Washington State
Department of Transportation

# Washington State Bridge Inspection Manual

**M 36-64.15**

January 2025

**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/tunnels 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.

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

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Subject: *Bridge Inspection Manual* Comment

Recommendation for Improvement:

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# Contents


**Chapter 1 Bridge Inspection Organization Requirements**

1-1 General . . . . . 1-1
1-1.1 Definitions . . . . . 1-1
1-2 Description of Bridge Inspection Organization . . . . . 1-4
1-3 Bridge Inspection Programs . . . . . 1-6
1-4 Bridge Inspection Organization Roles and Responsibilities . . . . . 1-6
1-4.1 Statewide Program Manager (SPM) . . . . . 1-6
1-4.2 Delegated Program Manager (DPM) . . . . . 1-7
1-4.3 Team Leader (TL) . . . . . 1-7
1-4.4 Assistant Inspector . . . . . 1-7
1-4.5 Load Rating Engineer (LRE) . . . . . 1-7
1-4.6 Underwater Bridge Inspection Diver (UBID) . . . . . 1-8
1-4.7 FHWA Division Bridge Engineer (DBE) . . . . . 1-8
1-5 Bridge/Tunnel Inspection Certification . . . . . 1-8
1-5.1 Initial Certification . . . . . 1-8
1-5.2 Certification Renewal . . . . . 1-9
1-5.3 Certification Roles and Responsibilities . . . . . 1-10
1-6 Bridge Inspection Certification Probation, Suspension, Decertification and Reinstatement . . . . . 1-10
1-7 Appendices . . . . . 1-12
Appendix 1-A WSDOT Bridge/Tunnel Inspector Experience and Training Record Form (WSDOT Form 234-100) . . . . . 1-A-1
Appendix 1-B Continuing Education Course List . . . . . 1-B-1
Appendix 1-C SPM Delegation Letter . . . . . 1-C-1
Appendix 1-D DPM Delegation Letters . . . . . 1-D-1

## Chapter 2 Bridge Files and Documentation


2-1 General . . . . . 2-1
2-2 Maintaining Bridge and Tunnel Files and Documentation . . . . . 2-1
2-2.1 Transferring Bridge Ownership and/or Program Manager . . . . . 2-4
2-2.2 Dead/Obsolete Bridge Files . . . . . 2-5
2-2.3 Structures on WSDOT Right of Way . . . . . 2-5
2-3 Maintaining a State Bridge Inventory – WSBIS . . . . . 2-5
2-3.1 WSBIS Inventory and Data . . . . . 2-6
2-3.2 New Bridge Inventory in the WSBIS . . . . . 2-8
2-3.3 Deleting (Obsoleting) Bridges in the WSBIS . . . . . 2-9
2-3.4 Bridges with Multi-Agency Responsibility in the WSBIS . . . . . 2-9
2-3.5 Reporting WSBIS Data to the NBI – Special Circumstances . . . . . 2-10
2-4 FHWA Data Submittal Process . . . . . 2-11
2-5 Responding to FHWA . . . . . 2-12
2-6 Appendices . . . . . 2-13
Appendix 2-A WSDOT BPO Floor Plan with File Locations . . . . . 2-A-1
Appendix 2-B Record Change Form (WSDOT Form 220-033) . . . . . 2-B-1
Appendix 2-C Washington State Bridge Inventory System Coding Guide 2-C-1
Appendix 2-D 1995 NBI Coding Guide Items Retained for Reference . . . 2-D-1
Appendix 2-E Border Bridge Information . . . . . 2-E-1
Appendix 2-F WSDOT/FHWA Communication Protocol Flowchart . . . . . 2-F-1

