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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.

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

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Please contact Jody Bywater at BywaterJ@wsdot.wa.gov or 360-570-2557 with comments, questions, or suggestions for improvement to the manual.

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Approved By	Signature
Jody Bywater	

Washington State
Department of Transportation

Washington State Bridge Inspection Manual

M 36-64.07

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Bridge Preservation Office/Local Programs

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Foreword

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

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Comment Request Form

Date:	________________________________
From:	________________________________ Phone: ________________________________
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	________________________________
To:	Bridge Preservation Engineer Washington State Department of Transportation PO Box 47340 Olympia, WA 98504-7340
Subject:	*Bridge Inspection Manual* Comment
	Recommendation for Improvement:

Contents

Chapter 1 Bridge Inspection Organization Requirements

1.01 General

The National Bridge Inspection Standards (NBIS) are published in the Code of Federal Regulations, 23 CFR 650, Subpart C. The NBIS sets the national standard for the proper safety inspection and evaluation of bridges and it applies to all structures defined as reportable structures located on all public roads.

The National Tunnel Inspection Standards (NTIS) are published in the Code of Federal Regulations, 23 CFR 650, Subpart E. The NTIS sets the national standard for the proper safety inspection and evaluation of all highway tunnels on all public roads, on and off Federal-aid highways, including tribally and federally owned tunnels.

Washington State's bridge* inspection organization is required to meet the NBIS, NTIS, and functions under the authority of the Federal Highway Administration (FHWA) and state law. Washington State's bridge inspection organization, however, is only responsible for state and local agency-owned bridges and tunnels. Federally-owned bridges are inventoried and managed by federal agencies. Privately-owned highway bridges are not included in this requirement, although WSDOT encourages private bridge owners to inspect and maintain their bridges in conformance with the NBIS, NTIS, and this manual. There is an open invitation for private bridge owners to submit bridge records to the Washington State Bridge Inventory System (WSBIS).

A. Definitions

BEISt –Bridge Engineering Information System. The WSDOT internal website that holds electronic bridge files.

Bridge – All reportable structures that include bridges, culverts, and tunnels. See also definition of Reportable Structure below.

BridgeWorks – The software application that is used to record, process and report bridge inspections and which updates data in the inventory databases.

Bridge Condition Inspection Training (BCIT) – A comprehensive ten day training course offered by WSDOT based on the 2012 FHWA "*Bridge Inspectors Reference Manual* (BIRM)". The BCIT is an FHWA accepted equivalent to the course offered by the National Highway Institute (NHI), entitled "Safety Inspection of In-Service Bridges" with a course code of FHWA-NHI-130055.

Bridge File – A file containing historic and current information about a bridge, and meeting the intent of Chapter 2 of the AASHTO *Manual for Bridge Evaluation*.

Bridge Inspection – The act to assess the structural condition and collect pertinent data while on site of in-service bridges.

Bridge Inspection Certification – A process by which a Program manager, Team Leader and Underwater Bridge Inspection Diver is certified in the state of Washington to perform bridge inspections. See Section 1.05.

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

Bridge Inspection Committee (BIC) – A committee of state and local agency representatives that provides overall advisory input to the bridge inspection manual content and organization within the state of Washington. The current list of committee members is located within the Foreword of this manual.

Bridge Inspection Organization – See Section 1.02

Bridge Inspection Program – An organizational unit that functions as part of the Bridge Inspection Organization and that meets the requirements of 23 CFR 650.307, 23 CFR 650.507, and this manual. Agencies involved with the Bridge Inspection Program are led by delegated program managers, who work in coordination with the Statewide Program Manager.

Bridge Inspection Refresher Training (BIRT) – A training course designed to refresh the skills of practicing bridge inspectors. The course is offered by the National Highway Institute (NHI). The course code is FHWA-NHI-130053.

Bridge Preservation Office Bridge Inventory – The inventory of state bridges kept in the BPO database. The Bridge Reporting Database draws data from this database regularly for inclusion into WSBIS.

Bridge Reporting Database (BRD) – The database which stores the Washington State Bridge Inventory System (WSBIS) data, combining data from the Bridge Preservation Office (BPO) and Local Programs (LP) databases.

Critical Finding – The NBIS gives the following definition: "A structural or safety related deficiency that requires immediate follow-up inspection or action." WSDOT defines a critical finding/critical damage as a condition that necessitates closing, posting, or restriction of a bridge or a portion of a bridge due to an identified structural deficiency requiring structural repair(s) before it can be reopened to unrestricted traffic in the original configuration.

Culvert – A curved or rectangular buried conduit for conveyance of water, vehicles, utilities, pedestrians or animals.

Delegated Program Manager (DPM) – See Section 1.04.B

Fracture Critical Member – A steel load path member in tension, or with a tension element, whose failure would probably cause a portion of or the entire bridge to collapse.

Highway LID – A structure built with green space which interconnects neighborhoods otherwise cut off or impacted by freeways, with or without local roads. If carrying local roads, the structure must have a deck area at least twice the area of the roads it carries. Highway "LIDS" shall be inventoried as tunnels under the NTIS.

Local Programs Bridge Inventory – The inventory of local agency bridges kept in the LP database. The Bridge Reporting Database draws data from this database regularly for inclusion into the Washington State Bridge Inventory System (WSBIS).

Inventory Record – Data which has been coded according to this manual for each structure carrying public road traffic and/or for each inventory route which goes under a structure.

Inventory Route – The route for which the applicable inventory data is to be recorded. The inventory route may be on the structure or under the structure. Generally inventories along a route are made from west to east and south to north.

Local Agency – Generally refers to city or county bridge owners but also includes all bridge owners other than state and federal.

National Bridge Inspection Standards (NBIS) – Title 23 Code of Federal Regulations 650 Subpart C defines the NBIS regulations, and establishes requirements for inspection procedures, frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of a state bridge inventory. The NBIS apply to all structures defined as bridges located on all public roads.

National Bridge Inventory (NBI) – The aggregation of structure inventory and appraisal data collected nationally to fulfill the requirements of the National Bridge Inspection Standards. The state of Washington shall prepare and maintain an inventory of all bridges subject to the NBIS.

National Tunnel Inspection Standards (NTIS) – Title 23 Code of Federal Regulations 650 Subpart E defines the NTIS regulations, and establishes requirements for inspection procedures, frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of a state tunnel inventory. The NTIS apply to all structures defined as highway tunnels located on all public roads.

Public Road – Any road under the jurisdiction of and maintained by a public authority and open to public travel.

Reportable Structure – The NBIS gives the following definition: "A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening."

The State – The Washington State Department of Transportation (WSDOT).

Statewide Program Manager (SPM) – See Section 1.04.A

Tunnel – The term "tunnel" means an enclosed roadway for motor vehicle traffic with vehicle access limited to portals, regardless of type of structure or method of construction, that requires, based on the owner's determination, special design considerations that may include lighting, ventilation, fire protection systems, and emergency egress capacity. The term "tunnel" does not include bridges or culverts inspected under the National Bridge Inspection Standards (Title 23 Code of Federal Regulations 650 Subpart C). The state of Washington shall prepare and maintain an inventory of all tunnels subject to the NTIS.

Washington State Bridge Inventory System (WSBIS) – The aggregation of structure inventory, and appraisal data collected and used to fulfill the requirements of the NBIS and additional data used to manage the state and local bridge inventories. This data is stored in the Bridge Reporting Database.

1.02 Description of Bridge Inspection Organization

In Washington State, the bridge inspection organization is structured as a collaborative effort between the Washington State Department of Transportation (WSDOT) Bridge Preservation Office (BPO), WSDOT Local Programs Office (LP), and local agency bridge owners with the Federal Highway Administration (FHWA) as a primary stakeholder. Collectively, all state and local agency owned bridges subject to the NBIS and NTIS are managed under this organization. The inspection organization is led by the State Bridge Preservation Engineer (who serves as the Statewide Program Manager) and is advised by the Bridge Inspection Committee.

The bridge inspection organization has the following responsibilities:

- Establishing an organizational structure within the state that clearly defines the roles and responsibilities of those agencies required to participate.
- Maintaining personnel qualification records and a certification program for program managers, team leaders, load raters and underwater bridge inspection divers.
- Performing regularly scheduled in-service bridge inspections. This includes, but is not limited to, routine (low/high risk), underwater (low/high risk) and fracture critical inspections.
- Performing regularly scheduled in-service tunnel inspections.
- Establishing state specific load rating procedures and maintaining load ratings based on current conditions of all NBI and NTI reportable structures.
- Following MBE criteria for load posting/restricting bridges.
- Establishing and specifying written inspection procedures for:
  - Fracture Critical Bridge Members
  - Underwater Bridge Elements
  - Complex Bridge Features
- Performing scour evaluations for all bridges over water.
- Maintaining scour Plan of Action (POA) documents for all bridges documented to be vulnerable to scour.
- Establishing quality control and quality assurance procedures to maintain a high degree of accuracy and consistency within the inspection program.
- Responding to and reporting of significantly damaged bridges to the FHWA Washington Division Bridge Engineer.
- Maintain a separate inventory of bridges and tunnels for the entire state.
- Maintaining a bridge/tunnel file (electronic and/or physical) for every bridge/tunnel in the inventory.
- Maintaining National Bridge Inventory (NBI) data that follows the Federal Coding Guide criteria or can be translated into that system during the annual submittal of data.
- Maintaining National Tunnel Inventory (NTI) data that follows the Specifications for the National Tunnel Inventory criteria for the annual submittal of data.

- Maintaining Bridge Management System data that follows the National Bridge Element (NBE) condition assessment criteria or can be translated into that system during the annual submittal of data.
- Submitting required Washington bridge inventory data to FHWA for incorporation into the National Bridge Inventory (NBI).
- Submitting required Washington tunnel inventory data to FHWA for incorporation into the National Tunnel Inventory (NTI).

The bridge inspection organization's activities also include the following which although are not explicitly required by the NBIS, NTIS, but are either strongly implied or required by other FHWA policies:

- Responding to FHWA Technical Advisories, FHWA Action Memoranda, and other policy or information requirements provided by the FHWA Washington Division Bridge Engineer.

The bridge inspection organization is also responsible for the following activities which are clearly part of managing bridges but not required by the NBIS.

- Bridge repair management.
- Managing non-NBIS structures.

1.03 Bridge Inspection Programs

The composition and size of each bridge inspection program varies widely, generally depending on the number of bridges/tunnels managed by each agency. Two state offices play key roles in the organization:

- **Bridge Preservation Office (BPO)** – This office is dedicated to running the bridge inspection program for all state owned bridges and tunnels. This includes bridges and tunnels managed by State Parks, General Administration, and other state agencies with bridges/tunnels subject to the NBIS and NTIS. BPO also co-manages bridges on the border with Oregon and Idaho. The BPO is led by the Bridge Preservation Engineer who also functions as the Statewide Program Manager.
- **Local Programs (LP)** – This office provides support and services to local agency bridge inspection programs. In particular, LP provides training, manages the inspector certification program, and many aspects of the local agency bridge and tunnel inventory data. The WSDOT Local Programs Bridge Engineer (LPBE) functions as a delegated program manager for all local agency bridges and tunnels.

Local agencies have a wide variety of bridge/tunnel inspection programs, which generally fall into the following categories:

- Local agencies with a delegated program manager and bridge/tunnel inspection staff working directly for them.
- Local Agencies with a delegated program manager and agency contracts out to other agencies or consultants for completion of bridge/tunnel inspection work.
- Local agencies without a delegated program manager but with bridge/tunnel inspection staff.
- Local agencies without a bridge/tunnel inspection program. These agencies generally have agreements with other agencies or consultants to inspect and manage their bridges/tunnel.

1.04 Bridge Inspection Organization Roles and Responsibilities

The bridge inspection organization, and the various programs within it, are staffed by individuals who have defined roles and responsibilities described as follows.

A. Statewide Program Manager (SPM)

The Statewide Program Manager is the individual in Washington State who leads the bridge inspection organization. This position is held by the Bridge Preservation Engineer, who must ensure that the organization fulfills its NBIS and NTIS responsibilities, see Appendix 1.07-C. To qualify as the SPM, WSDOT requires this individual to have both a current Structural Engineering and Professional Engineering license and qualify as a certified team leader. The SPM must also be recertified on a regular basis by attending a refresher training class according to state policy. The certification process is described in detail in Section 1.05.

B. Delegated Program Manager (DPM)

A delegated program manager assumes duties of the program manager for the selected subset of bridges and tunnels under their direct control, See Appendix 1.07-D. To qualify as a delegated program manager, the individual must meet, at a minimum, the program manager requirements as described in the NBIS and NTIS. Delegated program managers must be recertified on a regular basis by attending a refresher training class according to state policy. The certification process is described in detail in Section 1.05.

Note: Although delegated program managers perform duties for the bridge inspection organization, overall responsibility for NBIS and NTIS compliance still resides with the Statewide Program Manager as defined by the NBIS and NTIS.

C. Team Leader (TL)

A team leader is in charge of an inspection team and responsible for planning, preparing, and performing the field inspection of bridges and/or tunnels. The team leader also makes repair recommendations and is responsible for initiating the critical damage procedures including full bridge or tunnel closure if deemed necessary. To qualify as a team leader, the individual must meet, at a minimum, the team leader requirements as described in the NBIS and NTIS. Team leaders must be recertified on a regular basis by attending a refresher training class according to state policy. The certification process is described in detail in Section 1.05.

D. Assistant Inspector

An assistant inspector (Co-Inspector) may accompany the team leader during field bridge/tunnel inspections. Typical duties include helping to organize bridge/tunnel inspection trips, taking measurements, compiling notes, and taking photographs. When assistant inspectors also fully participate in the inspection process and prepare inspection reports under the direct supervision of a team leader, this work provides qualifying experience towards certification as a team leader.

Note: The NBIS/NTIS does not set specific training or educational requirements for assistant inspectors. However, bridge/tunnel inspector training is recommended and available to all assistant bridge/tunnel inspectors to serve as a good foundation for beginning inspectors as well as being a requirement for advancement to team leader.

E. Load Rating Engineer (LRE)

A load rating engineer manages all aspects of maintaining current and accurate load ratings for bridges/tunnels they are responsible for in their inventory. Responsibilities include reviewing inspection reports for changed conditions that warrant revisions to the load ratings on file, revising load ratings as needed, creating new load ratings for new bridges/tunnels, and ensuring that the findings from load ratings are implemented. In particular, the load rating engineer must track bridges/tunnels that require posting and ensure that the bridge/tunnel inventory has current data from the load ratings.

Note: To qualify as a load rating engineer in the BPO, the individual must have 4 years of bridge design or load rating experience and a current Professional Engineering license.

F. Underwater Bridge Inspection Diver (UBID)

To qualify as an underwater bridge inspection diver, the individual must meet, at a minimum, the underwater bridge inspection diver requirements as described in the NBIS. The certification process is described in detail in Section 1.05.

Note: The BPO has a Dive Safety Manual that regulates the diving activities for the BPO UBID's.

G. FHWA Division Bridge Engineer (DBE)

The Washington Division Office of the FHWA has assigned a Division Bridge Engineer to work collaboratively with the bridge inspection organization. The DBE works directly with the SPM and LPBE on resolving issues of compliance and is an active member of the BIC. The DBE has federal authority to approve the policy and procedures of this manual as noted in the Foreword of this manual.

1.05 Bridge/Tunnel Inspection Certification

Certification for bridge/tunnel inspection work within the state of Washington is a two-fold process that consists of the initial certification and subsequent certification renewals for the SPM, DPM's, TL's, and UBID's. For the purposes of simplifying the explanation of this procedure, the general term program manager (PM) will be used in place of SPM and DPM. The following requirements will pertain to both positions unless otherwise noted.

A. Initial Certification

The minimum qualifications for prospective individuals are described within Sections 309 and 509 of 23 CFR 650, Subpart C and E of the NBIS and NTIS respectively. To ensure that these requirements are met, the following steps outline the process for those individuals seeking initial certification.

- Fill out the WSDOT Bridge/Tunnel Inspector Experience and Training Record form, see Appendix 1.07-A.
- Submit an electronic copy of the completed form along with the following applicable documents to the WSDOT Local Programs Bridge Engineer (LPBE) for review:
  - Higher education degree(s), certification as a Level III or IV Bridge Safety Inspection Inspector, or qualifying bridge/tunnel inspection experience.
  - Registered professional engineering license(s).
  - Certificate of completion of an FHWA approved comprehensive bridge inspection course such as the *WSDOT Bridge Condition Inspection Training (BCIT)* course or the *NHI Safety Inspection of In-Service Bridges* course.
  - Certificate of completion of an FHWA approved comprehensive tunnel inspection training course and score 70% or greater on an end-of-course assessment.
  - Certificates of completion for any special technical courses related to in-service bridge condition inspection.
  - Any additional information documenting the bridge inspection experience of the applicant.
- Approved applicants are issued a WSDOT Inspection Identification Number that is acknowledged through an email response from the LPBE.
- In addition to the minimum qualifications, the SPM, TL's within the BPO, and the LPBE, are all required to be registered professional engineers in Washington State. The SPM must also be licensed in the state of Washington as a structural engineer.

B. Certification Renewal

Certification renewal ensures that the PM's, TL's, and UBID's in any agency maintain a minimum level of training in the latest practices and technology in the area of bridge inspections. The training may consist of inspection related courses, conferences, seminars and other sources of education deemed qualified by the SPM and LPBE. A list of approved courses is located in Appendix 1.07-B. This process within the State of Washington consists of a fixed five year period established for each individual PM, TL and UBID. Within this five year period, the following course credit hours are required for continuing education training.

- State PM and TL's and UBID's are required to have 80 hours.
- Local Agency PM's and TL's and UBID's are required to have 40 hours.

Five year certification period

- The five year certification period is to be managed between the individual and the designated PM.
- Depending on the individual's need, the *NHI Bridge Inspection Refresher Training (BIRT) course or other State, local or other federally developed instruction* course must be taken at least once during each 5 year certification period.
- The hours for these two particular courses can only be counted once as credit during each 5 year certification period.
- The hours from BIRT course count toward completion of the designated hours of continuing education training required to maintain certification.
- For purposes of ensuring enrollment in a BIRT course, the BIRT can be taken within six months either side of the established certification expiration date of the current five year period for each employee to extend certification for the next 5 year period. The employee should be placed under probation and a plan of corrective action created if the expiration date is exceeded by going beyond the five year period. See Section 1.06.
- Complete a cumulative total of 18 hours of FHWA approved tunnel inspection refresher training over each 60 month period.

C. Certification Roles and Responsibilities

1. Employee Responsibilities:

   a. The PM, TL and UBID are responsible for maintaining an individual accounting of the approved training courses they have taken in the established five year re-certification period.

   b. The PM, TL and UBID are responsible to attend training when scheduled and to seek out attendance when needed.

   c. Continuing education courses, seminars or conferences pertaining to bridge inspection work, that are not pre-approved as qualifying classes are to be submitted to the SPM or LPBE for consideration. The following information is needed when submitting a class to the SPM or LPBE for approval.

      1. Course/Conference title

      2. Course/Conference description

3. Course/Conference duration
4. Course/Conference date
5. Explanation of how the course/conference provides the latest practices and/or technology in the area of bridge inspections.

Upon PM approval, the class will be added to the pre-approved class list.

2. Supervisor Responsibilities:
   a. Meet annually during the employee's annual evaluation to discuss training completed and overall status for re-certification.
   b. Ensure the employees have opportunity to attend training that qualifies for recertification.

1.06 Bridge Inspection Certification Probation, Suspension, Decertification and Reinstatement

To couple the process of certification above in Section 1.05, a process for decertification has been established to ensure that all PM's, TL's, UBID's are following the proper conduct of their respective positions.

Key Terms:

Appointing Authority – The designated authority that oversees the sanctions of probation, suspension or decertification of a PM, TL and UBID.

Probationary Period – A PM, TL or UBID is allowed to continue their duties for a prescribed timeframe in order to complete an approved Plan of Corrective Action.

Plan of Corrective Action – A personalized plan approved by the Appointing Authority that identifies criteria the PM, TL, or UBID must complete within an established timeframe for inspection re-certification.

Suspension – Temporary removal of inspection certification as PM, TL or UBID.

Decertification – Permanent removal of inspection certification as PM, TL or UBID until a formal Plan of Corrective Action is administered by the Appointing Authority and fulfilled by the PM, TL or UBID.

Three examples in which a certified PM, TL or UBID may be placed on probation or suspended are listed below. Decertification can result immediately upon knowledge of conduct presented below or if the PM, TL or UBID does not meet the terms agreed upon in the plan of corrective action:

1. If a PM, TL or UBID does not fulfill the requirements for recertification (Section 1.05).
2. If a PM, TL or UBID is found to be using poor inspection practices or producing inadequate inspection documents as assessed by the QC/QA process.
3. If a PM, TL or UBID is found to be falsifying bridge inspection records, misrepresenting bridge hours on site or otherwise failing to meet general ethical standards.

Reinstatement of certification from suspension or completing probation requirements will require a formal plan of corrective action. This may be a simple process or more complex based on the nature of the situation.

This formal plan of corrective action consists of the following:

- The suspended PM, TL, or UBID will be notified in writing by the appointing authority that a plan of corrective action is needed.
- A plan of corrective action developed by the employee is to be approved by the appointing authority.
- Based on the circumstances in examples 1 and 2 above, the PM, TL, or UBID may be required to attend additional Bridge Inspector training classes beyond the continuing education requirements of Section 1.05 as specified by the appointing authority involved in the formal review. The PM, TL or UBID may also be required to receive additional field instruction by the direct supervisor.
- For the circumstance in example 3 above, the PM, TL or UBID may be subjected to more strict consequences as determined by the appointing authority.

A PM, TL or UBID who successfully completes the plan of corrective action will be considered to be in good standing. A PM, TL or UBID who does not satisfactorily complete the plan of corrective action may be decertified.

The DPM will notify the SPM when a PM, TL or UBID in a Local Agency is placed on probation or is suspended, as well as the resulting reinstatement or decertification.

1.07 Appendices

Appendix 1.07-A	WSDOT Bridge/Tunnel Inspector Experience and Training Record form
Appendix 1.07-B	Continuing Education Course List
Appendix 1.07-C	SPM delegation letter
Appendix 1.07-D	DPM delegation letter

Washington State Department of Transportation

WSDOT Bridge/Tunnel Inspector Experience and Training Record

Applicant for Bridge/Tunnel Inspector Certification	Date
Organization	

Education

Institution	Major	Years	Degree

Professional Registration

State	Branch/Agency	Registration Number

Bridge/Tunnel Inspection Training

Course	Hours	Sponsor	Dates

Special Technical Course

Course	Hours	Sponsor	Dates

Bridge/Tunnel Inspection Experience

Organization	Bridge Duties	Years

To the best of my knowledge, the above information is true and accurate.

Applicant's Signature ________________ Date ________

Having reviewed the above information, I conclude that this individual meets the minimum qualifications for a bridge/tunnel inspection team leader as specified in the current National Bridge Inspection Standards and National Tunnel Inspection Standards.

Team Leader's Signature ________________ Date ________

Team Leader's Name (Print) Title

DOT Form 234-100
Revised 08/201

Appendix 1.07-B Continuing Education Course List

For the purpose of continued certification as the SPM, TL, or UBID within the Bridge Preservation Office, the following list of courses are examples of qualifying courses for bridge inspection with estimated hours to acquire the necessary continuing education hours in an established 5 year period for each individual employee.

WSDOT/LTAP – Bridge Condition Inspection Fundamentals (BCIF)	24 hours
WSDOT/LTAP – Bridge Condition Inspection Training (BCIT)	72 hours
WSDOT/LTAP – Bridge Condition Inspection Update (BCIU)	16 hours
WSDOT/LTAP – Bridge Inventory Coding	18 hours
NHI Safety Inspection of In Service Bridges	74 hours
NHI Bridge Inspection Refresher Training	18 - 20 hours
NHI Stream Stability and Scour at Highway Bridges for Bridge Inspectors	8 hours
NHI Stream Stability and Scour at Highway Bridges	24 hours
NHI Underwater Bridge Inspection	24 hours
NHI Fracture Critical Inspection Techniques for Steel Bridges	32 hours
NDT – Dye Penetrant Testing	12 hours
NDT – Magnetic Particle Testing	20 hours
NDT – Ultrasonic Testing	32 hours
PNW Bridge Maintenance Conference	Credit as appropriate
Bridge & Tunnel Inspectors’ Conference	Credit as appropriate
Annual Inspection Process Change Meeting	Credit as appropriate
Western Bridge Engineers Seminar	Credit as appropriate

Additional courses, seminars or conferences of similar content can be considered for approval by the SPM or LBPE.

Documents available as reference and training material include but are not limited to the following:

- Washington State *Bridge Inspection Manual* (WSBIM)
- *Bridge Inspection Reference Manual* (BIRM)
- *The Manual for Bridge Evaluation* (MBE)
- *Timber Bridges Manual* (USDA)
- SNTI
- TOMIE
- WSDOT *Transportation Structures Preservation Manual*

Chapter 2 Bridge Files and Documentation

2.01 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 referred to as 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 which will be 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 that are mandated by FHWA and components that are required by WSDOT policy. The following sections clearly identify the authorizing environment.

2.02 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 2.02 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 2.03), 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 2.06-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 2.06-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* M 41-01, 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 Contract History database that records all contract work completed on a structure. This database correlates contract number and contract work to structures maintained by the WSDOT bridge inventory. Contract work includes: new bridges, resurfacing bituminous pavement, expansion joints, rail retrofits, bridge widening, bridge painting, scour mitigation, contract bridge repairs, maintenance work by contract, other agency contract work, and concrete deck overlays and replacements.

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.

2.02.01 Transferring Bridge Ownership

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 2.06-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.

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.

For more information about transferring electronic files in the WSBIS, see Section 2.03.03.

2.02.02 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 2.03.04 for more information on processing "dead" bridge electronic records in the WSBIS.

2.02.03 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 2.03.05.

2.03 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.

In Washington State, there are currently two separate databases which hold bridge information, one mostly holding state owned structures (BPO database) and a second mostly holding local agency owned structures (LP database). A third database (the Bridge Reporting Database) draws data from these two databases and is the source for data reported to FHWA. This third BRD database is maintained by the WSDOT Information Technology Division (ITD). The Washington State Bridge Inventory System (WSBIS) consists of all the data held in the BRD.

In 2017, the BPO and LP databases will be merged into a single database, and the BRD database will be abandoned, with the source data for FHWA reporting coming from this single merged database.

The BPO database is maintained by the WSDOT Bridge Preservation Office, which maintains an associated coding guide available in Appendix 2.06-C. The LP database is maintained by the WSDOT Local Programs Office, which also maintains an associated LP coding guide available in Appendix 2.06-D. These coding guides are intended to define the fields maintained in the respective databases for use by bridge inspectors and inventory managers. These coding guides are 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 state or local agency coding guides cannot contradict the federal coding guide. In cases where the federal coding guide is either inconsistent with other FHWA requirements or vague, the state or local agency coding guide needs to clearly identify the issue and describe how the field should be coded into WSBIS.
3. Required and optional fields must be clearly identified.
4. Every field must clearly state whether or not it is required for under records, and if so, exactly how it is coded for these under records.
5. When bridge records are neither "on" nor "under" (pedestrian bridge adjacent to a highway bridge for example). The coding guide must provide clear and consistent guidance on how these are to be coded.

2.03.01 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 2.06-E for the WSDOT BMS to NBE translation specifications. See www.fhwa.dot.gov/map21 for more information about MAP-21.

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 2.03.06).

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

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.

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 2.03.05.

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 a coding guide.

The following additional fields or clarifications of NBI fields are required:

- **Bridge Number** – A 10-digit alphanumeric code that must always be populated.
- **Bridge Name** – A 24-digit alphanumeric code that must always be populated.
- **Washington State Region Code (Federal Coding Guide Item 2)** – Consist of the following 2 digit alphanumeric codes that always must be populated:

  NW – Northwest Region
  EA – Eastern Region
  NC – Northcentral Region
  OL – Olympic Region
  SC – Southcentral Region
  SW – Southwest Region

- **County Code (Federal Coding Guide Item 3)** – Consists of the numeric code representing the alphabetic order of Washington State counties. This field must always be populated. These codes are available in an Excel spreadsheet within the "County and City Codes" tab at www.ofm.wa.gov/pop/annex

  Use the 2-digit COUNTYN column in the County Codes spreadsheet tab.

Examples:	Adams	01
	Yakima	39

- **City Code** – Consists of the 1990 federal census place code, updated by OFM for cities incorporated after 1999. These codes are available in an Excel spreadsheet within the "County and City Codes" tab at www.ofm.wa.gov/pop/annex

  Use the 4-digit Place_1990 column in the City Codes spreadsheet tab.

Examples:	Aberdeen	0005
	Zillah	1500

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 2.06-E for detailed information on the translation process.

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.

2.03.02 New Bridge Inventory in the WSBIS

Newly built bridges must be added to the bridge inventory (WSBIS) and the Structure Inventory & Appraisal (SI&A) 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.

2.03.03 Transferring Bridge Ownership in the WSBIS

Transferring bridge ownership between local agencies and state agencies requires transferring electronic records between the LP and BPO databases. This will be a manual process whereby the record will be "obsoleted" in the originating database, and a new record created in the receiving database. This new record will be created based on printouts of the established record in the originating database, and all associated electronic files (.jpg photos, .pdf images, plans, etc.) transmitted along with paper records on DVD or other compatible format. These electronic files will be associated with the database record and stored electronically.

2.03.04 Deleting (Obsoleting) Bridges in the WSBIS

Both the BPO and LP databases are 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 2.02.02).

WSDOT policy guides the requirements for deleting (obsoleting) structures in the WSBIS, but in this case the policy applies to all bridges in the WSBIS that are reported to the NBI, including local agency bridges on local agency right of way. Obsoleting bridge records in both databases 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 2.06-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 2.02.02 for more information on maintaining "dead" bridge files.

2.03.05 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.

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, both the BPO and LP database must use the same structure identifier (Federal Coding Guide Item 8) and coordinate the on/under code (Federal Coding Guide Item 5A) to maintain a unique combination of these fields (a composite key) for all bridge records in both databases, regardless of which ones are reported to the NBI. The BPO and LP data stewards shall coordinate closely to ensure these bridge files are kept complete, accurate and current. 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.

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 2.06-F for bridge specific information.

2.03.06 Reporting WSBIS Data to the NBI – Special Circumstances

Section 2.03.01 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.

2.03.07 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 2.06-C.

2.04 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 twice per year. Submittals may also happen at other times at the request of the Washington Division of the FHWA. The scheduled submittals are April 1 and October 1, or the first work days following these dates. The data submitted includes all the data defined by the NBI federal coding guide and the NBE specifications, and is provided in a very specific format also defined by these documents. These submittals are performed by the Bridge Preservation Office with data taken from the Bridge Reporting Database (BRD 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 and NBE is taken only from the most current "released" data from the BRD, meaning that each bridge 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 NBI submittals 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:

- Bridges added to the inventory are reviewed to determine if they should be reported to the NBI.

- Bridges removed from the inventory are reviewed to determine if they should be reported to the NBI and to ensure the electronic records accurately and sufficiently document the obsolete record.
- Bridges that are transferred between agencies are reviewed to ensure the electronic records accurately document the transfer.
- Bridges 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 the NBI and NTI is used for performance measurements after the submittal, both by FHWA and WSDOT. Verifying timely inspections for the four federally reported inspection types (routine, fracture critical, underwater, and special feature) is a primary focus of these performance measures. For the April 1 data submittal, all inspection work due through December 31 of the previous year must be "released" into the BPO and LP databases prior to April 1; for the October 1 data, all inspection work due through June 30 of the same year must be "released" prior to October 1.

On August 17, 2017, WSDOT will submit complete NTI data to FHWA for the first time.

2.05 Responding to FHWA

Information Requests – FHWA requests bridge inspection information from WSDOT on a periodic basis. The information that is 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 2.06-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.

2.06 Appendices

Appendix 2.06-A	WSDOT BPO Floor Plan with File Locations
Appendix 2.06-B	Record Change Form
Appendix 2.06-C	Washington State Bridge Inventory System Coding Guide
Appendix 2.06-D	Local Agency Bridge Inventory Coding Guide
Appendix 2.06-E	WSDOT BMS to NBE Translation
Appendix 2.06-F	Border Bridge Information
Appendix 2.06-G	Sufficiency Rating Calculation
Appendix 2.06-H	WSDOT/FHWA Communication Protocol Flowchart

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This list is sorted by WSBIS item number.

Table 1 - WSBIS Item Numbers by Sequence

WSBIS Item No.	WSBIS Item Name	NBI Item No.	NTI Item No.	Page No.	WSBIM sequence
1001	Structure Identifier	8	I.1	2.06-C-45	39
1019	Owner	22	C.1	2.06-C-48	43
1021	County Code	3	I.4	2.06-C-49	44
1022	Urban Code	-	C.8	2.06-C-114	172
1132	Bridge Name	-	I.2	2.06-C-50	46
1156	Location	9	-	2.06-C-50	47
1188	Latitude	16	I.13	2.06-C-51	51
1196	Longitude	17	I.14	2.06-C-51	52
1232	Features Intersected	6	-	2.06-C-53	54
1256	Facilities Carried	7	I.10	2.06-C-53	55
1274	Region code	2	I.6	2.06-C-54	56
1276	FIPS Code	4	I.5	2.06-C-54	57
1285	Toll	20	C.4	2.06-C-55	58
1286	Custodian	21	C.2	2.06-C-56	59
1288	Parallel Structure	101	-	2.06-C-57	60
1289	Temporary Structure	103	-	2.06-C-57	61
1291	Median	33	-	2.06-C-76	83
1292	Historical Significance - NRHP	37	-	2.06-C-58	62
1293	Open, Closed or Posted	41	L.4	2.06-C-26	15
1310	Skew	34	-	2.06-C-77	85
1312	Flared Flag	35	-	2.06-C-78	86
1332	Year Built	27	A.1	2.06-C-59	63
1336	Year Rebuilt	106	A.2	2.06-C-59	64
1340	Structure Length	49	-	2.06-C-60	65
1348	Maximum Span Length	48	-	2.06-C-62	67
1349	Tunnel Length	-	G.1	2.06-C-116	173
1352	Lanes On	28A	-	2.06-C-62	68
1354	Lanes Under	28B	A.3	2.06-C-86	108
1356	Curb-to-Curb Width	51	G.3	2.06-C-63	69
1360	Out-to-Out Deck Width	52	-	2.06-C-64	70
1364	Sidewalk/Curb Width Left	50A	G.4	2.06-C-65	71
1367	Sidewalk/Curb Width Right	50B	G.5	2.06-C-65	72
1370	Minimum Vertical Clearance Over Deck	53	-	2.06-C-67	73
1374	Minimum Vertical Clearance Under Bridge	54B	-	2.06-C-68	74
1378	Vertical Underclearance Code	54A	-	2.06-C-70	75
1379	Minimum Lateral Underclearance Right	55A	-	2.06-C-70	76
1382	Lateral Underclearance Code	55B	-	2.06-C-73	77
1383	Minimum Lateral Underclearance Route Left	56	-	2.06-C-73	78
1386	Navigation Control	38	-	2.06-C-74	79
1387	Navigation Vertical Clearance	39	-	2.06-C-74	80
1390	Navigation Horizontal Clearance	40	-	2.06-C-75	81
1394	Vertical Lift Minimum Navigation Clearance	116	-	2.06-C-75	82
1397	Approach Roadway Width	32	-	2.06-C-77	84
1401	Min. Vertical Clearance Over Tunnel Roadway	-	G.2	2.06-C-116	174
1402	Tunnel Height Restriction	-	L.10	2.06-C-118	180
1408	Tunnel Hazardous Material Restriction	-	L.11	2.06-C-118	181

Table 1 - WSBIS Item Numbers by Sequence

WSBIS Item No.	WSBIS Item Name	NBI Item No.	NTI Item No.	Page No.	WSBIM sequence
1409	Tunnel Other Restrictions	-	L.12	2.06-C-118	182
1413	Detour Length	19	A.7	2.06-C-89	114
1432	Inventory Route On/Under	5A	-	2.06-C-79	88
1433	Inventory Route Highway Class	5B	-	2.06-C-80	89
1434	Inventory Route Service Level	5C	-	2.06-C-80	90
1435	Route	5D	I.7	2.06-C-81	91
1436	Route Direction	-	I.8	2.06-C-114	170
1445	ADT	29	A.4	2.06-C-87	109
1451	ADT Truck Percentage	109	A.5	2.06-C-87	110
1453	ADT Year	30	A.6	2.06-C-87	111
1457	Future ADT	114	-	2.06-C-88	112
1463	Future ADT Year	115	-	2.06-C-88	113
1467	Linear Referencing System Route	13A	I.11	2.06-C-82	98
1469	LRS Milepost	11	I.12	2.06-C-83	100
1477	Linear Referencing System Sub Route	13B	-	2.06-C-83	99
1483	National Highway System	104	C.5	2.06-C-83	101
1484	Base Highway Network	12	-	2.06-C-84	102
1485	STRAHNET Highway	100	C.6	2.06-C-84	103
1486	Federal Lands Highways	105	-	2.06-C-84	104
1487	Functional Classification	26	C.7	2.06-C-85	105
1489	National Truck Network	110	-	2.06-C-85	106
1490	Lane Use Direction	102	C.3	2.06-C-86	107
1491	Horizontal Clearance, Route Direction	47	-	2.06-C-90	116.9
1495	Horizontal Clearance, Reverse Direction	47	-	2.06-C-91	117
1499	Maximum Vertical Clearance, Route Direction	10	-	2.06-C-92	118
1510	Number of Bores	-	S.1	2.06-C-119	183
1511	Tunnel Shape	-	S.2	2.06-C-120	184
1512	Portal Shape	-	S.3	2.06-C-121	185
1513	Ground Conditions	-	S.4	2.06-C-121	186
1514	Complex	-	S.5	2.06-C-121	187
1532	Main Span Material	43A	-	2.06-C-95	124
1533	Main Span Design	43B	-	2.06-C-96	125
1535	Approach Span Material	44A	-	2.06-C-97	126
1536	Approach Span Design	44B	-	2.06-C-97	127
1538	Number of Main Spans	45	-	2.06-C-98	129
1541	Number of Approach Spans	46	-	2.06-C-99	130
1543	Service in Tunnel	-	A.8	2.06-C-114	171
1544	Service On	42A	-	2.06-C-99	131
1545	Service Under	42B	-	2.06-C-99	132
1546	Deck type	107	-	2.06-C-100	133
1547	Wearing Surface	108A	-	2.06-C-101	134
1548	Membrane	108B	-	2.06-C-101	135
1549	Deck Protection	108C	-	2.06-C-101	136
1550	Design Load	31	-	2.06-C-102	137
1551	Operating Rating Method	63	-	2.06-C-107	151
1552	Operating Rating Tons	64	-	2.06-C-108	152
1553	Operating Rating Factor	64	L.3	2.06-C-109	153

Table 1 - WSBIS Item Numbers by Sequence

WSBIS Item No.	WSBIS Item Name	NBI Item No.	NTI Item No.	Page No.	WSBIM sequence
1554	Inventory Rating Method	65	L.1	2.06-C-109	154
1555	Inventory Rating Tons	66	-	2.06-C-109	155
1556	Inventory Rating Factor	66	-	2.06-C-109	156
1560	Posted Load – Gross	-	L.5	2.06-C-116	175
1561	Posted Load – Axle	-	L.6	2.06-C-117	176
1562	Posted Load – Type 3	-	L.7	2.06-C-117	177
1563	Posted Load – Type 3S2	-	L.8	2.06-C-117	178
1564	Posted Load – Type 3-3	-	L.9	2.06-C-117	179
1585	Border Bridge State Code	98A	L.2	2.06-C-110	157
1588	Border Bridge Percent	98B	-	2.06-C-110	158
1590	Border Bridge Structure Identifier	99	-	2.06-C-110	159
1657	Structural Evaluation	67	-	2.06-C-18	9
1658	Deck Geometry	68	-	2.06-C-19	10
1659	Underclearances	69	-	2.06-C-22	11
1660	Operating Level	70	-	2.06-C-25	14
1661	Alignment	72	-	2.06-C-23	12
1662	Waterway	71	-	2.06-C-24	13
1663	Overall Deck Condition	58	-	2.06-C-28	16
1671	Superstructure Overall	59	-	2.06-C-29	17
1676	Substructure Condition	60	-	2.06-C-30	19
1677	Channel Protection	61	-	2.06-C-31	20
1678	Culvert	62	-	2.06-C-32	21
1679	Pier/Abutment Protection	111	-	2.06-C-34	22
1680	Scour	113	-	2.06-C-35	23
1684	Bridge Rails	36A	-	2.06-C-38	27
1685	Transitions	36B	-	2.06-C-40	28
1686	Guardrails	36C	-	2.06-C-41	29
1687	Terminals	36D	-	2.06-C-41	30
1844	Proposed Improvement Work Type	75A	-	2.06-C-111	160
1846	Proposed Improvement Work Method	75B	-	2.06-C-111	161
1847	Proposed Improvement Length	76	-	2.06-C-112	162
1867	Proposed Improvement Structure Cost	94	-	2.06-C-112	165
1873	Proposed Improvement Roadway Cost	95	-	2.06-C-112	166
1861	Proposed Improvement Total Cost	96	-	2.06-C-113	168
1879	Proposed Improvement Estimate Year	97	-	2.06-C-113	169
1990	Routine Inspection Date	90	-		1.1
1990	Fracture Critical Inspection Date	93A	-		1.2
1990	Underwater Inspection Date	93B	-		1.3
1990	Special Feature Inspection Date	93C	-		1.4
1991	Routine Inspection Frequency	91	-		1.5
1991	Fracture Critical Inspection Frequency	92A	-		1.6
1991	Underwater Inspection Frequency	92B	-		1.7
1991	Special Feature Inspection Frequency	92C	-		1.8
1992	Routine Inspection Target Date	-	D.1	2.06-C-116	175
2000	Main Listing Flag	-	-	2.06-C-79	87
2009	Bridge Number	-	-	2.06-C-46	40
2010	Bridge Sort Number	-	-	2.06-C-47	41

Table 1 - WSBIS Item Numbers by Sequence

WSBIS Item No.	WSBIS Item Name	NBI Item No.	NTI Item No.	Page No.	WSBIM sequence
2023	City	-	-	2.06-C-49	45
2157	Crossing Description	-	-		122
2181	Section	-	-	2.06-C-50	48
2183	Township	-	-	2.06-C-50	49
2185	Range	-	-	2.06-C-50	50
2346	NBIS Length	-	-	2.06-C-62	66
2400	Program Manager	-	-	2.06-C-47	42
2401	Crossing Manager	-	-	2.06-C-94	123
2402	Crossing Description	-	-		123.5
2409	NTI Reportable Flag	-	-	2.06-C-90	114.5
2410	NBI Reportable Flag	-	-	2.06-C-90	115
2411	Bridge List	-	-	2.06-C-90	116
2436	Route Sequencer	-	-	2.06-C-81	93
2437	Bridge List Milepost Override	-	-	2.06-C-81	94
2438	Milepost Sequencer	-	-	2.06-C-81	95
2440	Milepost	-	-	2.06-C-81	92
2468	Directional Indicator	-	-	2.06-C-82	96
2470	Ahead/Back Indicator	-	-	2.06-C-82	97
2500	Minimum Vertical Clearance, Route Direction	-	-	2.06-C-94	119
2501	Maximum Vertical Clearance, Reverse Direction	-	-	2.06-C-94	120
2502	Minimum Vertical Clearance, Reverse Direction	-	-	2.06-C-94	121
2537	Alphabetic Span Type	-	-	2.06-C-98	128
2580	Reference Inspection Date	-	-	2.06-C-104	138
2581	Load Rating Date	-	-	2.06-C-104	139
2582	Rated By	-	-	2.06-C-104	140
2587	Type 3 Rating Factor	-	-	2.06-C-104	141
2588	Type 3S2 Rating Factor	-	-	2.06-C-104	142
2589	Type 3-3 Rating Factor	-	-	2.06-C-105	143
2590	Notional Rating Load (NRL) Rating Factor	-	-	2.06-C-105	144
2591	Single Unit 4 (SU4) Rating Factor	-	-	2.06-C-105	145
2592	Single Unit 5 (SU5) Rating Factor	-	-	2.06-C-105	146
2593	Single Unit 6 (SU6) Rating Factor	-	-	2.06-C-106	147
2594	Single Unit 7 (SU7) Rating Factor	-	-	2.06-C-106	148
2596	Overload 1 (OL-1) Rating Factor	-	-	2.06-C-106	149
2597	Overload 2 (OL-2) Rating Factor	-	-		150
2610	Asphalt Depth	-	-	2.06-C-37	24
2611	Design Curb Height	-	-	2.06-C-37	25
2612	Bridge Rail Height	-	-	2.06-C-37	26
2614	Subject to NBIS Flag	-	-	2.06-C-44	38
2615	Special Structures Flag	-	-	2.06-C-51	53
2642	Inspection Hours	-	-	2.06-C-16	6
2643	Inspection Overtime Hours	-	-	2.06-C-16	7
2646	Inspector Initials	-	-	2.06-C-16	3
2649	Inspector Certification Number	-	-	2.06-C-16	4
2654	Co-Inspector Initials	-	-	2.06-C-16	5
2675	Number of Utilities	-	-	2.06-C-29	18
2688	Revise Rating Flag	-	-	2.06-C-41	31

Table 1 - WSBIS Item Numbers by Sequence

WSBIS Item No.	WSBIS Item Name	NBI Item No.	NTI Item No.	Page No.	WSBIM sequence
2691	Photos Flag	-	-	2.06-C-41	32
2693	Soundings Flag	-	-	2.06-C-42	33
2694	Clearance Flag	-	-	2.06-C-42	34
2695	QA Flag	-	-	2.06-C-42	35
2710	Sufficiency Rating	-	-	2.06-C-42	36
2711	Structurally Deficient/Functionally Obsolete	-	-	2.06-C-43	37
2853	Proposed Improvement Roadway Width	-	-	2.06-C-112	163
2860	Proposed Improvement Cost Per SF of Deck	-	-	2.06-C-112	164
2870	Proposed Improvement Eng. and Misc. Cost	-	-	2.06-C-112	167
2900	Program Manager Oversight	-	-	2.06-C-16	8
2920	Report Type	-	-	2.06-C-15	1
2921	Inspection Type	-	-	2.06-C-15	2

Coding Guide Instructions

1. Throughout this appendix, each item heading potentially has two parts. The text above the line is the WSBIS item number and name. The equivalent FHWA item number and name (if they exist) are below the line.
2. With the exception of WSBIS Item 1435 – Route Number, WSBIS does not record leading zeroes. When leading zeroes are required for FHWA items, they are added in the translation for the NBI submittal.
3. For any NBI or NTI item, where WSBIS codes differ from the NBI or NTI codes, the WSBIS code will be automatically translated for the NBI and NTI data submittals.
4. The following is a discussion of On and Under records for bridges.

