete Floating Pontoon element is the total number of pontoon cells for the bridge.

Concrete pontoons are specially designed to be water tight and dry while in service. The concrete is specifically designed to be visually crack free and have low permeability with water tight construction joints. Water tight design is the basis for condition evaluation of the pontoon below water line and is to include, but is not limited to the assessment of post-tensioned concrete, connections between pontoons, WSDOT element 237-Pontoon Hatch/ Bulkheads, and the risk to buoyancy. Water tight criteria shall not apply to the evaluations of conventionally designed concrete conditions above the waterline.

Concrete cracking shall be assessed on the location:

- Above or below the waterline;
- Whether it is in an exterior or interior wall;
- Whether it is active or in-active;
- And based on the design criteria that visible cracking should not exist on submerged surfaces.

An active crack is defined for this element as a crack that allows water to pass into or through a concrete section which is a risk for transporting fine materials out of the section or a source of contaminates into the section. Active cracks may be visible under normal bridge loading or only visible under storm conditions.

The presence of water in a cell is evaluated based on the time required to obtain a measured depth of water. Stated another way, the evaluation is based on the rate of accumulation, not the total depth of water. For example, seepage in a cell is defined as, less than 1” of water accumulated over a period of one year. In addition, ballasted cells shall establish a void ratio of the ballast to calculate a volume of water in a cell.

This Concrete Floating Pontoon element also defines the relationship between the bridge element condition and the corresponding NBI Substructure Condition rating or NBI Item 060.

1. Number of pontoon cells with defects that are superficial and are insignificant to structural capacity or buoyancy of the cell, pontoon or bridge. The cell concrete surfaces may have structurally insignificant hairline cracks, possibly sealed with Crystalline during construction, with no history of seepage. The cell is dry. A cell may have water present due to condensation caused when a deck hatch is opened.
    - If the total quantity is in CS1, then NBI Item 060 shall be an 8.

2. Number of pontoon cells with a repair such as, but not limited to a concrete patch or an epoxy injected sealed crack.
   - If repairs are above water level, or on interior walls between cells, then NBI Item 060 shall be a 7.
   - If repairs are below water level, then NBI Item 060 shall be a 6.
3. Number of pontoon cells with significant defects. Conventional concrete defects above the waterline which does not affect structural capacity of the concrete. Water tight defects below the waterline which may affect buoyancy of the cell, pontoon or the bridge. Typical CS3 submerged defects include, but are not limited to: Seepage of less than 1” of water accumulation in a year (trace); Areas of concrete that are moist or have wet leachate present; Any cells that are consistently in a damp or “trace condition”.

   Pontoon cells will be monitored annually for water when there is more than 1” accumulation in a year, but do not meet the leaking requirements of CS4.
   - If cells are in CS3 due to seepage, then NBI Item 060 shall be a 6.
   - If eight or more adjacent or contiguous cells in a single pontoon are in CS3, then NBI Item 060 shall be a 5.
   - If 20 percent of the cells in one pontoon, or a total of 10 percent of the cells in adjoining pontoons or 5 percent of the total element quantity are in CS3, then NBI Item 060 shall be a 4.
4. Number of pontoon cells with damage in locations or quantity, which has reduced the structural capacity of the pontoon or threatens the buoyancy of a cell, the pontoon or the bridge. Wet conditions that indicate a threat to a cell’s buoyancy include, but not limited to: Water leaks 1 inch or more per year in three consecutive years; Water leaks 2 inches or more in a year; Any cell visually leaking water. Any cell with a pontoon hatch or bulkhead in CS4, see WSDOT element 237.
   - If cells are in CS4, then NBI Item 060 shall be a 4.
   - If eight or more non-adjacent cells in a single pontoon are in CS4 or one cell leaks ½ inch per month, then NBI Item 060 shall be a 3.
   - If eight or more adjacent cells in a single pontoon are in CS4, or one cell leaks 1 inch of water per month, then NBI Item 060 shall be a 2.
   - If 20 percent of the cells in one pontoon, or a total of 10 percent of the cells in adjoining pontoons or 5 percent of the total element quantity are in CS4, then NBI Item 060 shall be a 2.
   - If one cell leaks 1 inch of water per month, for three consecutive months, then the NBI Item 060 shall be a 1 and the bridge shall be closed to traffic.
   - If there is a measurable or visual change in the alignment or the free board distance at any location on the pontoon, then the NBI Item 060 shall be a 1 and the bridge shall be closed to traffic.

237 Pontoon Hatch/Bulkhead Units – EA

This element defines a steel deck or bulkhead hatch access. Deck hatches are accessed from the exterior of a pontoon and bulkhead hatches provide access between cells. The condition evaluation of a hatch includes, but is not limited to the ability of a hatch to provide a watertight structural seal. The performance of the hatches is critical to the design buoyancy of the pontoon structure during extreme events. The total element quantity is the total number of hatch and bulkheads on a bridge.

1. Defects are superficial and are insignificant to performance of the hatch. Insignificant amounts of water enter a cell when a deck hatch is opened.
2. Number of hatch/bulkheads with repairs such as: replaced seals, repaired hold-down dogs or locks.
3. Number of hatch/bulkheads with structural defects. The defects do not threaten performance of the hatch. Number of hatches which allow water accumulation into a cell of less than 1” per year.
4. Number of hatch/bulkheads with damage that threatens performance during an extreme event. Number of hatches which allow water accumulation into a cell of 1” or more per year. All pontoon cells in WSDOT element 236 shall be coded CS4 that have a deck hatch or bulkhead hatch coded CS4.

238 Floating Bridge – Anchor Cable Units – EA

This element defines a steel anchor cable or structural strand used to stabilize the position of a floating bridge. The condition of a floating pontoon anchor cable is evaluated during underwater inspections performed by divers and remotely operated vehicles. Condition evaluation is based on the cable protection system, breakage of wires within the cable and the condition of the cable anchor. The total element quantity should equal the number of floating pontoon anchor cables attached to the bridge.

Floating bridge anchor cables Condition Definitions: The amount of corrosion noted corresponds to the following criteria.

LIGHT (CS2) – Light surface corrosion (freckle rust, not white oxidation) and rusting of the outer layers of wires, no appreciable rust nodules or section loss detected.

LIGHT TO MODERATE – More significant corrosion with scattered rust nodules $\frac{1}{16}$ inch thick, very early stages of section loss due to occasional pitting less than $\frac{1}{32}$ inch deep.

MODERATE (CS3) – Rust nodules more uniform and typically $\frac{1}{16}$ to $\frac{1}{4}$ inch thick with more frequent section loss due to pitting, typically still less than $\frac{1}{32}$ inch deep, but with occasional pitting up to $\frac{1}{32}$ inch deep. Visually corresponds to approximately 5% section loss in outer wires.

MODERATE TO HEAVY – Uniform rust nodules typically $\frac{1}{4}$ inch thick with uniform section loss due to pitting typically $\frac{1}{32}$ inch deep. Outer wire section loss estimated between 5% and 25%.

HEAVY (CS4) – Uniform rust nodules typically $\frac{1}{4}$ inch to $\frac{3}{8}$ inch thick with uniform section loss due to pitting typically $\frac{1}{32}$ to $\frac{1}{16}$ inch deep. Visually corresponds to approximately 25% section loss to the outer wires (obvious flattening of the wires, with grooves between the wires still visible).

1. Number of cables or anchors with no defects in the cable or anchor and the galvanized protection system is functioning properly, which includes white zinc oxidation. New replacement cables are coded in this condition state. (Corresponds to NBI substructure rating of 7 or 8.)
2. Number of cables or anchors with defects that are insignificant and do not affect the capacity of the cable. The galvanized protection system is showing signs of failure, and surface or freckled rust may exist with no measurable loss of section. Any individual wire up to 75% out of lay and no closer than 30 LF apart is CS2. If any portion of the cable or anchor is CS2, then the NBI Substructure Condition rating (NBI Item 060) shall be a maximum of 6.
3. Number of cables or anchors with defects that are beginning to affect the capacity of the cable, but are within acceptable design limits. Corrosion section loss is not more than 25% of the outer wire layer. Single wire failures of the cable may exist due to corrosion or hydrogen embrittlement, but no closer than 30 feet apart. Gaps in the outer wires exposing the inner layer with no ferrous corrosion to inner layer. Multiple adjacent wires up to 100% out of lay. Wires more than 100% out of lay with second layer exposed are considered broken wires. If any portion of the cable or anchor is CS3, then the NBI Substructure Condition rating (NBI Item 060) shall be a maximum of 5.
4. Number of cables or anchors with defects that have significantly affected the capacity. Two or more broken wires, or equivalent section loss due to other defects, are within 30 feet. Outer wire section loss greater than 25%. Exposed inner wires with measurable section loss. Any cable which exhibits permanent deformation. If any portion of the cable or anchor is CS4, then the NBI Substructure Condition rating (NBI Item 060) shall be a maximum of 4. If two or more adjacent cables (on the same side or opposite sides of the pontoon) or more than four cables on the structure are CS4, then the NBI Substructure Condition rating (NBI Item 060) shall be 3.

4-5 Culverts

240 Metal Culvert Units – LF

This element defines a metal (steel, aluminum, etc.) culvert including arches, round or elliptical pipes, etc. The total quantity is the length of culvert from inlet to outlet along the bottom of the culvert and does not include the apron.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be corrosion, erosion, scour, distortion, or roadway settlement.
2. Length of culvert with repairs.
3. Length of culvert with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Length of culvert affected by damage in locations or quantity and has reduced the structural capacity of the culvert. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to: distortion, deflection, roadway settlement, or misalignment of the barrel.

241 Concrete Culvert Units – LF

This element defines all precast and cast-in-place (conventional or prestressed) concrete arch, pipe and box culverts. The total quantity is the length of culvert from inlet to outlet along the bottom of the culvert and does not include the apron.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Length of culvert with repair or patch.
3. Length of culvert affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Length of culvert affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the culvert. Structural deficiencies are not limited to: distortion, deflection, roadway settlement, or misalignment of the.

242 Timber Culvert Units – LF

This element defines all timber box culverts. The total quantity is the length of culvert from inlet to outlet along the bottom of the culvert and does not include the apron.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of culvert that has been replaced, repaired, patched, or plated.
3. Length of culvert with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½″ are marked with a YELLOW TAG.
4. Length of culvert affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the structural capacity of the culvert. Structural deficiencies are not limited to: distortion, deflection, roadway settlement, or misalignment of the barrel. Typically, locations in a load path with less than a 1½″ shell thickness are marked with a RED TAG.

243 Other Culvert Units – LF

This element defines all culverts not included under steel, concrete, or timber culvert elements. It may include masonry or combinations of other materials. The total quantity is the length of culvert from inlet to outlet along the bottom of the culvert and does not include the apron.

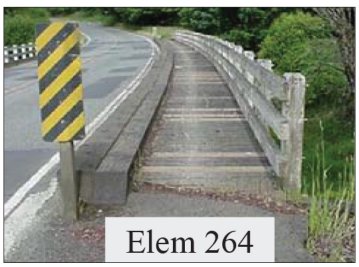
1. Defects are superficial and have no effect on the structural capacity of the culvert.
2. Length of culvert with repairs.
3. Length of culvert with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Length of culvert affected by damage in locations or quantity and has reduced the structural capacity of the culvert. Structural analysis is warranted or has determined repairs are essential to restore the structural capacity of the culvert. Structural deficiencies are not limited to: distortion, deflection, roadway settlement, or misalignment of the barrel.

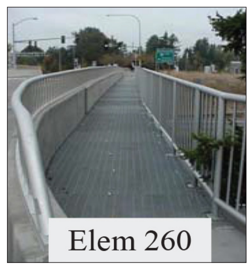
4-6 Sidewalk and Supports

A sidewalk is an element that provides pedestrian access across a bridge. A sidewalk is supported by a bridge deck and/or by sidewalk brackets that consist of several types of materials. The purpose of the sidewalk BMS is to record the structural integrity of the support system and sidewalk. Identify these elements in BMS if the sidewalk width is greater than or equal to 3 feet.

However, there are exceptions that must be accommodated. When there is a true sidewalk on a bridge as determined by the design, approach sidewalks, and location, it is appropriate to enter a sidewalk element in the BMS. Timber sidewalks, for example, may be narrow and have a support system. These exceptions should include a sidewalk WSDOT element. A specific note explaining the reasoning for including the sidewalk element should be provided.

If a rail retrofit or a wide curb has been determined to NOT be a sidewalk, then Bridge Rail elements will be used to document defects.