## Chapter 3 Inspections and Reports


3-1 General . . . . . 3-1
3-2 Inspection Types and Reporting . . . . . 3-1
3-2.1 Bridge Inspection Reports . . . . . 3-2
3-2.2 Initial Inspection (Triggered Inspection-No Interval, Next Routine Insp. at 24 months) . . 3-3
3-2.3 Routine Bridge Inspection (Scheduled 12, 24 or 48-Month Interval) . . 3-4
3-2.4 Nonredundant Steel Tension Member (NSTM) (Scheduled 12- or 24-Month Interval) . . . . . 3-6
3-2.5 Underwater Inspection (Scheduled Interval Not to Exceed 60 Months) . . . . . 3-13
3-2.6 Complex Feature Inspection (Scheduled 12- or 24-Month Interval) (SNBI In-Depth Inspection) . . 3-16
3-2.7 Interim Inspection (Scheduled 3, 6, 12- or 24-Month Interval) (SNBI Special Inspection) 3-18
3-2.8 Underwater Interim (Scheduled 3, 6, 12, 24, 36 or 48-Month Interval) (SNBI Special Inspection) . . . . . 3-19
3-2.9 Damage Inspection (Unscheduled-No Interval by WSDOT) . . . . . 3-21
3-2.10 CFDR (Critical Finding Damage Report) (Dedicated Tab in BridgeWorks) . . . 3-23
3-2.11 Local Agency Safety (Interval set by agency, Not Reportable) . . . . . 3-24
3-2.12 WSDOT Safety (Interval set by agency, Not Reportable) . . . . . 3-24
3-2.13 Condition Inspection (Interval set by agency, Not Reportable) . . . . . 3-25
3-2.14 Short Span Inspections (Interval set by agency, Not Reportable) . . . . 3-25
3-2.15 2-Man and 3-Man Agreement Inspections (2-Man Inspection Type Discontinued) . . . . . 3-27
3-2.16 Informational Report . . . . . 3-29
3-2.17 Signed Informational Report . . . . . 3-29
3-2.18 Inventory . . . . . 3-30
3-2.19 In-Depth (SNBI Special Inspection) . . . . . 3-30
3-2.20 Geometric (Anticipated Discontinuance in 2025) . . . . . 3-31
3-2.21 Scour Monitoring . . . . . 3-31
3-3 Bridge Inspection Orientation . . . . . 3-32
3-4 Policy and Procedures . . . . . 3-36
3-4.1 BPO Policy and Procedures . . . . . 3-36
3-4.2 LP Policy and Procedures . . . . . 3-47
3-5 Forms . . . . . 3-48
3-6 Appendices . . . . . 3-71
Appendix 3-A Bridge/Culvert Coding Matrix . . . . . 3-A-1
Appendix 3-B Short Span Bridge Criteria . . . . . 3-B-1
Appendix 3-C UBIT Inspections and Procedures . . . . . 3-C-1
Appendix 3-D FHWA Letter for Routine Extended Interval Inspections . 3-D-1

## Chapter 4 WSDOT Bridge Elements


4-1 Introduction . . . . 4-7
4-1.1 Element Description . . . . 4-8
4-1.2 Smart Flag . . . . 4-8
4-1.3 Identifying Elements Prior to Inspection . . . . 4-8
4-1.4 Application of Element Units . . . . 4-9
4-1.5 Quantifying Element Defects . . . . 4-9
4-1.6 Reporting Structural History . . . . 4-11
4-1.7 Concrete Element Cracking . . . . 4-11
4-1.8 WSDOT Deck Element to SNBI Deck Overall Rating . . . . 4-12
4-2 Bridge Decks . . . . 4-12
4-3 Superstructure . . . . 4-24
4-3.1 Girders . . . . 4-24
4-3.2 Diaphragms . . . . 4-24
4-3.3 Pedestrian Bridges . . . . 4-24
4-3.4 Slab Bridges . . . . 4-24
4-4 Substructure . . . . 4-61
**4-4.1** Abutments . . . . 4-61
**4-4.2** Pier Cap/Cross Beam . . . . 4-61
**4-4.3** Pier Wall Definition . . . . 4-61
**4-4.4** Pile/Column Elements . . . . 4-61
**4-4.5** Foundation Elements . . . . 4-62
4-5 Culverts . . . . 4-89
4-6 Sidewalk and Supports . . . . 4-93
4-7 Bearings . . . . 4-97
4-8 Bridge Approach . . . . 4-99
4-9 Bridge Rail . . . . 4-100
4-10 Pedestrian Rail . . . . 4-104
4-11 Smart Flags . . . . 4-108
4-12 Seismic Retrofit . . . . 4-115
4-13 Expansion Joint Elements . . . . 4-122
4-14 Movable Bridges . . . . 4-135
4-15 Other Bridge Elements . . . . 4-136
4-16 WSDOT Bridge Deck Overlay Elements . . . . 4-139
4-17 Protective Coatings . . . . 4-142
4-18 Appendices . . . . 4-145
Appendix 4-A Common Material Defects . . . . 4-146
Appendix 4-B National Bridge Element Translation Guide . . . . 4-150