   Each bridge has data elements related to the structure. This data describes the bridge itself, including the structure type, quantities and dimensions, location, etc.

   In addition, each bridge has data elements related to the roadway associated with the bridge. This data describes the roadway that is either on or under the structure, including route number, highway classifications, vertical and horizontal clearances, etc. This data is called a crossing record. A bridge will have either one or two National Bridge Inventory (NBI) reportable crossing records.

   A bridge that carries vehicular traffic will have an On crossing record. This On record exists for any public roadway on the bridge, whether it is a state route or a local agency route.

   A bridge that crosses a state route roadway, regardless of what is on the bridge, will have an Under crossing record in the Bridge Preservation Office (BPO) database. (A local agency may or may not have an Under crossing record for a state owned bridge that crosses a local route. That record would reside in the Local Programs database, not in the BPO database.)

   For crossing records, a flag known as the Main Listing or Secondary Listing is used. All structure data elements are related to the Main Listing. A Secondary Listing, if it exists, is reported to the NBI in a record separate from the structure record. For state owned structures, Secondary Listings are coded by the BPO Information Group, and are displayed in the BridgeWorks application in Inventory Management mode.

   The Structural Inventory and Appraisal (SI&A) sheet will display the data relevant to the structure and to the Main Listing. If a Secondary Listing exists, a second SI&A sheet will display only the data relevant to that crossing record.

   State owned bridges that meet the NBIS definition, and are located over a state route, are reported to the NBI by BPO. This includes all the structural and inspection data, as well as the crossing record for the roadway on and the crossing record for the roadway under.

   Local agency owned bridges that meet the NBIS definition, and are located over a state route, are reported to the NBI. The structural and inspection data, and the crossing record for the roadway on the bridge, are reported by the local agency. The crossing record for the roadway under the bridge is reported by BPO.

   Bridges that do not meet the NBIS definition, but are located over a state route, are reported to the NBI but with a truncated amount of structural data, no inspection data, and the crossing record for the roadway under.

Examples:

Bridge 90/327 Schoessler Rd Over I-90 – This bridge has an On crossing record for Shoessler Rd (the Main Listing) and an Under crossing record for I-90 (the Secondary Listing). Both these records are reported to the NBI.

Bridge 90/531N I-90 Over Abbott Rd – This bridge has an On crossing record for I-90 (the Main Listing). There is not an Under crossing record for Abbott Rd. in the BPO database. The On crossing record is reported to the NBI.

Bridge 90/564P Pedestrian Br Over I-90 – This bridge has an Under crossing record for I-90 (the Main Listing). This crossing record is reported to the NBI.

Bridge 90/179.25 Schnebly Coulee – This bridge, a short span, has an On crossing record for I-90 (the Main Listing). This record is not reported to the NBI because short span bridges are not NBIS bridges. WSDOT maintains a crossing record by BPO policy.

Pedestrian and railroad bridges over routes carrying public highways 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 highways themselves. Table 2 provides a listing of the WSBIS fields maintained for these structures.

Table 2 - WSBIS Items Coded for Pedestrian, Railroad, and Utility Bridges Over Highways[1]

WSBIS Item Name	WSBIS Item No.	NBI Item No.
Structure Identifier	1001	8
Location	1156	9
Latitude	1188	16
Longitude	1196	17
County Code	1021	3
Features Intersected	1232	6A
Facilities Carried	1256	7
FIPS Place Code	1276	4
Toll	1285	20
Parallel Structure	1288	101
Temporary Structure	1289	103
Year Built	1332	27
Bridge Length	1340	49
Maximum Span Length	1348	48
Lanes On	1352	28A
Lanes Under	1354	28B
On/Under	1432	5A
Highway Class	1433	5B
Service Level	1434	5C
Route Number	1435	5D
ADT On Inventory Route	1445	29
Truck ADT PCT	1451	109
ADT Year	1453	30
LRS Route	1467	13A
LRS Sub Route	1477	13B
LRS Milepost	1469	11
National Highway System	1483	104
Base Highway Network	1484	12
Strahnet	1485	100
Fed Funct Class	1487	26
National Truck Net	1489	110
Lane Use Direction	1490	102
Horizontal Clearance Route Dir	1491	47
Horizontal Clearance Reverse Dir	1495	47
Max Vertical Clearance Route Dir	1499	10
Detour Length	1413	19
Main Span Material	1532	43A
Main Span Design	1533	43B
Service On	1544	42A
Service Under	1545	42B
Main Listing Flag	2000	-
Bridge Number	2009	-
City	2023	-
Bridge Name	2132	-
Section	2181	-
Township	2183	-
Range	2185	-
Program Manager	2400	-
Crossing Manager	2401	-
Milepost	2440	-
Min Vert Clr, Route Direction	2500	-
Max Vert Clr, Reverse Direction	2501	-
Min Vert Clr, Reverse Direction	2502	-
Subject to NBIS Flag	2614	-
Photos Flag	2691	-
Clearance Flag	2694	-
Report Type	2920	-
Inspection Hours	2642	-
Inspection OT Hours	2643	-
Inspector Initials	2646	-
Inspector Cert No.	2649	-
Co-Inspector Initials	2654	-

Notes:
1. These structures are managed as Main Listing Under Records in WSBIS.

5. The following is a discussion of On and Under records for tunnels.

   Tunnels do not have On and Under records as reported to the NTI. Within WSBIS, all tunnels are coded as Main Listing Under records. The National Tunnel Inventory (NTI) does not consider routes above a tunnel, and only one tunnel record is ever reported to the NTI and maintained in WSBIS.

Table 3 - WSBIS Items Coded for NTI Records

WSBIS Item Name	WSBIS Item No.	NTI Item No.
Tunnel Number	1001	I.1
Owner	1019	C.1
County Code	1021	I.4
Urban Code	1022	C.8
Bridge Name	1132	I.2
Location (Main Listings)	1156	-
Tunnel Portal's Latitude	1188	I.13
Tunnel Portal's Longitude	1196	I.14
Feature Intersected	1232	-
Facility Carried	1256	I.10
Highway Agency District	1274	I.6
Place Code	1276	I.5
Toll	1285	C.4
Operator	1286	C.2
Historical Significance - NRHP	1292	-
Tunnel Load Posting Status	1293	L.4
Year Built	1332	A.1
Year Rehabilitated	1336	A.2
Tunnel Length	1349	G.1
Total Number of Lanes	1354	A.3
Roadway Width, Curb-to-Curb	1356	G.3
Left Sidewalk Width	1364	G.4
Right Sidewalk Width	1367	G.5
Min Vert Clr over Tunnel Rdwy	1401	G.2
Height Restriction	1402	L.10
Hazardous Material Restriction	1408	L.11
Other Restrictions	1409	L.12
Detour Length	1413	A.7
Inventory Route, On/Under	1433	-
Route Type	1433	I.9
Route Number	1435	I.7
Route Direction	1436	I.8
Average Daily Traffic	1445	A.4
Average Daily Truck Traffic	1451	A.5
Year of Average Daily Traffic	1453	A.6
LRS Route ID	1467	I.11
LRS Mile Point	1469	I.12
NHS Designation	1483	C.5
STRAHNET Designation	1485	C.6
Functional Classification	1487	C.7
Direction of Traffic	1490	C.3
Max. Vert. Clearance, Route Dir.	1499	-
Number of Bores	1510	S.1
Tunnel Shape	1511	S.2
Portal Shapes	1512	S.3
Ground Conditions	1513	S.4
Complex	1514	S.5

WSBIS Item Name	WSBIS Item No.	NTI Item No.
Service in Tunnel	1543	A.8
Operating Load Rating Factor	1553	L.3
Load Rating Method	1554	L.1
Inventory Load Rating Factor	1556	L.2
Posting Load – Gross	1560	L.5
Posting Load – Axle	1561	L.6
Posting Load – Type 3	1562	L.7
Posting Load – Type 3S2	1563	L.8
Posting Load – Type 3-3	1564	L.9
Routine Inspection Date	1990	D.2
Routine Inspection Frequency	1991	D.3
Routine Inspection Target Date	1992	D.1
Bridge Number	2009	-
Bridge Sort Number	2010	-
City	2023	-
Section	2181	-
Township	2183	-
Range	2185	-
Program Manager	2400	-
Milepost	2440	-
Min. Vert Clearance. Route Dir.	2500	-
Max. Vert. Clearance, Rev. Dir.	2501	-
Min. Vert. Clearance, Rev. Dir.	2502	-
Alphabetic Span Type	2537	-
Reference Inspection Date	2580	-
Load Rating Date	2581	-
Rated By	2582	-
Type 3 Rating Factor	2587	-
Type 3S2 Rating Factor	2588	-
Type 3-3 Rating Factor	2589	-
NRL Rating Factor	2590	-
SU4 Rating Factor	2591	-
SU5 Rating Factor	2592	-
SU6 Rating Factor	2593	-
SU7 Rating Factor	2594	-
OL-1 Rating Factor	2595	-
OL-2 Rating Factor	2596	-
Special Structures Flag	2615	-
Inspection Hours	2642	-
Inspection Overtime Hours	2643	-
Inspector Initials	2646	-
Co-Inspector Initials	2654	-
Revise Rating Flag	2688	-
Photos Flag	2691	-
Clearance Flag	2694	-
QA Flag	2695	-

Report Types

WSBIS Items 1990, 1991, and 2920 – Report Type

WSBIS Item 2921 – Inspection Type

Table 2920 - 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	-	-
Interim	-		-	-	D.6	-
UW Interim	-		-	-	-	-
Equipment	-		-	-	-	-
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	-
Safety	-		-	-	-	-
Short Span	-		-	-	-	-
2 Man UBIT	-		-	-	-	-
In-Depth	-		-	-	D.4	-
Inventory	-		-	-	-	-
Geometric	-		-	-	-	-
Feature	-		-	-	-	-
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 or Safety report types). Refer to Chapter 3 for more detailed descriptions of the Report Types.

WSBIS Item 2646 – Inspector Initials

(Cannot be null.)

These are the initials of the team leader at the bridge site performing the inspection for the designated report type.

WSBIS Item 2649 – Inspector Certification Number

(Cannot be null.)

This is the certification number of the team leader.

WSBIS Item 2654 – Co-Inspector Initials

(May be null only for Damage, Informational and Inventory report types.)

These are the initials of the individual who assisted the team leader in performing the inspection for the designated report type.

WSBIS Item 2642 – Inspection Hours

(Null only for Informational and Inventory report types.)

This is the total number of inspection hours (to the nearest half hour), excepting overtime hours, that the inspection team spent on the bridge while performing an inspection of the designated report type.

WSBIS Item 2643 – Inspection Overtime Hours

(Null unless overtime hours utilized during inspection.)

This is the total number of overtime inspection hours (to the nearest half hour) that the inspection team spent on the bridge while performing an inspection of the designated report type.

WSBIS Item 2900 – Program Manager Oversight

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

Late Inspection Explanation

For any NBI or NTI reportable inspection type, when an inspection is, or is to be, performed later than the calculated month due, an explanation must be provided for the delinquency.

Program Manager Response Date

Enter the date of the Program Manager's response to the Late Inspection Explanation.

Program Manager Approval

Enter a Y – Approved or N – Disapproved to indicate the Program Manager's response.

NBI

Adequacy Appraisals

WSBIS Items 1657, 1658, 1659, 1661, and 1662

FHWA Items 67, 68, 69, 71, and 72

The items in the appraisal section are used to evaluate a bridge 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

FHWA Item 67 Structural Evaluation

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

FHWA Item 68 – Deck Geometry

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

FHWA Item 69 – Underclearances, Vertical and Horizontal

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			
Principal Arterials (Interstate, etc.)				Other Principal and Minor Arterials	Major and Minor Collectors and Locals	Railroads	
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 thew 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

FHWA Item 72 – Approach Roadway Alignment

(Cannot be null.)

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

FHWA Item 71 – Waterway Adequacy

(Cannot be null.)

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 should be brought to the attention of the Scour Engineer and entered into the notes for this field 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

FHWA Item 70 – Bridge Posting

(Cannot be null.)

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

See the *Bridge Design Manual* M 23-50 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

FHWA Item 41 – Structure Open, Posted, or Closed to Traffic

NTI Item L.4 – Tunnel Load Posting Status

(Cannot be null if bridge has an On record, must be null if the bridge does not have an On record.)

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.)

Condition Ratings

WSBIS Items 1663, 1671, 1676, 1677, and 1678

FHWA Items 58, 59, 60, 61, and 62

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.

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	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 minor section loss, cracking, spalling or scour.
4	Poor condition – advanced section loss, deterioration, 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 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	“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.

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

FHWA Item 58 – Deck

(Cannot be null.)

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 WSBIM 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.

NBI Commentary:

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

WSBIS Item 1671 – Superstructure

FHWA Item 59 – Superstructure

(Cannot be null.)

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.

WSBIS Item 2675 – Number of Utilities

(Null only when there is no On record associated with the bridge.)

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 1676 – Substructure

FHWA Item 60 – Substructure

(Cannot be null.)

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.

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

FHWA Item 61 – Channel and Channel Protection

(Cannot be null.)

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.

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

FHWA Item 62 – Culverts

(Cannot be null.)

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.

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

FHWA Item 111 – Pier or Abutment Protection (for Navigation)

(Cannot be null.)

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

FHWA Item 113 – Scour Critical Bridges

(Cannot be null.)

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 (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, 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 (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 (Example B) • Scour below spread-footing base or pile tips (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.

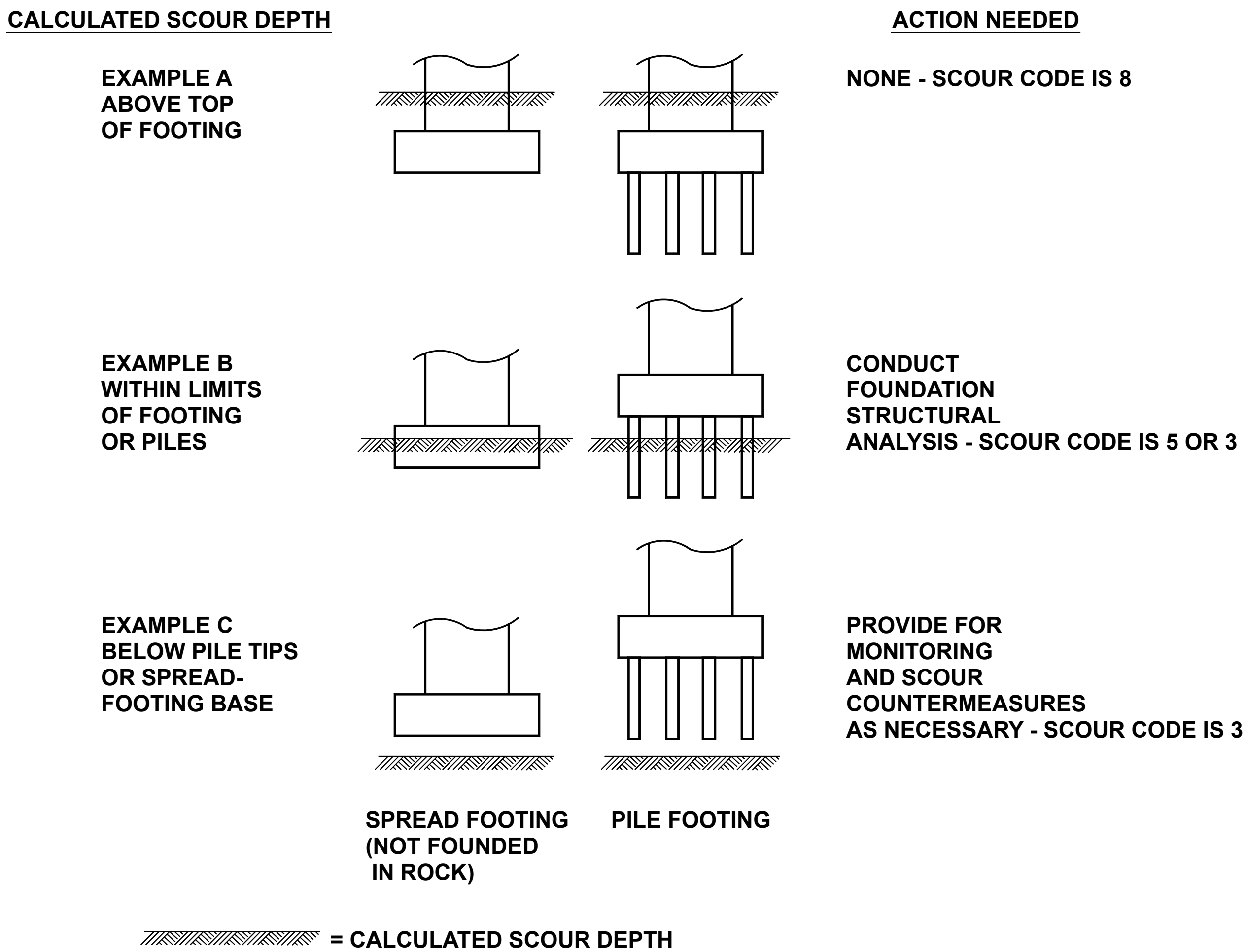


Figure WSBIS 1680

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.

WSBIS Item 2610 – Asphalt Depth (XX.XX inches)

(Null only when there is no On record associated with the bridge.)

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 (XX.XX inches)

(Null only when there is no On record associated with the bridge.)

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

WSBIS Item 2612 – Bridge Rail Height (XX.XX inches)

(Null only when there is no On record associated with the bridge.)

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

WSBIS Items 1684, 1685, 1686, 1687 – Traffic Safety

FHWA 36 – Traffic Safety Features
(Cannot be null.)

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

FHWA Item 36A – Traffic Safety Features, Bridge Railings

Bridge railings should be coded to reflect the current WSDOT standards. Refer to *Design Manual* M 22-01, Section 1610.04(3) Bridge Traffic Barriers.

Acceptable crash tested bridge rails fall into two general categories.

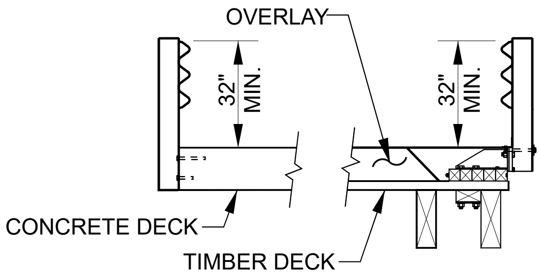
Thrie-beam Retrofit

- 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

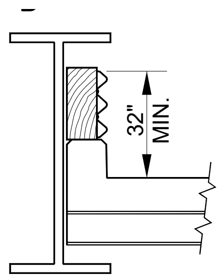
Concrete Rail

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

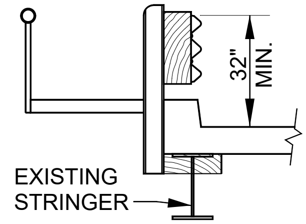
Bridge rails are coded as N when there is sufficient roadway fill that there is no attachment to the structure.



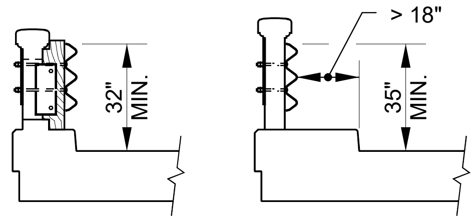
EDGE MOUNTED THRIEBEAM (Fig. a)



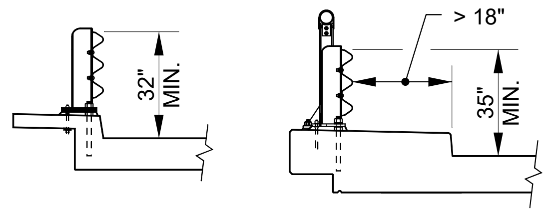
THRIE BEAM MOUNTED TO OPEN GIRDER (Fig. b)



STEEL TRUSS & THRIE BEAM (Fig. c)

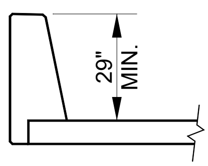


THRIE BEAM MOUNTED TO BALLUSTER RAIL (Fig. d)



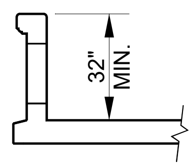
THRIE BEAM MOUNTED TO STEEL POSTS ON CONCRETE DECK (Fig. e)

THRIE BEAM RETROFIT



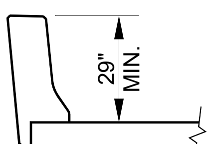
SINGLE SLOPE CONCRETE RAIL (Fig. a)

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



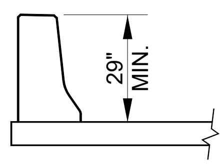
32" INCH VERTICAL CONCRETE PARAPET (Fig. b)

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



F-SHAPE TYPE CONCRETE RAIL (Fig. c)

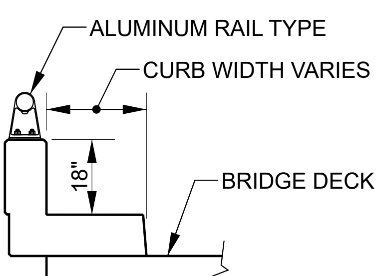
(NOTE: BARRIER IS ACCEPTABLE WITH ANY TYPE OF METAL RAIL MOUNTED TO IT)



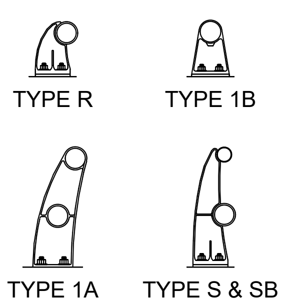
NEW JERSEY STYLE RAIL (Fig. d)

(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

Figure WSBIS 1684

WSBIS Item 1685 – Transitions

FHWA Item 36B – Traffic Safety Features, Transitions

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.

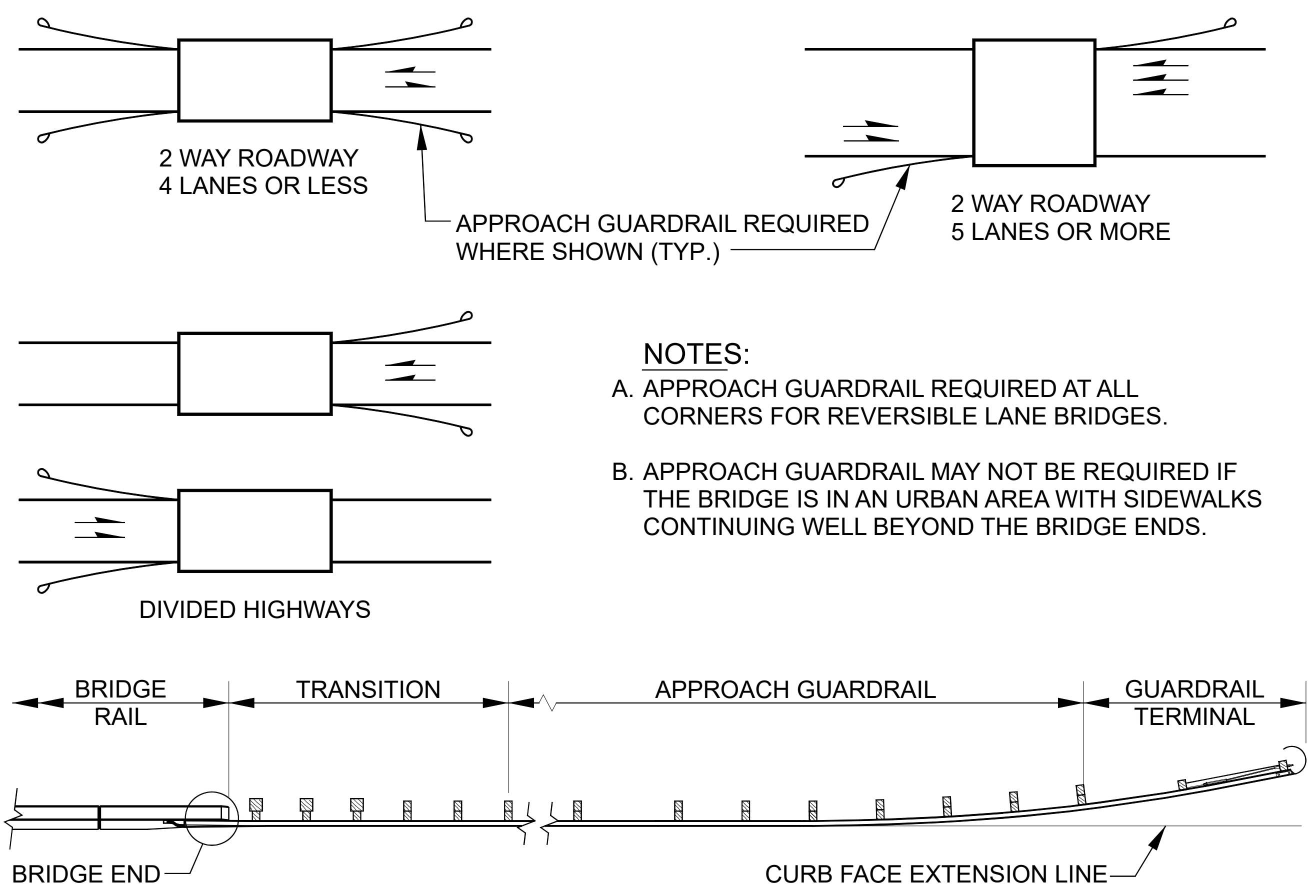


Figure WSBIS 1685

WSBIS Item 1686 – Guardrails

FHWA 36C – Traffic Safety Features, Approach Guardrail

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″ x 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

FHWA 36D – Traffic Safety Features, Approach Guardrail Ends

- 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.

WSBIS Item 2688 – Revise Rating Flag

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 5.02.

WSBIS Item 2691 – Photos Flag

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

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

WSBIS Item 2693 – Soundings Flag

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

This field identifies which clearances need to be checked on a structure.

C Measure horizontal/lateral and vertical clearances.
H Measure horizontal/lateral clearances.
V Measure vertical clearances.
* Null field, measurements are not required

This field is coded as part of the inspection planning process, and instructs the inspector to take, document and code clearance measurements. Unless otherwise instructed, all vertical and horizontal clearances in, on, or under the structure are to be verified. When measurements are taken, documented and coded, this field should be made null.

WSBIS Item 2695 – QA Flag

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

Y Quality assurance report on file.
* Null field

WSBIS Item 2710 – Sufficiency Rating

This item is calculated automatically and cannot be edited.

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 2.06-G for the Sufficiency Rating formula.

WSBIS Item 2711 – Structurally Deficient/Functionally Obsolete

This item is calculated automatically and cannot be edited.

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 2711a - 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 2711b - 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

WSBIS Item 2614 – Subject to NBIS Flag

(Cannot be null.)

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)

Bridge ID Tab (formerly WB71)

WSBIS Item 1001 – Structure Identifier

FHWA Item 8 – Structure Number
NTI Item I.1 – Tunnel Number
(Cannot be null.)

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 WSDOT Inventory Engineer at the Bridge Preservation Office assigns 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

(Cannot be null.)

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. This field is maintained for tunnels and culverts.

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

(Cannot be null.)

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 2400 – Program Manager

(Cannot be null.)

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 1019 – Owner

FHWA Item 22 – Owner

NTI Item C.1 - Owner

(Cannot be null.)

The actual name of the owner of the structure shall be recorded on the inspection form. The code shall be used to represent the type of agency that is the primary owner of the structure. If more than one agency has equal ownership, code one agency in the hierarchy of State, Federal, county, city, railroad, and other private.

Table 1019 - Owner Code

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

FHWA Item 3 – County Code
NTI Item I.4 – County Code
(Cannot be null.)

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.

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

(Cannot be null.)

This is the 1990 federal census place code, updated by OFM for cities incorporated after 1999. These codes are available in an Excel spreadsheet within the "County and city codes" tab at www.ofm.wa.gov/pop/geographic/codes/geographic_codes.xlsx.

Use the 4-digit Place_1990 column in the City Codes spreadsheet tab.

If the bridge is not in a city, code all zeroes.

Examples:

Aberdeen = 0005
Zillah = 1500

WSBIS Item 1132 – Bridge Name

NTI Item I.2 – Tunnel Name

(Cannot be null.)

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 is too long to fit in the field, use abbreviations to shorten it. This field is maintained for tunnels and culverts.

WSBIS Item 1156 – Location

FHWA Item 9 – Location

(Cannot be null.)

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 Items 2181, 2183, and 2185 – Section, Township, and Range

(Cannot be null.)

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 1188 – Latitude (XX degrees XX minutes XX.XX seconds)

WSBIS Item 1196 – Longitude (XXX degrees XX minutes XX.XX seconds)

FHWA Item 16 – Latitude
FHWA Item 17 – Longitude
NTI Item I.13 – Tunnel Portal's Latitude
NTI Item I.14 – Tunnel Portal's Longitude
(Cannot be null.)

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.

Accurate data can be acquired using internet resources such as Google Maps or Bing Maps. For On records, the reading should be taken at the beginning of the structure at centerline. When the route being inventoried has a Linear Referencing System (LRS) designation, the beginning of the structure is the lower milepoint for the LRS route. For Under records, the reading should be taken at the centerline of the roadway under the bridge or in the tunnel.

When data is acquired in the field, note that GPS devices will show the longitude as a negative number, but this field must be coded as a positive number. For On records, the reading should be taken at the beginning of the bridge at the centerline of the roadway if traffic allows, at the shoulder as necessary. For bridge Under records, the reading should be taken at the centerline of the inventory route where it crosses under the bridge. Generally this can be most easily taken from the deck of the bridge crossing over the route. For tunnel Under records, the reading should be taken at the beginning of the tunnel at the centerline of the roadway.

WSBIS Item 2615 – Special Structures Flag

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

Y	Yes, structure inspected by the BPO Special Structures group.
N	No, structure not inspected by the BPO Special Structures group.

Facilities Tab (formerly WB72)

WSBIS Item 1232 – Features Intersected

FHWA Item 6 – Features Intersected
(Cannot be null.)

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

FHWA Item 7 – Facility Carried by Structure
NTI Item I.10 – Facility Carried
(Cannot be null.)

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
MAIN STREET
ISRAEL RD
RAILROAD
PEDESTRIANS

WSBIS Item 1274 – Region Code

FHWA Item 2 – Highway Agency District
NTI Item I.6 – Highway Agency District

(Cannot be null.)

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 1276 – Federal Information Processing Standards (FIPS) Code

FHWA Item 4 – Place Code
NTI Item I.5 – Place Code

(Cannot be null.)

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

FHWA Item 20 – Toll
NTI Item C.4 - Toll
(Cannot be null.)

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 1286 – Custodian

FHWA Item 21 – Maintenance Responsibility
NTI Item C.2 - Operator
(Cannot be null.)

The codes below shall be used to represent the type of agency that has primary responsibility for maintaining the structure. If more than one agency has equal maintenance responsibility, code one agency in the hierarchy of State, Federal, county, city, railroad, and other private.

Table 1286 - Custodian Code

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 1288 – Parallel Structure

FHWA Item 101 – Parallel Structure Designation

(Cannot be null.)

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. 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.

WSBIS Item 1289 – Temporary Structure

FHWA Item 103 – Temporary Structure Designation

(Leave this field blank unless there are a temporary structure or conditions.)

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

FHWA Item 37 – Historical Significance

(Cannot be null.)

Structures are considered historically significant based on a review and listing on the National Register of Historic Places (NRHP). Generally this review is performed by the Washington State Department of Archaeology and Historic Preservation (DAHP).

Use one of the following codes:

Table 1292 - Historical Significance Code

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.

Layout Tab (Formerly WB73)

WSBIS Item 1332 – Year Built

FHWA Item 27 – Year Built
NTI Item A.1 – Year Built
(Cannot be null.)

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

FHWA Item 106 – Year Reconstructed
NTI Item A.2 – Year Rehabilitated
(Cannot be null.)

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 0000.

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 as part of a larger highway surfacing project (for example, overlay carried across bridge deck for surface uniformity without additional bridge work).
- 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 (XXXX feet)

FHWA Item 49 – Structure Length

(Cannot be null.)

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

Bridge lengths are taken 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 centerline length must be calculated.

This field is not used for tunnels, see WSBIS Item 1349.

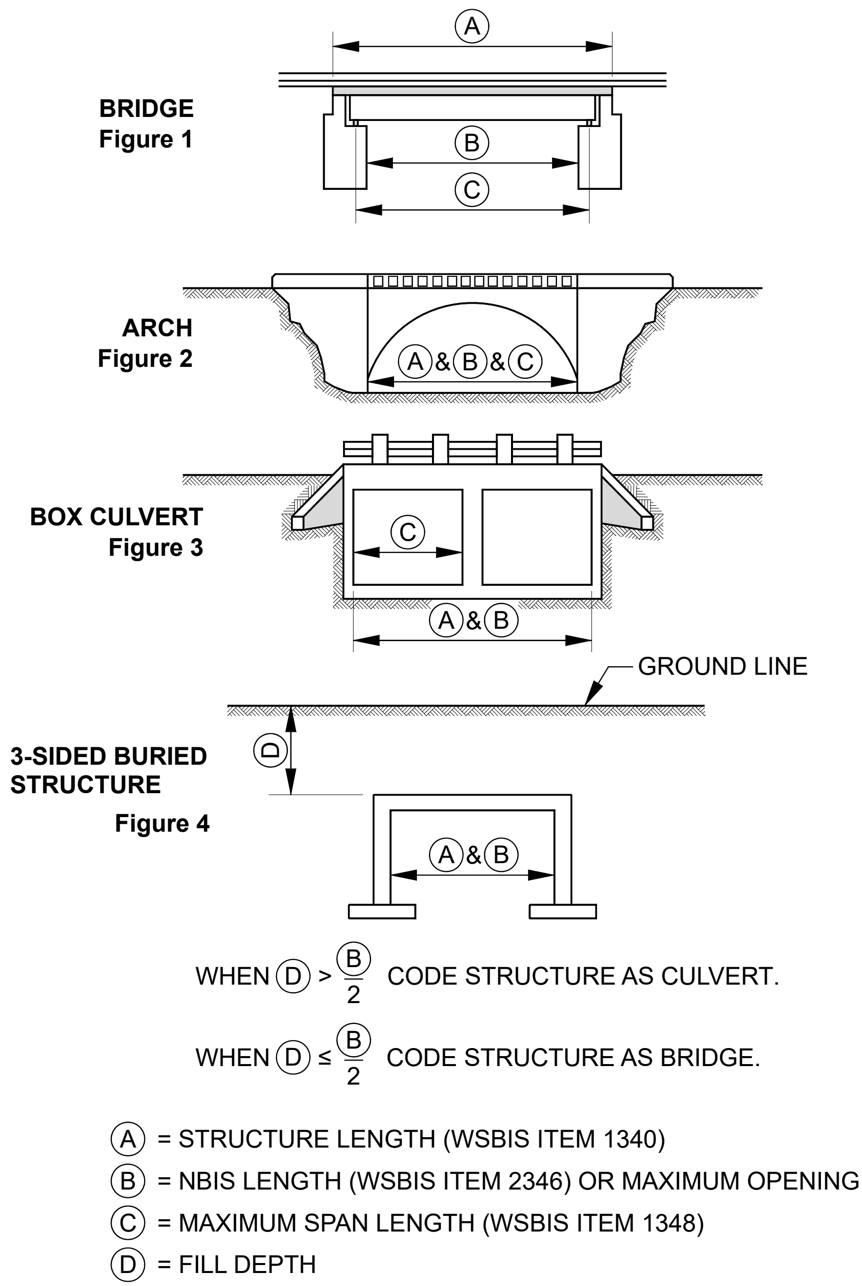


Figure WSBIS 1340a

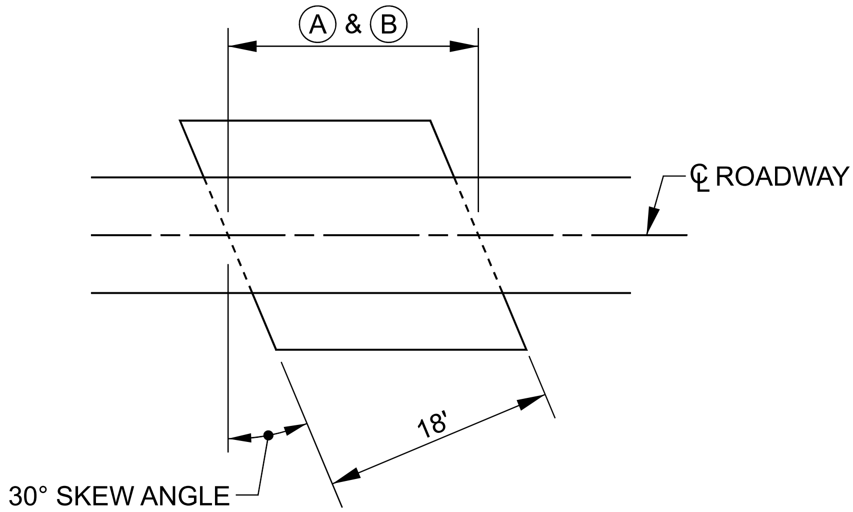


Figure 1

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

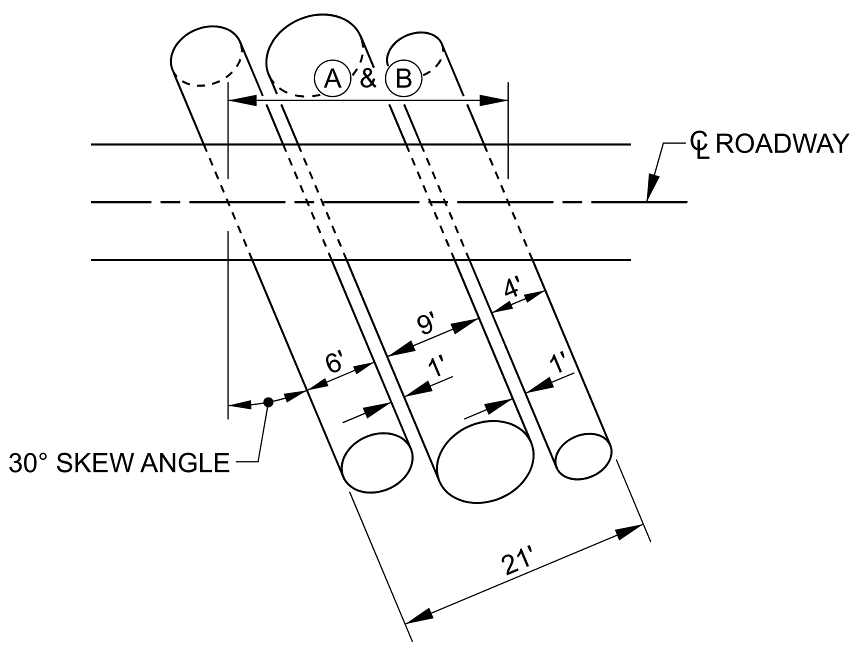


Figure 2

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

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

Figure WSBIS 1340b

WSBIS Item 2346 – NBIS Length (XX.X feet)

(Leave this field blank if the measurement as entered in Structure Length is less than 19 feet or greater than 23 feet.)