260 Steel Open Grid Sidewalk and Supports Units – SF

This element defines a sidewalk constructed of steel grids that are open and unfilled. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

261 Steel Concrete Filled Grid Sidewalk and Supports Units – SF

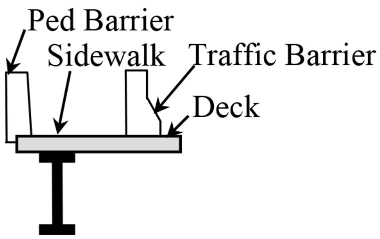
This element defines a sidewalk constructed of steel grids that have been filled with concrete. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

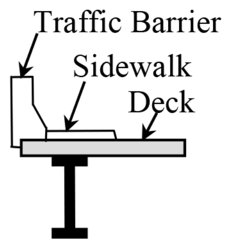
262 Corrugated/Orthotropic Sidewalk and Supports Units – SF

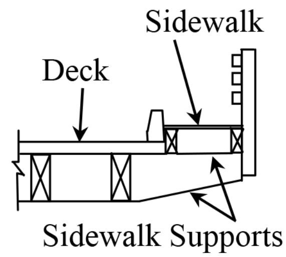
This element defines a sidewalk constructed of corrugated metal filled with Portland cement concrete or asphaltic concrete or an orthotropic steel deck. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

264	Timber Sidewalk and Supports	Units – SF

This element defines a sidewalk constructed of timber. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.







266	Concrete Sidewalk and Supports	Units – SF

This element defines a sidewalk constructed of reinforced concrete. The concrete sidewalk may be supported by the roadway deck, bracing, diaphragms, or sidewalk stringers. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

267	Fiber Reinforced Polymer (FRP) Sidewalk and Supports	Units – SF

This element defines a sidewalk constructed of fiber-reinforced polymer. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

Condition States for WSDOT Elements 260, 261, 262, 264, 266, and 267

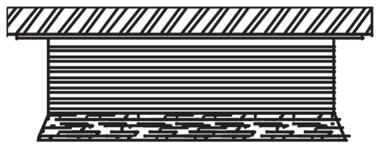
1. Defects are superficial and have no effect on the structural capacity of the sidewalk or supports.
2. Sidewalk area (or support projected area) with repairs or patches
3. Sidewalk area (or support projected area) with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Sidewalk area (or support projected area) affected by damage in locations or quantity and has reduced the structural capacity of the sidewalk support. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

4-7 Bearings

When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only.

310 Elastomeric Bearing — Units – EA

This element defines a bridge bearing that is constructed primarily of elastomers, with or without fabric or metal reinforcement.



311 Moveable Bearing (Roller, Sliding, etc.) — Units – EA

This element defines those bridge bearings that provide for both deflection and longitudinal movement by means of roller, rocker or sliding mechanisms.

312 Concealed Bearing or Bearing System — Units – EA

This element defines those bridge bearings and/or bearing seats that are not accessible with tools or equipment and therefore are not open for detailed inspection.

313 Fixed Bearing — Units – EA

This element defines those bridge bearings that provide for rotation only.

314 Pot Bearing Units – EA

This element defines those high load bearings with a confined elastomer. The bearing may be fixed against horizontal movement, guided to allow sliding in one direction, or floating to allow sliding in any direction.

314 – Pot Bearing

315 Disc Bearing Units – EA

This element defines a high load bearing with a hard plastic disc. The bearing may be fixed against horizontal movement, guided to allow sliding in one direction, or floating to allow sliding in any direction.

316 Isolation Bearing Units – EA

This element defines a bearing that is laminated and is a sandwich of neoprene and steel plates. The bearing contains a lead core that is primarily used for seismic loads. The isolation bearing is used to protect structures against earthquake damage.

Condition States for WSDOT Elements 310, 311, 312, 313, 314, 315, and 316

1. Defects are superficial and have no effect on the superstructure movements or safe transfer of load to the substructure. Shear deformation, displacement, or cracking of grout pad may be present. Top and bottom surfaces may not be parallel.
2. Number of bearings with a repair.
3. Number of bearings with structural defects. The defects are not detrimental to the superstructure or the safe transfer of load to the substructure. Deficiencies do not warrant analysis, but may require repairs.
4. Number of bearings with defects that are detrimental to the superstructure or the safe transfer of load to the substructure. Loss of minimum bearing area may be imminent. Structural analysis is warranted or has determined bearing repairs are essential to restore the safe movement or transfer of load to the substructure.

4-8 Bridge Approach

321 Concrete Roadway Approach Slab Units – SF

This element defines a structural concrete slab supported at the bridge abutment and the roadway pavement. This element is essentially a concrete deck element that documents the surface conditions of the approach slab. The element quantity is the total area of both concrete approach slabs attached to the bridge. Do not include asphalt shoulder if present. Whether surface of approach slab is visible or covered by an asphalt overlay, a WSDOT element shall exist.

1. Defects are superficial. The slab surface do not have spalls/delaminations or previous repairs. The deck surfaces may have cracks or rock pockets. Wear and rutting may expose aggregate or reinforcing.
2. Slab area with repairs or patches. Do not include the rare case rutting filled with patching material.
3. Slab area with spalling. Do not add delaminations found in the field.
4. This condition state documents when an approach slab has failed and needs to be replaced. Failure is normally due to the slab falling off the bridge seat with a visible grade separation and/or excessive gap at the pavement seat. Code the total SF of approach slab in condition state 4.

322 Bridge Impact Units – EA

This documents an increase to the bridge live load, or impact, due to hammering or dynamic response of the bridge from trucks passing on to the bridge. Truck speed may be considered when slower speeds reduce the impact. Total quantity is based on the direction of trucks on to the bridge. Head to head traffic has two and bridges with a single direction of traffic will have one, such as ramps or main line divided structures (N&S or E&W). Code the approach roadway in the condition state that best indicates the severity of the problem. For the roadway where trucks are leaving the structure, deficiencies will be described and repairs may be called out; however, the trailing roadway will not be quantified in the condition states.

1. The number of approach roadways that are smooth. Hammer or dynamic response to the structure is not significant. There may be small bumps or minor raveling of the pavement in the approach roadway.
2. The number of approach roadways (not approach slab) that have been repaired or feather patched to correct an approach problem. If a paving project has removed the repairs, maintain the CS2 condition and note the year of the new asphalt.
3. The number of approach roadways that are rough, but the increase in live load to the structure is minor. Hammering impact is minor due to the wheels passing over surface discontinuities such as joints, cracks, or potholes. Dynamic response is minor due to a dip or rise in the approach roadway alignment.
4. The number of approach roadways that are causing significant increase in live load to the structure. Hammering impact is significant due to the wheels passing over surface discontinuities such as joints, cracks, or potholes. Dynamic response is significant due to a dip or rise in the approach roadway alignment.

4-9 Bridge Rail

WSDOT element for bridge railing are to be entered for each type of rail. For example, if there is W-beam or Thrie beam guardrail mounted on the concrete bridge rail, then the length of each metal and concrete element should be entered. If the original concrete bridge rail has aluminum rail installed on top (with or without a rail retrofit), enter that quantity into the appropriate WSDOT element as well. In the element notes, describe what type of metal bridge or pedestrian rail has been entered.

330 Metal Bridge Railing Units – LF

This element defines all types and shapes of metal bridge railing aluminum, metal beam, rolled shapes, etc. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

331 Concrete Bridge Railing Units – LF

This element defines all types and shapes of reinforced concrete bridge railing. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

332 Timber Bridge Railing Units – LF

This element defines all types and shapes of timber railing. All elements of this rail (except connectors) must be timber. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

333 Other Bridge Railing Units – LF

This element defines all types and shapes of bridge railing except those defined as METAL, CONCRETE or TIMBER. This element will include cable rails, and combinations of materials. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

Condition States for WSDOT Elements 330, 331, 332, and 333

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Bridge rail length with a repair.
3. Bridge rail length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth), decay, or spalling.
4. Bridge rail length with damage in locations or quantity and has reduced the structural capacity of the rail. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

4-10 Pedestrian Rail

A pedestrian rail will typically be on the outside of a sidewalk and protected from traffic by a Bridge Rail.

340	Metal Pedestrian Rail	Units – LF

This element defines all types and shapes of metal pedestrian bridge railing including steel (excluding weathering steel), aluminum, metal beam, rolled shapes, etc. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

341	Concrete Pedestrian Rail	Units – LF

This element defines all types and shapes of reinforced concrete pedestrian bridge railing. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

342	Timber Pedestrian Rail	Units – LF

This element defines all types and shapes of timber pedestrian bridge railing. All elements of this rail (except connectors) must be timber. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

343	Other Pedestrian Rail	Units – LF

This element defines all types and shapes of pedestrian bridge railing except those defined as METAL, CONCRETE or TIMBER. This element will include cable rails, and combinations of materials. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

Condition States for WSDOT Elements 340, 341, 342, and 343

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Pedestrian rail length with a repair.
3. Pedestrian rail length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth), decay, or spalling.
4. Pedestrian rail length with damage in locations or quantity and has reduced the structural capacity of the rail. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

4-11 Smart Flags

355 Damaged Bolts or Rivets — Units – EA

This smart flag is used to identify superstructure steel elements that have broken or missing bolts and/or rivets. Report one unit for each occurrence in the corresponding condition state.

1. Number of damaged, missing, or loose bolts or rivets in secondary member(s).
2. Number of damaged, missing, or loose bolts or rivets has been replaced.
3. Number of damaged, missing, or loose bolts or rivets in a primary member(s).

356 Steel Cracking — Units – EA

This smart flag is used to identify superstructure steel elements with cracks. Report one unit for each occurrence (or crack) in the corresponding condition state. If fatigue damage exists, which may warrant analysis of the element or the serviceability of the element is uncertain, contact a supervisor immediately.

1. Number of steel cracks, of any length, in a secondary member(s).
2. Number of steel cracks within a load path that have been repaired or arrested. The bridge may still be prone to fatigue.
3. Number of steel cracks within a load path that are not arrested and less than 1 inch. Any cracks (typically cope cracks) on WSDOT bridges must be repaired accordance with WSDOT Bridge Preservation Office procedures.
4. Number of steel cracks within a load path that are not arrested and 1 inch or greater in length. Any cracks (typically cope cracks) on WSDOT bridges must be repaired accordance with WSDOT Bridge Preservation Office procedures.

357 Pack Rust — Units – EA

The primary purpose of this smart flag is to quantify steel connections where rust expansion is visually deflecting steel plates and should be addressed when the bridge is painted. Structural impacts to pack rust overstressing are recorded in the steel elements. The total quantity is the number of existing pack rust locations identified by the inspector.

1. Number of locations where visible pack rust exists and is less than ¼ inch thick.
2. Number of locations where pack rust is more than ¼ inch thick.

360 Bridge Movement Units – EA

The primary purpose of this smart flag is to identify structural movement that is causing significant distress to the bridge. Movements may be horizontal, vertical, or rotational. Evidence of movement should be documented (photo) in such a way that future measurements can determine if the structure is still moving or has stabilized.

1. The entire bridge appears to have stabilized due to repairs or recent history of measurements. Tilt meters, piezometer tubes, or monitoring system show no movement in the past two years.
2. Bridge elements are moving but do not cause a significant problem for the bridge. Bearings may be approaching design limits. Substructure elements may be moving.
3. Bridge movement is at or beyond design limits. Investigation and repair analysis of the bridge is warranted.

361 Scour Units – EA

This element is used to identify foundation scour for bridges crossing waterways as observed during inspections. Its primary purpose is to identify bridge piers or abutments that are subject to scour and to provide some measure of the magnitude of that scour. Piers in normal high water are typically considered for this element but there are instances where piers above high water may be subject to scour. Maintain historical information related to scour documented in previous inspections such as measurements and/or comments of exposed footings.

1. Number of pier/abutment foundations where no Scour exists, or where scour is superficial and has no effect on the foundations structural capacity.
2. Number of pier/abutment foundations where scour has been mitigated and the repair is functioning and in place as designed. Evaluate and comment on any riprap or other scour countermeasures that are in place.
3. Number of pier/abutment foundations where scour exists. The scour does not significantly affect the foundations structural capacity. Scour does not warrant analysis, but may require repairs. If left unchecked, could adversely impact the foundations structural capacity.

   Scour at this level should not impact the NBI Substructure Overall rating code, item 060 (WSBIS Item 1676).

   Examples:

   - Top of spread footings are exposed due to scour.
   - Bottom of pile caps are exposed due to scour.
   - Minimum known pile embedment is between 5’ and 10’ or the column unbraced length has increased, but does not threaten pile capacity.

4. Number of pier/abutment foundations with scour damage in significant locations or quantity and has reduced the foundations structural capacity. Structural analysis is warranted. Repair and or action are required to protect exposed foundation and to restore capacity to the pier.