## Chapter 5 Load Rating and Scour


5-1 General . . . . . 5-1
5-2 Bridge Load Rating . . . . . 5-1
5-2.1 General Load Rating and Re-Rating Guidelines . . . . . 5-1
5-2.2 Bridge Load Rating Revision Criteria . . . . . 5-2
5-2.3 Bridges With Unknown Structural Components . . . . . 5-3
5-2.4 Data Management . . . . . 5-4
5-2.5 Posting Requirements . . . . . 5-4
5-2.6 Overload Permits . . . . . 5-8
5-3 Scour Appraisal . . . . . 5-10
5-3.1 Determining Susceptibility to Scour . . . . . 5-11
5-3.2 Action Plans for Scour Critical Bridges . . . . . 5-12
5-3.3 Recording Bridge Scour Information . . . . . 5-14
5-3.4 Scour Analysis . . . . . 5-15
5-4 Appendices . . . . . 5-18
Appendix 5-A Bridge Scour Appraisal Level 1 (WSDOT Form 722-011) . 5-A-1
Appendix 5-B Scour Summary Sheet (WSDOT Form 722-010) . . . . . 5-B-1
Appendix 5-C WSDOT Plan of Action Template . . . . . 5-C-1
Appendix 5-D Instructions for Completing WSDOT Plan of Action . . . . . 5-D-1
Appendix 5-E FHWA Plan of Action Template . . . . . 5-E-1
Appendix 5-F Instructions for Completing FHWA Plan of Action . . . . . 5-F-1


## Chapter 6 Damage and Repairs


6-1 General . . . . . 6-1
6-2 Critical Finding and Critical Finding Damage Report (CFDR) . . . . . 6-1
6-2.1 Completing the CFDR . . . . . 6-4
6-2.2 CFDR Tracking and Reporting . . . . . 6-5
6-3 Other Damage Reports . . . . . 6-6
6-4 Bridge Repairs . . . . . 6-7
6-4.1 New Repair Entries . . . . . 6-7
6-4.2 Modifying Existing Repairs . . . . . 6-13
6-4.3 Repair Verification . . . . . 6-13
6-5 Maintenance – Bridge Repair Report (MBRR) . . . . . 6-15
6-6 Appendices . . . . . 6-15
Appendix 6-A Critical Finding/Damage Report Instructions . . . . . 6-A-1
Appendix 6-B Maintenance - Bridge Repair Report . . . . . 6-B-1

## Chapter 7 Quality Control/Quality Assurance


7-1 General . . . . . 7-1
7-2 WSDOT Bridge Preservation Office Quality Control Program . . . . . 7-3
7-2.1 Purpose . . . . . 7-3
7-2.2 Definitions . . . . . 7-3
7-2.3 Time Frame of Evaluation . . . . . 7-3
7-2.4 Personnel . . . . . 7-3
7-3 Coding and Appraisal Unit . . . . . 7-4
7-3.1 Bridge File Maintenance . . . . . 7-4
7-3.2 Processing Inspection Reports . . . . . 7-4
7-3.3 Coding New and Repaired/Rehabilitated Structures . . . . . 7-5
7-3.4 Data Concurrency . . . . . 7-5
7-3.5 Vertical Clearance and Clearance Posting . . . . . 7-5
7-3.6 Inspector Certification . . . . . 7-5
7-3.7 Inspection Status Report and Performance Indicators . . . . . 7-6
7-4 Risk Reduction Unit (Load Rating) . . . . . 7-6
7-4.1 QC Criteria . . . . . 7-6
7-5 Risk Reduction Unit (Scour Group) . . . . . 7-7
7-5.1 Bridge Selection Criteria . . . . . 7-7
7-5.2 Office Review . . . . . 7-7
7-5.3 On Site Field Review . . . . . 7-7
7-6 Regional and Special Structures Inspection Units . . . . . 7-8
7-6.1 Office Review of Structural Inspections . . . . . 7-8
7-6.2 Field Review of Structural Inspections . . . . . 7-9
7-7 Underwater Inspection Unit . . . . . 7-10
7-7.1 Underwater Inspection Office Report Review Process . . . . . 7-10
7-7.2 Field Review of Underwater Bridge Inspections . . . . . 7-10
7-8 WSDOT Bridge Preservation Office Quality Assurance Program . . . . . 7-10
7-8.1 Purpose . . . . . 7-10
7-8.2 Definitions . . . . . 7-10
7-8.3 Timeframe of the Quality Assurance Evaluation . . . . . 7-11
7-8.4 Personnel . . . . . 7-11
7-8.5 Quality Assurance . . . . . 7-11
7-9 Appendices . . . . . 7-13
Appendix 7-A Vacated . . . . . 7-A-1
Appendix 7-B Vacated . . . . . 7-B-1
Appendix 7-C WSBIS Fields Maintained With Other WSDOT Database Source Information . . . . . 7-C-1
Appendix 7-D Bridge Preservation Office Lead Approval Criteria . . . . . 7-D-1