The NBIS bridge 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 10^{th} of a foot.

If the measurement as entered in Structure Length is between 19 and 23 feet inclusive, a measurement of the NBIS length shall be coded in this field. 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.

WSBIS Item 1348 – Maximum Span Length (XXXX feet)

FHWA Item 48 – Length of Maximum Span
(Cannot be null.)

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

FHWA Item 28A – Lanes On the Structure
(Cannot be null.)

Code the number of lanes being carried on the structure.

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.

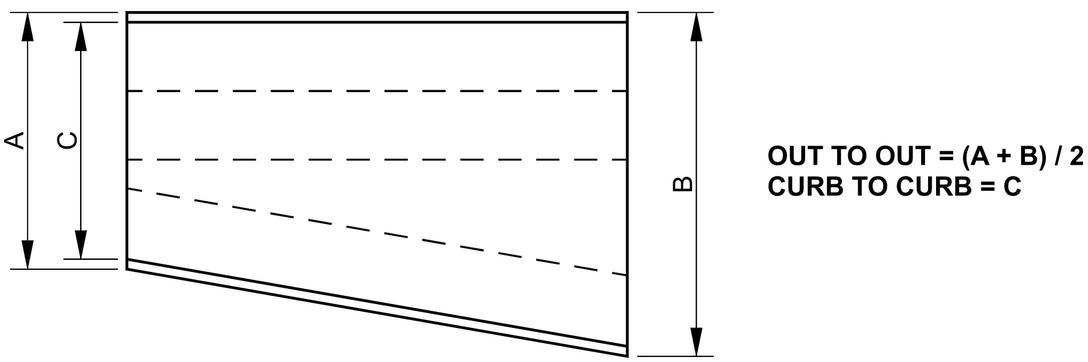
Double deck bridges may be coded as 1 or 2 structures, but all related data must be compatible with the method selected.

WSBIS Item 1356 – Curb-to-Curb Width (XXX.X feet)

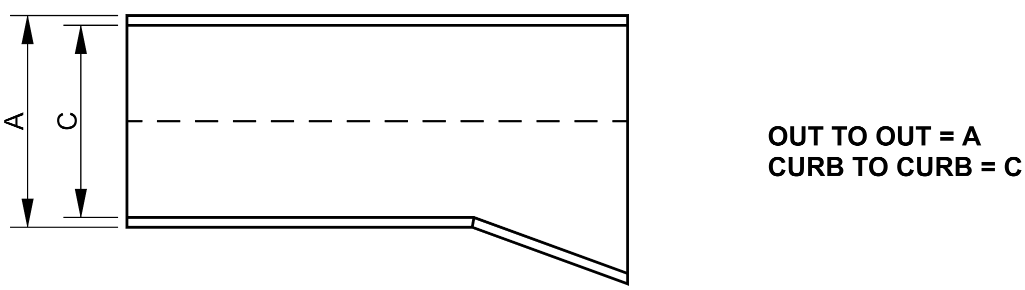
FHWA Item 51 – Bridge Roadway Width, Curb-to-Curb
NTI Item G.3 – Roadway Width, Curb-to-Curb
(Cannot be null.)

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.



EXAMPLE 1



EXAMPLE 2

Figure WSBIS 1356a

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.

Coding a sidehill viaduct (half bridge):

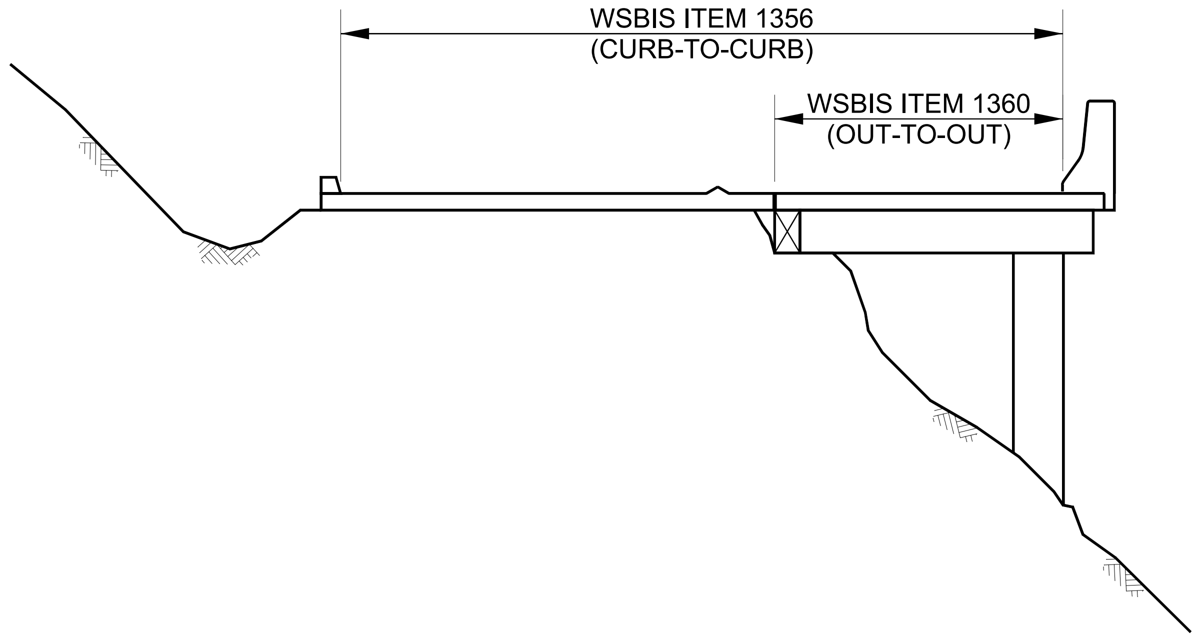


Figure WSBIS 1356b

WSBIS Item 1360 – Out-to-Out Deck Width **(XXX.X feet)**

FHWA Item 52 – Deck Width, Out-to-Out
(Cannot be null.)

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.

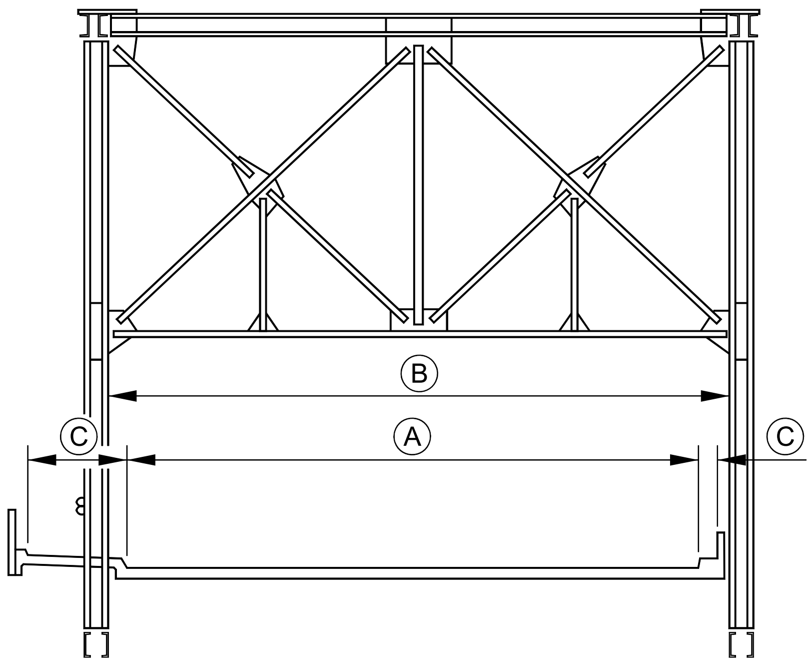
WSBIS Item 1364 – Sidewalk/Curb Width Left (XX.X feet)

NBI Item 50A – Curb or Sidewalk Width – Left
NTI Item G.4 – Left Sidewalk Width

WSBIS Item 1367 – Sidewalk/Curb Width Right (XX.X feet)

FHWA Item 50B – Curb or Sidewalk Widths Curb or Sidewalk Width – Right
NTI Item G.5 – Right Sidewalk Width
(Cannot be null.)

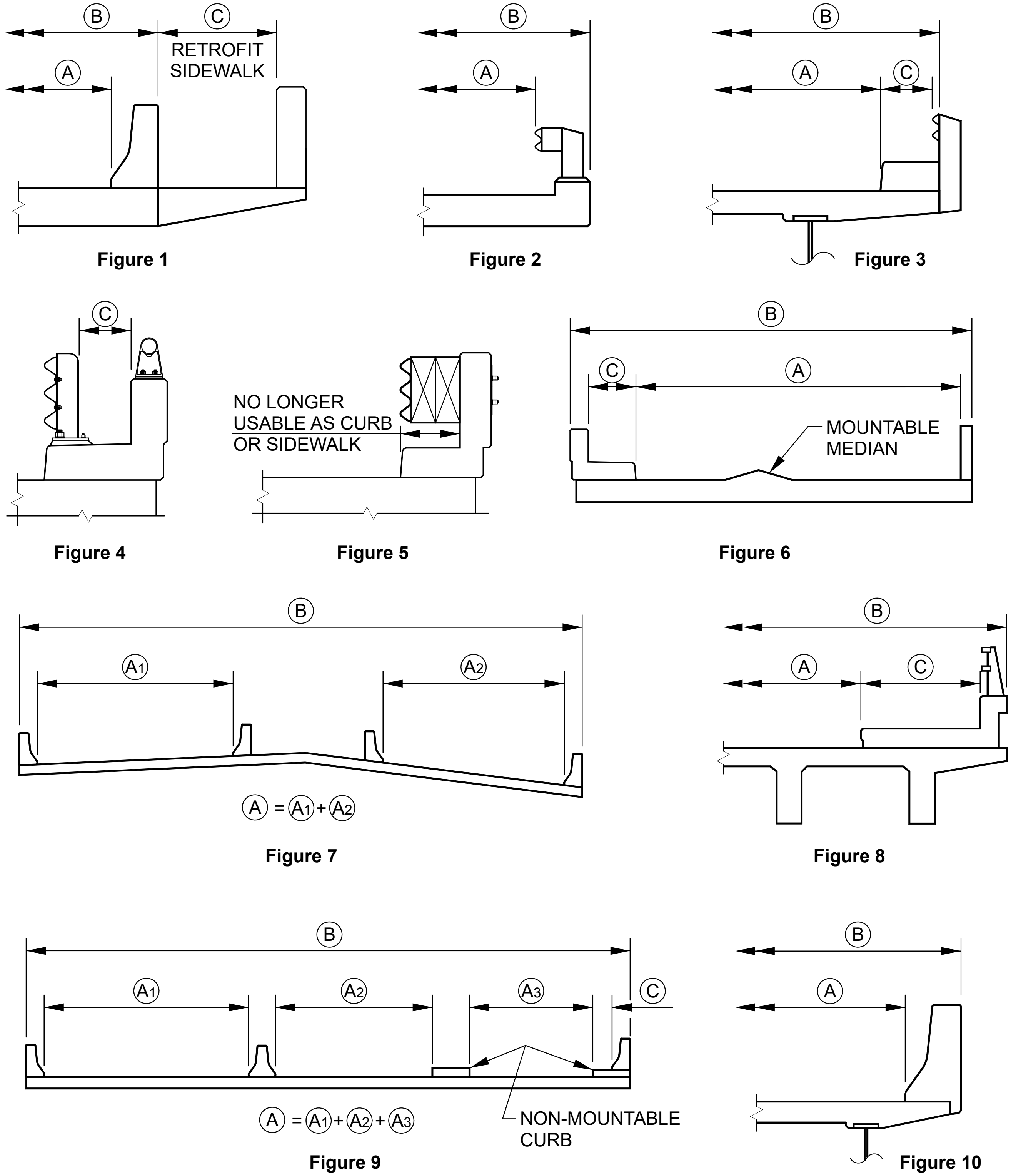
Code the widths of the left and right curbs or sidewalks to the nearest tenth of a foot. Code zeroes when there are no curbs or sidewalks.



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

(1) WSBIS 1356 – Roadway Width, Curb-to-Curb
(2) WSBIS 1360 – Deck Width, Out-to-Out
(3) WSBIS 1364 and 1367 – Curb or Sidewalk Width

Figure WSBIS 1364a



(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

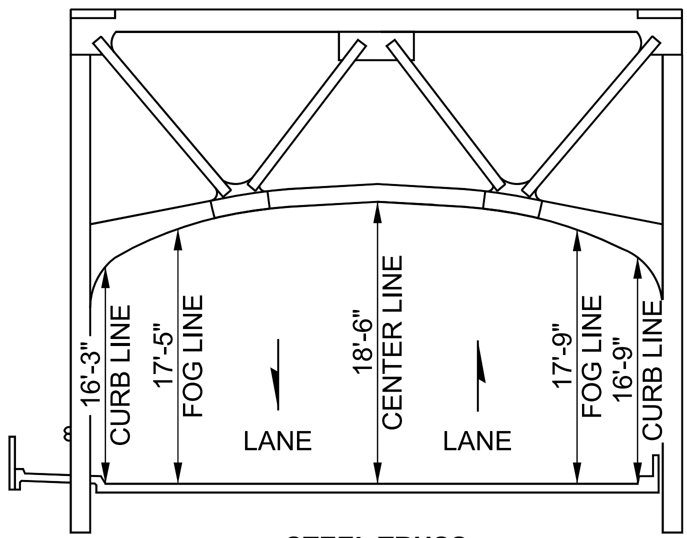
Figure WSBIS 1364b

WSBIS Item 1370 – Minimum Vertical Clearance Over Deck (XXXX feet and inches)

FHWA Item 53 – Minimum Vertical Clearance Over Bridge Roadway

(Cannot be null.)

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.



STEEL TRUSS
CODE: **1603**

Figure WSBIS 1370

WSBIS Item 1374 – Minimum Vertical Clearance Under Bridge (XXXX feet and inches)

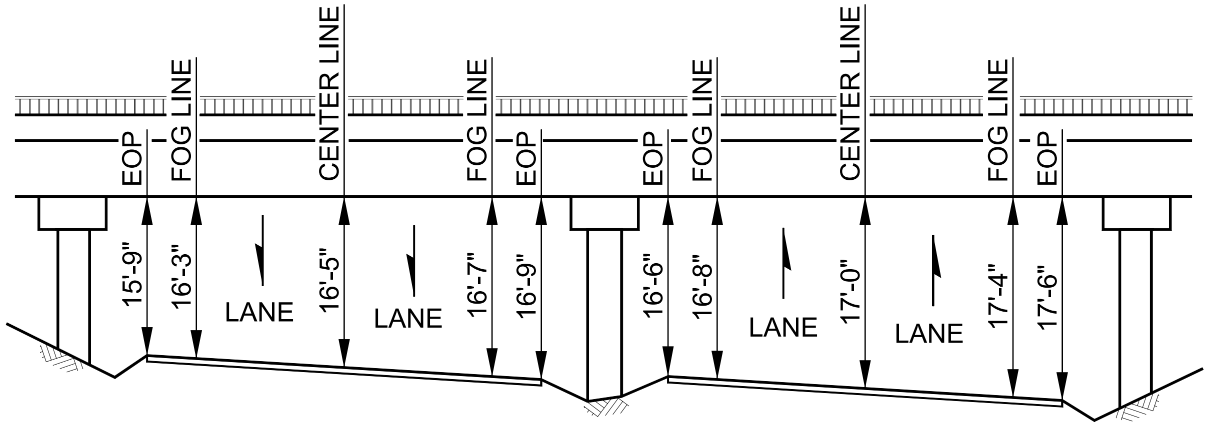
FHWA Item 54B – Minimum Vertical Underclearance
(Cannot be null.)

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.

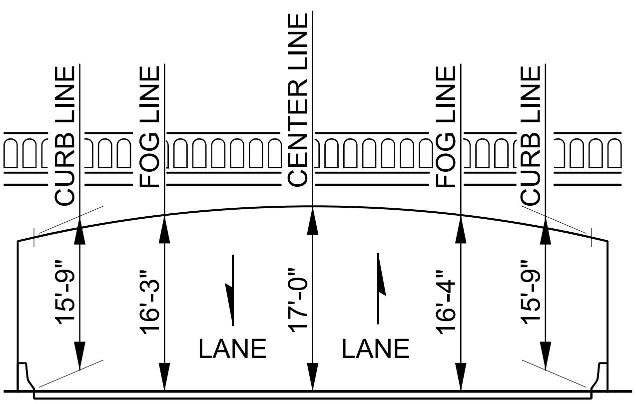
If the bridge crosses both a highway and a railroad, code the highway clearance UNLESS the railroad has a substandard clearance based on current design criteria and the roadway is NOT substandard.

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.

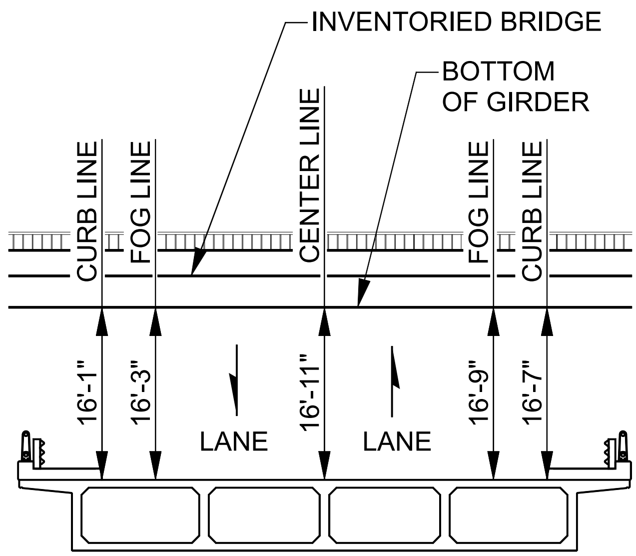
If the feature is not a highway or railroad, code the minimum vertical clearance 0. A highway is to be considered any functionally classified, public road. Private roads are not to be included.



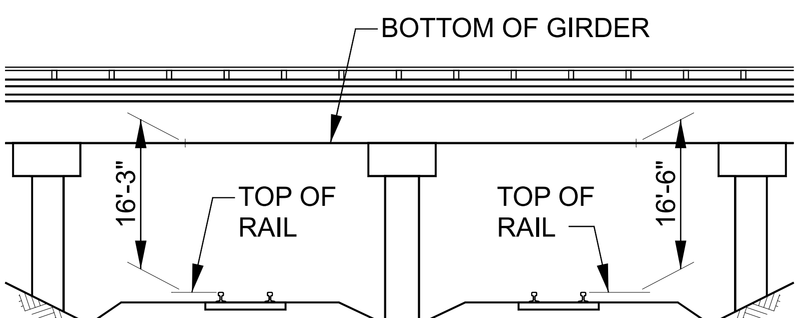
DIVIDED HIGHWAY (Fig. 1374a)
CODE: **1603**



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



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



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

Figure WSBIS 1374

WSBIS Item 1378 – Vertical Underclearance Code

FHWA Item 54A – Reference feature

(Cannot be null.)

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 (XX.X feet)

FHWA Item 55B – Minimum Lateral Underclearance on Right

(Cannot be null if bridge has an On record, must be null if the bridge does not have an On record.)

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

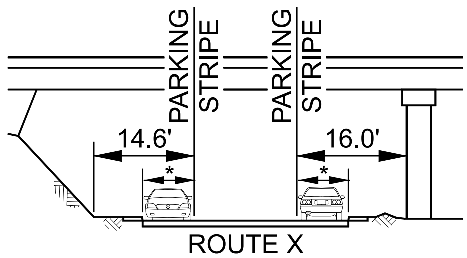
Code the minimum lateral underclearance on the right to the nearest tenth of a foot. When both a railroad and highway are under the structure, code the most critical dimension.

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.

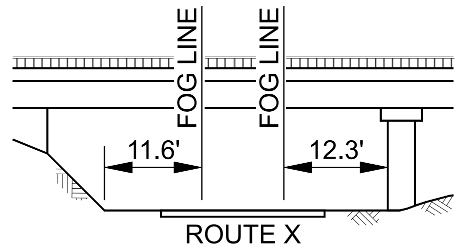
If two related features are below the bridge, measure both and record the lesser of the two. An explanation should be written on the inspection form as to what was recorded. When the clearance is 100 feet or greater, code 99.9.

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

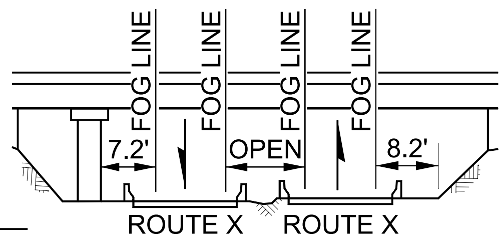
The presence of ramps and acceleration or turning lanes is not considered in this item; therefore, the minimum lateral clearance on the right should be measured from the right edge of the through roadway.



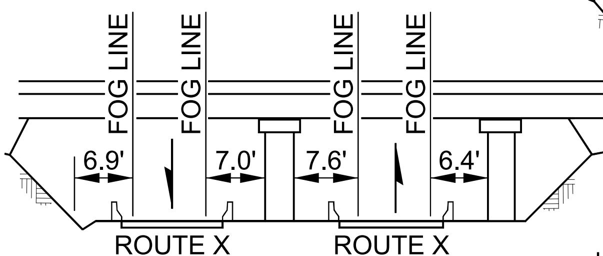
CITY STREET (Figure 1)
2-WAY TRAFFIC: RT. = 14.6 LT. = 0.0
1-WAY TRAFFIC LOOKING IN THE DIRECTION OF TRAFFIC: RT. = 16.0 LT. = 14.6
* = PARKING AREA, INSPECTORS PLEASE DOCUMENT DIMENSION.



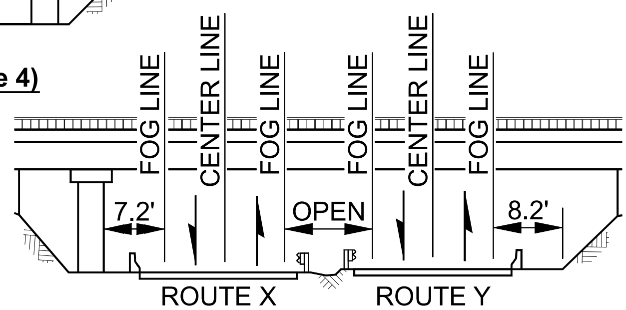
HIGHWAY (Figure 2)
2-WAY TRAFFIC: RT. = 11.6 LT. = 0.0
1-WAY TRAFFIC LOOKING IN THE DIRECTION OF TRAFFIC:
RT. = 12.3 LT. = 11.6



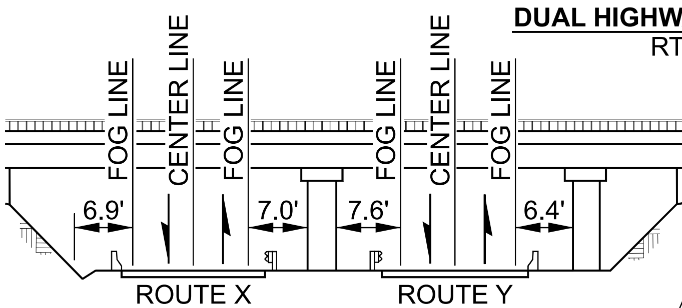
FREEWAY OPEN MEDIAN (Figure 3)
RT. = 7.2 LT. = 99.9



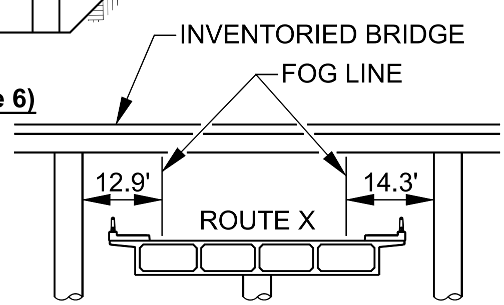
FREEWAY PIER MEDIAN (Figure 4)
RT. = 6.4 LT. = 7.0



DUAL HIGHWAY OPEN MEDIAN (Figure 5)
RT. = 7.2 LT. = 99.9

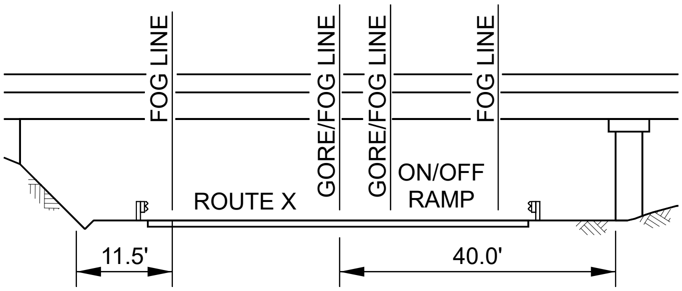


DUAL HIGHWAY PIER MEDIAN (Figure 6)
RT. = 6.4 LT. = 0.0



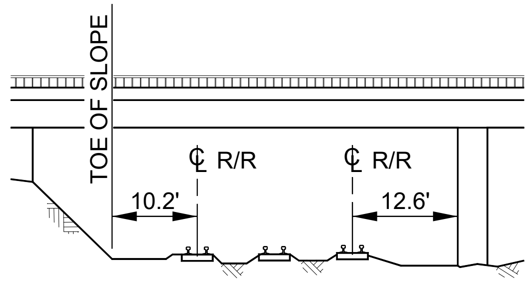
MULTIPLE LEVEL INTERCHANGE (Figure 7)
2-WAY TRAFFIC: RT. = 12.9 LT. = 0.0
1-WAY TRAFFIC LOOKING IN THE DIRECTION OF TRAFFIC: RT. = 14.3 LT. = 12.9

Figure WSBIS 1379a



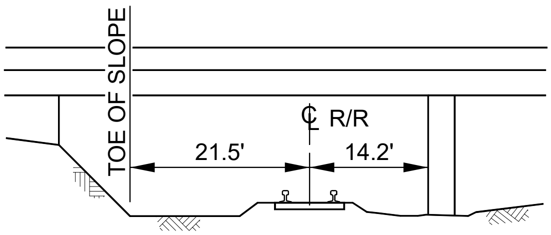
FREEWAY ON/OFF RAMP (Figure 1)

2-WAY TRAFFIC: RT. = 11.5 LT. = 0.0
1-WAY TRAFFIC LOOKING IN THE DIRECTION
OF TRAFFIC: RT. = 40.0 LT. = 11.5



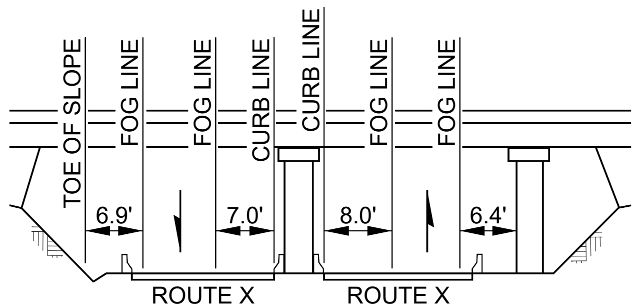
RAILROAD MULTIPLE TRACK (Figure 2)

RT. = 10.2 LT. = 0.0



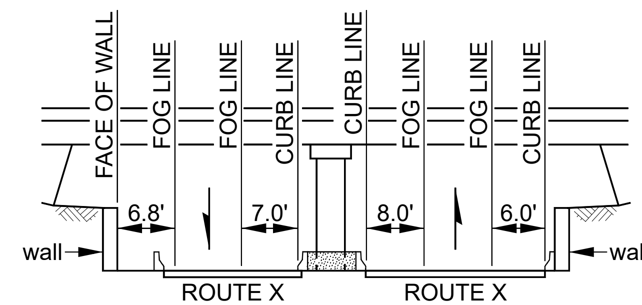
RAILROAD SINGLE TRACK (Figure 3)

RT. = 14.2 LT. = 0.0



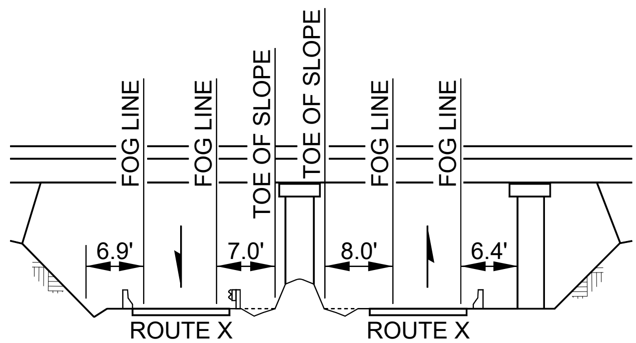
FREEWAY PIER MEDIAN WITH
BARRIER ADJACENT TO SUBSTRUCTURE (Figure 4)

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

Figure WSBIS 1379b

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

FHWA Item 55A – Minimum Lateral Underclearance on Right

(Cannot be null if bridge has an On record)

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 (XX.X feet)

FHWA Item 56 – Minimum Lateral Underclearance on Left

(Cannot be null if bridge has an On record)

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

This field is intended to record measurements on the left side of highway based on traffic direction for divided highways, 1 way streets, and ramps. For railroads and all 2 direction, 2 lane routes which are undivided, code 000.

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

FHWA Item 38 – Navigation Control

(Cannot be null.)

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 USCG[1]
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.

NBI Commentary:

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

WSBIS Item 1387 – Navigation Vertical Clearance (XXX feet)

FHWA Item 39 – Navigation Vertical Clearance

(Cannot be null.)

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 (XXXX feet)

FHWA Item 40 – Navigation Horizontal Clearance

(Cannot be null.)

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 (XXX feet)

FHWA Item 116 – Minimum Navigation Vertical Clearance, Vertical Lift Bridge

(Code this item only for vertical lift bridges in the dropped or closed position, otherwise leave blank.)

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 3/6/2013 email from Debbie Lehmann, FHWA, ferry terminal structures coded as lift spans should have 000 coded in this field.

WSBIS Item 1291 – Median

FHWA Item 33 – Bridge Median

(Cannot be null.)

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

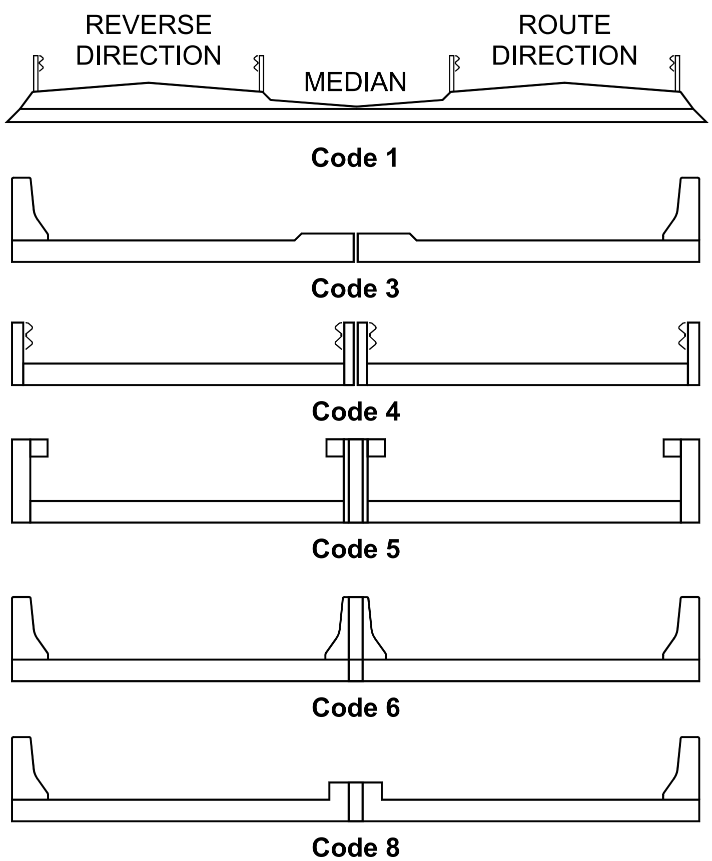


Figure WSBIS 1291

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 (XXX feet)

FHWA Item 32 – Approach Roadway Width

(Cannot be null if bridge has an On record, must be null if the bridge does not have an On record.)

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 1310 – Skew (XX degrees)

FHWA Item 34 – Skew

(Cannot be null.)

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.

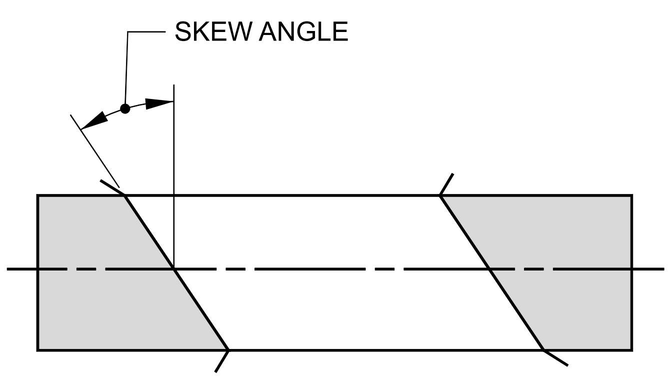


Figure WSBIS 1310

WSBIS Item 1312 – Flared Flag

FHWA 35 – Structure Flared

(Cannot be null.)

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

Crossing Tab (Formerly WB74)

WSBIS Item 2000 – Main Listing Flag

See Coding Guide Clarifications for a description of the Main Listing Flag.

This item is visible in the BridgeWorks Inventory Management mode.

WSBIS Items 1432, 1433, 1434, and 1435

FHWA Item 5 – Inventory Route

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

FHWA Item 5A – Record type

(Cannot be null.)

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

FHWA Item 5B – Route Signing Prefix
NTI Item I.9 – Route Type

(Cannot be null.)

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)

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

FHWA Item 5C – Designated Level of Service

(Cannot be null.)

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

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

WSBIS Item 1435 – Route XXXXX

FHWA Item 5D – Route Number
NTI Item I.7 – Route Number
(Cannot be null.)

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 (XXX.XX) miles

(Cannot be null.)

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 2436 – Route Sequencer XX

(Cannot be null.)

The route sequencer is a two digit number used for placement of crossing records 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.

WSBIS Item 2437 – Bridge List Milepost Override (XXX.XX) miles

(Cannot be null.)

The bridge list milepost override is used for placement of crossing records in the *Bridge List* M 23-09.

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

WSBIS Item 2438 – Milepost Sequencer XX

(Cannot be null.)

The milepost sequencer is a two digit number used for placement of crossing records 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.

WSBIS Item 2468 – Directional Indicator

(Cannot be null.)

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

WSBIS Item 2470 – Ahead/Back Indicator

(Cannot be null.)

The ahead/back indicator specifies whether a milepost value is the 'back' (B) duplicate of a milepost value 'ahead' (A) on the route.

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

WSBIS Item 1467 – Linear Referencing System Route XXXXXXXXXXXX

FHWA Item 13A – LRS Inventory Route Number
NBI Item I.11 – LRS Route ID
(Cannot be null.)

Linear Reference is coded to correspond to the location of the crossing as it relates to the WSDOT standard Linear Referencing System (LRS). The LRS used must correspond to the LRS reported by our state's Highway Performance Monitoring System (HPMS).

Primarily the State Route LRS representation will be seen in this field, but there will be some form of a local LRS to use as well. For the State Route mainline, code the LRS as a three digit number (e.g., 090, 002). When coding other State Route types (e.g., ramps, couplets, spurs) maintain the 3 digit route designator along with additional information signifying a related route.

Examples:

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

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 1477 – Linear Referencing System Subroute

FHWA Item 13B – LRS Subroute Number

(Cannot be null.)

The LRS subroute number is always coded 00.

NBI Commentary:

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

WSBIS Item 1469 – LRS Milepost (XXX.XX) miles

FHWA Item 11 – Kilometerpoint

NTI Item I.12 – LRS Milepoint

(Cannot be null.)

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.

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

FHWA Item 104 – Highway System of the Inventory Route

NTI Item C.5 – NHS Designation

(Cannot be null.)

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

FHWA Item 12 – Base Highway Network

(Cannot be null.)

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

FHWA Item 100 – STRAHNET Highway Designation

NTI Item C.6 – STRAHNET Designation

(Cannot be null.)

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

FHWA Item 105 – Federal Lands Highways

(Cannot be null.)

Code zeroes for this field.

NBI Commentary:

WSDOT has not been able to identify a source for this data, and will code zeroes until an information source is identified.

WSBIS Item 1487 – Functional Classification

FHWA Item 26 – Functional Classification of Inventory Route
NTI Item C.7 – Functional Classification
(Cannot be null.)

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

FHWA Item 110 – Designated National Network
(Cannot be null.)

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

FHWA Item 102 – Direction of Traffic
NTI Item C.3 – Direction of Traffic

(Cannot be null.)

Code the direction of traffic of the inventory route identified in WSBIS Item 1435 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

FHWA Item 28B – Lanes Under the Structure
NTI Item A.3 – Total Number of Lanes

(Cannot be null.)

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 1445 – ADT XXXXXX

FHWA Item 29 – Average Daily Traffic
NTI Item A.4 – Average Daily Traffic
(Cannot be null.)

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 (XX percent)

FHWA Item 109 – Average Daily Truck Traffic
NTI Item A.6 – Average Daily Truck Traffic
(Cannot be null.)

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

FHWA Item 30 – Year of Average Daily Traffic
NTI Item A.6 – Year of Average Daily Traffic
(Cannot be null.)

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

FHWA Item 114 – Future Average Daily Traffic

(Cannot be null if inventory route is on the bridge, must be null if inventory route is under the bridge.)

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

FHWA Item 115 – Year of Future Average Daily Traffic

(Cannot be null if inventory route is on the bridge, must be null if inventory route is under the bridge.)

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 1413 – Detour Length (XX miles)

FHWA Item 19 – Bypass, Detour Length
NTI Item A.7 – Detour Length
(Cannot be null.)

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.