   Scour at this level may impact the NBI Substructure Overall rating code, item 060 (WSBIS Item 1676). A comment is necessary if the NBI Substructure Overall rating code is lowered.

   Examples:

   - Undermining of spread footings or foundation material is occurring.
   - Minimum known pile embedment is less than 5' or the column unbraced length has increased and threatens pile/column capacity. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

367 Movable Bridge — Units – EA

This is a smart flag to identify movable bridges. WSDOT elements will be used in addition to this smart flag.

1. A Movable bridge with elements that do not require repair (EA).
2. A Movable bridge with elements that require repair (EA).

368 Seismic Pier Crossbeam Bolster — Units – EA

This element identifies concrete piers with seismic structural improvements.

1. Number of piers with a crossbeam bolster.

369 Seismic Pier Infill Wall — Units – EA

This element identifies concrete piers with seismic structural improvements.

1. Number of piers with a seismic pier infill wall.

378 Primary Safety Inspection Units – EA

This is a smart flag for the Primary Safety Inspection report type, to be used when the structure is not owned by the agency performing the inspection but interacts with a route that is. Primary safety inspections only address significant safety issues on those parts of the structure that affect the route that is owned by the agency performing the inspection.

This smart flag is intended to hold all notes associated with the primary safety inspection, and the inspector should not create or edit any other inspection notes except for repair recommendations, if warranted.

Examples include:

- railroad owned structures over state or local agency routes
- locally owned structures over state routes
- state owned structures over locally owned routes

1. Report the entire bridge in condition state 1 (EA).

379 Secondary Safety Inspection Units – EA

This is a smart flag for the Secondary Safety Inspection report type, to be used when the structure is not owned by the agency performing the inspection but interacts with a route that is AND there is another agency that also needs to perform a safety inspection. Secondary safety inspections are otherwise similar to primary safety inspections and only address significant safety issues on those parts of the structure that affect the route that is owned by the agency performing the inspection.

This smart flag is intended to hold all notes associated with the secondary safety inspection, and the inspector should not create or edit any other inspection notes except for repair recommendations, if warranted.

Examples include:

- railroad owned structures over state AND local agency routes
- a state route crosses over a city street and a county road.

1. Report the entire bridge in condition state 1 (EA).

4-12 Seismic Restrainers

Earthquake restrainers have been installed on WSDOT bridges since the 1980s. The typical longitudinal restrainer uses epoxy coated Dywidag bars with a designed gap maintained by double nuts. An earlier system using springs to maintain the required restrainer gap was used until the early 1990s when it was discontinued as being ineffective. Gap measurements are required during an inspection if visual inspection or loose double nuts indicate the gaps are not uniform.

370 Seismic – Longitudinal Restrainer Units – EA

This element is used to identify longitudinal seismic restrainers. When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only. The quantity should equal the total number of longitudinal restrainers on the bridge.

371 Seismic – Transverse Restrainer Units – EA

This element identifies existing bridges that have been retrofitted or newer structures that have been equipped with transverse restrainers designed to restrain transverse movement during a seismic event. The quantity should equal the total number of transverse restrainers on the bridge. When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only. Concrete girder stops located at the ends of girders attached to the abutment or intermediate pier caps/crossbeams provide lateral restraint however it is not the intention to include these in with this element.

372 Seismic – Link/Pin Restrainer Units – EA

This element is used to identify link/pin seismic restrainers. When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only. The quantity should equal the total number of link/pin restrainers on the bridge.

Condition States for WSDOT Elements 370, 371, and 372

1. Restrainer is in good condition and will function as designed. Anchor plate nuts have been checked and are in good condition.
2. Number of restrainers with misaligned seismic-longitudinal restrainer rods. Anchor plate nuts that are tight, but that have epoxy running down their bolts or are of varying lengths. The gap between adjacent longitudinal restrainers varies between ¼ inch and ¾ inch. Short transverse pipe restrainer length. Measure the depth of the diaphragm hole to the restrainer. Take a picture of the hole and tape measure.
3. Number of restrainers with improper anchor plate installation.
   Loose or inadequately bonded anchor nuts. A repair is warranted if over 25 percent of the anchor nuts have more than 2 inches of bolt thread exposed below the nut. Restrainer gap variation in a series of longitudinal seismic restrainers is greater than ¾ inches (measure and add the two gap distances on both sides of each restrainer in making your comparisons).
   Loose double nuts. Specify the replacement of the double nuts with (new) nuts having (with) setscrews and the resetting of the restrainer gaps according to the design tables. The inspector shall specify the required gaps, according to the bridge plans, in the repair.

373 Seismic – Catcher Block Units – EA

This element is used to identify a catcher block attached to a pier or abutment installed as part of a seismic retrofit. The quantity should equal the total number of catcher blocks on the bridge.

1. Number of catcher blocks in good condition.
2. Number of catcher blocks with deficiencies that need correction.

374 Seismic - Column Silo Units – EA

I-5 N-N RAMP OVER I-5 - 5/628N-N - 0016991A

This element is used to identify when a column has been designed to be isolated from the surrounding soil during a seismic event. This will usually consist of a corrugated metal pipe buried in the ground with a cap at the base of a column. The inspection note needs to identify the individual columns that are siloed along with the planned depth (relative to an identifiable elevation) at each one. In cases with small numbers of siloed columns, that could be done in the note. In other situations, a spreadsheet attached as a file or something similar may be useful. In-depth inspections at 12-year intervals are required to confirm the system condition and functionality. In-depth inspection may require means (equipment and manpower) to open and then reclose/reseal the capping system along with tools to measure the silo depth and to roughly assess column and silo condition below the capping system. Each bridge with siloed columns may require an individual in-depth inspection procedure.

1. Silo capping system is intact as designed and is accessible with no visible deterioration.
2. Minor deterioration of silo capping system elements such as hardware corrosion, visible seal deterioration, access hardware broken/missing.
3. Capping system has been buried and is not visible for inspection. (write repair – priority 2 or higher)
4. Capping system has failed allowing solid foreign material to enter the intended gap and potentially restrict column movement. (write repair – priority 1)

375 Cathodic Protection Units – EA

This is a smart flag used to identify a cathodic protection system used on a bridge.
The quantity should equal the total number of cathodic protection systems on the bridge.

1. Code 1 if the cathodic protection system is functioning as designed.
2. Code 1 if the cathodic system is no longer functioning as designed.

376 Concrete Deck Delamination Testing Units – SF

This flag provides a snapshot of deck testing and must be included in the evaluation of a concrete deck and overlay. ASTM4580, Chain Drag Testing will locate and quantify the patches, spalls, delaminations not visible to the inspector and other defects on the entire top surface of the bridge deck. This information is supplemental to the deck/overlay elements and the quantities do not change. For Washington State bridges, the BMS engineer will provide the condition state quantities and notes for this element based on a Chain Drag Report produced by Design or Construction.

For decks covered with an Asphalt Overlay, the 376 data will be updated each time the asphalt is removed from the concrete surface and must be used to evaluate the deck element even though defects are not visible to the inspector. This information does not expire and the element must not be deleted from the report unless the deck is replaced or new information is provided.

1. Deck area with no delaminations.
2. For decks covered with asphalt, this quantity of patching must be recorded in the Deck CS2 and used to evaluate the deck. Do not include this quantity in the evaluation of a bare deck.
3. For decks covered with asphalt, this quantity of spalling must be recorded in the Deck CS3 and used to evaluate the deck. Do not include this quantity in the evaluation of a bare deck.
4. For concrete decks and concrete overlays, the CS4 delamination quantities must be applied to the deck/overlay element CS4. If the Chain Drag Report is more than 10 years old, then the 376 element is deleted from the report because the test results are no longer accurate and also must be removed from the evaluation of the deck/overlay element. If a Chain Drag was completed before the concrete overlay was constructed, then the 376 element must be deleted from the report since patching and delaminations are addressed during the construction.

4-13 Expansion Joint Elements

The expansion joint condition states are designed to track the criteria associated with joint structural failure such as spalling, patches, and other structural problems. A spall within 1′-0″ of a joint system should be considered a joint spall and not included with the deck spalling. Spalls next to the joint are a joint deficiency rather than deck deterioration.

Missing or defective joint glands are not considered structural joint failures in the joint condition states. Some joints are designed to pass water and many joints leak within days of installation. If the joint seal leakage is causing structural problems with elements below the joint, this should be noted in the report and a repair should be recommended. A smart flag or element may be used to track this deterioration in the future, but it is not included in the joint condition states at this time.

If any portion of a joint falls into a lower condition state, code the entire length of the joint in the lower condition state. Joints with structural defects are coded in CS2. Joints that require replacement are tracked in CS3. In general, joints in Condition State 3 will be programmed for rehabilitation or replacement.

When the entire joint is replaced with a new joint system, change the WSDOT element to the new joint type. Do not use more than one WSDOT element for a joint location, unless the structure has been widened and there are two joint systems present. Joint notes should reference specific joints by pier or span number.

When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only.

400 Asphalt Butt Joint Seal Units – LF

This element defines a butt joint between concrete and asphalt pavement that is an asphalt sawcut filled with hot poured rubber. This joint is shown in WSDOT Standard Plan A-40.20, Bridge Paving Joint Seals, Detail 3 or 4. This element shall also be apply for a butt joint at the end of the approach slab to extend the life of the asphalt. The quantity should equal the length measured along the joint.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent concrete or asphalt is sound.
2. Skewed joint length at each location. “D” spalls or patches are present in the header or in the concrete within one foot of either side of the joint but no more than 10 percent of the length.
3. Skewed joint length at each location with the following typical criteria: When the concrete or asphalt must be rebuilt to maintain a reliable roadway surface; More than 10 percent of the joint length has spalls or patches adjacent to the seal; Asphalt was placed without a sawcut or the sawcut was not in the proper location.

401 Asphalt Open Joint Seal Units – LF

This element represents a sealed and sawcut contraction joint or a asphalt joint in bridge paving over an open concrete joint in a bridge deck or truss panel joint, as shown in WSDOT Standard Plan A-40.20, Bridge Paving Joint Seals, Detail 1, 2, 5, or 6 . The joint consists of hot poured rubber placed in an open concrete joint and a membrane may or may not exist. After the asphalt is placed, a sawcut is placed over the concrete joint and the gap filled with hot poured rubber. WSDOT Elements 402 - Open Concrete Joint and 420 - Joint Paved Over flag do not apply at these locations. The quantity should equal the length measured along the joint.

WSDOT Element 420 - the Joint Paved Over flag does apply for all locations of a buried steel joint due to the risk of planing equipment damaging the bridge deck.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent concrete or asphalt is sound.
2. Skewed joint length at each location. “D” spalls or patches are present in the header or in the concrete within one foot of either side of the joint but no more than 10 percent of the length.
3. Skewed joint length at each location with the following typical criteria: When the concrete or asphalt must be rebuilt to maintain a reliable roadway surface; More than 10 percent of the joint length has spalls or patches adjacent to the seal; Asphalt was placed without a sawcut or the sawcut was not in the proper location.

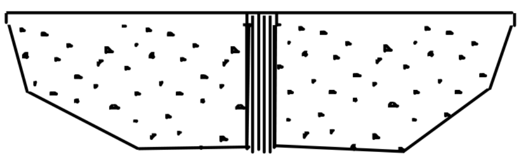
402 Open Concrete Joint Units – LF

This element defines a joint designed to have concrete edges at the joint opening in a concrete wearing surface. The original design is usually filled with hot poured rubber or pre-molded joint filler and the design materials may or may not be present. This joint is typical for panel joints at a truss floorbeam, interior joints on older bridges, and at the concrete roadway/approach slab joint. At the back-of-pavement seat, if a compression seal has been removed and replaced with Hot Poured Rubber (crack sealant), then quantities for the 402 element apply and the quantities for the compression seal must be reduced. The quantity should equal the length measured along the expansion joint.

This joint must not to be confused with: WSDOT Element 403 - Concrete Bulb-T joint, WSDOT Elements 405 or 406 Compression Seals with the seal missing, or WSDOT Element 417 - Rapid Cure Silicone (RCS) joint.

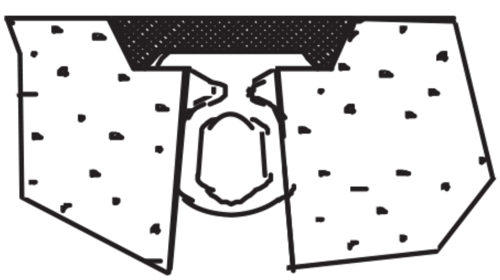
1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with “D” spalls or patches are present in the header or in the deck within one foot of either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

   A repair to reseal the joints is required for bridges at each steel floorbeam where water is corroding the top flange and/or connections.