Appendix 7-E Bridge Preservation Office Quality Control Review Tracking Form . . . . . 7-E-1
Appendix 7-F Bridge Preservation Office Quality Control Report Review Tracking Form . . . . . 7-F-1
Appendix 7-G Bridge Preservation Office Quality Control Field Review Form . . . . . 7-G-1
Appendix 7-H Bridge Preservation Office Quality Assurance Bridge Selection Process . . . . . 7-H-1
Appendix 7-I Bridge Preservation Quality Assurance Bridge File Review 7-I-1

## Chapter 8 Electrical and Mechanical

8-1 General . . . . . 8-1
8-1.1 References . . . . . 8-1
8-1.2 Definitions . . . . . 8-1
8-2 Description of Complex Bridges and Tunnels . . . . . 8-2
8-2.1 Delegated Program Manager (DPM) . . . . . 8-2
8-2.2 Electrical/Mechanical Complex Bridge Lead Inspector (CBLI) . . . . . 8-2
8-3 Inspections . . . . . 8-2
8-3.1 Routine Inspections . . . . . 8-3
8-3.2 Blue Ribbon Inspections . . . . . 8-4
8-3.3 In-Depth Inspection . . . . . 8-4
8-4 Complex Bridge and Tunnel QC/QA Program . . . . . 8-5
8-5 Tunnel Inspection Duties . . . . . 8-6
8-6 Complex Bridge and Tunnel Records . . . . . 8-6
8-6.1 Operation, Inspection and Maintenance Manuals . . . . . 8-6
8-6.2 Structure Files . . . . . 8-7
8-7 Bridge Damage/Emergency Responsibilities . . . . . 8-7
8-8 Plans, Specifications and Estimates . . . . . 8-8
8-9 Appendices . . . . . 8-8
Appendix 8-A BPO Memo for Blue Ribbon Inspection Schedule Alteration . . . . . 8-A-1
Appendix 8-B Guideline for Writing Bridge Electrical and Mechanical Inspection Reports . . . . . 8-B-1
Appendix 8-C Numerical Rating Condition Description . . . . . 8-C-1
Appendix 8-D Continued Certification of Complex Bridge Inspection Personnel . . . . . 8-D-1
Appendix 8-E Complex Bridge and Tunnel Inspection List . . . . . 8-E-1
Appendix 8-F Operations, Inspections, and Maintenance Manual List . . . 8-F-1
Appendix 8-G Guideline for Writing Tunnel Electrical and Mechanical Inspection Reports . . . . . 8-G-1

## Chapter 9 Tunnels


9-1 General . . . . . 9-1
9-1.1 Definitions . . . . . 9-1
9-2 Description of Tunnel Inspection Organization . . . . . 9-2
9-3 Tunnel Inspection Programs . . . . . 9-2
9-4 Tunnel Inspection Organization Roles and Responsibilities . . . . . 9-2
9-4.1 Team Leader (TL) . . . . . 9-2
9-5 Tunnel Inspection Certification . . . . . 9-2
9-6 Tunnel Inspection Certification Probation, Suspension, Decertification and Reinstatement . . . . . 9-3
9-7 Inspections . . . . . 9-3
9-8 Tunnel Elements . . . . . 9-3
9-9 Tunnel QC/QA Program . . . . . 9-4
9-10 Tunnel Records . . . . . 9-4
9-10.1 SNTI Coding Guide . . . . . 9-4
9-11 Use of Bridge Elements . . . . . 9-4
9-12 Tunnel Deck and Roadway Condition Coding . . . . . 9-4
9-13 Appendices . . . . . 9-4
Appendix 9-A Tunnel BMS Elements . . . . . 9-A-1
Appendix 9-B Vacant . . . . . 9-B-1
Appendix 9-C WSDOT/NTI Tunnel Inventory Codes . . . . . 9-C-1

# Introduction

## Purpose

The *Washington State Bridge Inspection Manual* (WSBIM) has been developed to provide specific guidance, offer needed technical details, and serve as an information source to both state and local agency staff related to and involved with bridge inspections within the state of Washington. The intent of this manual is to serve as an operations manual for the collection, processing, and reporting of bridge inspection information.