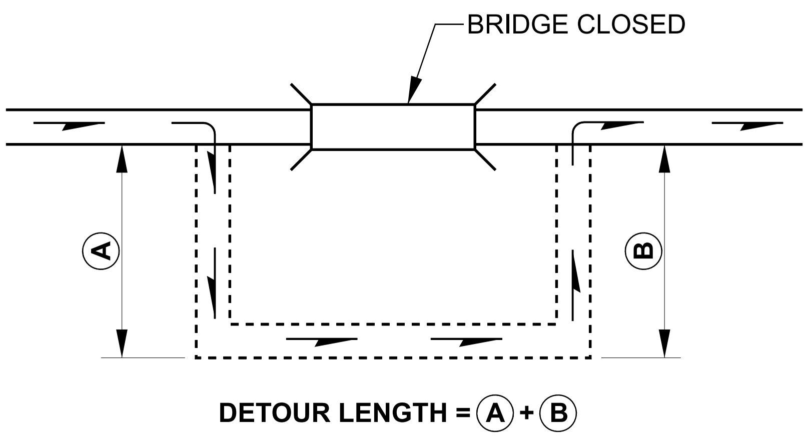


Figure 1413

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 2409 – NTI Reportable Flag

(Cannot be null.)

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

(Cannot be null.)

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 2411– Bridge List

(Cannot be null.)

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 1491 – Horizontal Clearance, Route Direction (XXXX feet & inches)

WSBIS Item 1495 – Horizontal Clearance, Reverse Direction (XXXX feet & inches)

FHWA Item 47 – Inventory Route, Total Horizontal Clearance
(Cannot both be null.)

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. Roadway surface and shoulders when there are no other restrictions.

When the entire inventory route passes through a single opening, code the measurement in WSBIS Item 1491 and WSBIS Item 1495 blank.

When the inventory route passes through multiple openings, code WSBIS Item 1491 and WSBIS Item 1495 for the mainline as appropriate.

When a restriction is 100 feet or greater, code 9912.

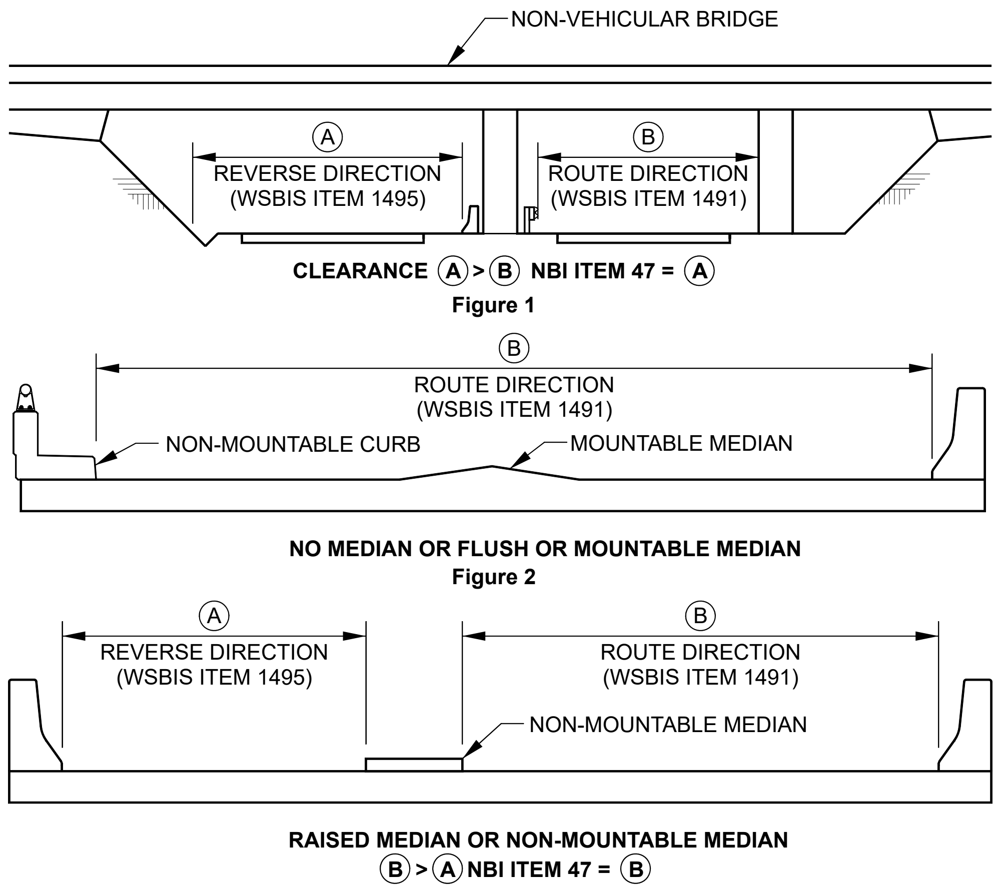


Figure 1495

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 1499 – Maximum Vertical Clearance Route Direction (XXXX feet & inches)

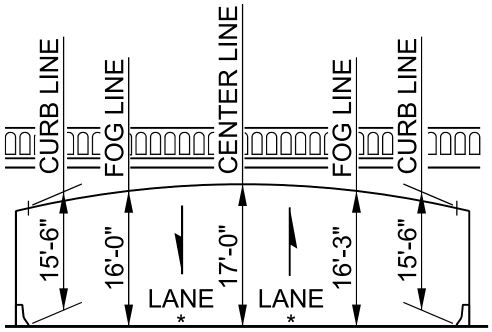
FHWA Item 10 – Inventory Route, Minimum Vertical Clearance

(Null when no restriction exists.)

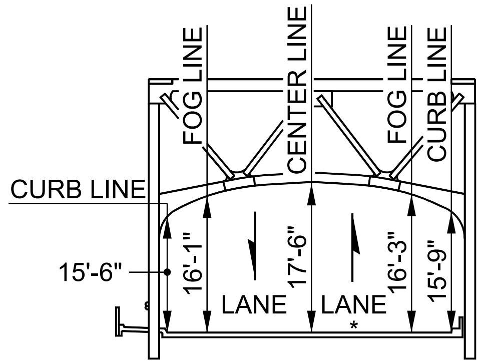
Code the practical maximum vertical clearance over the inventory route identified in WSBIS Item 1435, in the direction of increasing mileposts, whether the route is on the structure or under the structure. This field identifies the minimum vertical clearance for the lane that will carry the highest load, regardless of the direction of travel. When no restriction exists leave this item blank. When the restriction is 100 feet or greater code 9912.

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.

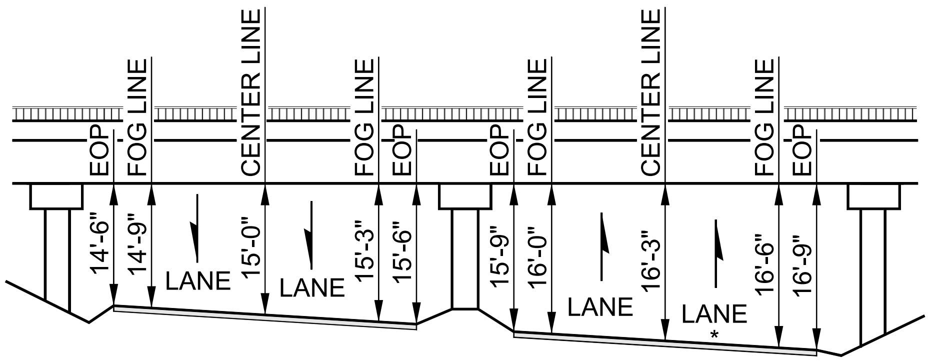
Example:



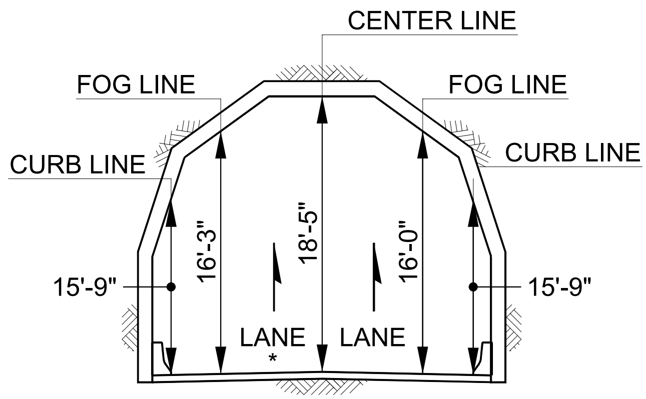
UNDIVIDED HIGHWAY EXAMPLE
Figure 1499a



STEEL TRUSS EXAMPLE
Figure 1499b



DIVIDED HIGHWAY EXAMPLE
Figure 1499c



TUNNEL
Figure 1499d

Code "1603": THE MAXIMUM VERTICAL HEIGHT ALLOWED IN ANY 10 FOOT ROADWAY WIDTH IS THE LEAST VERTICAL CLEARANCE IN THE LANE OF ROADWAY WITH THE MAXIMUM VERTICAL CLEARANCE.

* CONTROLLING LANE.

Figure 1499

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.

WSBIS Item 2500 – Minimum Vertical Clearance Route Direction (XXXX feet & inches)

(Null when no restriction exists.)

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 2501 – Maximum Vertical Clearance Reverse Direction (XXXX feet & inches)

(Null when route is an undivided highway or when no restriction exists.)

Code the practical maximum vertical clearance over the inventory route identified in WSBIS Item 1435, in the direction of decreasing 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 2502 – Minimum Vertical Clearance Reverse Direction (XXXX feet & inches)

(Null when route is an undivided highway or when no restriction exists.)

Code the practical minimum vertical clearance over the inventory route identified in WSBIS Item 1435, in the direction of decreasing 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 2401– Crossing Manager

(Cannot be null.)

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

(Cannot be null.)

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

Design Tab (Formerly WB75)

WSBIS Item 1532 – Main Span Material

FHWA Item 43A – Structure Type, Main, Kind of Material

(Cannot be null.)

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)

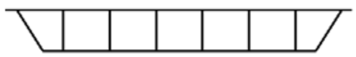
WSBIS Item 1533 – Main Span Design

FHWA Item 43B – Structure Type, Main, Type of Design

(Cannot be null.)

Indicate the predominant type of design and/or type of construction.

Table 1533 - Main Span Design Code

WSBIS Code	NBI Code	Description
1	01	Slab
2	02	Stringer/Multibeam or Girder
3	03	Girder and Floorbeam System
4	04	Tee Beam
5	05	Box Beam or Girders – Multiple 
6	06	Box Beam or Girders – Single or Spread 
7	07	Frame (except frame culverts)
8	08	Orthotropic
9	09	Truss – Deck
10	10	Truss – Thru
11	11	Arch – Deck
12	12	Arch – Thru
13	13	Suspension
14	14	Stayed Girder
15	15	Movable – Lift
16	16	Movable – Bascule
17	17	Movable – Swing
18	18	Tunnel (this code designates reporting to the NTI instead of the NBI)
19	19	Culvert (includes frame culverts)
20*	20*	Mixed types
21	21	Segmental Box Girder
22	22	Channel Beam (Bathtub Unit)
0	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

FHWA Item 44A – Structure Type, Approach Spans, Kind of Material

(Cannot be null.)

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

FHWA Item 44B – Structure Type, Approach Spans, Type of Design

(Cannot be null.)

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

(Cannot be null.)

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	Alpha Span Type	Description
3SCCulv	3 Sided Concrete Culvert	PTCSeg	Post-Tensioned Segmental Box Girder
3STCulv	3 Sided Timber Culvert	PTCTB	Post-Tensioned Concrete T-Beam
BAS	Bascule Lift Span	SA	Steel Arch
CA	Concrete Arch	SBox	Steel Box Girder
CBox	Concrete Box Girder	SCulv	Steel Culvert
CCulv	Concrete Culvert	SFP	Steel Floating Pontoon
CEFA	Concrete Earth Filled Arch	SG	Steel Girder (weld or rivet)
CESB	Concrete Encased Steel Beam	SLS	Steel Lift Span
CFP	Concrete Floating Pontoon	SRB	Steel Rolled Beam
CG	Concrete Girder	SSCG	Steel Stayed Concrete Girder
CLTun	Concrete Lined Tunnel	SSusS	Steel Suspension Span
CS	Concrete Slab	SSwS	Steel Swing Span
CSS	Cable Stayed Span	STA	Steel Tied Arch
CSTP	Concrete Slab on Timber Piling	STrus	Steel Truss
CTB	Concrete T-Beam	TCulv	Timber Culvert
CTrus	Concrete Truss	TLTun	Timber Lined Tunnel
CVS	Concrete Voided Slab	TS	Timber Slab
LIDTun	Cut and Cover (LID) Tunnel	TTC	Treated Timber (Creosote) Bridge
MCulv	Masonry Culvert	TTLB	Treated Timber Laminated Beam
PCBTG	Prestressed Concrete Bulb-T Girder	TTS	Treated Timber (Salts) Bridge
PCG	Prestressed Concrete Girder	TTTrus	Treated Timber Truss
PCMWG	Prestressed Concrete Multi-Web Girder	UT	Untreated Timber Bridge
PCS	Prestressed Concrete Slab	UTLB	Untreated Timber Laminated Beam
PCTG	Prestressed Concrete Trapizoidal Girder	UTTrus	Untreated Timber Truss
Plaza	Park Plaza Structures	UTun	Unlined Tunnel
PRCB	Precast Reinforced Concrete Beam	WSBox	Weathering Steel Box Girder
PTCBox	Post-Tensioned Concrete Box Girder	WSG	Weathering Steel Girder

WSBIS Item 1538 – Number of Main Spans

FHWA Item 45 – Number of Spans in Main Unit

(Cannot be null.)

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

FHWA Item 46 – Number of Approach Spans

(Cannot be null.)

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

FHWA Item 42A – Type of Service On Bridge

(Cannot be null.)

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

FHWA Item 42B – Type of Service Under Bridge

(Cannot be null.)

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

FHWA Item 107 – Deck Structure Type

(Cannot be null.)

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.

FHWA Item 108 – Wearing Surface/Protective System

(Cannot be null.)

Information on the wearing surface and protective system of the bridge deck shall be coded using a 3-digit code composed of three segments, WSBIS Items 1547, 1548 and 1549.

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/Protective system codes.

WSBIS Item 1547 – Wearing Surface

FHWA Item 108A – Type of 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

FHWA Item 108B – Type of 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

FHWA Item 108C – Deck Protection

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

FHWA Item 31 – Design Load

(Cannot be null if bridge has an On record, must be null if the bridge does not have an On record.)

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.

TEMPLATE
To
UPDATE LOAD RATINGS

(Actual Summary Sheets may vary)

BRIDGE RATING SUMMARY

Bridge Name: *WSBIS Item 1132 – check for accuracy*
Bridge Number: *WSBIS Item 2009 – check for accuracy*
Structure ID *WSBIS Item 1001 – check for accuracy*
Span Types: *WSBIS Item 2537 – check for accuracy*
Bridge Length: *WSBIS Item 1340 – check for accuracy*
Design Load: *WSBIS Item 1550 – check for accuracy*
Rated By: WSBIS Item 2582 – code/update
Checked By: ______
Date: WSBIS Item 2581 – code/update

Inspection Report Date:	2580 – code/update	Deck Condition	
Rating Method:	1551 – code/update	Superstructure Condition	
Overlay Thickness:		Substructure Condition	

Truck	RF (INV)	RF (OPR)	Controlling Point
AASHTO 1	WSBIS Item 2587 – code/update		
AASHTO 2	WSBIS Item 2588 – code/update		
AASHTO 3	WSBIS Item 2589 – code/update		
NRL	WSBIS Item 2590 – code/update		
SU4	WSBIS Item 2591 – code/update		
SU5	WSBIS Item 2592 – code/update		
SU6	WSBIS Item 2593 – code/update		
SU7	WSBIS Item 2594 – code/update		
OL-1	WSBIS Item 2595 – code/update		
OL-2	WSBIS Item 2596 – code/update		

NBI Rating	RF	TONS	Controlling Point
Inventory (HS20)	WSBIS Items 1552 and/or 1553 – code/update		
Operating (HS20)	WSBIS Items 1555 and/or 1556 – code/update		

Remarks:

WSBIS Item 2580 – Reference Inspection Date

(Cannot be null if bridge has an On record)

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, see Figure WSBIS 2580.

WSBIS Item 2581 – Load Rating Date

(Cannot be null if bridge has an On record)

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, see Figure WSBIS 2580.

WSBIS Item 2582 – Rated By

(Cannot be null if bridge has an On record)

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, see Figure WSBIS 2580.

WSBIS Item 2587 – Type 3 Rating Factor (XX.XX rating factor)

(Cannot be null if bridge has an On record)

Code the rating factor for the AASHTO Type 3 legal load truck 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 this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet, see Figure WSBIS 2580.

WSBIS Item 2588 – Type 3S2 Rating Factor (XX.XX rating factor)

(Cannot be null if bridge has an On record)

Code the rating factor for the AASHTO Type 3S2 legal load truck 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 this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet, see Figure WSBIS 2580.

WSBIS Item 2589 – Type 3-3 Rating Factor (XX.XX rating factor)

(Cannot be null if bridge has an On record)

Code the rating factor for the AASHTO Type 3-3 legal load truck 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 this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet, see Figure WSBIS 2580.

WSBIS Item 2590 – Notional Rating Load (NRL) Rating Factor (XX.XX rating factor)

(Cannot be null if bridge has an On record)

Code the rating factor for the AASHTO Notional Rating Load (NRL) 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 this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet, see Figure WSBIS 2580.

WSBIS Item 2591 – Single Unit 4 (SU4) Rating Factor (XX.XX rating factor)

Code the rating factor for the AASHTO SU4 legal load truck 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 this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet, see Figure WSBIS 2580.

This field can be null if WSBIS Item 2590 (NRL) is populated and equal to or greater than 1.00.

WSBIS Item 2592 – Single Unit 5 (SU5) Rating Factor (XX.XX rating factor)

Code the rating factor for the AASHTO SU5 legal load truck 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 this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet, see Figure WSBIS 2580.

This field can be null if WSBIS Item 2590 (NRL) is populated and equal to or greater than 1.00.

WSBIS Item 2593 – Single Unit 6 (SU6) Rating Factor (XX.XX rating factor)

Code the rating factor for the AASHTO SU6 legal load 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 this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet, see Figure WSBIS 2580.

This field can be null if WSBIS Item 2590 (NRL) is populated and equal to or greater than 1.00.

WSBIS Item 2594 – Single Unit 7 (SU7) Rating Factor (XX.XX rating factor)

Code the rating factor for the AASHTO SU7 legal load 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 this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet, see Figure WSBIS 2580.

This field can be null if WSBIS Item 2590 (NRL) is populated and equal to or greater than 1.00.

WSBIS Item 2595 – Overload 1 (OL-1) Rating Factor (XX.XX rating factor)

(Cannot be null if bridge has an On record)

Code the rating factor for the WSDOT Overload 1 (OL-1) permit load 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 factor only.

Usually this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet, see Figure WSBIS 2580.

WSBIS Item 2596 – Overload 2 (OL-2) Rating Factor (XX.XX rating factor)

(Cannot be null if bridge has an On record)

Code the rating factor for the WSDOT Overload 2 (OL-2) permit load 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 factor only.

Usually this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet, see Figure WSBIS 2580.

WSBIS Item 1551 – Operating Rating Method

FHWA Item 63 – Method Used to Determine Operating Rating

(Cannot be null if bridge has an On record)

Code this field with one of the following codes to indicate which load rating method was used to determine the rating for this bridge.

Table 1551 - Operating Rating Method Code

WSBIS Codes			
Used by WSDOT	Used by Local Agencies	NTI Codes	Description
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. Local Agencies uses codes 0 through 8 for bridges and culverts. For tunnels, all agencies use WSBIS codes 0, 1, 2, 3, 5, and A.			

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.

Codes A through E are not available in WSBIS because there are no agencies which use these methods.

WSBIS Item 1552 – Operating Rating Tons (XX tons)

FHWA Item 64 – Operating Rating
NTI Item L.3 – Operating Rating Factor

(Cannot be null if structure has an On record and WSBIS Item 1551 is coded 0 through 4. Must be null if WSBIS Item 1551 is coded 5 through 8 or F.)

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.

The following text defines both WSBIS Item 1552 – Operating Rating Tons and WSBIS Item 1555 – Inventory Rating Tons.

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/032204.htm.

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.

For reporting to the FHWA, this 2-digit number is converted to metric tons and reported as a 3-digit number, rounded to tenths.

WSBIS Item 1553 – Operating Rating Factor (X.XX rating factor)

FHWA Item 64 – Operating Rating

(Cannot be null if bridge has an On record and WSBIS Item 1551 is coded 5 through 8 or F. Must be null if WSBIS Item 1551 is coded 0 through 4.)

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 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 1554 – Inventory Rating Method

FHWA Item 65 – Method Used to Determine Inventory Rating
NTI Item L.1 – Load Rating Method

See WSBIS Item 1551 for coding instructions.

WSBIS Item 1555 – Inventory Rating Tons (XX tons)

FHWA Item 66 – Inventory Rating

For Inventory Rating Methods coded 0 through 4, see WSBIS Item 1552 for rating tons coding instructions.

WSBIS Item 1556 – Inventory Rating Factor (X.XX rating factor)

FHWA Item 66 – Inventory Rating
NTI Item L.2 – Inventory Load Rating Factor

For Inventory Rating Methods coded 5 through 8 or F, see WSBIS Item 1553 for rating factor coding instructions.

WSBIS Item 1585 – Border Bridge State Code

FHWA Item 98A – Border Bridge, Neighboring State Code

(If the bridge is not on a border, leave blank.)

Use this item to indicate structures crossing to Oregon or Idaho. Code a 3-digit number specifying which border state.

The neighboring state codes are:

Oregon 410
Idaho 160

NBI Commentary:
This field has been limited to codes relevant to Washington State.

WSBIS Item 1588 – Border Bridge Percent

FHWA Item 98B – Border Bridge, Percent Responsibility

(If the bridge is not on a border, leave blank.)

Code a 2-digit number specifying the percent responsibility for any bridge improvements born by the border state.

WSBIS Item 1590 – Border Bridge Structure Identifier

FHWA Item 99 – Border Bridge Structure Number

(If the bridge is not on a border, leave blank.)

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.

Proposed Improvements Tab (Formerly WB78)

The following Proposed Improvement items must be coded for bridges eligible for the Highway Bridge Replacement and Rehabilitation Program. To be eligible, a bridge must carry highway traffic, be structurally deficient and have a sufficiency rating of 80.0 or less. This item may be coded for other bridges at the option of the highway agency.

WSDOT maintains all proposed improvement data for all bridges. These codes are automatically populated for every bridge, but can be manually overridden as appropriate. If manual entry is to be done, use WSBIS Item 2883 to prevent automatic calculation.

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 1844 – Work Type

FHWA Item 75A – Type of Work ProposedUse one of the following codes to represent the proposed work type:

Table 1844 - Work Type Code

WSBIS Code	Description
31	Replacement of bridge or other structure because of substandard load carrying capacity or substandard bridge roadway geometry.
32	Replacement of bridge or other structure because of relocation of road.
33	Widening of existing bridge or other major – structure without deck rehabilitation or replacement; includes culvert lengthening.
34	Widening of existing bridge with deck rehabilitation or replacement.
35	Bridge rehabilitation because of general structure deterioration or inadequate strength.
36	Bridge deck rehabilitation with only incidental widening.
37	Bridge deck replacement with only incidental widening.
38	Other structural work, including hydraulic replacements.

WSBIS Item 1846 – Work Method

FHWA Item 75B – Work Done By

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
1	Work to be done by contract
2	Work to be done by owner’s forces

WSBIS Item 1847 – Structure Length (XXXX feet)

FHWA Item 76 – Length of Structure Improvement

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 (XXX feet)

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 (XXX dollars)

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 (XXXXXX in thousands of dollars)

FHWA Item 94 – Bridge Improvement Cost

Code a number to represent the estimated cost of the proposed bridge improvements (including replacement) in thousands of dollars. Numbers exceeding 6 digits will be converted to 999999 for the NBI submittal. This cost does not include roadway, right of way, detour, demolition, or preliminary engineering costs.

WSBIS Item 1873 – Roadway Cost (XXXXXX in thousands of dollars)

FHWA Item 95 – Roadway Improvement Cost

Code a number to represent the cost of the proposed roadway improvement in thousands of dollars. Numbers exceeding 6 digits will be converted to 999999 for the NBI submittal. 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.

WSBIS Item 2870 – Engineering and Miscellaneous Cost (in thousands of dollars)

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 (XXXXXX in thousands of dollars)

FHWA Item 96 – Total Project Cost

Code a number to represent the total project cost in thousands of dollars, including incidental costs not included in Structure Cost and Roadway Cost. Numbers exceeding 6 digits will be converted to 999999 for the NBI submittal. 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.

WSBIS Item 1879 – Estimate Year

FHWA Item 97 – Year of Improvement Cost Estimate

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.

WSBIS Item 2883 – Proposed Improvement Calculation

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 1436 – Tunnel Route Direction

NTI Item I.8 –Route Direction

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
0	Two route directions
1	North
2	East
3	South
4	West

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 1543 – Service In Tunnel

NTI Item A.8 –Service In Tunnel

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 1022 – Urban Code

NTI Item C.8 – Urban Code

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

Table 1022 - Urban Code

WSBIS Code	Urban Area Name
Urban Areas with Populations of 50,000 or more as of 2017	
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
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

WSBIS Item 1349 – Tunnel Length

NTI Item G.1 – Tunnel Length

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 1401 – Minimum Vertical Clearance Over Tunnel Roadway

NTI Item G.2 – Minimum Vertical Clearance Over Tunnel Roadway

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 1992 – Routine Inspection Target Date

NTI Item D.1 – Routine Inspection Target Date

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.

WSBIS Item 1560 – Posted Load - Gross

NTI Item L.5 – Posting Load - Gross

Record the gross weight limit shown on the load posting sign rounded down to the nearest US ton. Leave this item blank if there is no load posting sign.

WSBIS Item 1561 – Posted Load - Axle

NTI Item L.5 – Posting Load - Axle

Record the axle weight limit shown on the load posting sign rounded down to the nearest US ton. Leave this item blank if there is no load posting sign.

WSBIS Item 1562 – Posted Load – Type 3

NTI Item L.5 – Posting Load – Type 3

Record the Type 3 weight limit shown on the load posting sign rounded down to the nearest US ton. Leave this item blank if there is no load posting sign.

WSBIS Item 1563 – Posted Load – Type 3S2

NTI Item L.5 – Posting Load – Type 3S2

Record the Type 3S2 weight limit shown on the load posting sign rounded down to the nearest US ton. Leave this item blank if there is no load posting sign.

WSBIS Item 1564 – Posted Load – Type 3-3

NTI Item L.5 – Posting Load – Type 3-3

Record the Type 3-3 weight limit shown on the load posting sign rounded down to the nearest US ton. Leave this item blank if there is no load posting sign.

WSBIS Item 1402 – Tunnel Height Restriction

NTI Item L.10 – Height Restriction

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

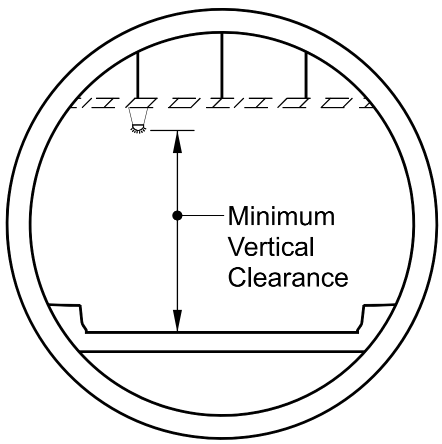


Figure WSBIS 1402a

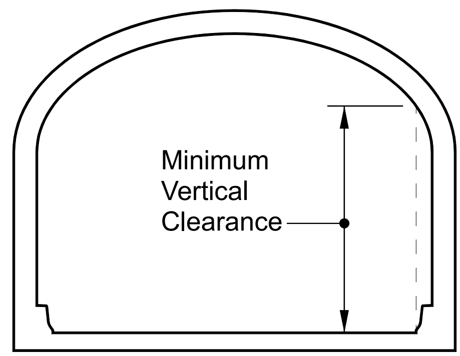


Figure WSBIS 1402b

WSBIS Item 1408 – Tunnel Hazardous Material Restriction

NTI Item L.11 – Hazardous Material Restriction

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

NTI Item L.11 – Other Restrictions

Record any other restriction status (not including height or hazardous material restrictions) for the route in the tunnel using one of the following codes:

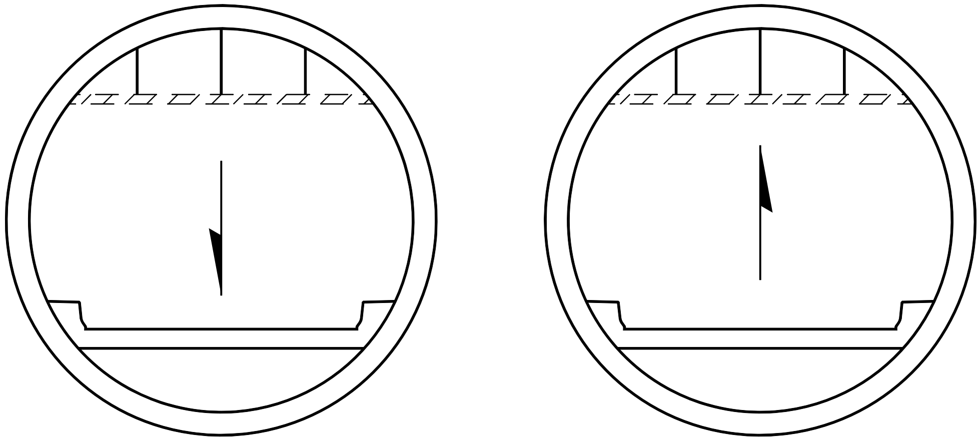
Table 1409 - Other Tunnel Restriction Code

WSBIS Code	Description
1	Yes, there are other restrictions
2	No, there are no other restrictions

WSBIS Item 1510 – Number of Tunnel Bores

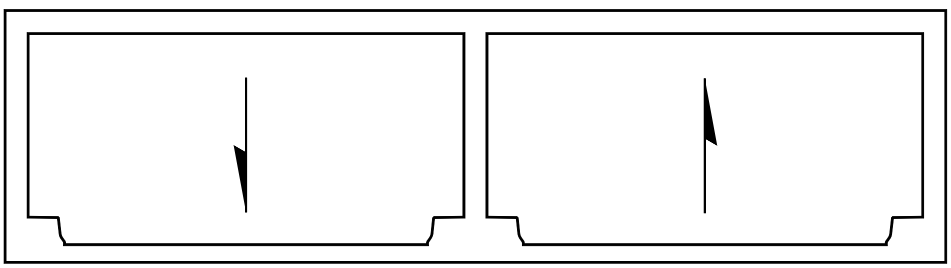
NTI Item S.1 – Number of Bores

Record the number of bores in the tunnel.



TWO BORES

Figure WSBIS 1510a



ONE BORE

Figure WSBIS 1510b

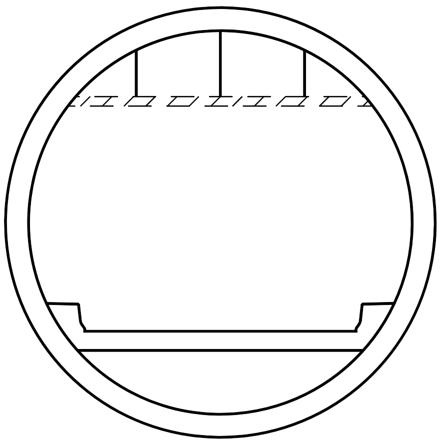
WSBIS Item 1511 – Tunnel Shape

NTI Item S.2 – Tunnel Shape

Record the tunnel shape using one of the following codes:

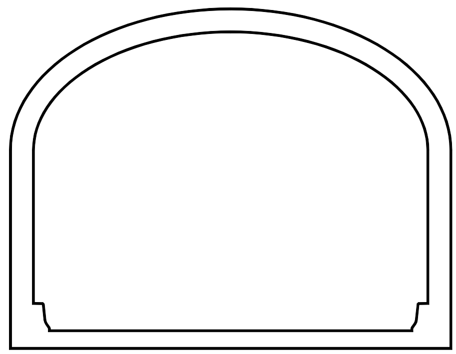
Table 1511 - Tunnel Shape Code

WSBIS Code	Description
1	Oval
2	Horseshoe
3	Rectangular
4	Circular



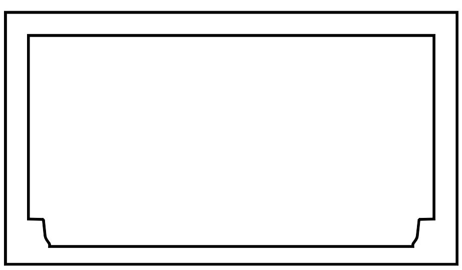
CIRCULAR TUNNEL

Figure WSBIS 1511a



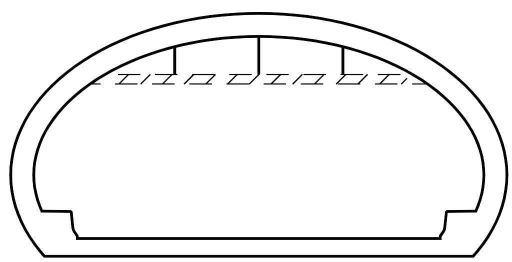
HORSESHOE TUNNEL

Figure WSBIS 1511b



RECTANGULAR TUNNEL

Figure WSBIS 1511c



OVAL TUNNEL

Figure WSBIS 1511d

WSBIS Item 1512 – Portal Shape

NTI Item S.3 – Portal Shape

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

NTI Item S.4 – Ground Conditions

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

NTI Item S.5 – Complex

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.

FHWA 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.

3.01 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.

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

3.02 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)	Safety (H)
Fracture Critical (B)	Short Span (I)
Underwater (C)	Two Man UBIT (J)
Special Feature (D)	Information (K)
Interim (E)	Inventory (L)
Underwater Interim (F)	In-Depth (M)
Damage (G)	Geometric (N)

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 Section 3.02.B.
      - An Underwater Inspection is needed to inspect underwater portions of the bridge, see Section 3.02.F.
      - A Special Features inspection if the bridge contains unique design or construction elements, see Section 3.02.D.

      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 Section 3.02.A.2 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 2.02 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 5.03, 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 3.05.

   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 6.04 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 Section 3.02.G for Damage Inspections, and Section 3.02.M 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 3.06-C for further details. 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 an increased inspection interval 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.

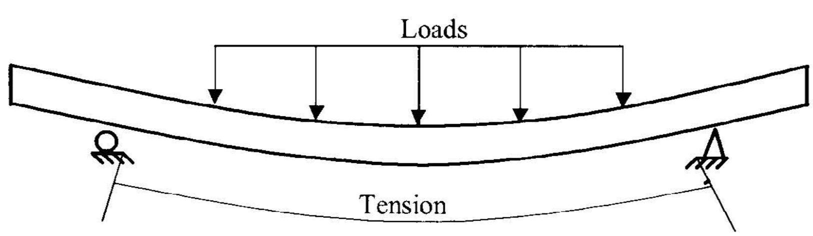
B. Fracture Critical

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.

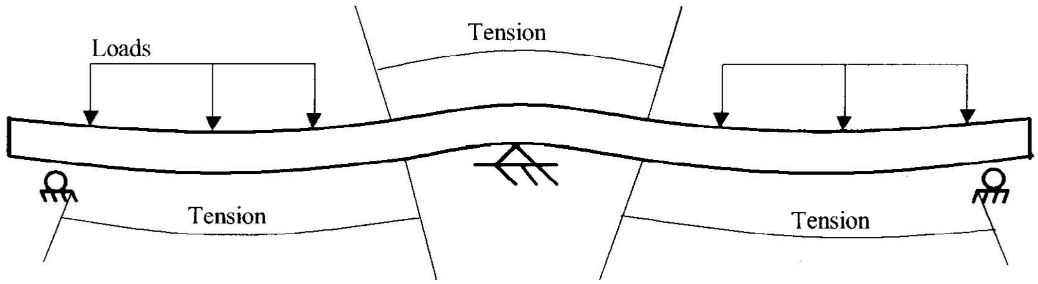
This section provides information to assist the Team Leader in identifying fracture critical bridge members, preparing written procedures, planning and performing effective Fracture Critical Inspections and completing the required inspection report. The information presented here is meant as a summary 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.

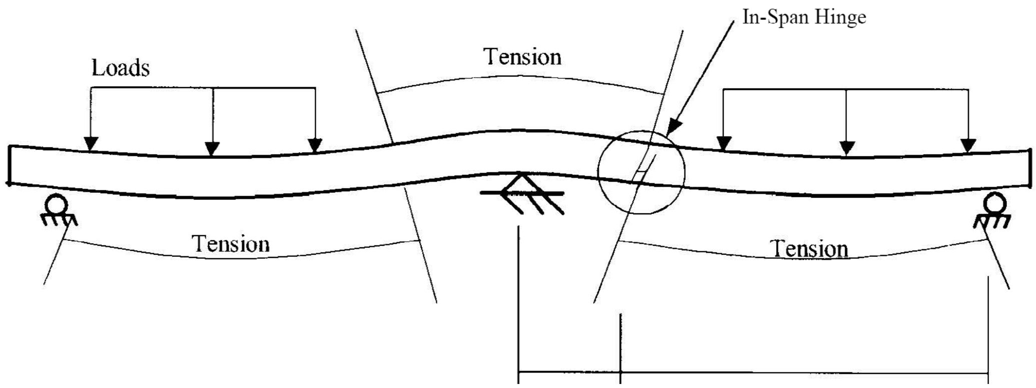
      There are three types of redundancy: load path, structural, and internal. Only load path redundancy is evaluated to determine whether a member is fracture critical. Load path redundancy is the number of supporting elements, usually parallel, such as girders or trusses. AASHTO neglects structural and 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 (Figure 3.02.B-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).



Example A: Simple Beam



Example B: Continuous Spans



Example C: Cantilever - Suspended Spans

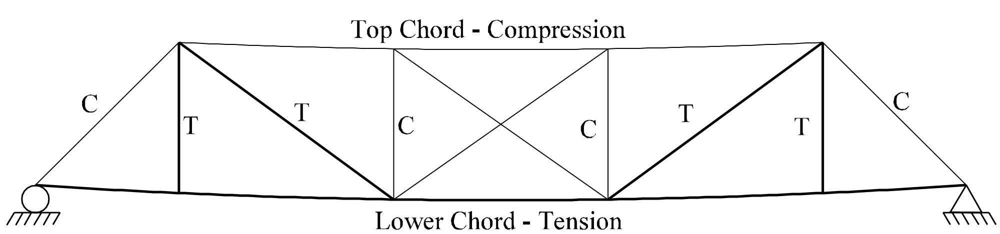
Figure 3.02.B-1

b. **Steel Truss Systems (Figure 3.02.B-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.



T - Tension, Fracture Critical Member (FMC)
C - Compression

Figure 3.02.B-2

c. **Tied Arches (Figure 3.02.B-3)** – The tie girder which keeps the supports from spreading apart is in tension and should be considered fracture critical.

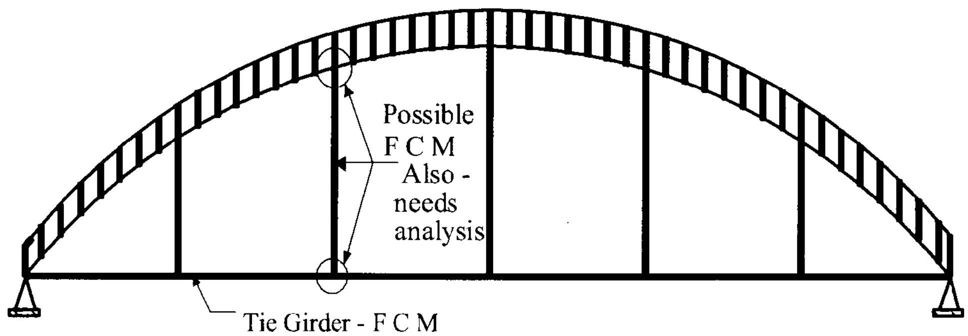
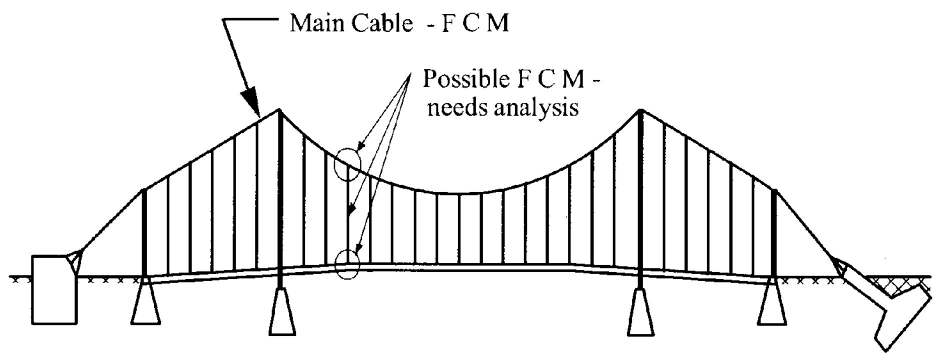


Figure 3.02.B-3

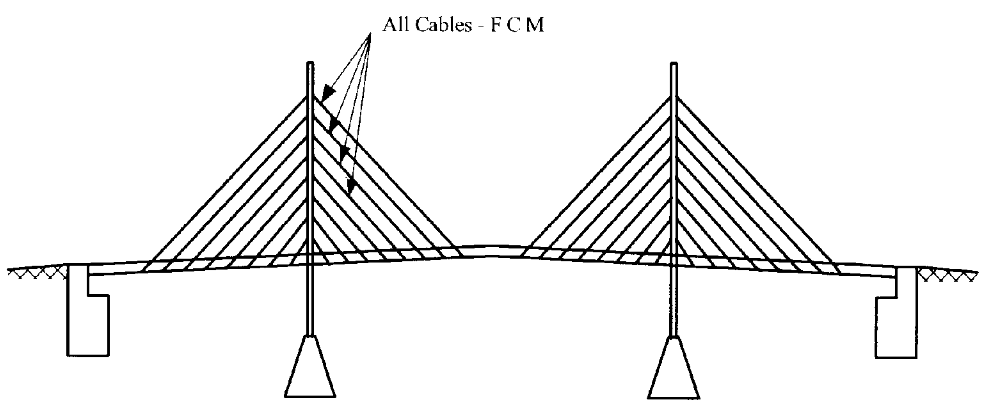
d. **Suspension Spans (Figure 3.02.B-4)**

(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).