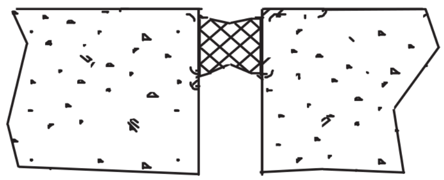
403 Concrete Bulb-T Units – LF

This element defines a joint formed to accept a Bulb-T preformed seal. The seal may be missing or other materials present to provide a seal. The quantity should equal the length measured along the expansion joint.



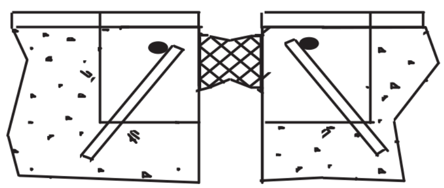
404 Compression Seal/Concrete Header Units – LF

This element defines a joint with concrete headers formed during the original construction of the bridge. The joint is filled with a pre-formed compression type seal. The quantity should equal the length measured along the expansion joint.



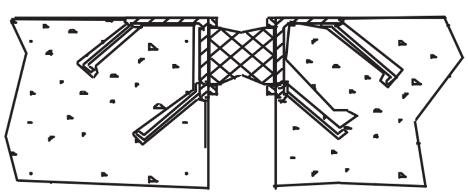
405 Compression Seal/Polymer Header Units – LF

This element defines those joints that have been rehabilitated with a polymer header and filled with a pre-formed compression type seal. The quantity should equal the length measured along the expansion joint.



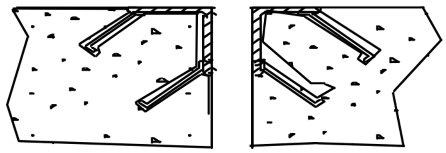
406 Compression Seal/Steel Header Units – LF

This element defines a joint with steel angle plate headers that have a pre-formed compression type seal. The quantity should equal the length measured along the expansion joint.



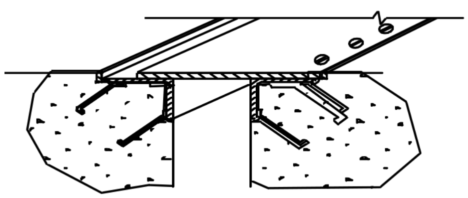
407 Steel Angle Header Units – LF

This element defines an open joint with steel angle plate headers. The quantity should equal the length measured along the expansion joint.



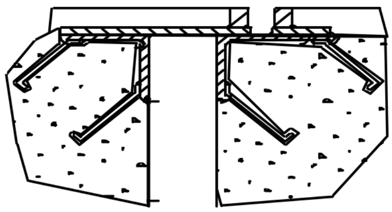
408 Steel Sliding Plate Units – LF

This element defines a joint with steel sliding plates. The quantity should equal the length measured along the expansion joint.



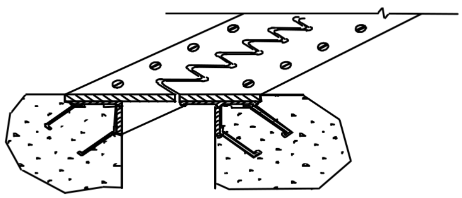
409 Steel Sliding Plate w/Raised Bars Units – LF

This element defines a joint with steel sliding plates and steel raised bars welded to the plates to accommodate an overlay. The quantity should equal the length measured along the expansion joint.



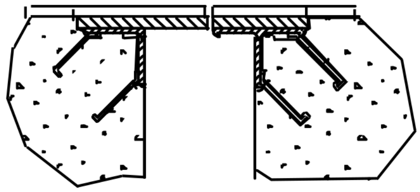
410 Steel Fingers Units – LF

This element defines a joint with open steel fingers. The quantity should equal the length measured along the expansion joint.



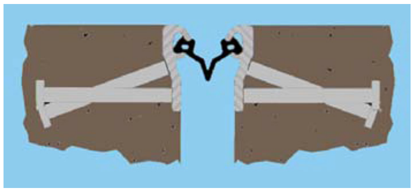
411 Steel Fingers w/Raised Bars Units – LF

This element defines a joint with bars or plates welded to the steel finger plates to accommodate an overlay. The quantity should equal the length measured along the expansion joint.



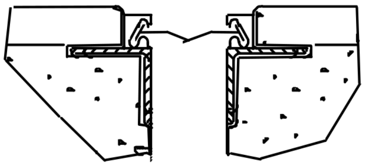
412 Strip Seal – Anchored Units – LF

This element defines an expansion joint that uses a neoprene type waterproof gland with steel extrusion or other system to anchor the gland. The steel extrusion is anchored into the concrete deck or header. The quantity should equal the length measured along the expansion joint.



413 Strip Seal – Welded Units – LF

This element defines an expansion joint that uses a neoprene type waterproof gland with steel extrusion or other system to anchor the gland. The steel extrusion is welded to a pre existing steel expansion joint. The quantity should equal the length measured along the expansion joint.



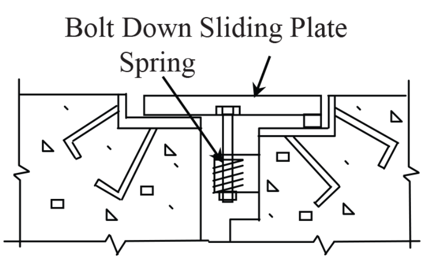
414 Bolt Down – Sliding Plate w/springs Units – LF

This element defines a bolted sliding plate expansion joint that uses steel springs.
The quantity should equal the length measured along the expansion joint.

Condition States for WSDOT Elements 403,404, 405, 406, 407, 408, 409, 410, 411, 412, 413, and 414

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with "D" spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

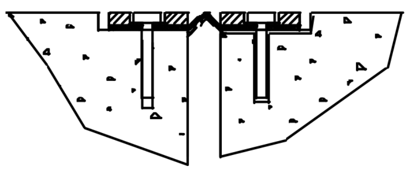
   Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.



415 Bolt Down Panel – Molded Rubber Units – LF

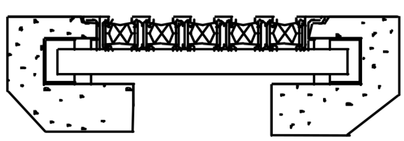
This element defines an expansion joint that uses a waterproof gland that is held in place by molded rubber panels that are attached with bolts. The quantity should equal the length measured along the expansion joint.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound. Molded Rubber panels are secure and have no defects.
2. Skewed joint length at each location with "D" spalls or patches present in the header or in the deck within one foot either side of the joint. Some of the bolts may be broken but they represent less than 10 percent of the total for that panel.
3. Skewed joint length at each location where more than 10 percent of the bolts in a panel are missing, loose, or broken. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.



416 Assembly Joint Seal (Modular) Units – LF

This element defines a large movement joint that has an assembly mechanism with multiple neoprene type waterproof glands. The quantity should equal the length measured along the expansion joint.



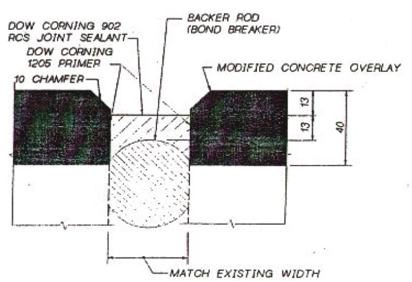
417 Silicone Rubber Joint Filler Units – LF

This element defines an expansion joint that has been repaired with a single or two component rubber joint filler. The quantity should equal the length measured along the expansion joint.

Condition States for WSDOT Elements 416 and 417

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with “D” spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

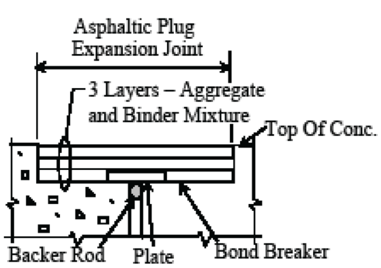
   Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.

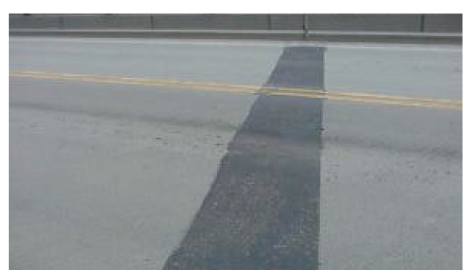


418 Asphalt Plug Units – LF

This element defines an expansion joint that has been replaced with an asphalt plug system. The quantity should equal the length measured along the expansion joint.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with rutting in the joint is minor. “D” spalls or patches are present in the joint, or in deck adjacent to joint.
3. Skewed joint length at each location where the asphalt material in the joint has significant rutting, bulging or is missing. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.



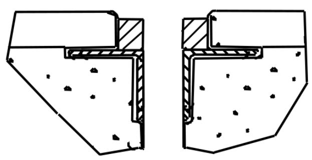


419 Steel Angle w/Raised Bars — Units – LF

This element defines a joint with steel angles and steel raised bars welded to the angles to accommodate an overlay. The quantity should equal the length measured along the expansion joint.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with “D” spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

   Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.



420 Joint Paved Over Flag — Units – LF

This element identifies when a steel joint system that has been paved over with asphalt. This is a high risk to damaging the steel joint or bridge deck by the paving operations. When this flag is used, a cost for joint work will be included in the next paving contract to correct the problem. Since the joint cannot be inspected, the joint element condition states should remain unchanged (and so noted). Some steel joints may have more than 2.5” of asphalt may not require rehabilitation. The Total quantity will be the sum total length of all joint systems on the bridge.

1. Skewed joint length at each location that is paved over, but rehabilitation is not required.
2. Skewed joint length at each location that requires rehabilitation. A photo is helpful to determine the type of rehabilitation.

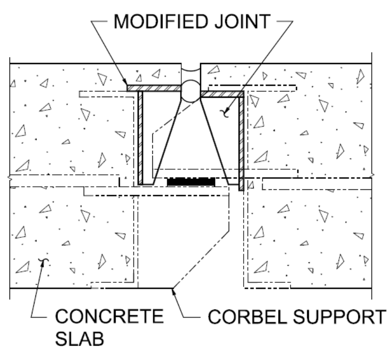
421 Concrete Slab In-Span Joint Units – LF

This element is defined as a modified joint at an In-Span bearing in a slab superstructure. These joints are distinct because the joint anchorages are located in concrete structurally significant to supporting slab. This joint element applies at these locations regardless of the current joint type. As of 2016, all current modified joints are RCS joints. The quantity should equal the length measured along the expansion joint.

WSDOT bridges known to have this modified s are: 5/539E&W, 5/536E&W, 5/535E, 5/537E-S, 5/537N &S, 5/537N-W, 5/538E, 5/543E&W, 5/543NCD, 5/543SCD, 5/545NCD, 5/545SCD. As with all WSDOT contracts, work that affects bridge elements will have a record in the Contract History for reference by the inspector.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with “D” spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

   Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.

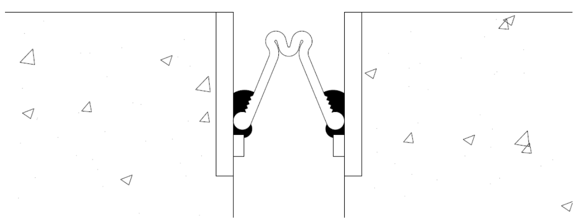


422	Flexible Joint Seal	Units – LF

This element defines a joint with a flat extruded gland that is flexible. The gland is folded, held in place with adhesive, and may be supported by steel or concrete materials. This element supersedes other joint elements where maintenance has replaced the existing gland with a flexible joint seal. The quantity should equal the length measured along the expansion joint.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with "D" spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

   Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.



4-14 Movable Bridges

501	Movable Bridge Steel Tower	Units – LF

This element defines the structural steel columns and members used to support a counter weight of a vertical lift span. The total quantity is the total of the supporting column lengths.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Tower column length with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Tower column length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Tower column length affected by damage in locations or quantity and has reduced the structural capacity of the column or the tower. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

4-15 Other Bridge Elements

705	Bridge Luminaire Pole and Base	Units – EA

This element is defined by a light pole and anchor system attached to a bridge. It does not include the mast arm or other types of lights that may be attached to the bridge. The condition states describe the structural condition of the pole, anchor bolts, and support. WSDOT Region maintenance may need to be contacted prior to inspection in order to remove bolt covers or otherwise provide access for inspection. The total element quantity should equal the number of luminaire poles attached to the bridge.