Example A: Cable Suspension Bridge



Example B: Cable Stayed Bridge

Figure 3.02.B-4

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 (Figure 3.02.B-5).

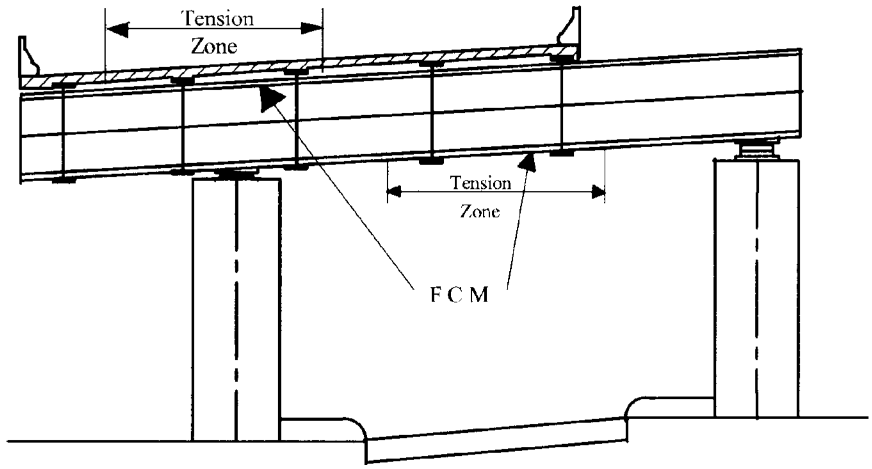


Figure 3.02.B-5

(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 (Figure 3.02.B-6).

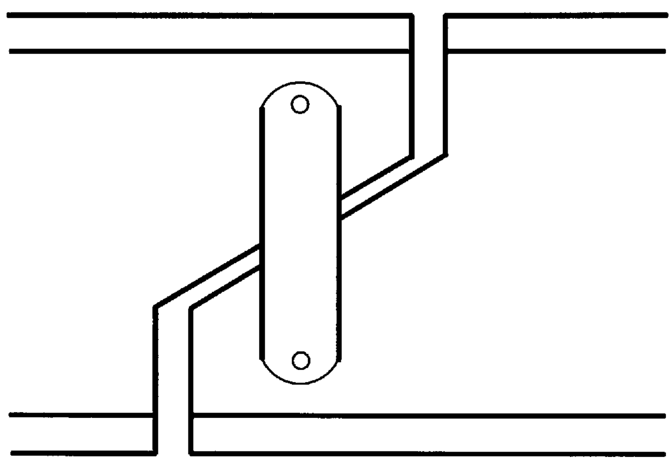


Figure 3.02.B-6

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 1/3 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 3.05 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.

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 5.03. 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 3.05, 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.

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 3.06-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 Inspection

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:

- **Overheight (Code 'A' in BridgeWorks)** – Damage typically caused by over height loads.
- **Flooding (Code 'E' in BridgeWorks)** – Damage as a result of scour to the channel beneath the structure.
- **Earthquake (Code 'G' in BridgeWorks)** – Damage caused by seismic events.
- **Other (Code 'O' in BridgeWorks)** – Damage/defects found during normal inspection that result in loss of capacity, or for other undefined types of damage.
- **Reported by Others (Code 'R' in BridgeWorks)** – Minor damage typically caused by over height loads but reported by maintenance forces. This damage type is used primarily by the state to track deterioration over time. It only exists electronically and therefore is not signed.

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 6.02 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 6.02 for further instructions.

   For over height damage, add the BMS Element #362, Impact Damage flag, if required. 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 3.05.

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 5.03.B.

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. Safety

Safety (H) – This inspection type is utilized for structures crossing over public highways which could impact public safety, but are not reported to the NBI. These include railroads, pedestrian bridges and utility bridges. 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 perform as a Team Leader for Safety Inspections. These structures are not submitted to FHWA but are still inspected as they may impact public safety. On all Safety Inspections, all changes/updates to the data shall be released into the inventory within 90 days of the date of inspection.

The inspection intervals will vary depending on the structure type being inspected. Recommended frequencies are as follows:

- **12 Months** – Timber bridges 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 bridge material that has BMS elements in Condition States 3 or 4.
- **48 Months** – Steel structures in good condition and concrete structures with minor problems.
- **72 Months** – Concrete structures in good condition.

There are two categories that Team Leaders from the state typically perform Safety Inspections on:

1. **Non-State-Owned Bridges That are Non-Vehicular and Crossing Over State Routes** – The Deck Overall (1663), Superstructure (1671) and Substructure (1676) codes should all be coded a “9”. These bridges could be railroads, local roads, local agency pedestrian bridges, or utility bridges owned by the utility. The inspection frequency is generally 72 months. The Team Leader shall only use BMS Element (#366) – Undercrossing-Safety Inspection, documenting any details of flagged defects or damage within the element note in BridgeWorks.
2. **State-Owned Bridges** – Even if they are not NBI bridges they should receive full NBI and BMS inspections.

I. 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 3.06-A1 and Appendix 3.06-A2.
   - Single span concrete or metal structures, other than metal corrugated pipes that meet the criteria in Appendix 3.06-A1 and Appendix 3.06-A2.
   - Multiple span structures that meet the criteria in Appendix 3.06-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 2.06-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.

J. 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 Responsibilities** – The Assistant Inspector from the State 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.

K. 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. A typical example of an Informational Report that requires 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.

L. 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.

M. 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.

N. 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.

3.03 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 Figures 3.03-A, 3.03-B, 3.03-C, and 3.03-D) or follow established agency orientation.

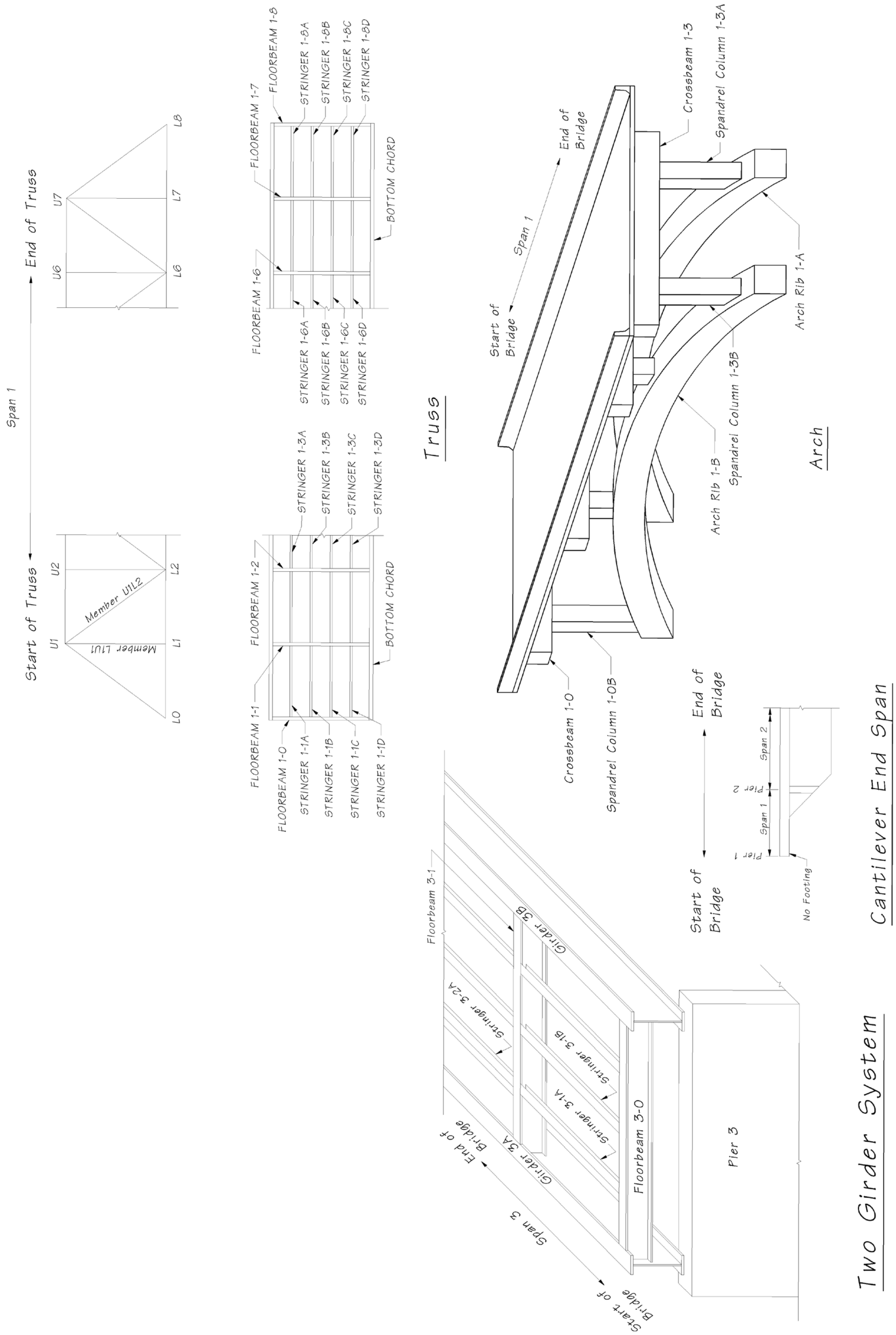
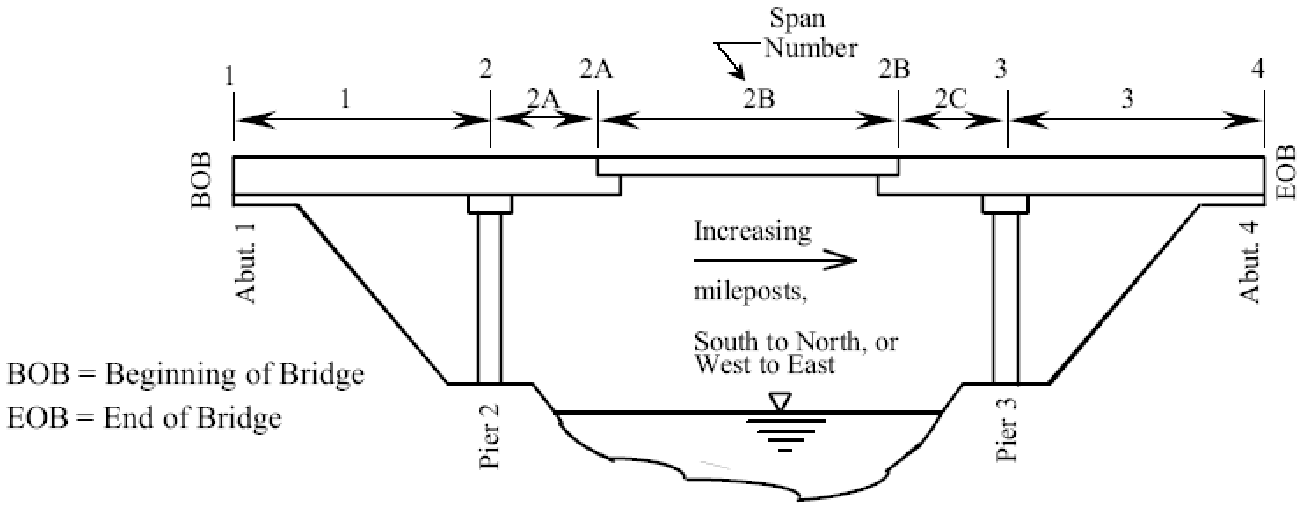

Truss
Span 1
Start of Truss
End of Truss
U1
U2
U6
U7
L0
L1
L2
L6
L7
L8
Member U1L2
Member L1U1
FLOORBEAM 1-0
FLOORBEAM 1-1
FLOORBEAM 1-2
FLOORBEAM 1-6
FLOORBEAM 1-7
FLOORBEAM 1-8
STRINGER 1-1A
STRINGER 1-1B
STRINGER 1-1C
STRINGER 1-1D
STRINGER 1-3A
STRINGER 1-3B
STRINGER 1-3C
STRINGER 1-3D
STRINGER 1-6A
STRINGER 1-6B
STRINGER 1-6C
STRINGER 1-6D
STRINGER 1-8A
STRINGER 1-8B
STRINGER 1-8C
STRINGER 1-8D
BOTTOM CHORD
Arch
Start of Bridge
End of Bridge
Span 1
Crossbeam 1-0
Crossbeam 1-3
Spandrel Column 1-0B
Spandrel Column 1-3A
Spandrel Column 1-3B
Spandrel Column 1-B
Arch Rib 1-A
Arch Rib 1-B
Cantilever End Span
Start of Bridge
End of Bridge
Pier 1
Pier 2
Span 1
Span 2
No Footing
Two Girder System
Floorbeam 3-1
Floorbeam 3-0
Girder 3A
Girder 3B
Stringer 3-1A
Stringer 3-1B
Stringer 3-2A
Pier 3
Span 3
Start of Bridge
End of Bridge

Figure 3.03-A



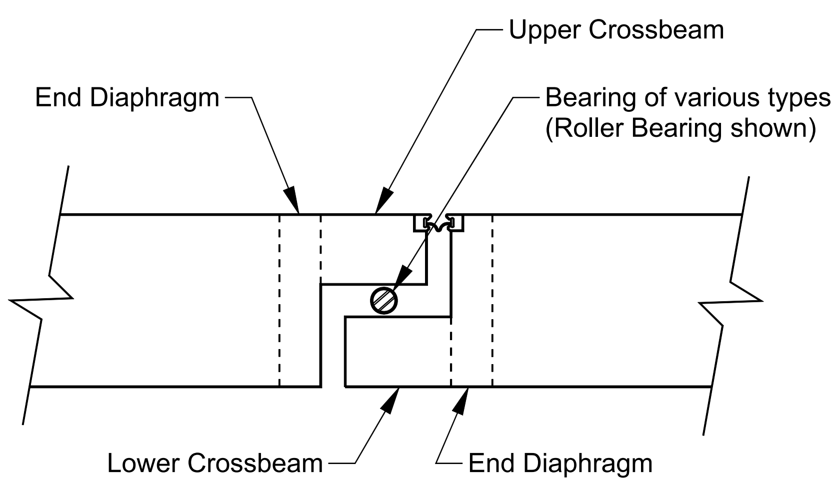
Component Location
Figure 3.03-B

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.



IN-SPAN HINGE CALLOUT
(Do not Quantify Crossbeams in BMS for Box Girder)

Figure 3.03-C

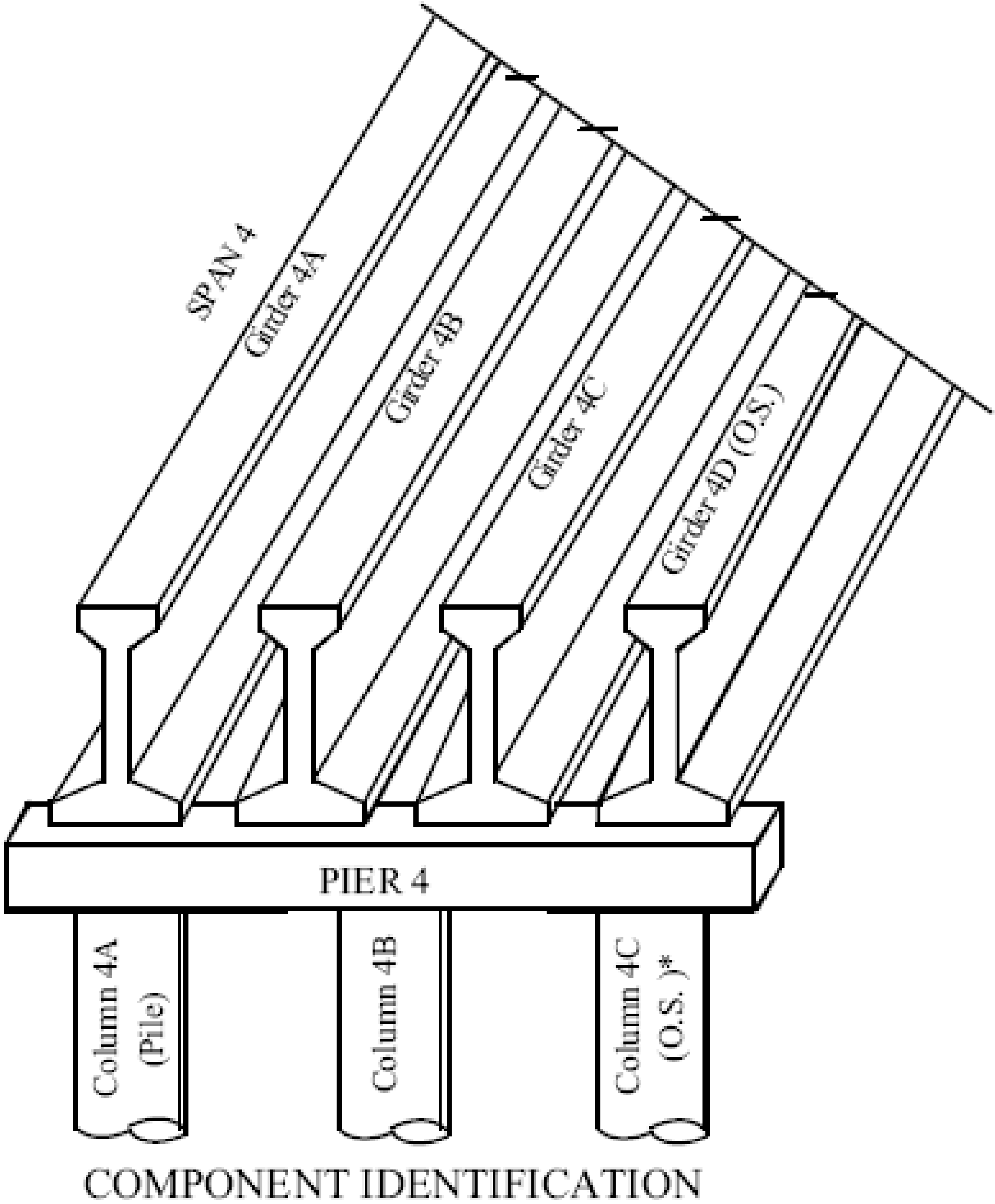


Figure 3.03-D

Section 3.04 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.

3.04 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.

3.04.1 BPO Policy and Procedures

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 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. 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 4.04.
- 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.

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

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 3.03 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 3.04.1.E.

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.

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.

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.

G. Soundings Flag (2693)

- 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 3.05.
     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. Place the date soundings were taken in the (2693) note (e.g., 'Soundings taken 2/1/2004').
  6. 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.

7. 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.

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.

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.

J. Vertical Clearances (1370 and 1374)

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.
- At bridges with vertical clearances under or over that are equal to or less than 16’6”.
- 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/694 Clearance folder in BridgeWorks. See the Vertical Clearance Card form located in Section 3.05.
- 2694 Note should reference: Vertical clearances checked on (date). Minimum clearance below the bridge measured to be (measured minimum clearance) below (exact location). See photo #. REPAIR #00000
- 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. Consideraion is given to adjusting existing clearance signage when the existing signage provides a buffer of only 1” or less to the actual measured clearance. If advance warning and/or detour signage is required and does not exist, then re-posting the structure at 3” below the actual measurement is considered good judgment.
- 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.
- When vertical clearance posting is found deficient or missing, write a “priority 1”, “V repair” as follows: (Coordinate with the region traffic office to provide required correct vertical clearance posting on and in advance of the bridge. Minimum clearance measured to be (measured clearance) located at (controlling location) on (date measured). Post for (3” less than measured clearance). Posting is to be in accordance with “Vertical Clearance Repair” sheet attached to the files tab. Contact (Bridge Geometry Engineer) at Bridge Preservation 360-570-2544 with any questions.
- 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.

Each Inspection, Check For:

- All postings on bridge, and in advance, are in place.
- Posted clearances are consistent with existing conditions and documentation.
- Update 2694 note with the date that the vertical clearance was taken and the date that the vertical clearance card was reviewed.
- Update the WSBIS.

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).

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.

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.

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.

O. Bridge Inspection Safety

See Pre-Activity Safety Plan (PASP) for details. See Section 3.05.

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.

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.

3.04.2 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.

3.05 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.

Bridge Inspection Report

WSBIS Form

Scour Field Evaluation

Daily Site Dive Log

Visual Fracture Critical Inspection Report

Prestressed Concrete Damage Drawing Template

Girder Elevation Template

Fall Protection Plan – Emergency Action Plan

Lead Exposure Control Work Plan

Respirator Record

Confined Space Entry Permit

Ultrasonic UT Inspection Report

UT Inspection Schedule

Pins Summary Sheet

Pin and Hanger Visual Inspection Report

Special Features Inspection Report

Vertical Clearance Card Generic

Vertical Clearance Card Steel

Vertical Clearance Card Tunnel

Pre-Activity Safety Plan (PASP)

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)
Deck Geometry (1658)	Op RF (1553)	Bridge Rails (1684)
Underclearance (1659)	Inventory Tons (1555)	Transition (1685)
Alignment (1661)	Inv RF (1556)	Guardrails (1686)
Deck Overall (1663)	Operating Level (1660)	Terminals (1687)
Superstructure (1671)	Open/Closed (1293)	Asphalt Depth (2610)
Substructure (1676)	Waterway (1662)	Des Curb Ht (2611)
Culvert (1678)	Scour (1680)	Bridge Rail Ht (2612)
Chan/Protection (1677)	Soundings Flag (2693)	Year Built (1332)
Pier/Abut/Prot (1679)	Revise Rating (2688)	Year Rebuilt (1336)
	Photos Flag (2691)	Sufficiency Rating
	Measure Clrnc (2694)	Risk Category

Inspections Performed:

Freq	**Hrs**	**Date**	**Rep Type**
			Routine
			Fract Crit
			UW
			Special
			Interim
			UWI
			Damage
			Safety
			Short Span
			In Depth
			Geometric

BMS Elements

Element	Element Description	Total	Units	State 1	State 2	State 3	State 4

Notes

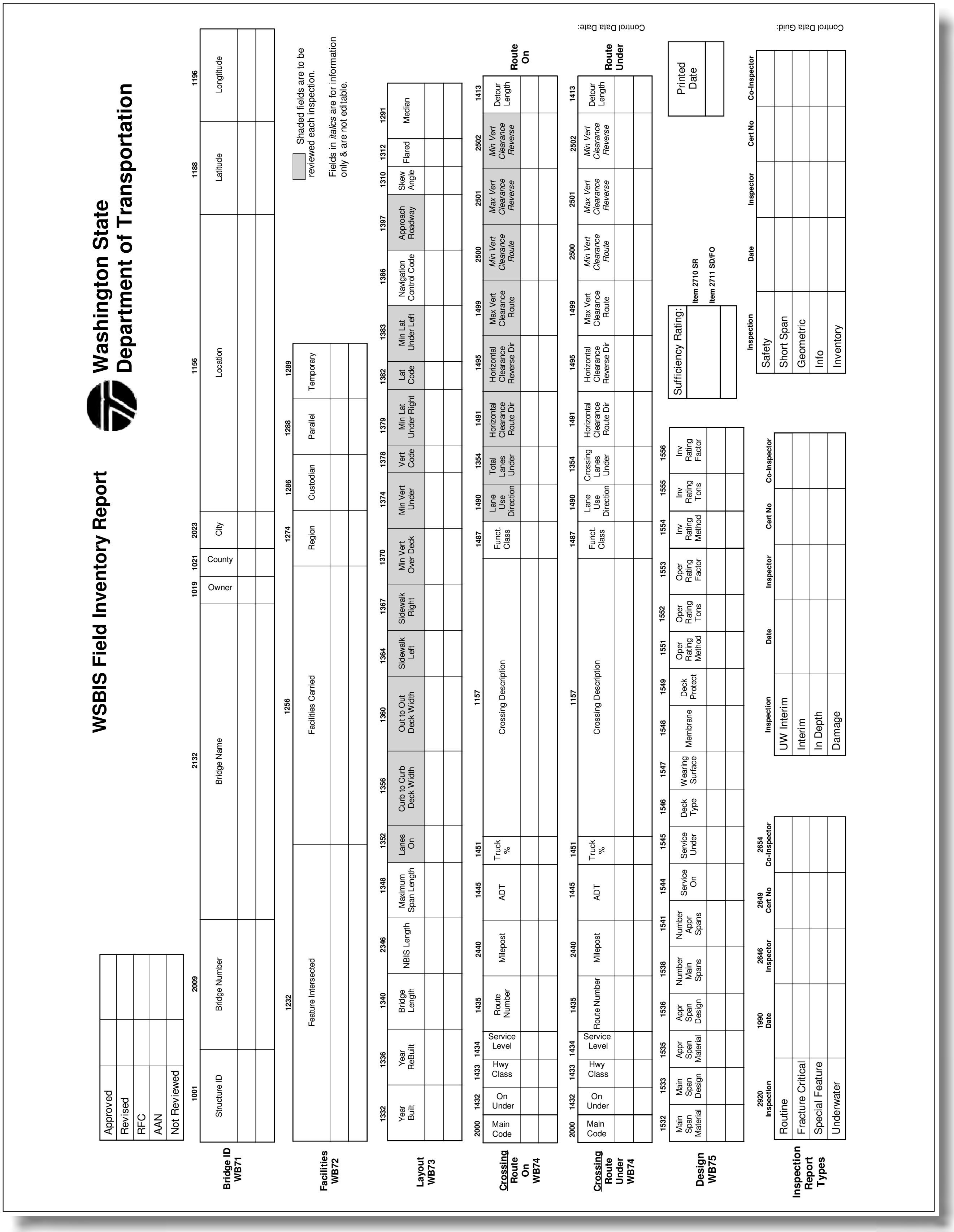
Repairs

Repair No	Pr	R	Repair Descriptions	Noted	Maint	Verified

Inspections Performed and Resources Required

Report Type	Date	Frq	Hrs	Insp	CertNo	Coinsp	Note

Bridge Inspection Report
(Page 1 of 1)



Bridge ID WB71

1001 Structure ID	2009 Bridge Number	2132 Bridge Name	1019 Owner	1021 County	2023 City	1156 Location	1188 Latitude	1196 Longitude

Facilities WB72

1232 Feature Intersected	1256 Facilities Carried	1274 Region	1286 Custodian	1288 Parallel	1289 Temporary

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 — Route On

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

Crossing Route Under WB74 — Route Under

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

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				

WSBIS Form

Washington State Department of Transportation

Scour Field Evaluation

Bridge Number	Bridge Name		Structure ID
Date	Lead Inspector	Co-Inspector	

☐ Heavy Growth Along Banks	☐ Boat Required
☐ Ice/Debris in Channel	☐ Divers Required
☐ Channel/Embankments are Eroding/Sloughing	☐ UBIT Required
☐ Damage to Riprap/Abutments/Piers	☐ Winter Inspection
☐ Scour Holes Near Piers/Abutments	☐ Repair Required
☐ Riprap in Place at Piers/Abutments	☐ 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:

Scour Field Evaluation

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.

Daily Site Dive Log

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

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:
Co-Inspector:

Truss / Girder	Span	Location	Feature Inspected	Detail Description	Remarks

Visual Fracture Critical Inspection Report.xlsx 2 of 2

Visual Fracture Critical Inspection Report
(Page 2 of 2)

Bridge Number:________________ Inspected By:__________________

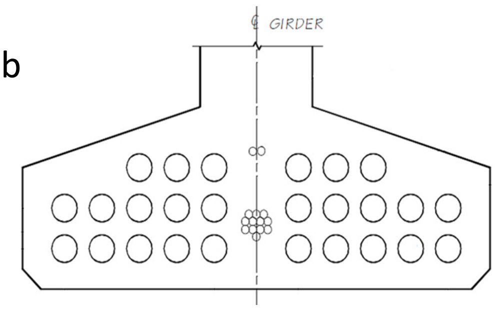
Bridge Name:__________________ Notes:____

Date: _______________________ ____

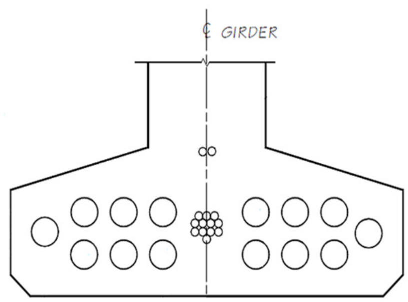
Looking:_____________________ ____

Location:_____________________ ____

Bulb



W



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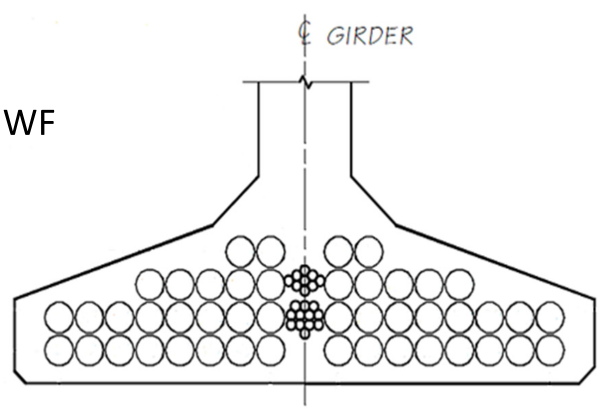
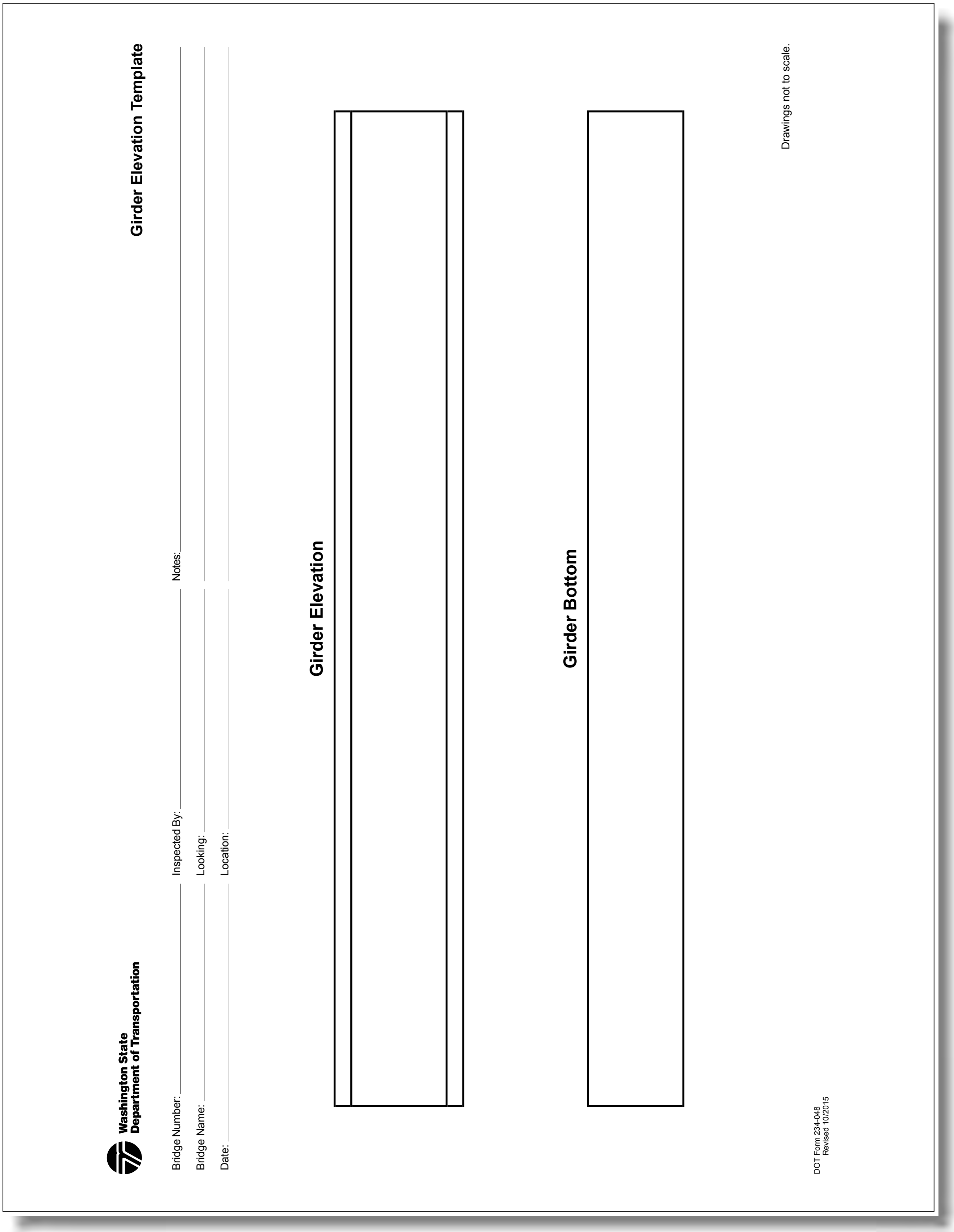


Prestressed Concrete Damage Drawing Template
DOT Form 234-030



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

Girder Elevation Template
DOT Form 234-048

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

Fall Protection Plan – Emergency Action Plan
DOT Form 750-001 (Page 1 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

Fall Protection Plan – Emergency Action Plan
DOT Form 750-001 (Page 2 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) ☐ Employee rotation to distribute lead exposed work ☐ Dust suppression/wet methods ☐ Prior removal with chemical stripper ☐ Encapsulation ☐ Other, describe:
☐ 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	
☐ 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	
☐ 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

Lead Exposure Control Work Plan
DOT Form 750-060 (Page 1 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

Lead Exposure Control Work Plan
DOT Form 750-060 (Page 2 of 2)

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

Respirator Record
DOT Form 750-090

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

Confined Space Entry Permit
DOT Form 750-094 (Page 1 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

Confined Space Entry Permit
DOT Form 750-094 (Page 2 of 2)

UT INSPECTION REPORT

Washington State Department of Transportation

Bridge Name:
Bridge No:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector Intials:
Co-Inspector Intials:

Inspected items:

Procedures:

Pins

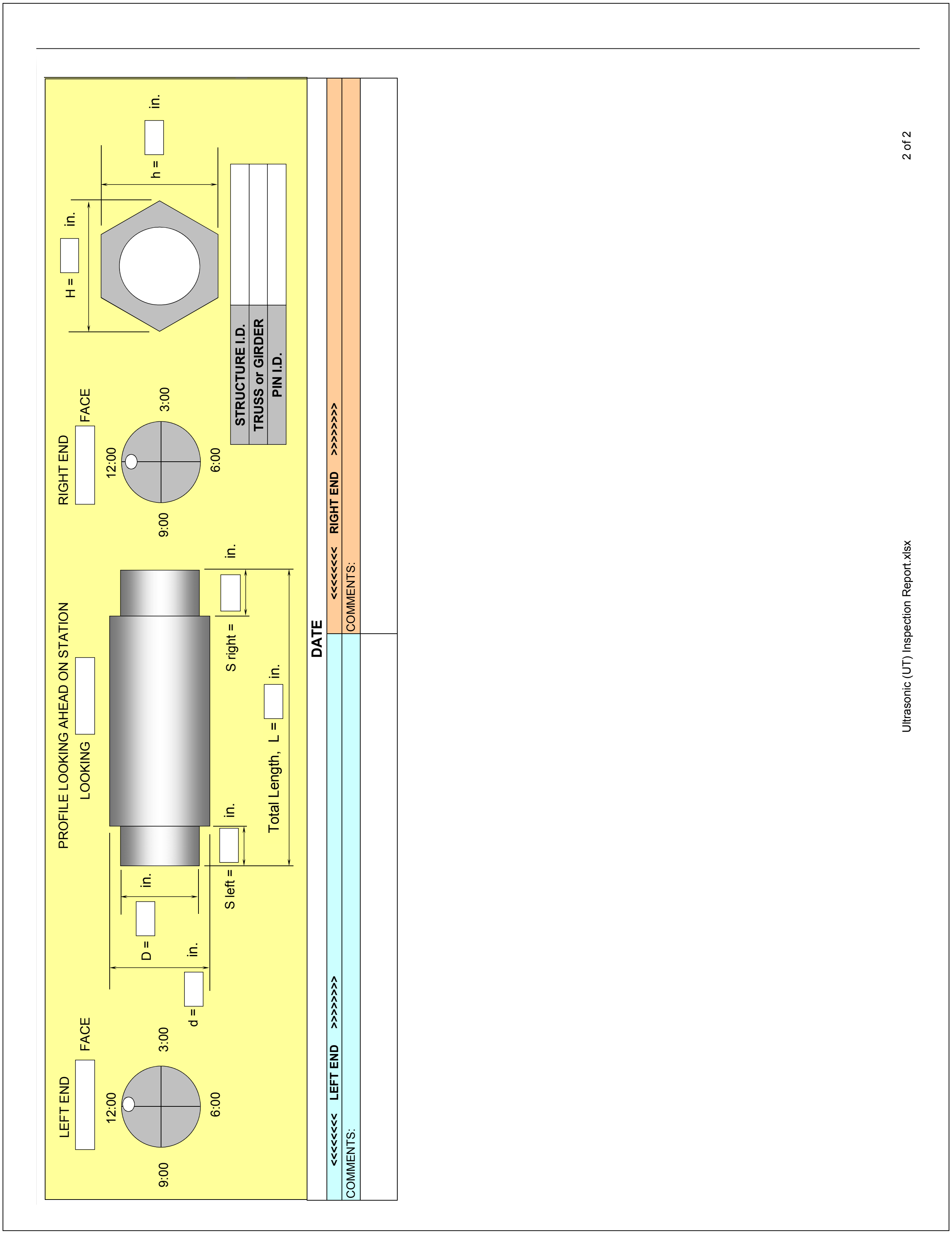
1. When possible, test from both ends of pins.
2. Verify pin length shown on back reflection with plans. If back reflection does not match the plans, conduct manual length measurement and document correct pin length.
3. Start test with transducer at or near pin center for back reflection check, then 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

Ultrasonic UT Inspection Report
(Page 1 of 2)



Ultrasonic UT Inspection Report
(Page 2 of 2)

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

UT Inspection Schedule

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

Pins Summary Sheet

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

Pin and Hanger Visual Inspection Report
(Page 1 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

Pin and Hanger Visual 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 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

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:
Co-Inspector:

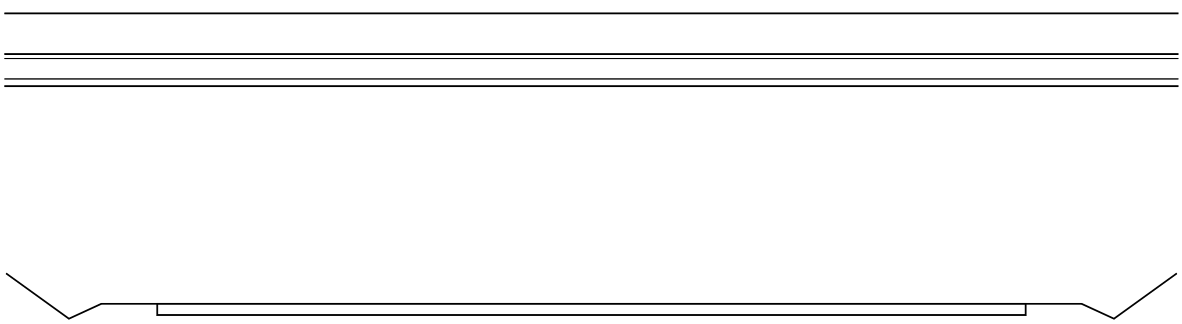
Girder	Pier	Location	Feature Inspected	Detail Description	Remarks

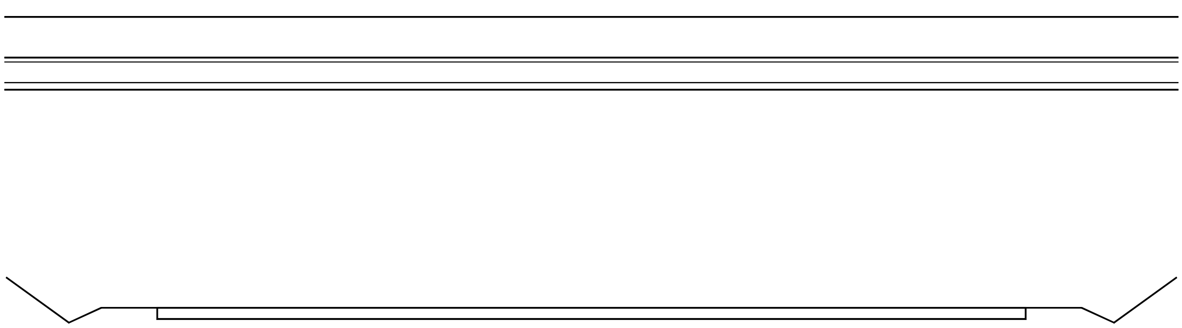
2 of 2

Special Features Inspection Report
(Page 2 of 2)

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.