1. There are no significant structural defects in the pole or support, and the grout pad is solid. Poles or supports that have been replaced are coded in this condition state.
2. Number of poles where structural inspection requires special equipment to access.
3. Number of poles with structural defects. The defects do not significantly affect the structural capacity.
4. Number of poles affected by damage in locations or quantity and has reduced structural capacity. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Visual inspection indicates a base plate that is not supported by leveling nuts.

707 Fender System/Pier Protection Units – EA

Piers in the water can be vulnerable to rot, corrosion, and collision damage from ships or ice flows. This element is limited to external pier collision systems such as dolphins and fenders designed to resist vessels in the water. Dolphins are placed in front of a pier to re-direct an impact such as a large mass structure or pile clusters tied together. Fenders are protective fences or bumpers that surround a pier to absorb impacts from marine traffic. This element is coded separately from the pier elements and does not include extended concrete footings or coffer dams that are designed and constructed to primarily support vertical pier loads.

This element defines a protection system made of wood, steel, or concrete that is designed to protect the pier from vessel damage. The total element quantity should equal the number of piers with protection. In the case of a log boom, count the one pier connected to the boom.

1. There are no significant structural defects in the pier protection system. A protection system that has been replaced is coded in this condition state.
2. Number of pier protection systems that have been repaired.
3. Number of pier protection systems with structural defects. The defects do not significantly affect the structural capacity or function of the system.
4. Number of pier protection systems affected by damage in locations or quantity, and has reduced structural capacity. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

709 Ceramic Tile Units – SF

This is an element to identify ceramic tile. The total quantity is the area of tile visible for inspection.

1. Tile is bonded with no cracks, chips, or blemishes. Tile may be dirty but reflectivity is enhanced during regular washing operations.
2. Tile area that has been repaired.
3. Tile area that is bonded, but cracked and may have efflorescence or small amounts of section loss. Tile may be blemished from impact or other causes resulting in major loss of reflectivity.

Tile area with delaminations based on soundings, is completely missing, or has major section loss warranting replacement.

710 Bridge Mounted Sign Structures Units – EA

This element defines bridge mounted sign structures anchored to the bridge. This includes signs mounted to the outside face of the bridge or over the deck using a beam, truss, or cantilevered support. The condition states address any physical damage defects with the sign or its anchorage and the inventory status of the sign. The inventory status may be determined by the presence of a "Bridge Preservation Sign Structure Identification Tag". The quantity should equal the number of signs mounted to the bridge.

1. The sign has been inventoried and has the appropriate identification tag. The sign, support, and anchorage are in good condition with no significant structural defects.
2. The sign has not been inventoried. The sign, support, and anchorage are in good condition with no apparent defects.
3. The sign may or may not have been inventoried and has defects to the structure or anchorage but is safe and structural capacity has not been significantly reduced. This may include loose, missing or damaged bolts, or hardware within the sign structure where redundant framework or hardware prevents the identified defects from creating an immediate hazard. Anchorage defects may include corrosion or cracks; grout may be loose or missing. A repair should be written and the sign bridge engineer notified.
4. The sign may or may not have been inventoried. Defects to the structure or anchorage threaten or have reduced the structural capacity. This may include loose, missing or damaged bolts, or hardware in multiple locations, and cracks within structural sections. Anchorage defects may include loose, missing or broken hardware, broken or delaminating anchor locations, or loss of embedment due to creep or pull out. An emergent repair should be specified with written notification to region maintenance and the sign bridge engineer.

4-16 WSDOT Bridge Deck Overlay Elements

WSDOT categorizes overlays in to two different types. The first type consists of Asphalt Concrete Pavement (ACP) and Thin Overlays, are a deck protection systems intended to prolong the life of the deck by removing the traffic wear from the surface of the concrete deck. The second type is a Concrete Overlay which is intended to rehabilitate the deck and provide a new concrete wearing surface.

ACP Overlays are represented by the WSDOT element 800 can generally be identified in the field where as WSDOT element 801 represents asphalt with a membrane that is not visible. Thin overlays may be identified in the field if the system has failed and chunks are missing. Deterioration of the ACP and thin overlays is not generally associated with the deterioration of the deck. The ACP may be replaced several times without exposing the concrete deck and the condition states for the deck and overlay elements are independent and DIFFERENT. Paving contracts attempt to repair all concrete spalls and delaminations on WSDOT bridges before placing the overlay. If the area of patching/spalls/delams is known, then the quantity should be noted and recorded in the WSDOT concrete deck element as CS2, CS3 or CS4 respectively; while the Overlay quantities of CS2 and CS3 are based on the visible inspection of the surface. In a similar fashion, if a new Bituminous Surface Treatment (BST) has been applied to an asphalt surface, then the overlay element CS2 and CS3 are equal to zero.

800	Asphalt Concrete (AC) Overlay	Units – SF

This element defines an Asphalt Concrete (AC) bridge deck overlay, with or without a Bituminous Surface Treatment (BST). The quantity should equal the overlay's width times the length.

801	Asphalt Concrete (AC) Overlay With Waterproofing Membrane	Units – SF

This element defines an asphaltic concrete with waterproofing membrane bridge deck overlay. The quantity should equal the overlay's width times the length.

802	Thin Polymer Overlay	Units – SF

This defines a thin polymer bridge deck overlay that is less than or equal to 0.5 inches in thickness (i.e., epoxy, methyl-methacrylate). The quantity should equal the overlay's width times the length.

Condition States for WSDOT Elements 800, 801, and 802

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have cracking.
2. Total area of overlay patches.
3. Total area of overlay spalls or potholes. Thin Polymer Overlays (802) may have visible delaminations and should be considered as spalls and coded in CS3.

Concrete Overlay elements are difficult to discern in the field and are identified in special provisions or Plans. When constructing modified concrete overlays, the material removed by the deck preparation (spalls and delams) is replaced with the overlay material. WSDOT considers this construction deck rehabilitation; or in other words, the concrete overlay and deck are monolithic. Therefore, CS2 and CS3 for the deck and concrete overlay will be the SAME. All defects noted in the concrete overlay (SF) apply to the deck. It is not uncommon to have the overlay break up when there is a problem in the deck below it.

803	Modified Concrete Overlay	Units – SF

This defines a rigid modified concrete bridge deck overlay that is normally 1.5 inches or greater in thickness (i.e., Latex (LMC), Microsilica (MMC), Fly Ash (FMC)). The quantity should equal the overlay's width times the length.

804 Polyester Concrete Overlay Units – SF

This defines a rigid polyester concrete bridge deck overlay that is normally 0.75 inches in thickness. The quantity should equal the overlay's width times the length.

Condition States for WSDOT Elements 803 and 804

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have hairline cracks or rock pockets.
2. Concrete overlay area with repairs or patches. Do not include the rare cases of rutting that has been filled with patching material.
3. Concrete overlay area with spalling.
4. Record the delaminated area (CS4) from WSDOT element 376 in the overlay CS4. If new delaminations are found, do not add delaminations found in the field unless approved by Bridge Management. Chain Drag testing by the Bridge Inspector must chain the entire deck, record the results in a Chain Drag Report available on the Bridge Website under Bridge Overlays, and send the file to Bridge Management.

805 AC Over a Polymer Overlay Units – SF

This defines an asphaltic concrete applied over a thin polymer bridge deck overlay (i.e., epoxy, methyl-methacyrlate). The quantity should equal the overlay's width times the length.

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have cracking.
2. ACP overlay area with patches.
3. ACP overlay area with spalls or potholes.

806 BST on Concrete (Chip Seal) Units – SF

This defines a Bituminous Surface Treatment (BST), or commonly known as a chip seal, mistakenly applied directly on a concrete deck and is to be removed. This severely limits the inspection of the deck. Code the area of BST covering the concrete deck in CS1.

Note: Element 800 or 801 is used when a chip seal is intentionally applied to a structure. WSDOT discontinued use of this element in the year 2012.

807 Asphalt Concrete (AC) Overlay W/High Performance Membrane Units – SF

This element is defined as asphaltic concrete overlay with a higher quality waterproof membrane on a bridge deck. These membranes are spray-on polymers that cover rough surfaces or bridge decks that are considered significant. The condition states are based on the overlay, not the membrane. The quantity should equal the overlay width times the length.

As of 2016, there are three WSDOT bridges with this element: 16/110W, 5/504W, and 5/814.

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have cracking.
2. Total area of overlay patches.
3. Total area of overlay spalls or potholes.

4-17 Protective Coatings

The steel paint area is equal to the surface area of the steel members in the bridge. An estimate of the steel paint area may be made if bridge plans are not available but the steel tonnage is known. The following table provides an approximate conversion factor:

Bridge Type	Square Feet Per Ton
Rolled or Plate Girder	110
Truss	160

901 Red Lead Alkyd Paint System Units – SF

This paint protection system is a 3-coat alkyd system incorporating lead based paint. Use this paint element as a default if the paint was installed prior to 1991.

902 Inorganic Zinc/Vinyl Paint System Units – SF

This paint protection system consists of an inorganic zinc silicate shop applied primer system and a vinyl is paint applied after erection, cleaning, and spot priming.

903 Inorganic Zinc/Urethane Paint System Units – SF

This paint protection system consists of a inorganic zinc silicate shop applied primer system and an epoxy, aliphatic urethane paint system applied after erection, cleaning, and spot priming. **This paint system is used on new WSDOT steel bridges.**

904 Organic Zinc/Urethane Paint System Units – SF

This paint protection system is a 3-coat system incorporating an organic zinc primer, an epoxy second coat and a moisture cured urethane topcoat.

905 Coal Tar Epoxy Paint System Units – SF

This paint protection system incorporates a coal tar epoxy based product.

906 Metalizing Units – SF

This protection system consists of a sprayed coating of zinc or zinc/aluminum.

907 Galvanizing Units – SF

This protection system consists of zinc applied to steel in a variety of spray-on methods.

908 Epoxy Paint for Weathering Steel Units – SF

This protection system consists of a clear epoxy coating applied to weathering steel to prevent excessive corrosion.

909 Zinc Primer Units – SF

This paint protection system consists of a zinc silicate shop applied primer system.

Condition States for WSDOT Elements 901 thru 909

1. The protection system is sound and functioning as intended to protect the metal surface.

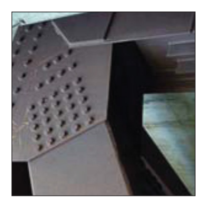
2. Protection system area that has been painted by maintenance.
3. Protection system area with chalking, peeling, curling or showing other early evidence of paint system distress, but there is no exposure of metal.

4. Protection system area that is no longer effective. The metal substrate is exposed.

910 Weathering Steel Patina Units – SF

This protection system consists of a chemical compound formed on the surface of weathering steel elements and is called the patina. When exposed to the atmosphere, weathering steel develops a patina, which seals and protects the steel from further corrosion. This oxide film is actually an intended layer of surface rust, which protects the member from further corrosion and loss of material thickness. The patina acts like a paint system to protect the steel. The color is an indicator of the condition of the patina may vary from orange to dark brown or purple-brown.

1. Weathering steel area that is chocolate brown or purple brown in color (boldly exposed) and in good condition. The patina is tightly adhered, capable of withstanding hammering or vigorous wire brushing. The patina system is sound and functioning to protect the metal surface.



2. Weather steel area that has been painted by maintenance.
3. Weathering steel color is yellow orange to light brown. Some areas may not have rust. Patina has a dusty to granular texture.

4. Weathering steel area that is black in color indicating non-protective patina. Area that remains damp for long periods of time due to rain, condensation, leaky joints, traffic spray or other source of moisture. Area where debris has accumulated on a horizontal surface and the steel is continuously wet. Area with a texture of large granules (greater than ⅛″ diameter); flaking (greater than ¼″ diameter) or laminar rusting in thin sheets.

5-1 General

The National Bridge Inspection Standards (NBIS) requires a load rating be calculated for each reportable bridge* as well as a scour evaluation for any reportable structure over water. Temporary structures that will be in service for more than 90 days shall be load rated as well as assessed for scour.

The load rating calculations and scour evaluations are a permanent part of the bridge file and are to be updated when the condition of the bridge changes. All load rating calculations and new and updated Scour analysis shall be stamped, signed, and dated by a registered professional engineer.

**Bridge is intended to mean all reportable structures which includes bridges, culverts and tunnels.*

5-2 Bridge Load Rating

Load rating of bridges shall be completed per *Bridge Design Manual* (BDM) Chapter 13 and the AASHTO Manual for Bridge Evaluation (MBE). See BDM Section 13.4 for summary sheets and information included in the Load Rating Report. See the appendix in the MBE for examples of load rating different types of structures. Newly discovered or transfer of ownership of bridges shall have load ratings completed and data entered into the inventory within 90 days.