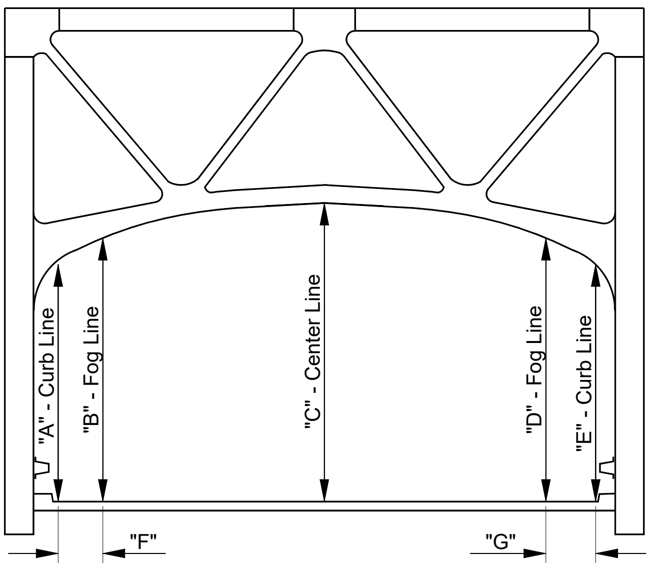




Vertical Clearance Card Generic

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.

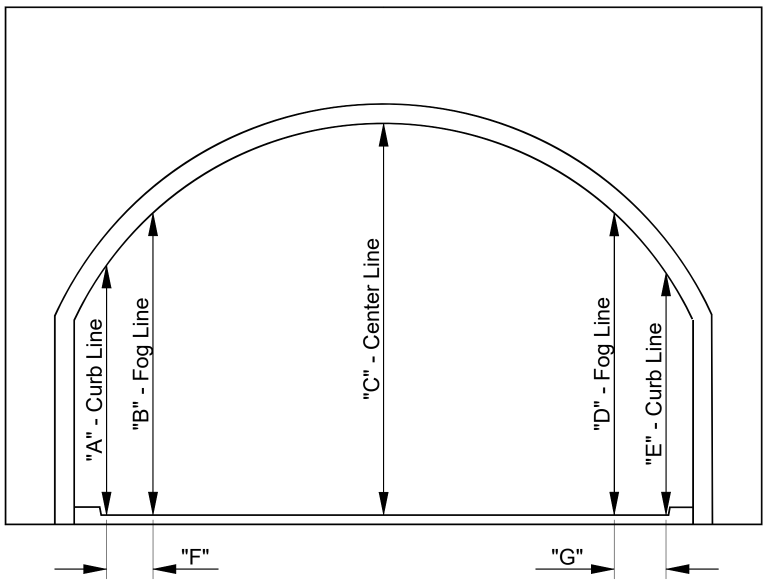


Location	Field Measurement						
	A	B	C	D	E	F	G

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

Vertical Clearance Card Tunnel

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.

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Pre-Activity Safety Plan (PASP)
(Page 1 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

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Pre-Activity Safety Plan (PASP)
(Page 2 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.

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Pre-Activity Safety Plan (PASP)
(Page 3 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.

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Pre-Activity Safety Plan (PASP)
(Page 4 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.

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Pre-Activity Safety Plan (PASP)
(Page 5 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.

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Pre-Activity Safety Plan (PASP)
(Page 6 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.

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Pre-Activity Safety Plan (PASP)
(Page 7 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.

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Pre-Activity Safety Plan (PASP)
(Page 8 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.

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Pre-Activity Safety Plan (PASP)
(Page 9 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.

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Pre-Activity Safety Plan (PASP)
(Page 10 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

Pre-Activity Safety Plan (PASP)
(Page 11 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 ______ ______ ☐ Motorized Vehicular Traffic

☐ Ladder w/o Fall Restraint ☐ Step Bolts w/o Fall Restraint ☐ Work Deck w/o Fall Restraint ☐ Rest Platform w/o Fall Restraint ☐ Other ______ ______

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

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

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 3/2000

APPENDIX A –PAGE 2

Pre-Activity Safety Plan (PASP)
(Page 12 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 750-004 EF
Revised 2/2000

APPENDIX A –PAGE 3

Pre-Activity Safety Plan (PASP)
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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 ______
- ☐ Motorized Vehicular Traffic
- ☐ Ladder w/o Fall Restraint
- ☐ Step Bolts w/o Fall Restraint
- ☐ Work Deck w/o Fall Restraint
- ☐ Rest Platform w/o Fall Restraint
- ☐ Other ______

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

Pre-Activity Safety Plan (PASP)
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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

Pre-Activity Safety Plan (PASP)
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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.

Pre-Activity Safety Plan (PASP)
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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.

Pre-Activity Safety Plan (PASP)
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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;

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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.

Pre-Activity Safety Plan (PASP)
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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

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Pre-Activity Safety Plan (PASP)
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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

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Pre-Activity Safety Plan (PASP)
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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

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Pre-Activity Safety Plan (PASP)
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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

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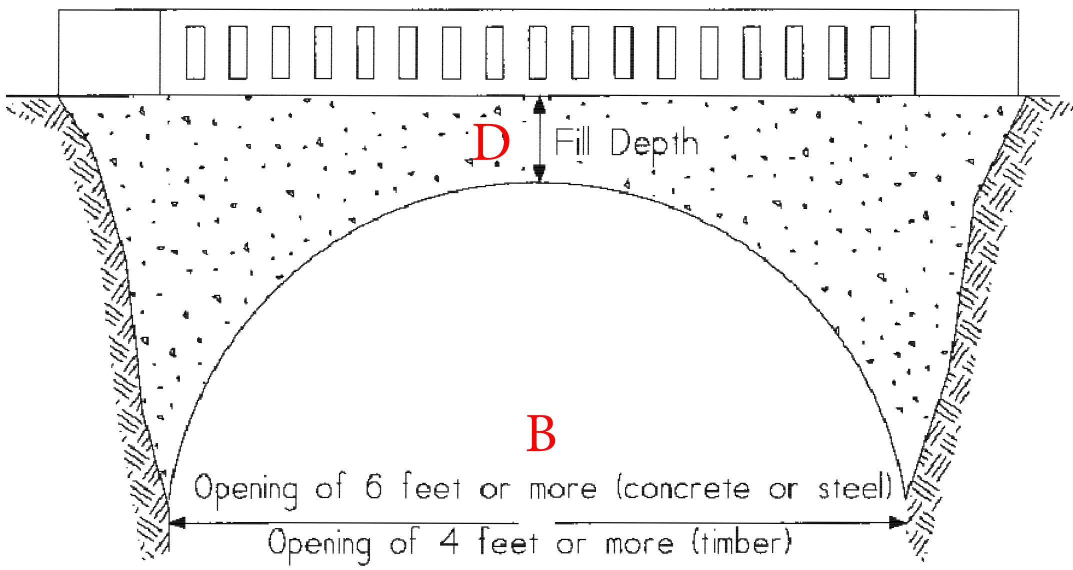
3.06 Appendices

Appendix 3.06-A1	Bridge With Fill on Deck
Appendix 3.06-A2	Bridge With No Fill on Deck
Appendix 3.06-A3	Culvert With Fill on Deck
Appendix 3.06-B	UBIT Inspections and Procedures
Appendix 3.06-C	FHWA Letter for Routine Extended Frequency Inspections
Appendix 3.06-D	FHWA Letter for Bridge Special Feature Inspections

Appendix 3.06-A1 Short Span Bridge With Fill on Deck

Short Span Inspections are recommended and performed by the Washington State Department of Transportation (WSDOT) Bridge Preservation Office when the following criteria are met:

1. Depth of fill (D) must be less than B/2 (where B = Maximum opening distance).
2. CONCRETE Structures: Opening of 6 feet or more.
   STEEL Structures: Opening of 6 feet or more.
   TIMBER Structures: Opening of 4 feet or more.

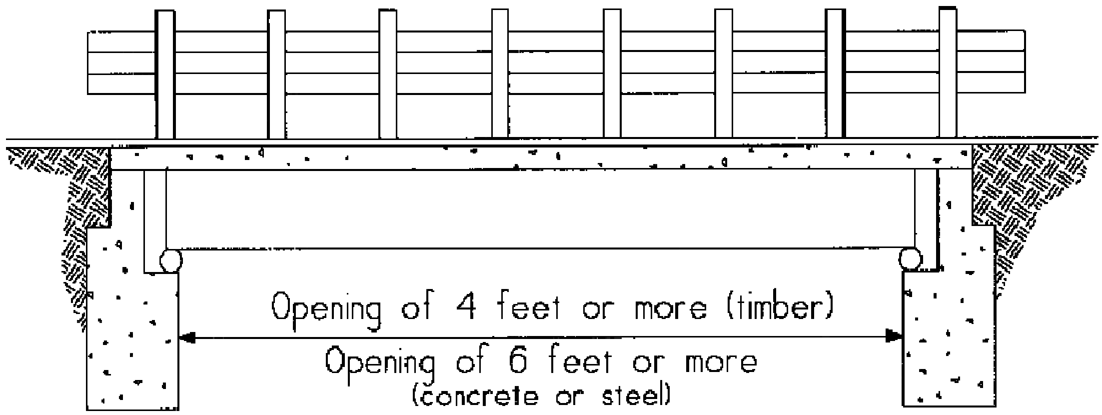


3. If the criteria does not meet items 1 and 2 above, the structure is considered to be a maintenance structure. It is the responsibility of the maintenance office in that area to inspect and maintain.
4. The Team Leader that determines that a structure is now a maintenance responsibility shall ensure that this information is passed on to the proper contacts.

Appendix 3.06-A2 Short Span Bridge With No Fill on Deck

Short Span Inspections are recommended and performed by the Washington State Department of Transportation (WSDOT) Bridge Preservation Office when the following criteria are met:

1. CONCRETE Structures: Opening of 6 feet or more.
   STEEL Structures: Opening of 6 feet or more.
   TIMBER Structures: Opening of 4 feet or more.

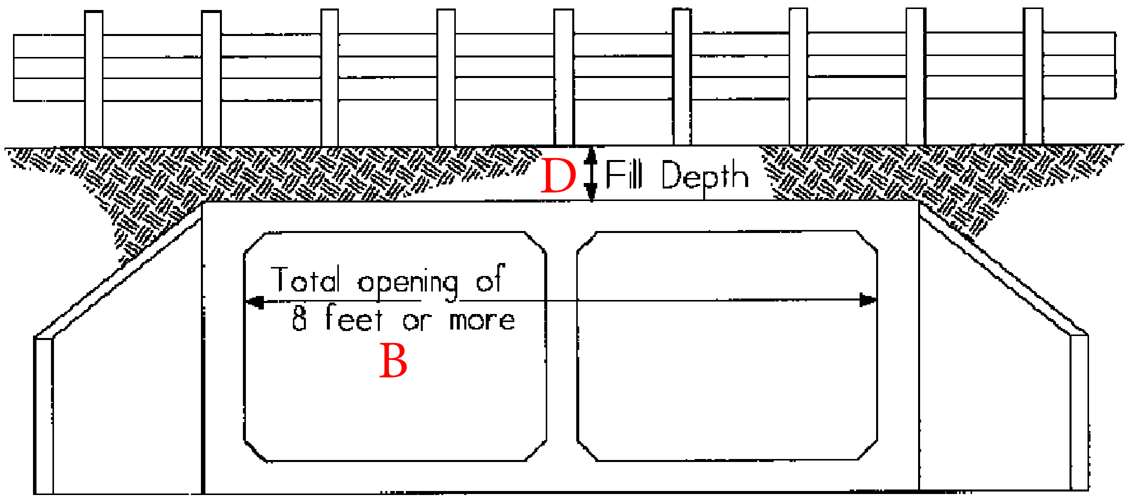


2. The Team Leader that determines that a structure is now a maintenance responsibility shall ensure that this information is passed on to the proper contacts.

Appendix 3.06-A3 Short Span Culvert With Fill on Deck

Short Span Inspections are recommended and performed by the Washington State Department of Transportation (WSDOT) Bridge Preservation Office when the following criteria are met:

1. Depth of fill (D) must be less than B/2 (where B = total opening).
2. Total Opening of 8 feet or more.



3. If the criteria does not meet items 1 and 2 above, the structure is considered to be a maintenance structure. It is the responsibility of the maintenance office in that area to inspect and maintain.
4. The Team Leader that determines that a structure is now a maintenance responsibility shall ensure that this information is passed on to the proper contacts.

Chapter 4 WSDOT Bridge Elements

List of WSDOT Elements by Number

List of WSDOT Elements by Subject

4.01 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 2.02 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.

4.1.3.1 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.

4.1.3.2 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.

	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″			

WSDOT Element Concrete Crack Width Guidelines
Table 4.1.5

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:

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

WSDOT Deck Condition to NBI Deck Overall
Table 4.1.6

4.02 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.

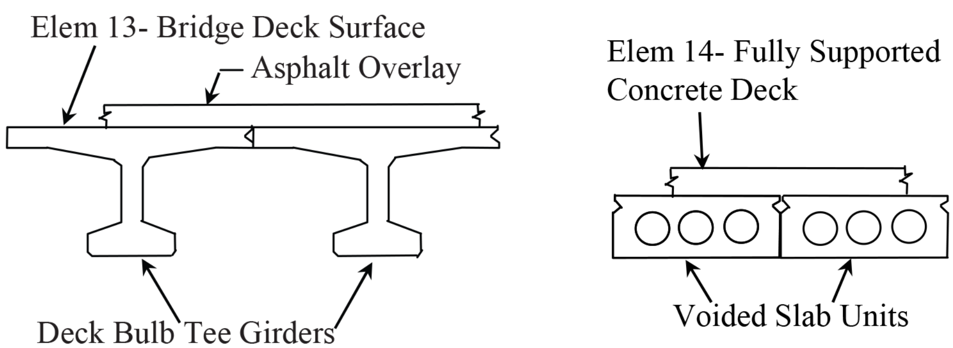
Quantity estimates must be based on the sum of the estimated length and width of the patched or spalled areas. Approximations based on the percent of area are not useful.

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

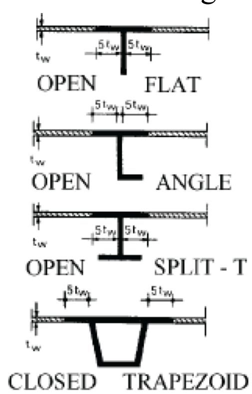
This WSDOT element defines a lightweight concrete bridge deck constructed with lightweight aggregate and steel reinforcement. The total design weight of the deck is approximately 120 lbs./C.Y. The total quantity for this element is the actual bridge deck area from curb line to curb line.

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

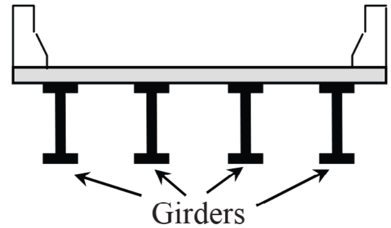
This does not apply to deck spalling with exposed rebar. This element is used to identify the top surface of bridge decks with concrete cover less than 1 inch and having rebar exposed. This condition results from either lack of cover during construction or general rutting that has exposed rebar. Deck 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.

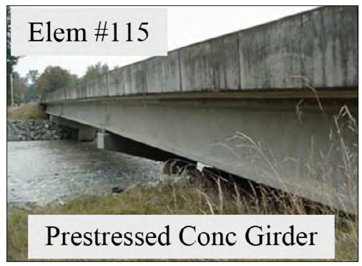
1. Deck top surface area with adequate concrete cover.
2. Concrete deck area with visible lack of cover due to construction or general rutting that has exposed rebar.

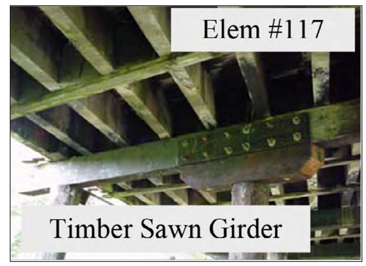
4.03 Superstructure

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.

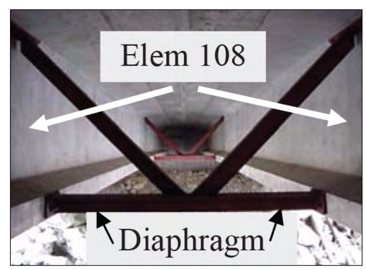






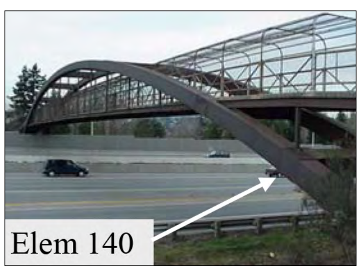
Diaphragms

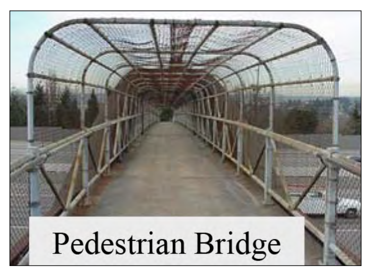
Diaphragms are structural members used to tie adjoining girders together to improve the strength and rigidity of the girder and to distribute forces in the lateral direction. Diaphragms do not have an element but if a diaphragm has advanced deterioration, it should be noted in the element comments of the associated girder.



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.





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.

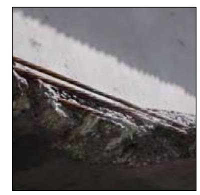
1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking.
2. Girder length affected by repairs or patches.
3. Girder length affected by structural defects. The defects do not significantly affect structural 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.

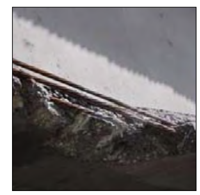
100 Post Tensioned Concrete Segmental Box Girder Units – LF

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.

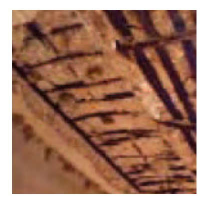
105 Concrete Box Girder — Units – LF

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.

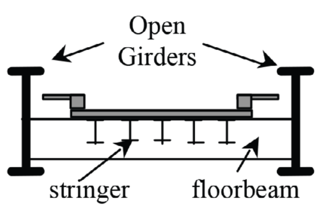
4. Girder span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

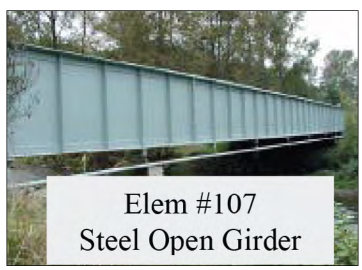


107 Steel Open Girder Units – LF

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.




Elem #107
Steel Open Girder

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.

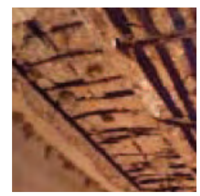
110 Concrete Girder Units – LF

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 supports the bridge deck. The total quantity for this element is the sum of each girder length.

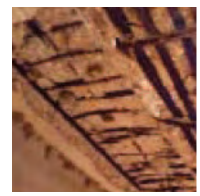
116 Concrete Stringer — Units – LF

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

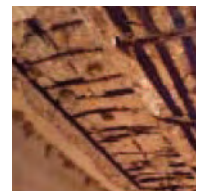
1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Girder or stringer length affected by repairs or plates.
3. Girder or stringer length affected by structural defects. The defects do not significantly 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

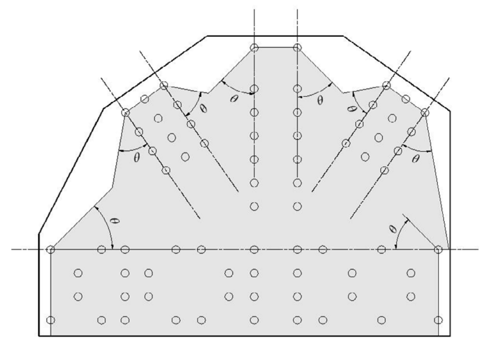
This element includes all truss members of a structural steel deck truss. The top and bottom chords are included in this element. The total quantity for this element is the sum of each truss length, which is two times the truss span length.

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.

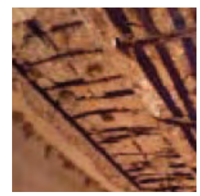
1. Arch panel length with defects that are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Arch panel length with repairs or patches.
3. Arch panel length with structural defects. 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 (Luten) 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.

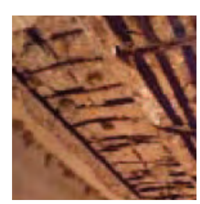
4. Number of cables or anchors with defects that have clearly affected the capacity. This includes broken wires or localized section loss due to other defects. The zinc protective coating is largely depleted with ferrous rust prevalent in many locations along the cable length.

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

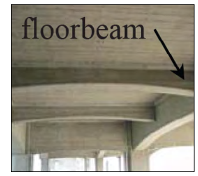
This element defines a floor beam constructed of structural steel that supports stringers in a stringer-floor beam system. Floor beams are load carrying elements located transversely to the general bridge alignment. Floor beams transmit the loads from the deck and/or stringers to the outside open girders 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

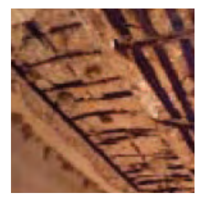


This element defines a floor beam constructed of reinforced concrete that supports the bridge deck in a stringer-floor beam system. Floor beams are load carry elements located transversely to the general bridge alignment. Floor beams transmit the loads from the deck and/or stringers to the outside open 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.

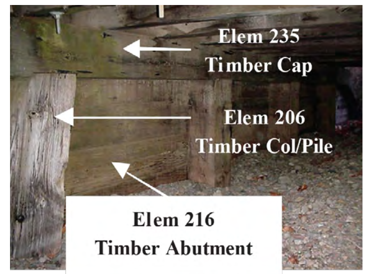
WSDOT bridges known to have Tension Hold Down Anchor Assemblies are: 97/420, 25/130, 2/35, 99/560, 305/10, 82/280S.

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.

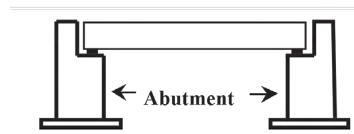
4.04 Substructure

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.

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.

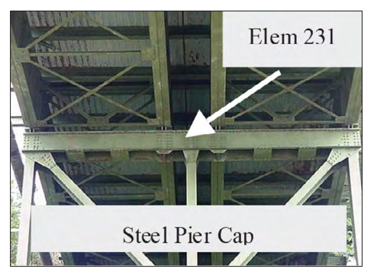


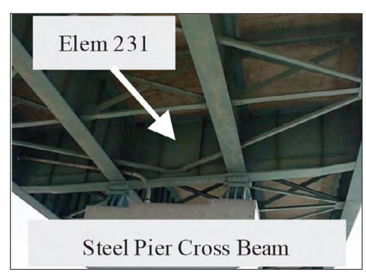
All abutments shall be evaluated for the capacity to transfer design loads to a foundation thru structural elements. The roadway embankment with non-monolithic concrete wingwalls, timber planking, or other abutment retaining systems are included in the evaluation of the WSDOT Abutment Fill element 200 (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.

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.

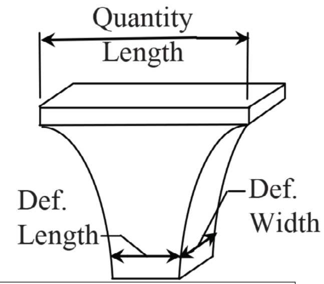
One WSDOT element is used to define either a cap or cross beam constructed of the same material.

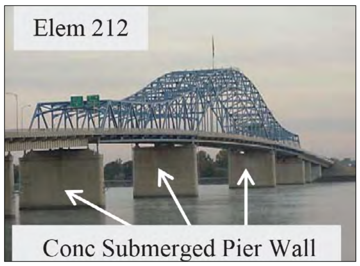


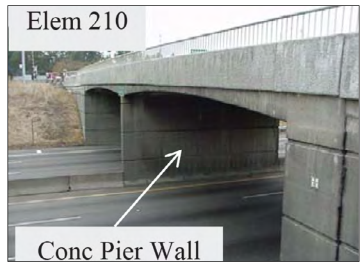


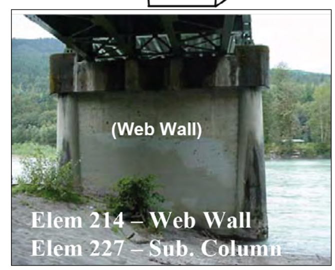
Pier Wall Definition

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.









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.

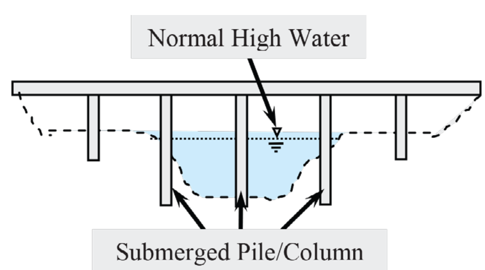
Foundation Elements

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.

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 or the 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 pile 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 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 column or column portion of a pile constructed of reinforced concrete and has been seismically retrofitted with composite wrap visible for inspection.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, superficial cracking or debonding.
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 at the top of the wall.

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 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 a sealed crack.
   - If repairs are above water level, then NBI Item 060 shall be a 7.
   - If repairs below water level, then NBI Item 060 shall be a 6.
   - 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 CS2, then NBI Item 060 shall be a 5.
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; Cracks that are stable or inactive for several storm events; Areas of concrete that are moist or have 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 used in 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 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.

1. Number of cables or anchors with no defects in the cable or anchor and the galvanized protection system is functioning properly. 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 significant loss of section. 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 present. Single wire failures of the cable may exist due to corrosion or hydrogen embrittlement, but no closer than 30 feet apart.
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. 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.

4.05 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.

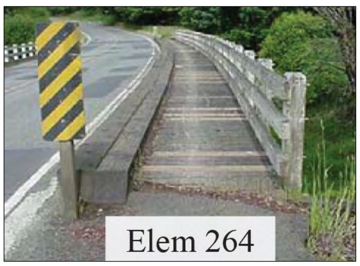
1. Defects are superficial and have no effect on the structural capacity of the culvert.
2. Length of culvert with repairs.
3. Length of culvert with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Length 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.

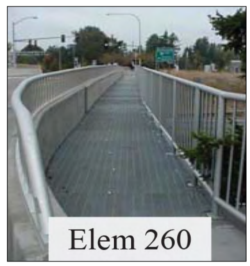
4.06 Sidewalk and Supports

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

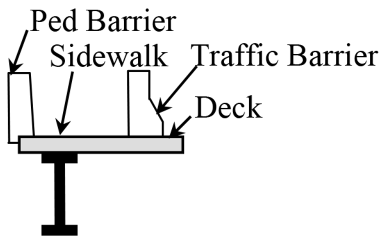
This element defines a sidewalk constructed of steel grids that have been filled with concrete. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

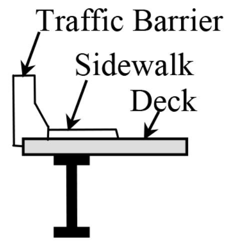
262 Corrugated/Orthotropic Sidewalk and Supports — Units – SF

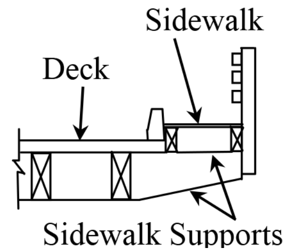
This element defines a sidewalk constructed of corrugated metal filled with Portland cement concrete or asphaltic concrete or an orthotropic steel deck. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk 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

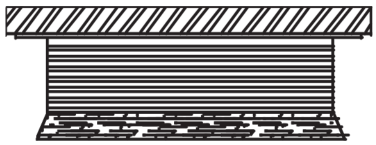
1. Defects are superficial and have no effect on the structural capacity of the sidewalk or supports.
2. Sidewalk area (or support projected area) with repairs or patches
3. Sidewalk area (or support projected area) with structural defects. The defects do not significantly affect structural capacity. 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.

4.07 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.


311 – Movable (roller, sliding, ect.)


311 – Movable (roller, sliding, ect.)

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

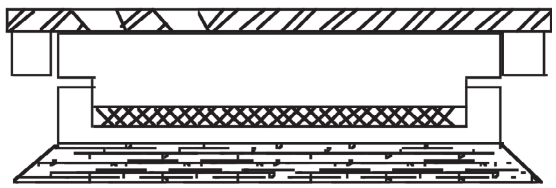
This element defines those bridge bearings that provide for rotation only.


313 – Fixed Bearing


313 – Fixed Bearing

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.

4.08 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.

4.09 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 attached to structural bridge members such as 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 attached to structural bridge members such as 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 attached to structural bridge members such as 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 attached to structural bridge members such as 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 attached to structural bridge members such as 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 attached to structural bridge members such as 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 attached to structural bridge members such as 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 attached to structural bridge members such as 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’.

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 pile embedment is less than 5'. Make a recommendation to evaluate the exposed pile for lateral stability.

366 Undercrossing – Safety Inspection — Units – EA

This is a smart flag for safety checks of structures where Washington is not the Custodian (NBI Item 21) such as Railroad and other non-vehicular undercrossings. No other core elements are needed.

1. Report the entire bridge in condition state one (EA).

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.

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

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.

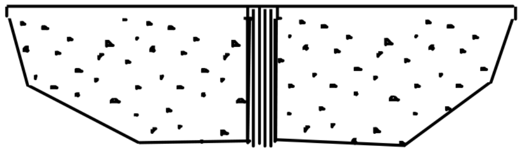
402 Open Concrete Joint — Units – LF

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.

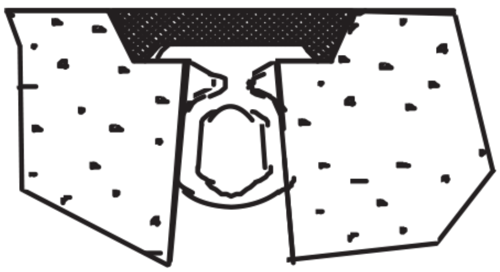
1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with “D” spalls or patches are present in the header or in the deck within one foot of either side of the joint.
3. Skewed joint 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.



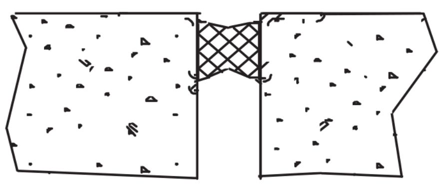
403 Concrete Bulb-T Units – LF

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.



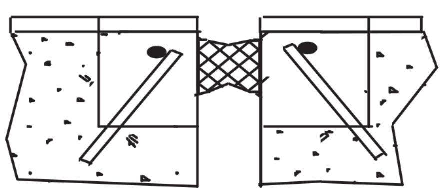
404 Compression Seal/Concrete Header Units – LF

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.



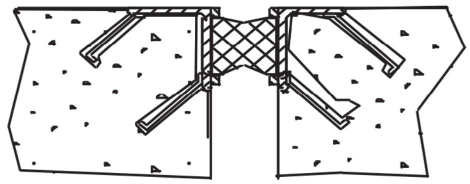
405 Compression Seal/Polymer Header Units – LF

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.



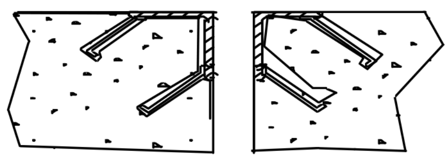
406 Compression Seal/Steel Header Units – LF

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.



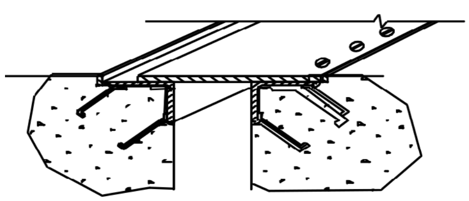
407 Steel Angle Header Units – LF

This element defines an open joint with steel angle plate headers. The quantity should equal the length measured along the expansion joint.



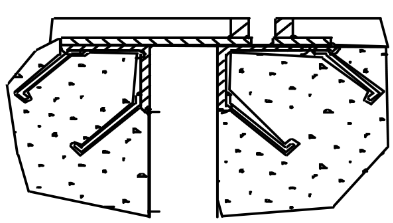
408 Steel Sliding Plate Units – LF

This element defines a joint with steel sliding plates. The quantity should equal the length measured along the expansion joint.



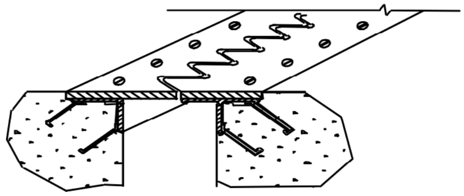
409 Steel Sliding Plate w/Raised Bars Units – LF

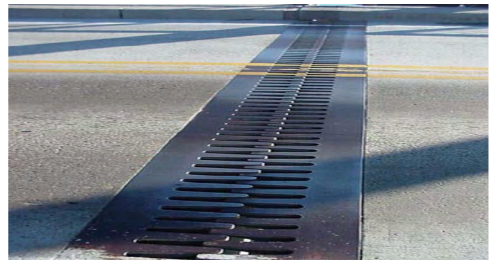
This element defines a joint with steel sliding plates and steel raised bars welded to the plates to accommodate an overlay. The quantity should equal the length measured along the expansion joint.



410 Steel Fingers Units – LF

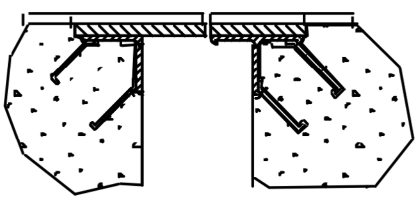
This element defines a joint with open steel fingers. The quantity should equal the length measured along the expansion joint.





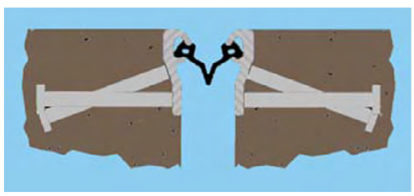
411 Steel Fingers w/Raised Bars Units – LF

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.



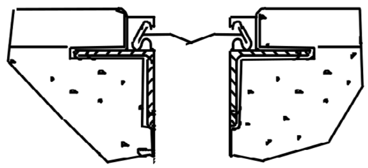
412 Strip Seal – Anchored Units – LF

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.



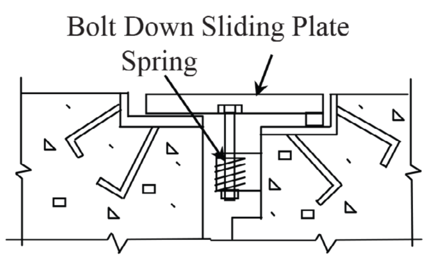
414 Bolt Down – Sliding Plate w/springs Units – LF

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.

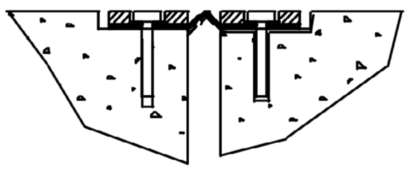
   Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.



415 Bolt Down Panel – Molded Rubber Units – LF

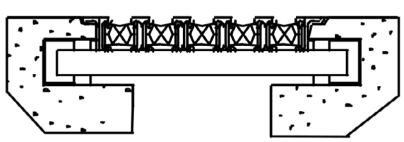
This element defines an expansion joint that uses a waterproof gland that is held in place by molded rubber panels that are attached with bolts. The quantity should equal the length measured along the expansion joint.

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.



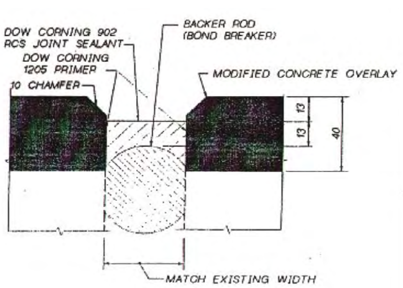
417 Silicone Rubber Joint Filler Units – LF

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.

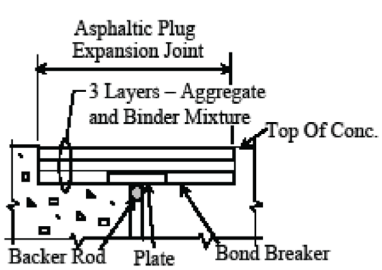
   Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.



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.

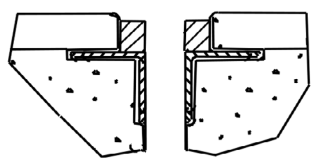


419 Steel Angle w/Raised Bars Units – LF

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.

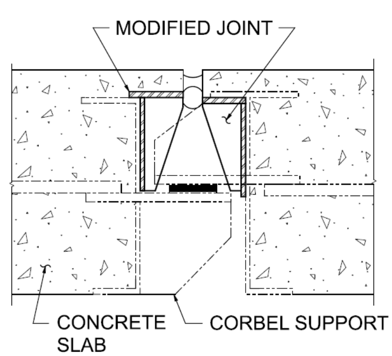
   Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.



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.



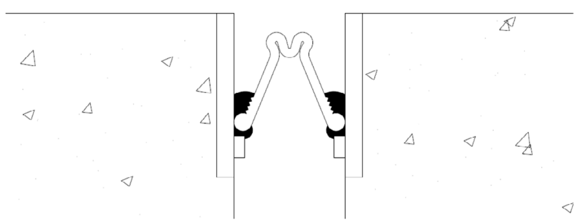
421 Concrete Slab In-Span Joint Units – LF

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. The sign bridge engineer should be notified.
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.

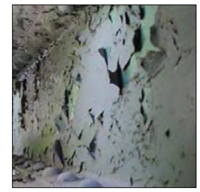
909 Zinc Primer Units – SF

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.

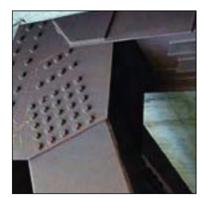


4. Protection system area that is no longer effective. The metal substrate is exposed.

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.

7.01 General

This chapter establishes policies on how the Washington State Department of Transportation (WSDOT) and local agencies within the state of Washington conduct quality control/quality assurance (QC/QA) on its respective bridge and tunnel inspection programs to meet FHWA requirements within 23 CFR 650.307(c), §650.313(g), §650.507(c) and §650.513(i).

The guidelines presented herein are those in use by both the WSDOT Bridge Preservation Office (BPO) and Local Programs (LP). Sections 7.02 through 7.08 pertain to the QC/QA program implemented by the BPO. Sections 7.09 through 7.11 pertain to the QC/QA program developed by the LP Office. Local Agencies are encouraged to follow these guidelines so as to provide a consistent basis for evaluation and reporting of inspection data.

The QC/QA programs documented in this chapter, including the appendices, have been approved for use by the Federal Highway Administration (FHWA.) As an alternative individual agencies may choose to establish their own QC/QA policies and procedures. The procedures will require documentation similar to what is discussed in this chapter and meet the approval of the SPM or named delegate as well as the FHWA Division Bridge Engineer within the state of Washington.

Any QC/QA program being developed will want to reflect on the five areas identified in §650.307 through §650.315 and §650.507 through §650.515. A thorough QC/QA program will examine these five areas as well as any internal policies and procedures established within a given agency as a means of determining whether or not the inspection program maintains what FHWA defines as a high degree of accuracy and consistency.

The five topics identified in 23 CFR 650 include:

- Bridge Inspection Organization (§650.307 and §650.507)
- Inspection Staff Qualifications and Re-Certification (§650.309 and §650.509)
- Inspection Frequency (§650.311 and §650.511)
- Inspection Procedures (§650.313 and §650.513)
- Inventory (§650.315 and §650.515)

There are also many sources of information available that can help an agency in developing their own QC/QA programs. One particularly helpful is a document written by Dr. Glen Washer and Dr. C. Alec Chang entitled *Guideline for Implementing Quality Control and Quality Assurance for Bridge Inspection*. AASHTO sponsored the creation of this document completed in June 2009 to help those agencies in need of assistance in developing their own QC/QA programs. Section 1.4 from that document identifies seven characteristics that are common to effective programs.

These include:

1. Independent Reviews.
2. Objective and quantitative measures of quality.
3. Quality program documentation.
4. Comprehensive coverage of the inspection and load rating program.
5. Established procedures for corrective actions.
6. Established schedule for evaluations.
7. Documented review procedures.

The section concludes by saying that these characteristics of effective programs can be used in many ways and methodologies depending upon an agencies specific programmatic characteristics and needs.

It is the intent throughout this chapter that the term “bridge” refers to all structures including bridges, culverts and tunnels. The QC/QA process for tunnel inspections performed in the state of Washington is currently under development and is anticipated to be incorporated into the 2018 update of the WSBIM.

7.02 WSDOT Bridge Preservation Office Quality Control Program

A. Purpose

To establish within management a diverse set of quality control (QC) procedures to be used in the BPO in order to maintain a high degree of accuracy and consistency within the BPO inspection program. These procedures have been developed uniquely for each of the different units in the office. The procedures focus on the following areas:

- Qualifications of designated positions within the office.
- Maintaining bridge information (electronic and physical information).
- Management/analysis of bridge load rating and bridge scour.
- Office review and Field verification of information and conditions collected in bridge inspection reports.