5-2.1 *General Load Rating and Re-Rating Guidelines*

- The Load rating of new bridges shall be completed within 90 days of opening the structure to the traveling public in the anticipated final configuration.
- The ratings of existing bridges shall be re-examined when the “Revise Rating Flag” is turned on. The condition of identified bridge elements shall be reviewed and the load ratings shall be updated if needed. In cases where the capacity of a member is reduced significantly, such as impact damage to a girder with loss of reinforcing or damage to steel members, ratings shall be updated within 30 days. In other cases such as increase in dead load, a preliminary assessment can be made based on the increase in dead load, condition of the structure and existing ratings. If in the engineer’s judgment, the ratings will not be affected significantly, and will not require a need to post or lower the load restriction on the bridge, ratings should be updated within 12 months, however, the decision and findings shall still be documented in the Load Rating File.

  Load ratings of structures shall be reviewed and updated if necessary every 12 years. Factors to be reviewed to assess the need for updating the rating should be changes in the design code or changes in the load rating criteria as well as the criteria listed in Section B, below. For State bridges, a field in the load rating database with the initials of the reviewer and the date of the review shall be filled out.

  For State owned bridges, the Risk Reduction Engineer shall provide a list of outstanding load ratings to the Bridge Preservation Engineer on a monthly basis. The list can be generated thru a query in the Load Rating database.

5-2.2 *Bridge Load Rating Revision Criteria*

WSBIS Item 2688, Revise Rating should be coded as "Y" when one or more of the following items apply:

1. The Superstructure or Cross-beams/ Floor-beams Elements' State condition changes from either Condition State 1, 2 or 3 to Condition State 4, or Superstructure or Substructure NBI code changed to 4 or less.
2. If the approach condition to the structure causes severe impact to the bridge, call for a high priority repair to fix the approaches so the transition onto the structure is smooth.
3. If the deck has potholes on the surface or at the joints, call for a high priority repair to patch the potholes in the deck at the joints.
4. The thickness of the overlay has increased.
5. The railing is replaced with a heavier traffic barrier.
6. New utilities such as water main or sewer line have been installed on the structure.
7. The number of striped lanes has increased on 2 line superstructure members such as trusses or 2-line girder bridge, and box girder bridges.
8. Damaged or deficient structural elements have been repaired/ replaced, such as replacement of timber caps or girders or replacement or repair of damaged girders due to high load hits or other deterioration.

When a deficiency is observed in the field such as rot pockets in timber or section loss in a steel member, the inspector should provide the following items to assist in providing accurate rating factors:

1. The description "shell thickness" shall state whether the thickness is all around the member or on one side and whether it is full depth and location.
2. Section loss in steel members shall include, if possible, the remaining section thickness, location of the section loss and required dimensions.

Provide a sketch of the deficient member and show deterioration as stated above and provide the dimensions of the deteriorated area. It is of great importance to provide as accurate information as possible instead of estimates. Posting or restricting a bridge is greatly dependent on this information.

The load rating engineer shall write a comment under "Note 11" addressing the "Revise Rating" flag. The comments should state whether the ratings were updated based on the Inspector's findings or that no need for updating the rating with the reasoning.

5-2.3 *Bridges With Unknown Structural Components*

For concrete and masonry bridges with no design plans, and when the necessary reinforcing details are unknown and cannot be measured, load capacity ratings may be determined based on field inspection by a qualified bridge inspector followed by evaluation by a qualified engineer. Such a bridge does not need to be posted for load restrictions if it has been carrying normal traffic for an appreciable period of time and shows no sign of distress; Reference the AASHTO *Manual for Bridge Evaluation* (MBE) second edition, Sections 6.1.4 and 6A.8.1. General rating guidelines for these structures are:

- Inventory rating shall be equal to the design truck at the time the bridge was constructed. Operating rating shall be equal to the inventory rating multiplied by 1.667.
- Legal trucks rating factors shall be equal to 1 when the Superstructure, Substructure, or culvert NBI code is equal or greater than 5. Restriction of permit loads shall be assessed.
- Posting or restricting of a bridge shall be assessed when NBI code of the superstructure, substructure or culvert is 4 or less or when there are signs of structural distress.

The Load Rating Methods WB1551 and WB1554 shall be coded as “ 0”, Administrative.

Full documentation for an administrative rating shall be placed in the bridge load rating file.

The table below shows typical design loads and the era they were utilized. The information in the table is based on State bridge inventory and it is dependent on the class of highway.

	Design Load in Tons	Design Era
H-10	10	Early 1900- mid 20’s
H-15	15	Mid 1910’s-Mid 1960’s
H-20	20	Mid 1910’s-1920’s
HS-15	27	Mid 1940’s-Late 60’s
HS-20	36	Mid-1940’s- Early 2000’s

*Administrative ratings imply ratings based on Field evaluation and Documented Engineering Judgment.

5-2.4 *Data Management*

The WSBIS database shall be updated within 30 days from the completion and approval of a load rating of a structure.

5-2.5 *Posting Requirements*

Posting of a structure shall occur when the Operating rating factor for any of the legal loads is less than 1 based on the Load Factor or Allowable Stress Methods or the rating factor for any of the legal loads is less than 1 based on the Load and Resistance Factor Method. Legal loads in the State consist of the three AASHTO legal trucks, Type 3 (Single Unit), Type 3S2 (Truck-Semi Trailer) and Type 3-3 (Truck Trailer), the SUV’s (SU4, SU5, SU6 and SU7). Emergency Vehicles EV2 and EV3 are also considered legal loads on the Interstate and within one road mile from the interstate per FHWA Memo dated November 3, 2016.

Agencies generally post a bridge between the Inventory Rating and the Operating Rating using the Load Factor Method and Allowable Stress Methods. The minimum permissible posting value is three tons at inventory or operating levels. Bridges not capable of carrying a minimum gross live load of three tons shall be closed. Follow the MBE for calculating the posting limits.

In general, posting of a structure, when warranted, shall occur as soon as possible but not to exceed 90 days from the time posting requirements have been verified and within 60 days from the date of the posting letter is sent to the region by the Statewide Program Manager. In instances where the load carrying capacity of a bridge is significantly reduced, such as by impact to the structure, posting or closing of the bridge shall occur as soon as it is determined it is not safe to carry legal vehicular loads.

When possible, additional tests such as concrete strength or steel yield strength shall be performed to validate the assumption in the load rating analysis, hence mitigate the need for posting or restriction of the bridge. Strengthening or repair of an element should also be considered to eliminate the need for posting or restriction.

Load Posting Signs for structures where needed, shall follow the Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT *Sign Fabrication Manual* M 55-05. See Exhibit 5-1 through Exhibit 5-3 for additional signage information.

All bridges requiring load posting also require additional advance posting signs in advance of the nearest intersecting roads, ramps or a wide point in the road where a driver can detour or turn around.

Exhibit 5-1 AASHTO Legal Trucks Posting

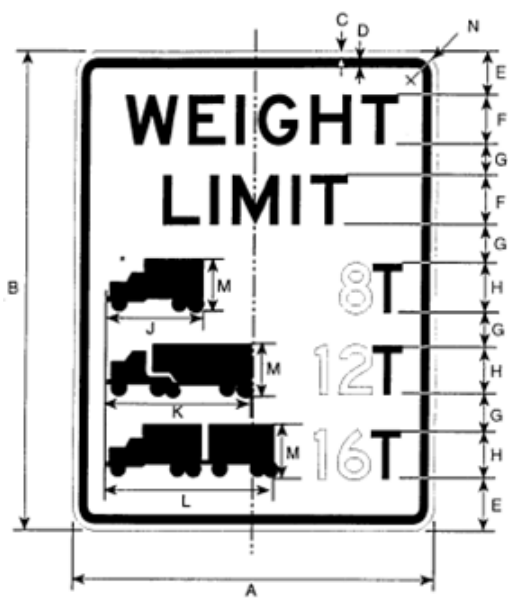


Exhibit 5-2 Emergency Vehicles Posting

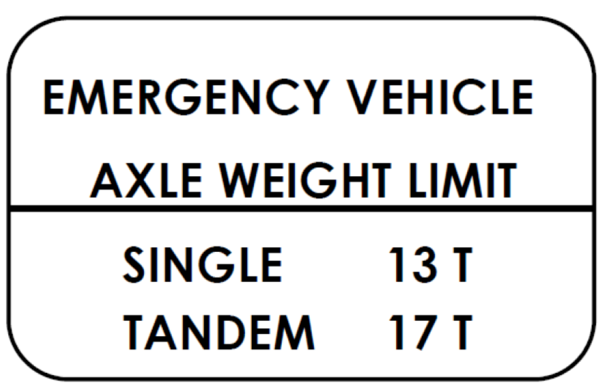
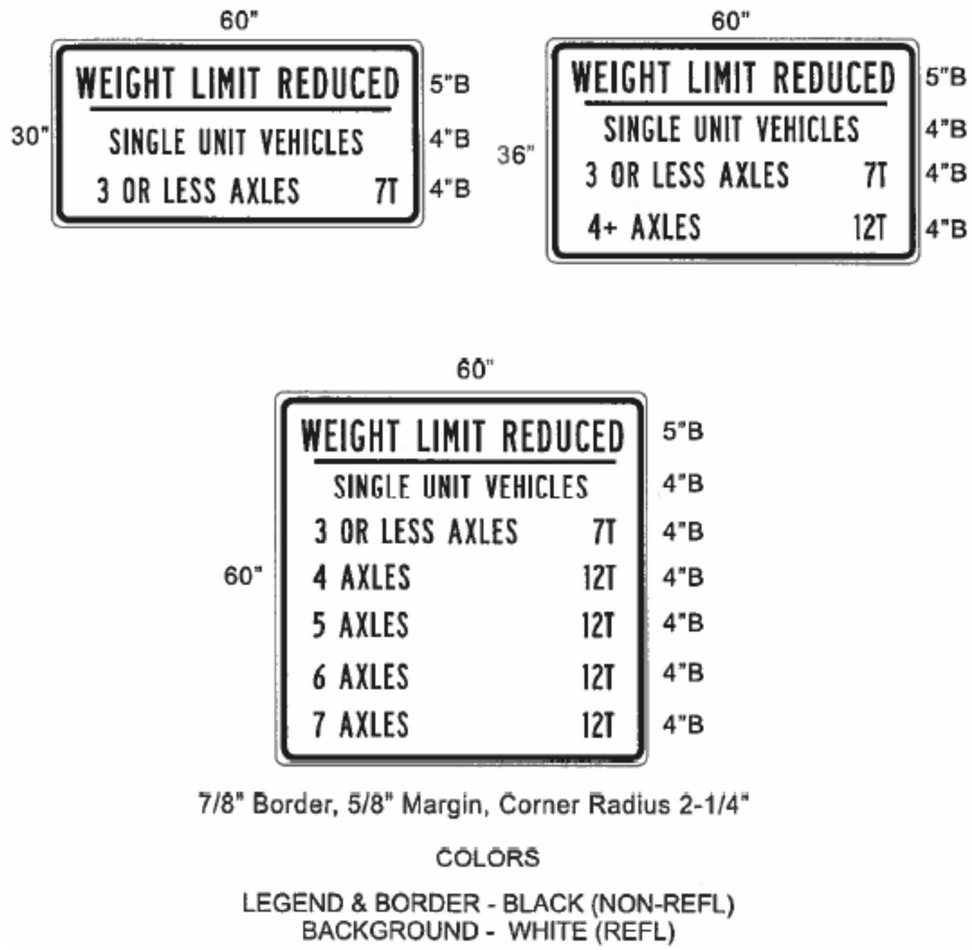


Exhibit 5-3 SUV Posting Signs



5-2.6 *Overload Permits*

Overweight loads traveling over state or local agency roads are required to obtain permits/approval from the state, county, or city maintaining those roadways. No permit loads shall be allowed over posted bridges. The first step in evaluating a permit is to determine if the configuration meets RCW 46.44 for maximum gross weight, load per axle, or axle group (E-Snoopi) is a tool on WSDOT Commercial Vehicle website is used to calculate axle weight per RCW). The second step is to evaluate the structures on the traveled route. This can be accomplished in two methods.

The first method, which is more precise for a specific structure, is to model the permit load moving on the bridge and calculating its load rating factor. A single lane distribution factor can be used in the model, which means that no other trucks are permitted in the adjacent lanes. A rating factor equal to or above 1 means the permit truck can safely travel over the particular structure. Permit loads that have unusual configuration or have more than 8 tires per axles shall be evaluated using this method.