The QC program's role is to evaluate and communicate directly with staff, any assessments made of their work. BPO policy and practices should be evaluated throughout this process and be addressed and adjusted accordingly in order to create a more consistent and accurate inspection program.

B. Definitions

Both the *National Bridge Inspection Standards (NBIS) Regulation 23 CFR 650.305 and National Tunnel Inspection Standards (NTIS) regulation 23 CFR 650.505 define Quality Control* as those procedures intended to maintain the quality of a bridge/tunnel inspection and load rating at or above a specified level. QC is performed within a work group.

C. Time Frame of Evaluation

This is an ongoing process throughout the year by each of the individual units within the office.

D. Personnel

To meet the federal requirements identified in 23 CFR 650 for Bridges, Tunnels, Structures and Hydraulics, the BPO has six distinct units that work together. These units consist of the following:

- Coding and Appraisal Unit
- Regional Inspection Unit
- Risk Reduction Unit
- Special Structures Unit
- Underwater Inspection Unit
- Movable Bridge Unit (Ch. 8 is dedicated to this unit and the work performed)

The QC program will be administered by the supervisor in each of these respective units. There may be portions of the work that are delegated to staff positions. This work will be addressed further below in each of the individual units.

7.03 Coding and Appraisal Unit

The Coding and Appraisal Unit is led by the Coding and Appraisal Engineer and is responsible for administering QC procedures within the unit. Listed below are those areas identified in 23 CFR 650 that require defined QC procedures. These procedures may be delegated to others within the unit at the discretion of the Coding and Appraisal Engineer.

A. Bridge File Maintenance

There are two positions within the Coding and Appraisal Unit that work at maintaining both the physical and electronic bridge files. These are parallel positions (Resource Technician and Inventory Technician) that operate as QC for each other.

Physical Letter Files – The Resource Technician performs an annual audit by comparing a current list of bridges from the Washington State Bridge Inventory System (WSBIS) database against the physical letter files. All conflicts between the electronic list and the physical letter files are addressed, validating both the physical and electronic portions of the bridge files. This audit has three QC functions:

- Identifies physical letter files that are missing so they can be recovered.
- Validates the accuracy of the electronic database with respect to the bridges listed in the inventory.
- Ensures that records for bridges that have been added, transferred, or removed from the inventory are complete and accurate.

Verify that all signed inspection reports from the previous year made it into the letter file.

There are two types of letter files depending on the type of inspection a bridge receives. Appendix 7.12-A provides information on what is contained in each of these two types. The physical letter files are located in the Bridge Resource Room (Room #2041). See the attached Bridge Office floor plan in Appendix 2.06-A for locations of the other various types of physical files kept in the office.

Electronic Files – The Resource Technician is also responsible for scanning electronic copies of signed inspection reports which are placed in the physical letter files, for placement in the electronic file for a particular bridge. The Inventory Technician is assigned the task of QC of this scanning process, reviewing 10 percent of the electronic files for accuracy and completeness.

Items reviewed include whether the final inspection report form was the “released” version of the report, all pages are included, all inspection types listed on the first page are included, and that the Team Leader signed the report. Once the spot check has been performed by the Inventory Technician on a batch of inspection reports, the Resource Technician uploads the reports on the BEISt server for access by all with the privileges to do so.

B. Processing Inspection Reports

Field Inspections – Bridge inspection reports are processed by the Bridge Data Steward after all the QC is complete between inspectors and supervisors. The Bridge Data Steward performs the following QC actions:

- Validates that the QC process between the inspectors and supervisors was performed (initials required on WSBIS sheet used to initiate inspection processing).
- Checks changes made to all codes in WSBIS report for reasonableness and consistency.
- Runs automated error checks within BridgeWorks application. See BPO coding guide for a detailed list of error checks.
- Checks to ensure that inspection report types are used correctly, and that when multiple report types are used in a single inspection that they all have the same inspection date.

When these checks are completed and errors corrected, the Bridge Data Steward "releases" the inspection data into the "State System Bridge Inventory" database.

The Bridge Data Steward then prints out a fresh copy of the bridge inspection report with released data, and sends that to the bridge inspectors for signature. The Bridge Data Steward then sends the WSBIS report with initials validating the inspector QC process to the Bridge Resource Technician, who also receives the signed inspection reports from the inspectors for scanning and filing. This WSBIS report is matched against the signed inspection reports to ensure they are returned to the Bridge Resource Technician for final processing as described above. The WSBIS report with QC initials is then filed for auditing purposes. These changes will then be permanently recorded in the database and immediately visible on the BEISt website.

Informational Inspections – The "State System Bridge Inventory" database often needs updated information from sources other than field bridge inspections. This includes updates to traffic or route information and setting flags for inspectors to take measurements or other specific field work that should be performed during the next field inspection. In all cases, a note is added to the informational inspection describing the changes made.

When single bridges or a small number of bridges need updating for new non-inspection data, the electronic data is reviewed and processed by the Bridge Data Steward prior to releasing into the database, though no printouts, signatures, scanning or filing is done. When batch updates are performed on a large number of structures, the Bridge Data Steward is involved in reviewing the changes, but the release process is done automatically by the BridgeWorks Application Engineer. Similarly, informational inspections are also created by the Bridge Preservation Supervisor as needed to make changes to bridge repairs. These changes are not reviewed by the Bridge Data Steward.

C. Coding New Bridges

The Bridge Inventory Technician has primary responsibility for tracking the construction of new bridges and entering them into the "State System Bridge Inventory" database. See the attached flowchart in Appendix 7.12-B that describes this process. This involves considerable coordination with many individuals both within BPO and other offices in WSDOT to obtain complete and accurate information. Due to this complexity, the flow chart is considered part of the QC process since it plays a key role in ensuring that all steps are taken.

QC of the inventory process consists of the following:

- All plan sheets are reviewed by the Bridge Resource Technician prior to loading onto BEISt to ensure that the sheet labels are correct and that the image is complete and legible.
- The new bridge inventory data is created as an Inventory report type, and is reviewed by the Bridge Data Steward prior to release into the "State System Bridge Inventory" database.

D. Data Concurrency

The Bridge Geometric Engineer is responsible to make sure that selected WSBIS fields have data that is reasonably concurrent with other WSDOT databases which serve as sources for these fields. Since this is a manual operation at this time, data queries are initiated with several other offices once per year in the late summer and the WSBIS is updated with the revised data in the following winter. The WSBIS fields managed this way are included in Appendix 7.12-C.

In order to obtain complete information on these selected fields from other databases in WSDOT, these external databases must have a complete and current list of bridges in the WSBIS and selected location information accurately coded. Regular communication and cross checking between the Bridge Geometric Engineer and the data stewards for these other external databases ensures this data integrity and concurrency, and has significant quality benefits for both the WSBIS and other databases with shared information.

E. Vertical Clearance and Clearance Posting

The Bridge Geometric Engineer manages the collection of vertical clearance data for all bridges intersecting state routes. In most cases, this consists of providing guidance to bridge inspectors on when and how to collect vertical clearance data, and reviewing and entering this data after it has been collected. This work serves as a QC mechanism for the vertical clearance data and for any bridge posting recommendations that result from vertical clearance findings.

F. Inspector Certification

Every Team Leader is responsible for keeping their own records. Their supervisors will validate certification training records during each annual performance evaluation and provide this information to BridgeWorks Application Engineer for implementation into the Bridgeworks software. Acceptable recertification courses or conferences as established by the Statewide Program Manager (SPM) can be found in Chapter 1. Inspectors who meet the qualifications retain active certification in the BridgeWorks software and retain accounts as needed to create bridge inspection reports.

G. Inspection Status Report and Performance Indicators

The BridgeWorks Application Engineer maintains a database and reporting tool called the Inspection Status Report (ISR) that serves as a "management dashboard" for the BPO. The ISR identifies bridges due for inspection and tracks their inspection progress. It also creates a record of NBI compliance for on-time inspection for federally reported inspection types. The ISR is considered a QC process for the entire bridge inspection operation.

7.04 Risk Reduction Unit (Load Rating)

The Load Rating group is led by the Risk Reduction Engineer who is responsible for administering QC within the group. QC consists of procedures defined below that will assess load rating work completed by consultants as well as what is completed in-house. Currently those load ratings completed by consultants and in-house consist of state owned bridges that meet the federal definition of a bridge. QC levels 1 and 2 listed below will be applied to all ratings submitted to the load rating section.

A. QC Criteria

All state owned bridges (owner code 1), that qualify as an NBI reportable bridge with new load ratings shall be reviewed per Level 1 as described below.

Level 1 –

- Verify that a stamped summary sheet is included in the rating file.
- Evaluate the rating factors, do they make sense? For example, is the OL1 RF greater than OL2 or the RF for AASHTO 1 greater than HS20.
- Verify that all elements/members that require ratings are rated.
- Verify that preliminary calculations are included in the submittal, especially for complex structures for accuracy. These files might include dead loads, factors, and any assumptions used in the calculations.
- Verify that the rating represent the condition of the structure based on the latest inspection report.
- Verify that each bridge's physical characteristics are modeled properly.
- Verify reinforcing/pre-stressing; typically check points at maximum stress.
- Verify that dead and live loads are modeled properly.
- Verify that the inventory and operating tons are updated in BridgeWorks and the posting matches the rating where needed.

Level 2 – This will require an independent load rating of eight structures per calendar year for state bridges. Rating factors and condition of the superstructure or substructure will be the main factors in choosing the bridges. That is, bridges with low rating factors or have an NBI code less than 5 for superstructure or substructure will have higher priority for review as well as when rating factors do not appear to be correct based on either the design load or condition.

7.05 Risk Reduction Unit (Scour Group)

The Scour Group is also led by the Risk Reduction Engineer and is responsible for administering QC within the group. QC tasks may be delegated to the Scour Engineer at the discretion of the Risk Reduction Engineer. QC of scour items will consist of procedures defined below to assess the scour work completed by the Regional and Special Structures Inspection Units as well as that of the Scour Group. QC will also verify that new structures added to the inventory are properly designed for scour and are not scour critical.

Note: The criteria set below contain QA elements.

A. Bridge Selection Criteria

All state bridges in which the scour code has changed since the last inspection. All state bridges in which the POA has changed in regards to new directions to the regions. These two items will be verified for validity.

In addition, a list of 60 bridges over water will be selected randomly from the previous inspection season. Of the bridges selected, 40 of them shall have a scour code of 2, 3, 4, or 7.

B. Office Review

- Verify that each bridge over water has a scour summary sheet, scour calculations if appropriate, a bridge layout sheet and initial ground line drawings.
- Verify that the bridge is properly coded based on scour calculations.
- Verify that each scour critical bridge has a Plan of Action and that it has clear direction for the field staff to follow.

C. On Site Field Review

- Verify that the scour code in the bridge inspection report is correct and that it reflects the field conditions.
- Verify that the scour code note added to all bridges over water, has clear and direct information.
- Verify any scour related concerns, exposed footings, channel migration, presence or need for countermeasures.
- Verify that the POAs reflect the conditions in the field.

7.06 Regional and Special Structures Inspection Units

The responsibility of structural inspections has been divided between three supervisors within the BPO. There are two Regional Inspection Engineers that oversee the bulk of the state inventory of bridges within the state of Washington. One Special Structures Engineer oversees the more unique types of structures within the inventory.

A. Office Review of Structural Inspections

A Regional Inspection Engineer or a second Team Leader will review 100 percent of High Risk, Fracture Critical, In-Depth, Interim, Damage, Special Feature, 48-month frequency, Inventory and Local Agency inspection reports under their responsibility, with the exception being those that qualify for "Team Leader Approval." See Appendix 7.12-D for specific criteria. The reviews are targeted in such a manner that all Team Leaders have close to an equal number of bridges reviewed.

The Special Structures Engineer reviews 100 percent of all Special Structure reports under his area of responsibility.

The office review of reports will consist of the following validation for accuracy and consistency:

- **Inspection Type** – The appropriate inspection types are identified.
- **Inspection Date** – Ensure that bridges are inspected on time.
- **Inspection Frequency** – Verify that inspection frequency is based on condition or policy (i.e., 48-month frequency criteria).
- **Inspection Hours** – Verify that the correct inspection hours are reported based on history of previous report hours, structure type and condition.
- **Accounting Codes** – Verify that the correct accounting codes are used.
- **Organization of Report** – Verify that the report is organized, understandable, uses correct photo and file references that follow office policy.
- **Proper Inspection Forms** – Verify that the appropriate inspection forms are included in the reports.
- **Soundings and Ground Lines** – Verify if bridge requires soundings. If required, verify that soundings and ground lines are correct and completed.
- **Inspection Resources** – Verify that the appropriate resources needed for safety, access, and adequate inspection are being used.
- **NBI Codes** – Verify that the NBI codes are supported by inspection report content.
- **BMS Elements** – Verify that the BMS elements are complete and accurate.
- **BMS Condition States** – Verify that the BMS condition states are supported by the inspection report content.
- **Repair Recommendation and Priorities** – Verify that appropriate repairs and repair priorities are recommended based on inspection report content.
- **Follow-Up Actions on Significant/Critical Findings** – Ensure deficiencies that require immediate action have had the proper parties notified and are being monitored and/or followed up on.
- **Follow-Up on Damage and Critical Damage Bridge Repair Report (CDBRR) Reports** – Verify that CDBRR's and Alerts have updated information added such as future repaired dates and/or completed repairs.

Additional QC measures that are associated with the inspection program consist of the following:

- Regional Inspection Team Leaders are scheduled to inspect bridges randomly. This limits the chances of the same bridge getting inspected by the same Team Leader repetitively.
- Regional Inspection Engineers have the opportunity to review reports written by all Regional Team Leaders. The two Regional Inspection Engineers participate in a two-year rotation in which one is responsible for reviewing all Local Agency inspection reports inspected by the BPO. All Regional Team Leaders (under both Regional Inspection Engineers) are assigned to inspect these Local Agency bridges. This allows the Regional Inspection Engineer on that particular rotation to review reports and provide feedback to all Regional Team Leaders, not just the Team Leaders working under them.
- All changes made or suggested for any particular report during the QC review process must be agreed upon by the Team Leader responsible for the final submittal of the report. In the event of a disagreement, the Bridge Preservation Engineer shall intervene as arbitrator to determine a final solution to the matter.

Documentation of reports reviewed includes, but is not limited to bridge name, inspector name, date bridge inspected, date reviewed and review state (APPROVED, APPROVED AS NOTED(AAN) OR RETURN FOR CORRECTION(RFC)). Example office review forms are included in Appendix 7.12-E and 7.12-F.

B. Field Review of Structural Inspections

Each year, 2 percent of all structural inspections are selected for field review. Structures are selected from a list of current year inspections, along with a concurrent review of the prior inspection. The reviews are targeted in such a manner that all Team Leaders have close to an equal number of bridges reviewed.

During the field review, the primary focus is to evaluate the accuracy of:

- NBI inventory items.
- NBI ratings of condition codes.
- Bridge BMS elements.
- Bridge BMS element condition states.
- Written or omitted repairs.
- Proper safety procedures.
- Areas of improvement.

Field reviews allow the supervisor an opportunity to see how the various Team Leaders are evaluating structures, relative to how the supervisor would evaluate the same structure. The expectation for coding NBI data items for “Deck, Super, and Substructure,” relative to the supervisors rating, are for the NBI condition codes to be within plus or minus 1 except for codes less than 5. Codes of 4 or less should not deviate at all, unless there are changed conditions warranting an updated code. For the BMS elements, there should be no missing elements. For BMS condition states, verbiage in the report should be supportive of the condition state ratings and quantities. For repairs, all repairs need to be supported by inspection findings.

All deviations from the above standard are documented, and the supervisor shall dialogue one-on-one with the Team Leader responsible for the report concerning all deviations. It is the responsibility of the supervisor to determine if more training is necessary for the Team Leader, or if other measures need to be taken to insure consistency of the bridge inspection reports. A field review form is included in Appendix 7.12-G.

7.07 Underwater Inspection Unit

The Underwater Inspection (UW) Unit within the BPO focuses on the structural inspection of substructure bridge elements identified to be in water deeper than 4 feet. The Special Structures Engineer has the responsibility of administering QC procedures identified below for this unit.

A. Underwater Inspection Office Report Review Process

Reviews of UW inspection reports are based on the type and condition of the bridge inspected. A complete office review is performed for all bridges that fall into one of the following categories:

- Local Agency owned.
- Washington State Ferry terminals.
- Scour critical bridges (scour code of 3 or less).
- Structures with exposed footings.
- Bridge with repairs associated with the underwater inspection findings.

The review ensures that all documentation is included to support the underwater findings. This includes:

- Correct substructure coding (based on inspection findings).
- Sketches and drawings showing the extents of underwater inspection.
- Documentation of ground lines around all piers.
- Drawings showing the location and extents of all defects.
- Drawings showing the current channel cross section.
- Repairs must be adequately described and written into the text of the inspection findings.

A UW report checklist is used to make sure the report package is complete.

B. Field Review of Underwater Bridge Inspections

The Special Structures Engineer accompanies the underwater bridge inspection team for 5 percent of all of the inspections performed each year.

7.08 WSDOT Bridge Preservation Office Quality Assurance Program

A. Purpose

To conduct an independent annual evaluation of the adequacy of the bridge and tunnel inspection program within the BPO in meeting the FHWA requirements as defined in the §650.307 through §650.315 and §650.507 through §650.515, as well as office policy, procedures and best management practices established in the WSBIM. The program will also assess the adequacy and consistency of QC procedures in place within the BPO.

B. Definitions

Quality assurance (QA) is defined in §650.305 and §650.505 as the use of sampling and other measures to assure the adequacy of QC procedures to verify or measure the quality level of the entire bridge inspection and load rating program. QA is administered from outside a work group.

C. Timeframe of the Quality Assurance Evaluation

QA will be conducted on bridges inspected in the previous inspection season. See Appendix 7.12-H for details on the selection process.

D. Personnel

To meet the federal requirement identified in §650.307(c), §650.313(g), §650.507(e), and §650.513(i) the BPO created a Quality Assurance Engineer (QAE) position. This position is responsible for administering the QA program. The QAE must meet the same qualifications and re-certification requirements as a TL.

E. Quality Assurance

The QA program treats the separate units within BPO as a whole to evaluate the following areas below for accuracy and consistency and produces an annual summary of findings. In addition to that, the QAE will participate in an annual office wide "Process Change" meeting, a meeting with management and staff prior to the beginning of the next inspection season. This will consist of a summary of the information that is contained in the annual report submitted to the SPM.

1. **Staff Qualifications and Re-Certification** – Document validity of qualifications and re-certification of SPM, TL, LRE and UBID based on roles and responsibilities defined in Chapter 1.
2. **Office Records and Procedures** – Review and document the accuracy and completeness of the following for those bridges selected using the selection criteria described in Appendix 7.12-H:
    - Contents of bridge letter and electronic files (see Appendix 7.12-A).
    - Load ratings.

    Review of load rating information:

    - Load posting at bridge matches that of load rating documentation.
    - Operating level codes match legal load ratings and posting codes.
    - Summary sheet in the letter file is signed and stamped by Engineer of Record (EOR).

Inspection reports:

- Appropriate report forms:
  - Fracture Critical report
  - Underwater report
  - Special Inspection report
  - Damage inspections
- Bridges on 48-month frequency.
- Scour Evaluation of bridges over water.

3. **Field Procedures** – Review and document the accuracy and completeness of the following for those bridges selected using the selection criteria described in Appendix 7.12-H:
   - Appropriate forms used.
   - NBI appraisal coding, NBI inventory data and Bridge Management System (BMS) condition state coding.
   - Inspection notes.
   - Photographs and sketches.
   - Maintenance recommendations.
   - Resources used to conduct bridge inspections.
   - Safety hazards addressed.
4. **Data Quality** – The Coding and Appraisal Unit completes QC/QA processes that include error checks, incorporated results from FHWA provided error checks, persistent error reports, and State developed consistency, compatibility and accuracy checks.
5. **De-certification/Reinstatement** – For process on de-certification and reinstatement see Chapter 1.
6. **Deliverables** – A written report will be provided to the SPM prior to the beginning of the next inspection season that will include:
   - Executive summary.
   - Selection breakout by category. See Appendix 7.12-H for details.
   - Individual QA field and office reports for each bridge selected.
   - Findings (from both office and field procedures).
   - Recommendations to management.

7.09 WSDOT LP Quality Control/Quality Assurance Program

A. General

LP conducts quality control/quality assurance (QC/QA) reviews of local agency bridge programs statewide to:

- Verify that local agency bridge inspection programs maintain a high degree of accuracy and consistency.
- Identify future training needs.
- Ensure compliance with the NBIS.

QC reviews are conducted by both the local agency bridge owners and by LP. The LP Local Agency Bridge Inventory Engineer continually performs routine QC on the data contained in the Local Agency Bridge Inventory.

QA reviews are formal reviews of an agency that are conducted a minimum of once every five years. This formal agency review consists of both a bridge file review and the field review as detailed in Section 7.11.B. See *Local Agency Guidelines* (LAG) M 36-63 Appendix 34.57 for a copy of the checklist used by LP for this review.

7.10 WSDOT LP Quality Control Program

LP has established a set of QC procedures to be used with Local Agencies in order to maintain a high degree of accuracy and consistency within the bridge inspection program. The procedures focus on the following areas:

- Qualifications of designated bridge positions within the agency.
- Maintaining bridge information (electronic and physical information).
- Management/analysis of bridge load rating and bridge scour.
- Office review and Field verification of information and conditions detailed in bridge inspection reports.

The QC program's role and that of those involved in the process is to evaluate and communicate the assessments made directly with staff involved. Local Agency practices should be evaluated throughout this process and be addressed and adjusted accordingly in order to create a more consistent and accurate inspection program.

Quality control is defined per 23 CFR 650.305 and §650.505 as "procedures that are intended to maintain the quality of a bridge inspection and load rating at or above a specified level." QC is performed within a work group.

A. Personnel – Roles, Responsibilities, and Qualifications

The roles and responsibilities for the following local agency bridge inspection personnel are described in detail in Chapter 1. The minimum qualifications for each of these positions are described in the NBIS.

List of typical local agency bridge inspection personnel:

- Program Manager
- Team Leader
- Load Rater
- Underwater Bridge Inspection Diver

B. Personnel – Continuing Education Requirements

The Certified Bridge Inspector (CBI) list is managed through the Local Agency BridgeWorks bridge inspection software. Each CBI must fulfill the continuing education requirements as listed in Chapter 1 or as outlined in LAG Chapter 34 prior to the expiration date on their Local Agency BridgeWorks account and must submit their training records for review and request an extension of their Local Agency BridgeWorks account rights.

LP will also search the database for all inspectors that are due for the refresher course within the next year and notify each inspector of the need to attend the refresher course and availability of training. A CBI who does not fulfill the requirements of Chapter 1 will have their certification suspended until the inspector supplies LP with proof that they have successfully fulfilled the continuing education requirements (see Section 1.06).

C. Maintain Bridge Information (Electronic and Physical Information)

Each agency is responsible for maintaining a bridge file for each bridge within its jurisdiction. A detailed list of information that should be in the bridge file is listed and described in Section 2.02. In addition, agencies are required to maintain a record of other general information. This information may be requested during the QA review of the bridge inspection program. The following general information should be on file:

- An experience and training record for each lead inspector.
- A master list of all bridges within the agency's jurisdiction. This list should identify bridges that have fracture critical members, require underwater inspection, and/or warrant special inspection because of their design features, location, or strategic importance.

Physical Letter Files – The LP Local Agency Bridge Engineer will perform an annual audit by comparing a current list of bridges from the Local Agency WSBIS database against the physical letter files. All conflicts between the electronic list and the physical letter files are addressed, validating both the physical and electronic portions of the bridge files. This annual audit has three QC functions:

- Identifies physical letter files that are missing so they can be recovered.
- Validates the accuracy of the electronic database with respect to the bridges listed in the inventory.
- Ensures that records for bridges that have been added, transferred, or removed from the inventory are complete and accurate.

All physical letter files should include an individual bridge record checklist as provided in LAG Appendix 34.56.

Electronic Files – Local Agencies have the option of keeping some or all of their bridge files electronically. If an agency chooses to maintain an electronic copy, it is the local agency program manager's responsibility for scanning the signed inspection reports. The agency should review the data scanned to ensure the files are accurate and complete.

Items to be reviewed include:

- Did the agency "release" the final inspection report form:
  - Were all pages included
  - Were all inspection types listed on the first page included
  - Did the Team Leader sign the report

See LAG Appendix 34.55, for additional information that should be reviewed and included as part of an individual electronic bridge record.

D. Management/Analysis of Bridge Load Rating and Bridge Scour

Load Rating – The QC tasks for load rating are the responsibility of the LP Local Agency Bridge Engineer or the Local Agency Program Manager. A PE license is required for the individual responsible for this review. The QC tasks apply to any new load rating work to be completed on a structure or for revisions to a load rating on a structure.

QC consists of procedures defined below that assess the load rating work completed by consultants as well as by local agencies. These rules currently apply to those load ratings completed by consultants and local agencies on locally owned bridges that meet the federal definition of a bridge (NBI bridges). However, agencies are also encouraged to follow these methods for their non-NBI bridges.

A selected number of locally owned bridges (Owner code of 2, 3,4,25, or 32) that qualify as NBI bridges will be reviewed annually. A sub-set of the selected bridges will consist of a combination of Fracture Critical bridges and bridges with a Superstructure or Substructure NBI Code of 4 or less.

The QC review on all selected structures will include the following:

- Verify the bridge has been rated.
- Verify a stamped summary sheet is included in the rating file.
- Verify the inventory and operating tons match the values reported in bridge inventory through the BridgeWorks software and the posting matches the rating where needed.
- Evaluate the rating factors, do they make sense? For example, is the OL1 RF greater than OL2 or the RF for AASHTO 1 greater than HS20?

For structures that consist of a combination of Fracture Critical bridges and bridges with a superstructure or substructure NBI condition code of 4 or less, additional information will be reviewed for these structures as follows:

- Verify all elements/members that require ratings are rated.
- Verify the preliminary calculations are included in the submittal and are checked for accuracy. These files might include dead loads, factors, and any assumptions used in the calculations.
- Verify the ratings represent the condition of the structure based on the latest inspection report.
- Verify each bridge's physical characteristics are modeled properly.
- Verify reinforcing/pre-stressing; typically check points at maximum stress.
- Verify dead and live loads are modeled properly.

Bridge Scour – The QC tasks for bridge scour are the responsibility of the LP Local Agency Bridge Engineer or the Local Agency Program Manager. The LP Local Agency Bridge Engineer will conduct an annual review on all local agency bridges in which the scour code has changed since the last inspection and on all bridges in which the scour Plan of Action (POA) has changed in regards to new directions for monitoring or implementing. These two items will be verified for validity.

The QC review on all selected structures will check the following:

- Verify each bridge over water has:
  – a scour summary sheet
  – scour calculations if appropriate
  – a bridge layout sheet
  – Initial ground line drawings
- Verify the bridge is properly coded based on scour calculations.
- Verify each scour critical bridge has a Plan of Action and that it has clear direction for the field staff to follow.

A field review is also conducted as part of the QC review on the bridges selected annually that includes the following:

- Verify the scour code in the bridge inspection report is correct and that it reflects the field conditions.
- Verify the scour code note added to all bridges over water has clear and direct information.
- Verify any scour related concerns, exposed footings, channel migration, presence or need for countermeasures.
- Verify the POAs reflects the conditions in the field.

E. Review and Validation of Inspection Reports and Data

QC reviews are conducted by both the local agency bridge owners and by LP. The LP Local Agency Bridge Inventory Engineer continually performs routine QC on the data contained in the Local Agency Bridge Inventory.

An individual bridge record specific QC check by the LP Local Agency Bridge Inventory Engineer begins after agencies conduct bridge inspections and perform their internal QC procedure. After an Agency's QC is complete, notification is made to LP by email that their bridge inspection records are ready for release to the Local Agency Bridge Inventory. Any necessary information or instructions related to their updated inspection data are also provided in this email. The Local Agency Bridge Inventory Engineer then starts the QC process on the updated, as well as the existing bridge data associated with the bridge records. This includes the following:

- A query is run on all inventory data for verification of data consistency and correct data field correlation.
- An in-depth review is run on all inventory data for verification of data consistency and correct data field correlation on all new data prior to releasing into the bridge inventory.
- A review of the inspection coding for consistency, completeness and accuracy.

- A review of additional bridge file components as they become available electronically through the bridge inspection software.
- Note any discrepancies, errors or questions.

Along with the individual inventory review:

- An evaluation of all bridge inventory data integrity is made whenever bridge information requests are made.
- Individual questions are answered daily through one-on-one instruction by phone call or email.
- Review visits with an Agency are conducted periodically with formal review visits as noted above.
- Quarterly reports are prepared from the bridge inventory data and are forwarded to the Agencies for review and action. This report lists bridges with inspections that appear to be out of date, with inspection work that needs to be completed and released, and a projection of what inspections need to be scheduled in the next quarter.

If discrepancies or errors are found the following will occur:

- A documented phone call may be sufficient to clear up the issue.
- If the error has been previously noted or is severe enough to warrant immediate action, the structure update will be returned un-released with an explanation as to why the update was not released and instructions on how to resolve the issue.
- An Excel spreadsheet of the errors found is prepared from the review notations and is sent to the Agency with instructions on how to correct their record. The updated inspection information is released and the corrections are made through an informational update or during the next inspection.
- If the review does not result in questions or concerns, the update is released without comment.

F. Reporting of Quality Control Reviews

Reporting annual results and findings of QC reviews will be as follows:

- Provide results to the Statewide Program Manager for incorporation into overall Washington QC/QA annual report by the end of October.
- Copies of all reporting and documentation of the LP QC reviews will be available at the WSDOT LP Office.

7.11 WSDOT LP Quality Assurance Program

QA reviews are formal reviews that are conducted by LP annually for bridge inspector personnel qualifications and a minimum of once every five years to verify the adequacy of the QC procedures for a local agency. The QA review is performed by the LP Local Agency Bridge Engineer as an independent reviewer from the bridge inspection team on a sample of work completed within a three-year timeframe prior and up to the time of the formal review.

Quality assurance is defined per 23 CFR 650.305 and §650.505 as "the use of sampling and other measures to assure the adequacy of QC procedures in order to verify or measure the quality level of the entire bridge inspection and load rating program". QA is administered from outside a work group.

A. Annual QA Review – Certified Bridge Inspector

At a minimum, the LP Local Agency Bridge Engineer will review qualifications and re-certification records for a sample of certified inspectors within the database on an annual basis. Continued certification will be in accordance with the inspector certification process established in Chapter 1. Any suspensions of certification will be in accordance with the process described in Section 1.06.

B. QA Review – On Local Agency QC Procedures

The formal QA review that is conducted a minimum of once every five years consists of both a bridge file review and the field review as detailed below. This review will be performed by, or under the direction of the LP Local Agency Bridge Engineer. The agencies and structures that are selected for review are those responsible for NBIS inspections and reporting. The number of bridges to be reviewed will be determined based on agency inventory and types of structures. If an agency has a cross section of structure types and condition states a sample from all types will be included as part of the review.

Selection criteria for agencies to receive a QA review includes the following;

- Agencies responsible for NBIS inspections and reporting will have a higher priority.
- Elapsed time since last local agency QA review (maximum interval of five years).
- **Past Performance** – An agency that has had a review with minor deficiencies and/or corrections will receive higher priority; conversely agencies with a demonstrated record of high quality results will be a lower priority.
- **Condition of Bridges** – Agencies with inventories of higher risk bridges (such as bridges with low sufficiency ratings that are fracture critical or structurally deficient) will receive high priority.

Listed below are the procedures and sampling parameters that will be used in selecting bridges to review from each selected agency:

- Is the bridge load restricted?
- Bridge's deficiency status.
- Is the bridge programmed for rehabilitation or replacement?

- Does the bridge have critical findings and what is the status of any follow-up action?
- Bridges with unusual changes in condition ratings.
- Bridges that require special inspection.
- Location of bridges.

A close-out meeting will be conducted at the conclusion of each local agency QA review. Any deficiencies, as well as commendable practices will be identified for the agency at the time of the review. See Appendix 7.12-J for procedure on documenting an agencies deficiencies and corrective action to be taken. If no deficiencies were found during the local agency's bridge program QA review, the local agency will be informed in writing.

Office File Review – The QA office file review assesses the following items documenting the results via the checklist in LAG Appendix 34.57:

- Inspection reports.
- Verify inspections were completed by qualified staff.
- Complete and organized bridge files.
- Accurate and current master lists.
- Accurate documentation of bridge load ratings.
- Accurate documentation of scour evaluations including scour codes and a plan of action for all scour critical bridges
- Thorough and accurate documentation of inspections performed
- Inspection frequency as outlined by the NBIS at a minimum or agency specific defined frequencies, see LAG Appendix 34.52.
- For agencies with a Program Manager delegated by WSDOT, an in-depth review to validate the agencies QC/QA procedures

Field Review – The field bridge inspection QA review is the second component of the overall QA review. The field review will be performed by, or under the direction of the Local Agency Bridge Engineer. Other members of the team will consist of representatives from the bridge owner agency and possibly Region Local Programs Personnel. The number of bridges the team selects will be based on a review of the agency's overall inventory and past performance. The Local Agency Bridge Engineer will consider the number of bridges in an agencies inventory when making the following decisions on the number of structures to be sampled:

- The various inspection types of structures in an agencies inventory. (i.e., fracture critical, special, underwater, routine).
- The sample reviewed should have a cross section of structures of all types of bridges within and agencies inventory. This should be at a minimum of three bridges per structure inspection type depending on the individual inventory.
- The number of bridges in poor condition. Generally, 10 percent of bridges considered structurally deficient in the Local Agency BridgeWorks Inventory should be reviewed, but not more than three will be required.
- An agencies past performance that has had a review with major deficiencies and/or corrections will have a higher priority.

The field review process will compare the bridge site condition report with the routine inspection reports as well as Fracture Critical, Underwater, and/or Complex Bridge Inspection Reports if applicable:

- General site review checklist:
  - Review Bridge Inspection Report(s).
  - NBI Appraisal Rating Items and Condition Codes (WB76).
  - BMS Element correctness and condition states.
  - Accuracy of notes.
  - Repair Recommendations.
  - Special inspections and procedures (fracture critical, underwater, complex).
  - Correct correlation of report elements.
  - Field aspects of frequency, scour, and load rating.
- One or more condition ratings are out of tolerance more than +/- 1. This will be reported on the closeout meeting and the information will also be included in the letter to the agency.
- Review Bridge Inventory Report
  - Inspection date and frequency for all reportable inspection types (WB77).
  - Additional coding not noted on the Bridge Inspection Report.

C. Reporting of Quality Assurance Reviews

Reporting results and findings of QA reviews will be as follows:

- Detailed in the Federal Aid Highway Program Stewardship and Oversight Agreement entered into by WSDOT and FHWA that is to be in place in early 2015 (pending signatures).
- Provided to the Statewide Program Manager for incorporation into overall Washington QC/QA annual report by the end of October.
- Copies of all reporting and documentation of the LP QA reviews will be available at the WSDOT LP office.

7.12 Appendices

Appendix 7.12-C WSBIS Fields Maintained With Other WSDOT Database Source Information

1. Fields that BPO would like to get from TDO to check for NBI submittal:

   hwy_class (char(1), null) – This code identifies what type of highway the inventoried route is one using the following:

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 (included toll roads not otherwise identified.)

   serv_level_code(char(1), null) – This code describes the designated level of service provided by the inventoried route:

1	Mainline (most local agency bridges)
2	Alternate
3	Bypass
4	Spur
6	Business
7	Ramp or “Y”
8	Service and/or unclassified Frontage Road
0	None of the above

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

   adt(numeric(6,0), null) – This is the Average Daily Traffic (ADT) volume carried on the route being inventoried. If bridges on a divided highway are coded as parallel, then the ADT is the volume carried on the individual bridge, not the cumulative volume carried on the route. The determined ADT volume must be no more than four (4) years old. Add leading zeros to fill all spaces in the field.

   adt_truck_pct (numeric(2,0),null) – This is the percentage of the ADT volume that is truck traffic. It does not include vans, pickups, or other light delivery trucks. Code to the nearest whole percent.

   adt_year(numeric(4,0), null) – This is the year in which the estimate of the ADT volume was determined. If the year entered in this field is more than four years in the past, a new ADT volume must be determined and entered in the ADT and the year the ADT was determined in this field.

Future_adt(numeric(6,0), null) – This is the ADT volume that the inventory route is expected to carry 20 years in the future. This field may be updated whenever a new projection is made. The field must be updated any time the projected date of this forecast is less than 17 years, but not more than 22 years from the current year.

Future_adt_year(numeric(4,0), null) – This is the year for which future_adt has been projected. This date must be at least 17, but no more than 22 years from the current year. If the date in this field is outside these limits, then a new value will be required for and a new year will need to be entered in this field.

strahnet_hwy(char(1),null – For the inventory route identified indicate STRAHNET highway status using one of the following codes:

0 The inventory route is not a STRAHNET highway.
1 The inventory route is an Interstate STRAHNET highway.
2 The inventory route is a non-Interstate STRAHNET highway.
3 The inventory route connects with a Department of Defense facility.

nat_truck_ntwrk_flag(char(1),null)

fed_hwy_system_code(char(1),null) – This item shall be coded for all records in the inventory. For the inventory route identified indicate whether the inventory route is on the NHS or not on that system. This code shall reflect an inventory route on the NHS as described in the TRANSPORTATION EQUITY ACT FOR THE 21ST CENTURY (TEA21).

If more than one federal aid highway is carried on or under the bridge, indicate only the classification of the more primary route.

0 Inventory Route is not on the NHS.
1 Inventory Route is on the NHS.

fed_functional_class(class(2),null) – This code describes the Federal Functional classification of the inventory route as classified according to Statewide National Functional Classification System maps. Statewide National Functional Classification System maps are located at local agency planning departments or WSDOT Service Center Planning.

Separate codes are used to distinguish roadways located in rural or in urban areas. Routes shall be coded rural if they are not inside a designated urban area, Codes 08, 09, and 19 are for off-system roads.

Rural Codes

01 Principal Arterial – Interstate
02 Principal Arterial – Other
06 Minor Arterial
07 Major Collector (Federal Aid Secondary)
08 Minor Collector
09 Local

Urban Codes

11 Principal Arterial – Interstate
12 Principal Arterial – Other Freeway or Expressway
14 Other Principal Arterial
16 Minor Arterial
17 Collector
19 Local

f**ed_lands_hwy_code(char(1),null)** – This code identifies bridges on roads which lead to and traverse through federal lands. These bridges may be eligible to receive funding from the Federal Lands Highway Program. Use one of the following codes:

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 definition of IRR (Indian Reservation Roads), see Title 23 USC Section 101.

2. Fields BPO would like to get from TDO if available:

Region_code(char(2),null) – This is a two-digit code, which identifies the WSDOT region in which the bridge is located.

County_id(int,null) – This is a two-digit code, which identifies the county in which the bridge is located. If this is a jointly owned bridge, the county that is responsible for reporting the data to the inventory should be entered here. Use one of the following codes.

City_id(int,null) – This is the city in which the bridge is located. (Codes for cities and towns are identified according to the most recent U.S. Bureau of the Census Identification Schedule.) Contact the Bridge Engineer for Local Agencies for newly incorporated municipalities.If the bridge is outside of corporate limits or in an unincorporated city, code all zeros.

Leg_dist_code_1(int, null) – This field identifies the first or only State Legislative District in which the bridge is located.If the legislative district number is followed by a letter (District 19A, for example), disregard the letter and enter the two-digit number only

Leg_dist_code_2(int, null) – 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 Number (1) field to enter the two separate State Legislative District numbers. If no code is applicable, enter all zeroes.

speed_limit(tinyint, null) – Speed limit on the bridge.

- These are coming from the Data Mart process…an ARM value is returned as well.
- These are going to be populated by HPMS.

Appendix 7.12-H Bridge Preservation Office Quality Assurance Bridge Selection Process

The following table identifies categories used to help evaluate whether or not the random selection is representative sample of the previous seasons inspections. If a particular category is not considered to be covered sufficiently, additional bridges can be traded out in order to establish more representative coverage. The selection set for the office and field review will include a minimum of 100 bridges of the previous year's inspections. Like the NBIP compliance review trips performed in Washington state, the QA selection process as of 2014 uses a three-year cycle in which bridges are selected from two different regions each year. In this three-year cycle, a random set of bridges are selected and receive a QA inspection from each of the six regions. In addition to this cycle and due to the number of bridges in the Northwest Region, a smaller sampling of bridges (one or at most two inspection trips depending on complexity of bridges) will be selected from this region. This will be done in the off cycle years in order to maintain a representative sample of bridges within that region in the overall three-year cycle.

The three-year cycle will pair up the following regions:

- SCR and EAR (includes a small set in NWR)
- OLR and SWR (includes a small set in NWR)
- NWR and NCR

The final list developed prior to generating a random sample is screened for inspection types that consist of Routine, Safety or Short Span type inspections. The list is also screened for bridges that have been previously QA'd. Once a final list of bridges is developed, a random list is generated. The first 100 bridges are selected and represent the final short list for QA office and field review for that year. This final short list is then validated for reasonable representation of the categories listed below.