The second method is more general and the engineer shall be extremely cautious when applying it to ensure that the permit load is enveloped by one of the typical rated trucks. The method calculates the maximum weight per axle allowed over a bridge and is dependent on the load rating factors for the particular structure, as follows:

- **Truck Type SA**

  Definition: Construction Equipment Tires (a.k.a., Super Single Axle) (RCW 46.44.091(3))

  Range: Up to 45,000 lbs. per axle.

  Criteria: Using the Load Rating Factor for the Overload 1 Truck (a.k.a., OL1), which has a dual axle weighing 43,000 lbs., the equation is 45,000 lbs. * Rating Factor * *43/45 rounded to the nearest 500 lbs.

- **Collection Truck (RCW 46.44.041) Restriction List Truck Type S/A**

  Definition: Two-axle trucks where the rear drive axle is the item in question on non-interstate routes only.

  Range: Up to 26,000 lbs. on rear axle.

  Criteria: Using the Load Rating Factor for the AASHTO1 Truck (a.k.a., Type 3), which has a dual axle weighing 34,000 lbs., the equation is **26,000 lbs.** * **Rating Factor** * **26/34** rounded to the nearest 500 lbs.

- **Truck Type T/D**

  Definition: Three-axle trucks where the rear tandem drive axles are the item in question on non-interstate routes only.

  Range: Up to 42,000 lbs. on rear dual.

  Criteria: Using the Load Rating Factor for the AASHTO1 Truck (a.k.a., Type 3), which has a dual axle weighing 34,000 lbs., the equation is **42,000 lbs.** * **Rating Factor** * **34/42** rounded to the nearest 500 lbs.

- **Tow Truck (RCW 46.44.015) Restriction List**

  Truck Type: Tow truck with tandem (dual) drive axles.

  Definition: Three axle tow truck with tandem drive axles towing a variety of vehicles.

  Range: Up to 48,000 lbs. on drive dual axles.

  Criteria: Using the Load Rating Factor for the AASHTO2 Truck (a.k.a., Type 3S2), which has dual weighing 31,000 lbs., the equation is **48,000 lbs.** * **Rating Factor** * **31/48** rounded to the nearest 500 lbs.

- **Truck Type CL8**

  Definition: Class 8 Short Hitch five-axle combination (three-axle tractor with a two-axle trailer).

  Range: Up to 21,500 lbs. per axle in dual group and 20,000 to 22,000 for a single axle.

  Criteria: Use the Load Rating Factor for the OL1 Truck based on single lane distribution factor. The equation is **22,000 lbs.* Rating Factor** rounded to the nearest 500 lbs.

- **Truck Type BL**

  Definition: Big load six plus axle combination and three to four axle single units.

  Range: Up to 22,000 lbs. per axle in dual and tridem groups and up to 22,000 lbs. for a single axle.

  Criteria: Use the Load Rating Factor for the OL2 Truck based on a single lane distribution factor. The equation is **22,000 lbs.* Rating Factor*** Modifying Factor (MF)* rounded to the nearest 500 lbs. In some instances engineering judgment may be used in establishing restrictions on a structure.

  *Modifying Factor (MF) is 1.15 if Superstructure or Substructure Condition is 6 or above; 1.10 for Condition of 5 and 1 for 4 or less. The MF is applicable to concrete and steel members. For timber members the MF is 1.

For permits traveling over State routes, WSDOT can request the weighing of a permit load at any time, however, here are typical triggers:

- Analysis shows that the load is close to overstressing one or more bridges.
- Multiple load requests: 10 or more loads in the 200-300 thousand pound range.
- 5 or more loads over 300 thousand pounds.
- Any load over 500,000 pounds.

Commentary: *The SA load is assumed to act as a tandem axle due to the size of the tire. The occurrence of these permitted loads are occasional, hence, the OL1 was used to envelope these vehicles due to the lower Live Load Factor instead of the Type 3S2 which was previously used.*

The MF multiplier applied to the BL is used since the OL2 is an envelope truck and is not permitted in the State. The Engineer shall use the MF with extreme caution and it shall not be applied to every permit load. The previous methodology which applied a Multiplier Factor based on the number of lanes is not valid any longer.

5-3 Scour Evaluation

All bridges spanning waterways are required by the NBIS to have a scour evaluation. A scour evaluation is done to identify the susceptibility to erosion of streambed material and the degree of foundation element stability. The evaluation should include as-built foundation details, current condition of the foundation, a stream bed cross section profile, and stream flow rates. The initial evaluation is a screening tool to evaluate the susceptibility of a structure to scour. If a structure is found to be vulnerable to scour, an analysis shall be performed by a professional engineer with hydraulics expertise to assess the scour issues or identify the proper repairs/countermeasures.

As the bridge foundation condition changes and/or the stream bed characteristics change, the scour criticality may have to be reanalyzed. Scour evaluations shall be reviewed and updated every 12 years, if necessary.

Upon determining that a bridge is scour critical, the agency needs to develop a written plan of action (POA) to monitor, mitigate, or close the bridge. For additional information, see FHWA HEC 18 Evaluating Scour at Bridges.

Scour evaluations of new bridges completed during the design phase that are provided to the Scour Engineer shall be entered into the data inventory within 90 days of the structure being open to traffic. Newly discovered or transfer of ownership of bridges shall have scour evaluation completed and entered into inventory within 12 months.

5-3.1 *Determining Susceptibility to Scour*

Each bridge's susceptibility to scour damage must be determined to be either:

1. Stable for calculated scour conditions (scour code 8, 7, 5, 4).
2. Scour critical (scour code 3, 2, 1, 0).
3. Scour risk cannot be determined due to unknown foundations (scour code U)
4. Tidal water that has not been evaluated for scour, but considered low risk (scour code 5) or appropriate scour code of U if foundations are unknown.

See FHWA coding guide revision at www.fhwa.dot.gov/engineering/hydraulics/policymemo/revguide.cfm.

The results of the scour evaluation are to be recorded by the scour engineer in the Scour Summary Sheet (See Section 5-4) and to be placed in the scour files. Upon completion of all scour evaluations, there should not be any bridges with a code "6." The completed scour evaluations, information required to do the evaluation, and the best mitigation option for the bridge in question are to be incorporated into the permanent bridge scour file.

Scour Code	Soundings Flag Max. Frequency (months)
2	12
3	24
U	24
4	24
5	72
7	72
8	72

The soundings frequency for State bridges can be changed by the Scour Engineer as needed based on field observations. The list of bridges that require soundings for State bridges is created by the Scour Engineer and provided to the Information Group within BPO no later than December 31st of each year to be added to Bridge Works.

5-3.2 *Action Plans for Scour Critical Bridges*

For each bridge that has been determined to be scour critical, a POA shall be developed to identify the appropriate measures necessary to monitor and/or to make the bridge less vulnerable to damage or failure due to scour. The POA is to provide specific direction as to essential actions required at the site for region field staff and inspectors to observe and take the appropriate action without further communication. It should have details of who to contact after a bridge has been closed due to the specified event. Whatever action is to be taken it must be documented in the POA in sufficient detail that is easy to follow and thorough enough that field personnel can make appropriate decisions without higher approval.

Region field staff inspecting the condition of susceptible elements must have authority to close the bridge and know how to conduct an emergency closure. They must have the necessary equipment with them to take this action at the time of the determination without leaving the bridge or calling for assistance.

The two primary components of the POA are instructions regarding the triggering event and frequency of inspections to be made at the bridge, and a schedule for the timely design and construction of scour countermeasures (see Section 5-4 for WSDOT and FHWA POA templates). The POA's for WSDOT are updated by the Scour Engineer as needed when condition changes warrant it, and they are stored on BEISt.

The POA should include:

- Physical site identification (bridge, route, stream, etc.); features that are vulnerable (approach roadway, pier/s, pier orientation/beginning of bridge)
- Hydrologic and Hydraulic Characteristics (water surface elevation needed if appropriate to the event type and characteristics.)
- Party responsible for decision on closure/reopen.
- Responsible party contact information.
- Trigger mechanisms for closure and opening. On-site water surface elevation marked on piers or abutments such that field crews can observe them from river bank.
- Detour routes
- Communication to public (detour signage, law enforcement, press, etc.)
- Records of mitigation in place (quarry spall, weirs, mats, barbs, etc.) with photo and original dimensions for future examination and reference. This information to be made available to inspectors and region field staff to utilize during inspections and flood events.

When monitoring is deemed appropriate there are basic components that should be incorporated as listed above. Depending on the risk or consequence of failure, greater detail may be warranted.

Monitoring – It is important that all scour critical bridges be monitored during and after flood events. The POA should include specific instructions to bridge inspectors or maintenance workers on what to look for, at what locations, and methods of inspection to use. Guidance should also be included as to when a bridge should be closed to traffic. Agencies should also develop and inform appropriate personnel of bridge closure procedures. The intensity of the monitoring effort is related to the risk of the scour hazard, as determined from the scour evaluation. Some of the items to consider when developing the monitoring plan include:

- Amount of existing rotational movement or settlement of substructure units
- Degree of streambed degradation, aggradation, or lateral movement
- Recommended procedures and equipment for taking measurements of streambed elevations (rods, probes, weights, portable sonic equipment, etc.)
- Instructions for inspecting existing countermeasures such as riprap, dikes, barbs, mats, etc.
- Guidance on maximum permissible scour depths, flood flows, water surface elevations, etc. beyond which the bridge should be closed to traffic
- Instructions for checking the operation of fixed scour monitoring devices
- Reporting procedures for conditions that warrant bridge closure. Establish the chain of command with authority to close bridges.
- Forms and procedures for documenting inspection results and instructions regarding follow-up actions when necessary

Temporary Countermeasures – Temporary countermeasures provide a degree of protection for scour critical bridges. They may prevent damage for most flows, but are sacrificial, low-cost treatments that help insure the safety of a bridge during normal flood events. Use of such measures may postpone the need to close a bridge during high flows. Temporary countermeasures, such as riprap, should not be viewed as an alternative to monitoring, but rather as a supplement.

Permanent Countermeasures – Permanent countermeasures are engineered to make a bridge safe from damage due to scour. A variety of methods exist including channel improvements, structural strengthening or underpinning, drop structures, relief bridges or constructing additional spans. These types of fixes would eliminate the bridge from being "scour critical," but are more costly. Agencies prioritize permanent countermeasures to address the most critical needs as funds permit.

5-3.3 *Recording Bridge Scour Information*

The completed bridge scour evaluation shall include the resulting WSBIS 1680 scour code, the information required to do the evaluations, and the written action plan to mitigate scour risk if appropriate. The evaluation is to be incorporated into the permanent bridge scour file for the bridge. Any changes to bridge inventory data should be accomplished within 90 days after the evaluation or field review are complete. The scour monitoring information or schedule should be communicated to all affected parties.

Fields that relate to bridge hydraulics and/or scour are:

- Waterway Adequacy Appraisal- WSBIS 1662 (NBI Item 71)
- Substructure Condition - WSBIS 1676 (NBI Item 60)
- Channel Protection - WSBIS 1677 (NBI Item 61)
- Pier/Abutment Protection – WSBIS 1679 (NBI Item 111)
- Scour – WSBIS 1680 (NBI Item 113)

5-3.4 *Scour Analysis*

The procedure for analyzing stream stability and scour shall be per HEC Publications (see Exhibit 5-4) which could involve the following three levels of analysis:

- **Level 1** – Application of simple geomorphic concepts and other qualitative analyses
- **Level 2** – Application of basic hydrologic, hydraulic and sediment transport engineering concepts.
- **Level 3** – Application of mathematical or physical modeling studies

Data Needs for Level 1 Qualitative and Other Geomorphic Analyses – The data required for preliminary stability analyses include maps, aerial photographs, notes, and photographs from field inspections, historic channel profile data, information on human activities, and changes in stream hydrology and hydraulics over time.

A flowchart of the typical steps in qualitative geomorphic analyses is provided in Exhibit 5-5.

The six steps are generally applicable to most stream stability problems. As shown in the figure, the qualitative evaluation leads to a conclusion regarding the need for more detailed (Level 2) analysis or a decision to complete a screening or evaluation based on the Level 1 analysis. A Level 1 qualitative analysis is a prerequisite for a Level 2 engineering analysis for bridge design or rehabilitation.