As an option, a minimum of five bridges previously receiving a quality assurance review, excluding work from the previous QA inspection season, can be added to the final short list for the season. The goal of doing this is to validate whether or not suggested changes in the report that reflect correct office procedures and federal requirements have been implemented or not. These bridges may be chosen by the QA Engineer to best fit within proximities of the randomly selected bridges.

Region	Scour Code
Primary Material Type	Open/Closed/Posted
Primary Design Type	Year Built
Inspection Type	Inspection Frequency
By Team Leader	NBI Reportable
Sufficiency Rating	Bridge Length
Structurally Deficient/Functionally Obsolete (SD/FO)	High Risk

BPO Scope of Field Review

The selection process above does not eliminate any bridges because of size or complexity. The typical bridge will be inspected in its entirety. However, the scope of field review for larger and more complex bridges is entirely a different matter. The process for QA inspection for these types of structures will be more case by case. The idea will be that some of all of the components for these particular bridges will be inspected. The QA process should consider both time and size in determining how to reach this goal for these types of bridges. Traffic windows, lane closure manpower, species windows, and equipment availability are other factors that will influence the ability for one QA team to accomplish a smaller scale inspection of a larger more complex structure.

Chapter 9 Tunnels

9.01 General

The National Tunnel Inspection Standards (NTIS) are published in the Code of Federal Regulations, 23 CFR 650, Subpart E. The NTIS requires that tunnel owners establish a program for the inspection of highway tunnels, to maintain a tunnel inventory, to report the inspection findings to FHWA, and to correct any critical findings found during these inspections. The Washington State's tunnel inspection program functions fully within the umbrella of the Washington State's bridge inspection organization.

Washington State's tunnel inspection organization, however, is only responsible for state and local agency-owned tunnels. Federally-owned tunnels are inventoried, inspected, and managed by federal agencies. Privately-owned highway tunnels are not included in this requirement, although WSDOT encourages private tunnel owners to inspect and maintain their tunnels in conformance with the NTIS and this manual. There is an open invitation for private tunnel owners to submit bridge records to the Washington State Bridge Inventory System (WSBIS).

A. Definitions

Complex Tunnel – A tunnel characterized by advanced or unique structural elements or functional systems.

Highway LID – A structure built with green space which interconnects neighborhoods otherwise cut off or impacted by freeways, with or without local roads. If carrying local roads, the structure must have a deck area at least twice the area of the roads it carries. Highway "LIDS" shall be inventoried as tunnels under the NTIS.

National Tunnel Inspection Standards (NTIS) – Title 23 Code of Federal Regulations 650 Subpart E defines the NTIS regulations, and establishes requirements for inspection procedures, frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of a state tunnel inventory. The NTIS apply to all structures defined as highway tunnels located on all public roads.

Tunnel – The term "tunnel" means an enclosed roadway for motor vehicle traffic with vehicle access limited to portals, regardless of type of structure or method of construction, that requires, based on the owner's determination, special design considerations that may include lighting, ventilation, fire protection systems, and emergency egress capacity. The term "tunnel" does not include bridges or culverts inspected under the National Bridge Inspection Standards (Title 23 Code of Federal Regulations 650 Subpart C). The state of Washington shall prepare and maintain an inventory of all tunnels subject to the NTIS.

Specifications for the National Tunnel Inventory (SNTI) – The SNTI is intended to supplement the NTIS and provide the specifications for coding data required to be submitted to the National Tunnel Inventory (NTI). Data in the NTI will be used to meet legislative reporting requirements and provide tunnel owners, the Federal Highway Administration (FHWA) and the general public with information on the number and condition of the Nation's tunnels.

National Tunnel Inventory (NTI) – The aggregation of structure inventory and appraisal data collected to fulfill the requirements of the National Tunnel Inspection Standards.

Tunnel Operations, Maintenance, Inspection, and Evaluation Manual (TOMIE) – The TOMIE provides uniform and consistent guidance on the operation, maintenance, inspection, and evaluation of tunnels.

See Section 1.01.A for additional definitions used in this manual.

9.02 Description of Tunnel Inspection Organization

In accordance with the description of the Bridge Inspection Organization offered in Section 1.02, a tunnel inspection organization as required by the NTIS has been developed. The tunnel inspection organization functions completely under the umbrella of the Washington State bridge inspection organization. The makeup of the tunnel organization is identical in all aspects as the bridge inspection organization.

9.03 Tunnel Inspection Programs

In accordance with the description of the Bridge Inspection Programs offered in Section 1.03, a tunnel inspection program as required by the NTIS has been developed. The tunnel inspection program functions completely under the umbrella of the Washington State bridge inspection organization. The makeup of the tunnel inspection program is identical in all aspects as the bridge inspection program.

9.04 Tunnel Inspection Organization Roles and Responsibilities

In accordance with the description of the Bridge Inspection Organization Roles and Responsibilities offered in Section 1.04, tunnel inspection Organization Roles and Responsibilities as required by the NTIS has been developed. Tunnel inspection roles and responsibilities fall completely under the umbrella of the Washington State bridge inspection organization with the additional requirement for the Team Leader as described below.

A. Team Leader (TL)

A team leader is in charge of an inspection team and responsible for planning, preparing, and performing the field inspection of tunnels. The team leader also makes repair recommendations and is responsible for initiating the critical damage procedures including full tunnel closure if deemed necessary. To qualify as a team leader, the individual must meet, at a minimum, the team leader requirements as described in the NTIS. Team leaders must be recertified on a regular basis by attending a refresher training class according to state policy. The certification process is described in detail in Section 1.05.

9.05 Tunnel Inspection Certification

Certification for tunnel inspection work within the state of Washington is in accordance with the requirements described in Section 1.05 with the additional requirement of having a Certificate of completion of an FHWA approved comprehensive tunnel inspection course such as the NHI Tunnel Safety Inspection course. All certified NTI inspector numbers will be tracked through the Bridgeworks System.

9.06 Tunnel Inspection Certification Probation, Suspension, Decertification and Reinstatement

A process for decertification has been established to ensure that all PM's and TL's are following the proper conduct of their respective positions. The requirements for Tunnel inspectors is identical to that of Bridge Inspectors as described in Section 1.06.

9.07 Inspections

A multi-disciplined approach to tunnel inspection has been adopted by the WSDOT Bridge Preservation Office to comply with the requirements of the NTIS. Routine inspections for the Civil and Structural components are described in Chapter 3 while the Electrical and Mechanical inspection are described in Chapter 8.

9.08 Tunnel Elements

BMS elements for WSDOT Tunnels is listed in Appendix 9.10-A (Only Civil/Structural Elements)

*There is no translation from WSDOT condition state to the SNTI.

WSDOT Pre-NTIS tunnel elements 250, 251, 252, 253 are discontinued and replaced with the Specifications for the National Tunnel Inventory (SNTI) elements. WSDOT bridge elements previously included in tunnel inspections no longer apply to tunnels.

This section describes why modified tunnel condition states are used by WSDOT to manage and inspect the tunnels. Element names and numbers are the same as published in the Specifications for the National Tunnel Inventory (SNTI), with WSDOT minor clarifications to the descriptions. However, the condition state definitions have been modified to follow the management and inspection philosophies of the WSDOT Bridge Elements as described here, see Section 4.1.3.1 for the use of the word "Affected" in evaluating condition states. There are no clarifications or changes to the Tunnel Inventory items.

The WSDOT deviation in condition evaluation can be summarized by stating the Condition State 2 (CS2) is reserved to document the quantity of repairs only, and excludes minor deteriorations that are not significant to management or the condition evaluation. The SNTI sets the precedent to evaluate repairs as a condition state 2 and has several examples specified, such as: Patching, Sound Patching, Arrested Cracks, Doubling Plates or similar, and other "Mitigated Defects". By including conditions other than repairs, the SNTI evaluation is more difficult and dilutes the quality of data for management purposes. This WSDOT CS2 deviation from SNTI is small, but has a large impact to the inspector and a significant improvement to the asset management.

The SNTI condition states require the inspector to make three evaluations to determine the proper condition state; typically, "Is the field condition CS2? or CS3?, or CS4? This requires significant memorization of the element definitions to consistently and correctly evaluate a variety of material defects, and extrapolate for defects not specified. By documenting only repair quantities in CS2, the inspector evaluation is essentially reduced to, "Is the defect CS3 or CS4?" The evaluation is focused on the important field conditions and the most valuable to management where the following significant benefits and efficiencies are realized.

1. The coding is simplified since repairs are easily identified and quantified. This improves the consistency between inspectors and is quality improvement because CS3 and CS4 is the focus of the inspection effort which provides the most useful data to predict future conditions and budgeting need. The focus is on, "What needs to be inspected and documented?"
2. More efficient in two ways. The first saves time because a large number of CS2 minor structural defects are ignored, such as: Freckled rust, Discoloration, Beginning Decay, and Hairline cracks. This data and documentation is not useful for prediction of element deterioration and does not justify the attention of funding. The second efficiency is a small number defects specified in SNTI as CS2 may be evaluated as WSDOT CS3, such as "Loose Fasteners in a Steel Tunnel Liner" because a repair may be appropriate. This useful information is more appropriate to WSDOT as CS3.
3. Pre-defined condition states for a few defects can create coding problems and are replaced with a more practical and useful evaluation. For example, the width of a concrete crack determines the SNTI condition state where large cracks are CS4. This prescriptive coding assumes a small crack is not a problem which may not be the case in the field. WSDOT condition state 3 and 4 is based on the importance of the crack using engineering judgment and practice, where the crack width is a factor. This allows a structurally significant small crack to be CS3 OR CS4 and a large crack ¼" wide in a sidewalk/barrier could be CS1. This WSDOT philosophy solves the coding problem for all materials including pre-cracked timber and concrete.
4. Repair quantities exclusively in CS2 provide the benefit of indirectly tracking a long term cost and decline of the asset. As the quantities change with time, CS1 quantities move to 3 or 4 and collect as expensive CS2 repairs. The SNTI definition eventually leads to a problem on older elements when the history of repairs is mixed with minor element defects because two possible conditions can exist with a large amount of CS2. Either an element is aging gracefully or the element has frequently been in Poor condition with a large amount of repairs; or some combination thereof. These are two different and distinct scenarios that cannot be distinguished in SNTI data for modeling or funding. By having exclusive CS2 repair quantities, WSDOT can model both scenarios. In addition, the CS2 quantities are an indicator of element performance and better of support the decision of when to replace the element in the inventory.

5. The WSDOT tunnel conditions tie directly to an NBI reporting of Good, Fair, and Poor which are directly associated with the established "Structurally Deficient" rating for bridges. Primary tunnel elements with quantities in CS3 are considered by WSDOT as Fair condition, and tunnels with quantities in CS4 are in Poor condition. If FHWA establishes an equivalent rating system for tunnels or WSDOT includes tunnels in reporting processes, the WSDOT elements have a justifiable reporting system.

   The SNTI use of the word "Severe" to describe CS4 has proven confusing to the WSDOT inspection and reporting process. Severe structural defects are viewed as something that demands an immediate or emergency action and inappropriate for a management system which takes up to 10 years or more to respond with funding.

   There are two important goals behind any asset management system. One goal is to identify what may require funding in the future and the second goal is to identify what needs funding now. With repairs dedicated to CS2, WSDOT definitions directly support these two goals with field conditions in state 3 may require funding, but not at this time; and field conditions in state 4 require funding for repair, rehabilitation, or replacement of the element, but are still safe for public use. If CS2 is used to collect other field conditions, the two goals of asset management are diminished and with little benefit.

6. Lastly, WSDOT believes modified CS2 is technically within the intent of the SNTI CS2 since repairs are clearly specified for several SNTI elements. Therefore, the FHWA element reporting will reflect the data as coded by the WSDOT inspector.

9.09 Tunnel QC/QA Program

In accordance with the description of the WSDOT Bridge Preservation Office Quality Control Program offered in Section 7.02, a tunnel QC program as required by the NTIS has been developed. The tunnel inspection program functions completely under the umbrella of the Washington State bridge inspection organization. The makeup of the tunnel QC program is identical in all aspects as the bridge inspection QC program except for Mechanical and Electrical QC, which is developed and documented in Section 8.04.

9.10 Tunnel Records

A. SNTI Coding Guide

In accordance with the description of the WSDOT Bridge Preservation Office Bridge Files and Documentation offered in Section 2.01, Tunnel Files and Documentation as required by the NTIS has been developed. Tunnel Files and Documentation functions completely under the umbrella of the Washington State bridge inspection organization.

The SNTI Coding Guide Section 2 Inventory data has been incorporated into the WSBIS Coding Guide, available in Appendix 2.06-C. A summary of the SNTI codes with associated WSBIS codes are in Appendix 9.10-C.

9.10 Appendices

Civil/Structural Tunnel BMS Element Listing

Element Type	Element Number	Element Description	Unit	Page
Liners	10000	Steel Tunnel Liner	SF	9.10-A-1
	10001	Cast-In-Place Tunnel Liner	SF	9.10-A-3
	10002	Precast Concrete Tunnel Liner	SF	9.10-A-3
	10003	Shotcrete Tunnel Liner	SF	9.10-A-3
	10004	Timber Tunnel Liner	SF	9.10-A-3
	10005	Masonry Tunnel Liner	SF	9.10-A-4
	10006	Unlined Rock Tunnel	SF	9.10-A-4
	10007	Rock Bolt/Dowel	EA	9.10-A-4
	10009	Other Tunnel Liner	SF	9.10-A-5
Tunnel Roof Girders	10010	Steel Tunnel Roof Girders	LF	9.10-A-5
	10011	Concrete Tunnel Roof Girders	LF	9.10-A-5
	10012	Prestressed Concrete Tunnel Roof Girders	LF	9.10-A-5
	10019	Other Tunnel Roof Girders	LF	9.10-A-5
Columns / Piles	10020	Steel Column / Piles	EA	9.10-A-6
	10021	Concrete Column / Piles	EA	9.10-A-6
	10029	Other Column / Piles	EA	9.10-A-6
Cross Passageway	10030	Steel Cross Passageway	LF	9.10-A-6
	10031	Concrete Cross Passageway	LF	9.10-A-6
	10033	Shotcrete Cross Passageway	LF	9.10-A-6
	10034	Timber Cross Passageway	LF	9.10-A-6
	10035	Masonry Cross Passageway	LF	9.10-A-6
	10036	Unlined Rock Cross Passageway	LF	9.10-A-6
	10039	Other Cross Passageway	LF	9.10-A-6
Interior Walls	10041	Concrete Interior Walls	SF	9.10-A-7
	10049	Other Interior Walls	SF	9.10-A-7
Portals	10051	Concrete Portal	SF	9.10-A-7
	10055	Masonry Portal	SF	9.10-A-7
	10059	Other Portal	SF	9.10-A-7
Ceiling Slab	10061	Concrete Ceiling Slab	SF	9.10-A-8
	10069	Other Ceiling Slab	SF	9.10-A-8
Ceiling Girder	10070	Steel Ceiling Girder	LF	9.10-A-8
	10071	Concrete Ceiling Girder	LF	9.10-A-8
	10072	Prestressed Concrete Ceiling Girder	LF	9.10-A-8
	10079	Other Ceiling Girder	LF	9.10-A-8
Hangers and Anchorages	10080	Steel Hangers and Anchorages	EA	9.10-A-9
	10089	Other Hangers and Anchorages	EA	9.10-A-9

Element Type	Element Number	Element Description	Unit	Page
Ceiling Panels	10090	Steel Ceiling Panels	SF	9.10-A-9
	10091	Concrete Ceiling Panels	SF	9.10-A-9
	10099	Other Ceiling Panels	SF	9.10-A-9
Invert Slab	10101	Concrete Invert Slab	SF	9.10-A-10
	10109	Other Invert Slab	SF	9.10-A-10
Slab-on-Grade	10111	Concrete Slab-on-Grade	SF	9.10-A-10
	10119	Other Slab-on-Grade	SF	9.10-A-10
Invert Girder	10120	Steel Invert Girder	LF	9.10-A-11
	10121	Concrete Invert Girder	LF	9.10-A-11
	10122	Prestressed Concrete Invert Girder	LF	9.10-A-11
	10129	Other Invert Girder	LF	9.10-A-11
Joints	10130	Strip Seal Expansion Joint	LF	9.10-A-11
	10131	Pourable Joint Seal	LF	9.10-A-11
	10132	Compression Joint Seal	LF	9.10-A-11
	10133	Assembly Joint With Seal	LF	9.10-A-11
	10134	Open Expansion Joint	LF	9.10-A-11
	10135	Assembly Joint Without Seal	LF	9.10-A-11
	10139	Other Joint	LF	9.10-A-11
Gaskets	10140	Gaskets	LF	9.10-A-12
Wearing Surface	10151	Concrete Wearing Surface	SF	9.10-A-12
	10158	Asphalt Wearing Surface	SF	9.10-A-12
	10159	Other Wearing Surface	SF	9.10-A-13
Traffic Barrier Pedestrian Railing	10160	Steel Traffic Barrier	LF	9.10-A-13
	10161	Concrete Traffic Barrier	LF	9.10-A-13
	10169	Other Traffic Barrier	LF	9.10-A-13
	10170	Steel Pedestrian Railing	LF	9.10-A-13
	10171	Concrete Pedestrian Railing	LF	9.10-A-13
	10179	Other Pedestrian Railing	LF	9.10-A-13
Lighting Fixtures	10601	Tunnel Lighting Fixtures	EA	9.10-A-14
Protective Systems	10952	Fire Protective Coating	SF	9.10-A-14
	10955	Reflective Tunnel Tile	SF	9.10-A-15

Tunnel liner quantities are based on the shape of the liner perimeter which does not include the roadway because the roadway/slab elements document these conditions. The total quantity for circular tunnel shape has a circular perimeter multiplied by the length of tunnel. The total quantity for a horseshoe tunnel is the perimeter exposed to traffic minus the roadway surface multiplied by the length of tunnel.

10000 Steel Tunnel Liner — Units – SF

Record this element for all steel tunnel liners. Steel tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

10001 Cast-in-Place Concrete Tunnel Liner — Units – SF

Record this element for all cast-in-place concrete tunnel liners. Cast-in place concrete tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

10002 Precast Concrete Tunnel Liner — Units – SF

Record this element for all precast concrete tunnel liners. Precast concrete tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

10003 Shotcrete Tunnel Liner — Units – SF

Record this element for all shotcrete tunnel liners. Shotcrete tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

10004 Timber Tunnel Liner — Units – SF

Record this element for all timber tunnel liners consisting of timber sets with or without timber lagging. Timber tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

10005 Masonry Tunnel Liner — Units – SF

Record this element for all masonry tunnel liners. Masonry tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

10006 Unlined Rock Tunnel — Units – SF

Record this element for all unlined rock tunnels. Unlined rock tunnels function as the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of an unlined rock tunnel is the product of the length of the tunnel (along the centerline) and the perimeter of the unlined rock.

Condition States for WSDOT Elements 10000, 10002, 10003, 10004, 10005, and 10006

1. Defects are superficial and have no effect on the structural capacity of the tunnel.
2. Tunnel Liner area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Tunnel Liner area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Tunnel area affected by damage in locations or quantity and has reduced the structural capacity of the tunnel (or tunnel liner). Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

10007 Rock Bolt/Dowel — Units – EA

Record this element for all rock bolts or dowels and is not a tunnel liner element. This documents all rock or soil nails used to stabilize the earth in the tunnel, or at and above the portals. Dowels used to connect pieces of precast concrete tunnel liner are considered part of the tunnel liner element and not included in this element.

The total number of rock bolt/dowels is the sum of all the number of rock bolts and dowels.

1. Defects are superficial and have no effect on the structural capacity of the tunnel.
2. Number of bolts with repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Number of bolts with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Number of bolts affected by 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. Defects threaten public safety, or the primary design function of the element.

10009 Other Tunnel Liner — Units – SF

Record this element for all tunnel liners composed of other materials. Other tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

1. Defects are superficial and have no effect on the structural capacity of the tunnel.
2. Tunnel Liner area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Tunnel Liner area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Tunnel area affected by damage in locations or quantity and has reduced the structural capacity of the tunnel (or tunnel liner). Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

10010 Steel Tunnel Roof Girders — Units – LF

10011 Concrete Tunnel Roof Girders — Units – LF

10012 Prestressed Concrete Tunnel Roof Girders — Units – LF

10019 Other Tunnel Roof Girders — Units – LF

Condition States for WSDOT Elements 10010, 10011, 10012, 10019

1. Defects are superficial and have no effect on the structural capacity.
2. Girder length affected by patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Girder span length affected by 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. Defects threaten public safety, or the primary design function of the element.

Tunnel Column/Piles

10020 Steel Columns/Piles **Units – EA**

10021 Concrete Columns/Piles **Units – EA**

10029 Other Columns/Piles **Units – EA**

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

Tunnel Passageway

10030 Steel Cross Passageway **Units – LF**

10031 Concrete Cross Passageway **Units – LF**

10033 Shotcrete Cross Passageway **Units – LF**

10034 Timber Cross Passageway **Units – LF**

10035 Masonry Cross Passageway **Units – LF**

10036 Unlined/Rock Cross Passageway **Units – LF**

10039 Other Cross Passageway **Units – LF**

Condition States for WSDOT Elements 10030, 10031, 10033, 10034, 10035, 10036, and 10039

1. Defects are superficial and have no effect on the structural capacity.
2. Passageway length affected by patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Passageway length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Passageway length affected by 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. Defects threaten public safety, or the primary design function of the element.

Tunnel Interior Walls

10041 Concrete Interior Walls **Units – SF**

10049 Other Interior Walls **Units – SF**

Condition States for WSDOT Elements 10041 and 10049

1. Defects are superficial and have no effect on the structural capacity.
2. Wall Area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Wall Area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Wall Area affected by 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. Defects threaten public safety, or the primary design function of the element.

Tunnel Portal

10051 Concrete Portal **Units – SF**

10055 Masonry Portal **Units – SF**

10059 Other Portal **Units – SF**

Condition States for WSDOT Elements 10051, 10055, and 10059

1. Defects are superficial and have no effect on the structural capacity.
2. Portal Area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Portal Area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Portal Area affected by 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. Defects threaten public safety, or the primary design function of the element.

Tunnel Ceiling Slab

10061 Concrete Ceiling Slab Units – SF

10069 Other Ceiling Slab Units – SF

Condition States for WSDOT Elements 10061 and 10069

1. Defects are superficial and have no effect on the structural capacity.
2. Ceiling Slab Area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Ceiling Slab Area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Ceiling Slab Area affected by 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. Defects threaten public safety, or the primary design function of the element.

Tunnel Ceiling Girder

10070 Steel Ceiling Girder Units – LF

10071 Concrete Ceiling Girder Units – LF

10072 Prestressed Concrete Ceiling Girder Units – LF

10079 Other Ceiling Girder Units – LF

Condition States for WSDOT Elements 10070, 10071, 10072, and 10079

1. Defects are superficial and have no effect on the structural capacity.
2. Ceiling Girder length affected by patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Ceiling Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Ceiling Girder span length affected by 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. Defects threaten public safety, or the primary design function of the element.

Tunnel Hangers/Anchors

10080 Steel Hangers and Anchorages **Units – EA**

10089 Other Hangers and Anchorages **Units – EA**

Condition States for WSDOT Elements 10080, and 10089

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, corrosion, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Number of Hanger/Anchors that have been repaired or patched.
3. Number of Hanger/Anchors 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, corrosion, deformity, exposed or corroded reinforcing or strands.
4. Number of Hanger/Anchors with damage in locations or quantity and has reduced the structural capacity of the element or the supported portion of the structure. Structural analysis is warranted.

Tunnel Ceiling Panels

10090 Steel Ceiling Panels **Units – SF**

10091 Concrete Ceiling Panels **Units – SF**

10099 Other Ceiling Panels **Units – SF**

Condition States for WSDOT Elements 10090, 10091, and 10099

1. Defects are superficial and have no effect on the structural capacity.
2. Ceiling Panel Area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Ceiling Panel Area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Ceiling Panel Area affected by 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. Defects threaten public safety, or the primary design function of the element.

Tunnel Invert Slab

10101 Concrete Invert Slab	**Units – SF**

10109 Other Invert Slab	**Units – SF**

Condition States for WSDOT Elements 10101 and 10109

1. Defects are superficial and have no effect on the structural capacity.
2. Invert Slab Area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Invert Slab Area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Invert Slab Area affected by 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. Defects threaten public safety, or the primary design function of the element.

Tunnel Slab on Grade

10111 Concrete Slab on Grade	**Units – SF**

10119 Other Slab on Grade	**Units – SF**

Condition States for WSDOT Elements 10111 and 10119

1. Defects are superficial and have no effect on the structural capacity.
2. Slab On Grade Area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Slab On Grade Area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Slab On Grade Area affected by 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. Defects threaten public safety, or the primary design function of the element.

Tunnel Invert Girder

10120 Steel Invert Girder **Units – LF**

10121 Concrete Invert Girder **Units – LF**

10122 Prestressed Concrete Invert Girder **Units – LF**

10129 Other Invert Girder **Units – LF**

Condition States for WSDOT Elements 10120, 10121, 10122, and 10129

1. Defects are superficial and have no effect on the structural capacity.
2. Invert Girder length affected by patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Invert Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Invert Girder span length affected by 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. Defects threaten public safety, or the primary design function of the element.

Tunnel Joints

10130 Tunnel Strip Seal Joint **Units – LF**

10131 Tunnel Pourable Joint Seal **Units – LF**

10132 Tunnel Compression Seal **Units – LF**

10133 Tunnel Assembly Joint w/ Seal **Units – LF**

10134 Tunnel Open Expansion Joint **Units – LF**

10135 Tunnel Assembly Joint without Seal **Units – LF**

10139 Other Tunnel Joint **Units – LF**

Condition States for WSDOT Elements 10130, 10131, 10132, 10133, 10134, and 10135.

These joints use the same philosophy as the 400 series WSDOT Joint elements.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent slab 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.

10140 Gaskets **Units – LF**

These joints are design to prevent water from penetrating a tunnel liner such as the seal between a segmental tunnel liner. The condition states focus on leakage and other SNTI defects such as header conditions should be ignored.

1. The expansion joint is functioning as designed. Joint may not be perfect, but the joint is not leaking. Seal may be damaged, worn, or cracked. There may be defects in the joint materials holding the seal in place.
2. Skewed joint length at each location with minor leakage or dripping is present. Signs of leakage may be present where leakage may be intermittent or not leaking at the time of inspection.
3. Skewed joint length at each location where water is free flowing; a threat to the tunnel or a tunnel system.

Tunnel Wearing Surface

10151 Concrete Wearing Surface **Units– SF**

This element defines a roadway surface made of Portland Cement Concrete Pavement (PCCP). The condition states do not address faulting, cracking, or smoothness of the profile at this time, but these defects should be described in the element notes. The quantity should equal the overlay's width times the length.

1. Defects are superficial. The concrete surface has no spalls/delaminations or previous repairs.
2. Total area of patches.
3. Total area of spalls or potholes.

10158 Asphalt Wearing Surface **Units– SF**

This element defines a roadway surface made of Asphalt Concrete Pavement (ACP), Hot Mixed Asphalt (HMA), or covered with a Bituminous Surface Treatment (BST) which is also called a Chip Seal. The condition states do not address faulting, cracking, or smoothness of the profile at this time. The quantity should equal the overlay's width times the length.

1. Defects are superficial. The asphalt surface has no spalls/delaminations or previous repairs.
2. Total area of patches.
3. Total area of spalls or potholes.

10159 Other Wearing Surface **Units– SF**

This tunnel element defines a roadway surface, or top layer, that is not asphalt or concrete such as a polyester, epoxy, or cementitious overlay on the roadway. The quantity should equal the overlay's width times the length.

1. Defects are superficial. The asphalt surface has no spalls/delaminations or previous repairs.
2. Total area of patches.
3. Total area of spalls or potholes.

Tunnel Traffic Barrier

10160 Steel Traffic Barrier **Units – LF**

10161 Concrete Traffic Barrier **Units – LF**

10169 Other Traffic Barrier **Units – LF**

Condition States for WSDOT Elements 10160, 10161, and 10169

1. Defects are superficial and have no effect on the structural capacity.
2. Traffic Barrier length affected by patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Traffic Barrier length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Traffic Barrier length affected by 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. Defects threaten public safety, or the primary design function of the element.

Tunnel Pedestrian Barrier

10170 Steel Pedestrian Railing **Units – LF**

10171 Concrete Pedestrian Railing **Units – LF**

10179 Other Pedestrian Railing **Units – LF**

Condition States for WSDOT Elements 10170, 10171, and 10179

1. Defects are superficial and have no effect on the structural capacity.
2. Pedestrian Railing length affected by patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Pedestrian Railing length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Pedestrian Railing length affected by 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. Defects threaten public safety, or the primary design function of the element.

Tunnel Mechanical systems (blank)

Tunnel Electrical Systems

10601 Tunnel Lighting Fixtures **Units – EA**

Record this element for all tunnel lighting fixtures. This element includes the physical housing of the tunnel lights and their connections to the support, but does not include the blub. When a lighting fixture serves the dual purpose of general tunnel lighting and emergency tunnel lighting, it is only counted under the tunnel lighting fixture element. However, those fixtures will have an impact on both tunnel lighting system and emergency lighting system elements.

The total quantity for tunnel lighting fixture is the sum of all the tunnel lighting fixtures.

1. Tunnel lighting fixture is fully effective and is functioning as designed. The housing is sealed and protecting the wiring. The anchors are installed and functioning properly.
2. Number of tunnel lighting fixtures that have been repaired.
3. Number of tunnel lighting fixtures with defects. The defects do not significantly affect the ability of the fixture to perform as designed but may require a repair. Weak connections do not threaten public.
4. Number of tunnel lighting fixtures with damage. The defects affect the ability of the fixture to perform as designed but and require repair or replacement. Weak connections threaten the public if they fail.

Fire/Life Safety/Security Systems

10952 Fire Protective Coating **Units – SF**

Record this element for all fire protective coatings used in the tunnel. This element is the coating applied on the tunnel elements to protect these elements from fire.

The total quantity for protective coatings is the product of the length and width of the entire exposed surface of the element.

1. Fire protective coating is fully effective and will function as designed in a fire.
2. Fire protective coating area that has been repaired.
3. Fire protective coating area that is substantially or has limited effectiveness to protect the underlying material in a fire.
4. Fire protective coating area that has exposed the underlying material.

Tunnel Signs (blank)

Tunnel Protective Coatings

10955 Reflective Tunnel Tile **Units – SF**

This element identifies tunnel tile attached to a tunnel liner whether it is reflective or not. 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 tunnel 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.
4. Tile area with delaminations based on soundings, is completely missing, or has major section loss warranting replacement.

Structure ID	Bridge Number	Bridge Name	Owner	Facilities Carried	Feature Intersected
0002228A	2/108	TUNNEL	WSDOT	US 2	TUNNEL
0007110L	5/546REN	5TH-EXP TUNNEL	WSDOT	5TH-EXP TUNNEL	I-5
0009839B	5/548PW	S-COL RAMP UNDER PLAZA	WSDOT	W PARK PLAZA	I-5 RAMP
000000PJ	5/549CNC	WASH ST CONVENTION CENTER	WSDOT	CONVENTION CENTER	I-5
0006635D	5/553R	EXPRESS LANES TUNNEL	WSDOT	NB I-5	EXP TUNNEL
0006800E	5/555E-S	E-S RAMP TUNNEL	WSDOT	I-5 REVERSIBLE	E-S RAMP TUNNEL
0006800D	5/555N-W	N-W RAMP TUNNEL	WSDOT	I-5 REVERSIBLE	N-W RAMP TUNNEL
0006470B	5/568S-E	I-5 OVER S-E RAMP TUNNEL	WSDOT	I-5	S-E RAMP TUNNEL
0006304C	5/577E-S	RAVENNA-S RAMP TUNNEL	WSDOT	RAVENNA-S RAMP	I-5
0002138A	12/308	RIMROCK TUNNEL	WSDOT	US 12	RIMROCK TUNNEL
000093CE	14/111	SR 14 TUNNEL UNDER RR	WSDOT	RAILROAD	SR 14
0002051A	14/128	TUNNEL NO 1	WSDOT	SR 14	TUNNEL NO 1
0002051B	14/129	TUNNEL NO 2	WSDOT	SR 14	TUNNEL NO 2
0002051C	14/130	TUNNEL NO 3	WSDOT	SR 14	TUNNEL NO 3
0002042B	14/133	TUNNEL NO 4	WSDOT	SR 14	TUNNEL NO 4
0002042C	14/134	TUNNEL NO 5	WSDOT	SR 14	TUNNEL NO 5
0001735A	14/215	LYLE TUNNEL	WSDOT	SR 14	TUNNEL
0001735B	14/216	TUNNEL NO 7	WSDOT	SR 14	TUNNEL
0006974B	20/316	TUNNEL	WSDOT	SR 20	TUNNEL
0006974D	20/327	TUNNEL	WSDOT	SR 20	TUNNEL
0013190C	90/16S-E	S-E RAMP TUNNEL	WSDOT	I-90	I-90 RAMP
0013105A	90/22LID	MARTIN L KING LID	WSDOT	I-90	MT BAKER RIDGE
0013105B	90/24N	MT BAKER RIDGE TUNNEL	WSDOT	I-90	MT BAKER RIDGE
000000KM	90/24S	MT BAKER RIDGE TUNNEL	WSDOT	I-90	MT BAKER RIDGE TUNNEL
0013199A	90/26LID	FIRST HILL LID	WSDOT	I-90	FIRST HILL
0013666A	90/33E-S	E-S RAMP TUNNEL	WSDOT	I-90	I-90
0013195C	90/33N-W	N-W RAMP TUNNEL	WSDOT	I-90	I-90
0013195D	90/33RE-S	REV E-S RAMP TUNNEL	WSDOT	I-90 EB	RAMP & ISLAND CREST WAY
0013200A	90/35LID	LUTHER BURBANK LID	WSDOT	LANDSCAPED PARK	I-90
0009557A	90/55	SE 35TH ST TUNNEL UNDER I-90	WSDOT	I-90	SE 35TH
0008611C	90/563	PERRY ST TUNNEL UNDER I-90	WSDOT	I-90	S PERRY ST
0002093A	97/359ALT	KNAPPS HILL TUNNEL	WSDOT	US 97ALT	KNAPPS HILL TUNNEL
0004314A	99/541	BATTERY ST TUNNEL	WSDOT	BATTERY STREET	SR 99
0001618A	101/3	FORT COLUMBIA TUNNEL	WSDOT	US 101	FORT COLUMBIA TUNNEL

Structure ID	Bridge Number	Bridge Name	Owner	Facilities Carried	Feature Intersected
00200453	101/351	DEER PARK LOOP TUNNEL UNDER US101	WSDOT	US 101	DEER PARK LOOP
0017343A	304/9	BREMERTON TUNNEL	WSDOT	SR 304	FERRY OFFLOAD TUNNEL
0095079A	405/22A	HOUSER WAY TUNNEL	WSDOT	I-405 RAMP & SR900	HOUSER WAY
0008190I	405/35N-W	I-90 OVER N-W RAMP TUNNEL	WSDOT	I-90	I-405 N-W TUNNEL
0008190J	405/35S-E	I-90 OVER S-E RAMP TUNNEL	WSDOT	I-90	I-405 S-E RAMP TUNNEL
0017963C	520/9LID	EVERGREEN POINT ROAD LID	WSDOT	EVERGREEN POINT RD	SR 520
0017963A	520/11LID	84TH AVE NE OVER SR 520	WSDOT	84TH AVE NE	SR 520
0017963H	520/12LID	92ND AVE NE OVER SR 520	WSDOT	92ND AVE NE	SR 520
00200416	520/36.5	NE 36TH ST OVER SR 520	WSDOT	NE 36TH STREET	SR 520
0006911E	522/15	ROOSEVELT WAY TUNNEL	WSDOT	NE 75TH ST	SR 522
0017945A	525/1S-S	S-E RAMP TUNNEL UNDER S-S RAMP	WSDOT	S-S RP(SR525- I-5)	S-E RAMP (I-5 to SR 524)
0008446B	526/12	SR 526 OVER E-N RAMP TUNNEL	WSDOT	SR 526	E-N RAMP
0014372A	526/22E-N	SR 526 OVER E-N RAMP TUN	WSDOT	SR 526 WB	SR 526 E-N RAMP
08495900	390036896	FISH TRAIL OC THORPE RD	City/Other Park, Forest, or Reservation Agency	PED TRAIL	THORPE RD
08423500	143-S	UPRR UNDERPASS	Railroad	UP RAILROAD	BENGE-WASHTUCNA ROAD
08497700	393083002	BNSF OC WASHINGTON ST	Railroad	BNSFRR	WASHINGTON ST
08531000	393000807	WASHINGTON ST TUNNEL	SPOKANE	RIVERFRONT PARK	WASHINGTON STREET
08580400	200000001	S 188TH ST TUNNEL BR 1	City or Other Toll Authority	AIRPORT RUNWAY	S 188TH ST
08753500	TNL 379	BAIRD SPRINGS TUNNEL	Railroad	BAIRD SPRINGS RD	BNSF RAILROAD
08493400	246001001	BNSF OC THORPE RD	Railroad	BNSFRR	THORPE RD
08210000	SPOK-4451	UPRR OVER MADISON RD	Railroad	UPRR	MADISON ROAD
08216400	D-1	DURGIN ROAD TUNNEL	Railroad	RAILROAD	DURGIN ROAD

Appendix 9.10-C WSDOT / NTI Tunnel Inventory Codes

WSBIS	NTI Item ID	NTI Inventory Item Name	Comments
1001	I.1	Tunnel Number	
1132	I.2	Tunnel Name	
n/a	I.3	State Code	autogenerated for the NTI submittal
1021	I.4	County Code	
1276	I.5	Place Code	
1274	I.6	Highway Agency District	
1435	I.7	Route Number	
1436	I.8	Route Direction	
1433	I.9	Route Type	
1256	I.10	Facility Carried	
1467	I.11	LRS Route ID	
1469	I.12	LRS Mile Point	
1188	I.13	Tunnel Portal's Latitude	
1196	I.14	Tunnel Portal's Longitude	
n/a	I.15	Border Tunnel State or Country Code	Washington State has no border tunnels, autogenerated for NTI submittal
n/a	I.16	Border Tunnel Financial Responsibility	Washington State has no border tunnels, autogenerated for NTI submittal
n/a	I.17	Border Tunnel Number	Washington State has no border tunnels, autogenerated for NTI submittal
n/a	I.18	Border Tunnel Inspection Responsibility	Washington State has no border tunnels, autogenerated for NTI submittal
1332	A.1	Year Built	
1336	A.2	Year Rehabilitated	
1354	A.3	Total Number of Lanes	
1445	A.4	Average Daily Traffic	
1451	A.5	Average Daily Truck Traffic	
1453	A.6	Year of Average Daily Traffic	
1413	A.7	Detour Length	
1543	A.8	Service in Tunnel	
1019	C.1	Owner	
1286	C.2	Operator	
1490	C.3	Direction of Traffic	
1285	C.4	Toll	
1483	C.5	NHS Designation	
1485	C.6	STRAHNET Designation	
1487	C.7	Functional Classification	
1022	C.8	Urban Code	
1349	G.1	Tunnel Length	

WSBIS	NTI Item ID	NTI Inventory Item Name	Comments
1401	G.2	Minimum Vertical Clearance over Tunnel Roadway	
1356	G.3	Roadway Width, Curb-to-Curb	
1364	G.4	Left Sidewalk Width	
1367	G.5	Right Sidewalk Width	
1992	D.1	Routine Inspection Target Date	
n/a	D.2	Actual Routine Inspection Date	Inspection dates for routine report type will be reported to the NTI.
n/a	D.3	Routine Inspection Interval	Inspection frequencies for routine report type will be reported to the NTI.
n/a	D.4	In-Depth Inspection	Structures with this report type will be flagged as such in the NTI submittal.
n/a	D.5	Damage Inspection	Structures with this report type will be flagged as such in the NTI submittal.
n/a	D.6	Special Inspection	Structures with this report type will be flagged as such in the NTI submittal.
1554	L.1	Load Rating Method	
1556	L.2	Inventory Load Rating Factor	
1553	L.3	Operating Load Rating Factor	
1293	L.4	Tunnel Load Posting Status	
1560	L.5	Posting Load – Gross	
1561	L.6	Posting Load – Axle	
1562	L.7	Posting Load – Type 3	
1563	L.8	Posting Load – Type 3S2	
1564	L.9	Posting Load – Type 3-3	
1402	L.10	Height Restriction	
1408	L.11	Hazardous Material Restriction	
1409	L.12	Other Restrictions	
n/a	N.1	Under Navigable Waterway	Washington state has no tunnels under waterways, autogenerated for the NTI submittal.
n/a	N.2	Navigable Waterway Clearance	Washington state has no tunnels under waterways, autogenerated for the NTI submittal.
n/a	N.3	Tunnel or Portal Island Protection from Navigation	Washington state has no tunnels under waterways, autogenerated for the NTI submittal.
1510	S.1	Number of Bores	
1511	S.2	Tunnel Shape	
1512	S.3	Portal Shapes	
1513	S.4	Ground Conditions	
1514	S.5	Complex	