Exhibit 5-4 Scour and Stream Stability Analysis

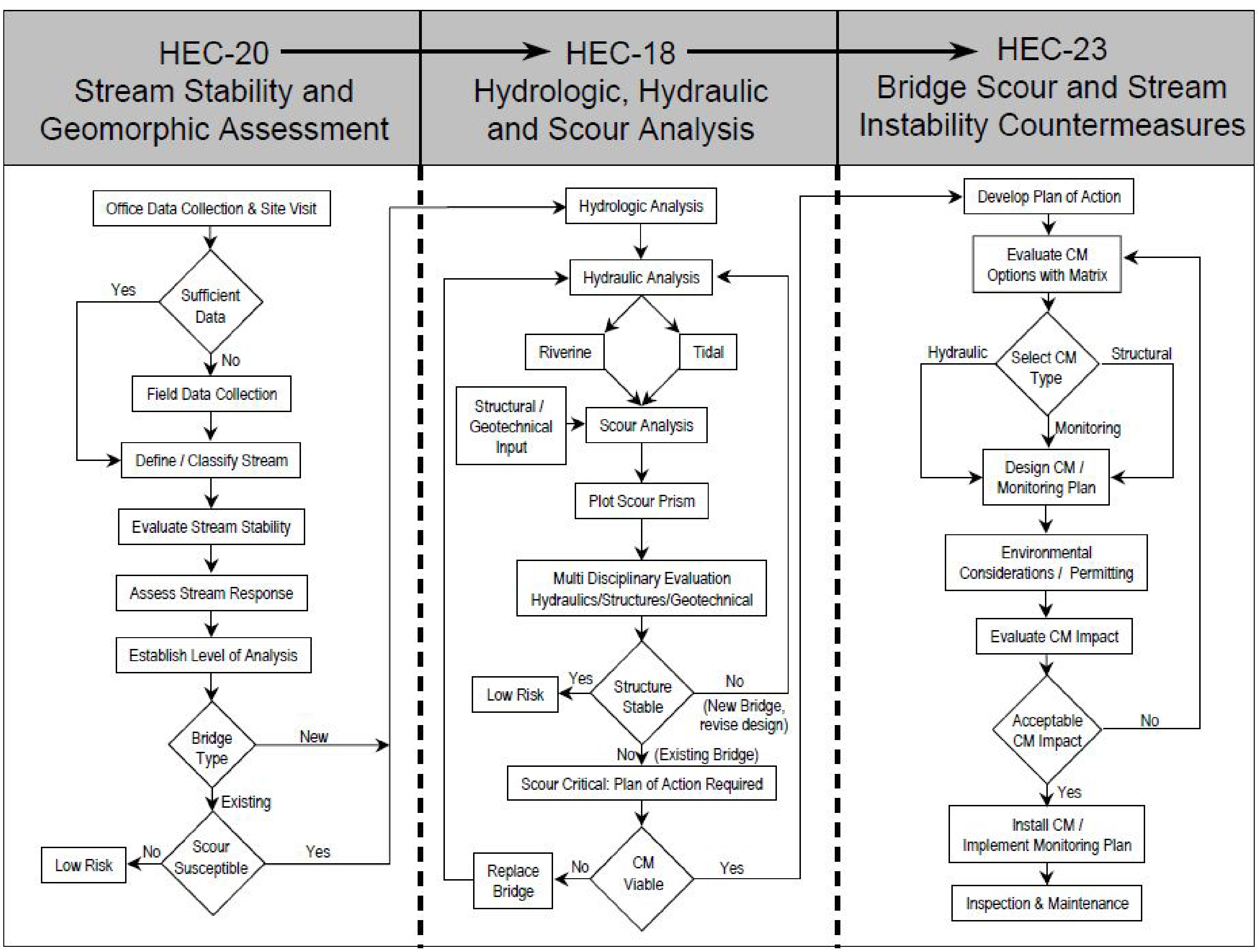
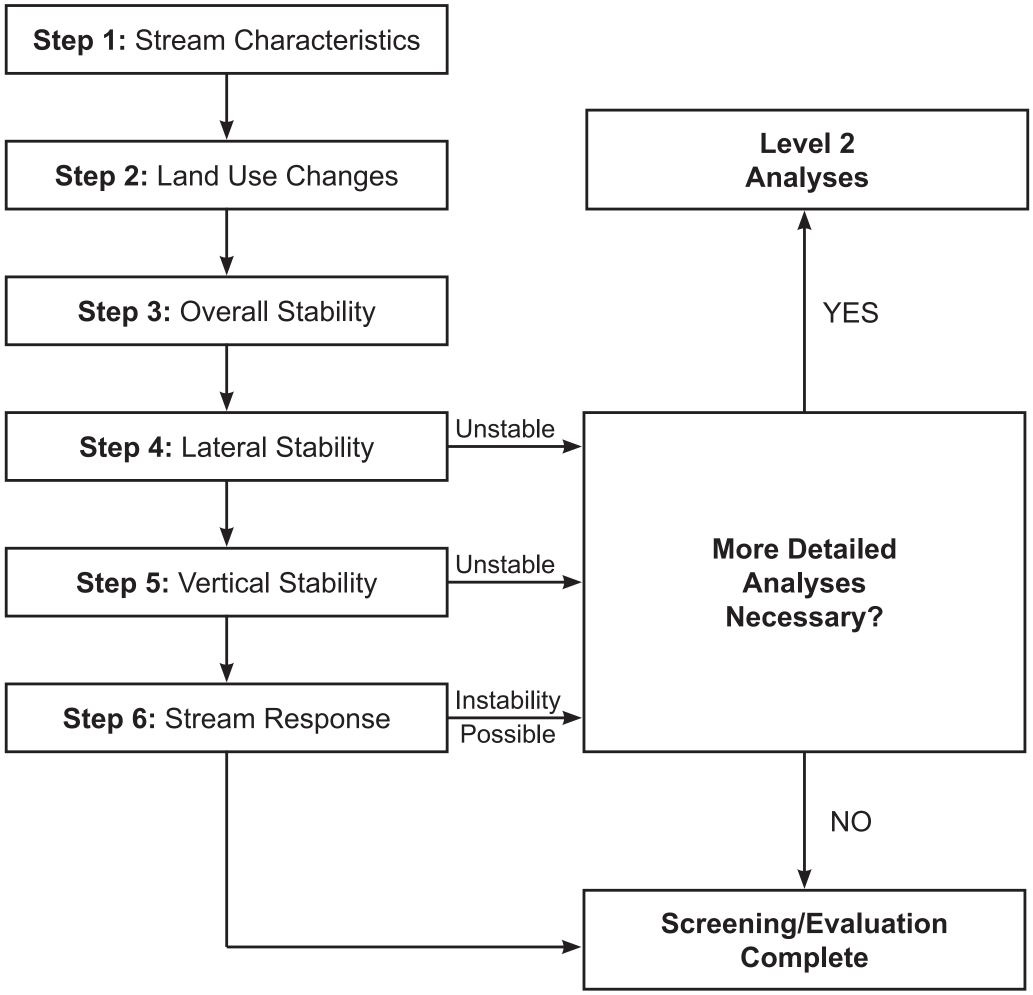


Exhibit 5-5 Level 1 Analysis

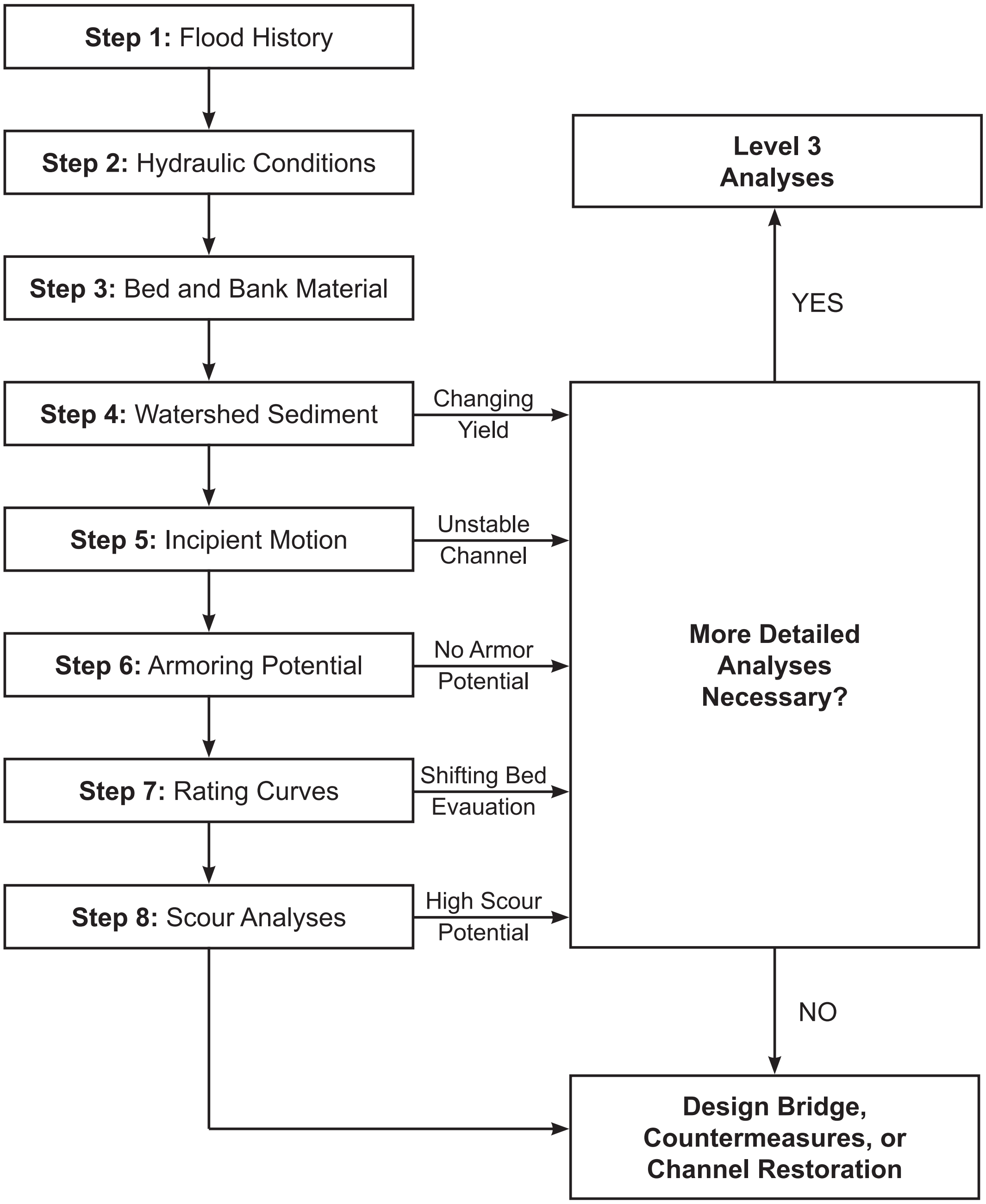


Data Needs for Level 2 Basic Engineering Analyses – Data requirements for basic hydrologic, hydraulic and sediment transport engineering analyses are dependent on the types of analyses that must be completed. Hydrologic data needs include dominant discharge (or bankfull flow), flow duration curves, and flow frequency curves. Hydraulic data needs include cross sections, channel and bank roughness estimates, channel alignment, and other data for computing channel hydraulics, up to and including water surface profile calculations. Analysis of basic sediment transport conditions requires information on land use, soils, geologic conditions, watershed and channel conditions, and available measured sediment transport rates (e.g., from USGS gauging stations).

More detailed quantitative analyses require data on the properties of bed and bank materials and field data on bed-load and suspended-load transport rates. Properties of bed and bank materials that are important to a study of sediment transport include size, shape, fall velocity, cohesion, density, and angle of repose.

Level 3 analyses are performed by a professional engineer with hydraulic expertise (see Exhibit 5-6).

Exhibit 5-6 Level 2 Analysis



5-4 Appendices

Appendix 7-D Bridge Preservation Office Lead Approval Criteria

Please use the following criteria to help you determine which reports can be sent directly to the Bridge Information Group without further review by a supervisor or a second Lead.

A "Bridge Inspection Report" that fits any one of the following nine criteria must be reviewed by a Regional Bridge Inspection Engineer or a second Lead Inspector.

1. If NBI codes for Deck Overall, Superstructure or Substructure are less than "6".
2. Structures with repairs or conditions to be monitored (excluding 'J' type repairs).
3. New bridge structures (Inventory Inspections).
4. Fracture Critical bridges.
5. Local Agency bridges.
6. UBIT Bridge Inspections.
7. Any inspection with a frequency >24 months.
8. Any bridge that is currently having issues with scour.
9. Any time an inspection/report type and/or frequency is either changed, added, or deleted.

Additionally, the Lead may submit for review any report that the Lead feels needs further input from the Regional Bridge Inspection Engineer.

If the "Bridge Inspection Report" does not meet any of these criteria, then the "Bridge Inspection Report" can be routed by the experienced Lead Inspector to the Info Group for processing.

For quality assurance reasons, the "Bridge Inspection Report" can be randomly reviewed at the Regional Bridge Inspection Engineer's option.