The WSBIM consists of nine chapters. Chapters 1 – 3 explain the responsibilities within the bridge inspection organization, provide guidance to the structure of the Washington State Bridge Inventory System (WSBIS), and it further explains the types of inspections and the reports required to meet the federal mandate outlined in the Code of Federal Regulations. Chapter 4 describes the Washington State Bridge Management System (BMS) and defines the element level inspection used by both state and local agency bridge inspectors. Chapters 5 – 7 provide more detailed information to the inspector regarding load ratings, scour, damage/repair reporting, and quality control/quality assurance. Chapter 8, currently written as a stand-alone chapter, covers the aspects of mechanical and electrical inspections of moveable structures. Chapter 9 integrates the operation of tunnel inspections into the overall inspection program.

## References

Bridge inspection staff may also refer to the most current editions of the following:

- *Bridge Inspector's Reference Manual* (BIRM), Publication No. FHWA NHI 23-024
- *The Manual for Bridge Evaluation (MBE)*, 3rd Edition, AASHTO
- *The Manual for Bridge Element Inspection*, 2nd Edition, AASHTO
- *Evaluating Scour at Bridges*, Hydraulic Engineering Circular (HEC) No. 18, 5th Edition, FHWA
- *Stream Stability at Highway Structures*, Hydraulic Engineering Circular (HEC) No. 20, 4th Edition, FHWA
- *Bridge Scour and Stream Instability Countermeasures*, Hydraulic Engineering Circular No. 23, 3rd Edition, FHWA
- Title 23 CFR 650 Subpart C – National Bridge Inspection Standards
- Title 23 CFR 650 Subpart E – National Tunnel Inspection Standards
- Title 23 CFR 500 Subpart A – Management and Monitoring Systems
- *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*, Report No. FHWA-PD-96-001, December 1995, FHWA. ***NOTE:*** use of this document will be discontinued after March 2025.
- *Specifications for the National Bridge Inventory* (SNBI), Publication No. FHWA-HIF-22-017. ***NOTE:*** use of this document is in transition until full use in 2026.
- *Specifications for the National Tunnel Inventory (SNTI)*, Publication No. FHWA-HIF-15-006.
- *Bridge Design Manual* (BDM) M 23-50, WSDOT
- *Transportation Structures Preservation Manual* M 23-11, WSDOT
- *Local Agency Guidelines* (LAG) M 36-63, WSDOT
- *Bridge List* M 23-09, WSDOT
- *Moveable Bridge Inspection, Evaluation, and Maintenance Manual*, 1st Edition, AASHTO
- *Dive Safety Manual* M 3107, WSDOT
- *Ferry Terminal Inspection Procedures Manual* M 3105, WSDOT

## Revisions

The WSBIM is a dynamic document that is updated annually to incorporate revisions based on new requirements from the Federal Highway Administration (FHWA), as well as newly adopted practices by either state or local agencies within the state. We encourage the user to submit to the Bridge Inspection Committee any proposed revisions or new material, by using the Comment Request Form provided.

In the event of conflicting information or requirements between the WSBIM and NBIS/NTIS, the NBIS/NTIS will govern. Agencies are not relieved of the responsibility of complying with the NBIS/NTIS even when a conflict exists. If a conflict is discovered, notify the WSDOT Bridge Condition Engineer or the Local Agency Bridge Engineer.

# Chapter 1 Bridge Inspection Organization Requirements

## 1-1 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, on and off Federal-aid highways, including tribally and federally owned tunnels.

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 unless it is connected to a public road on both ends of the bridge. 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).

### 1-1.1 *Definitions*

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

**Bridge** – A structure including supports erected over a depression or an obstruction, such as water, highway, or railway.

**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 2023 FHWA *Bridge Inspector's 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* (MBE).

**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 meet NBIS, NTIS, and WSDOT qualification requirements. See Section 1-5.

**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** – A structural or safety related deficiency that required immediate action to ensure public safety. See Section 1-2

**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.

**Critical Finding** – A structural or safety related deficiency that required immediate action to ensure public safety. See Section 6-2

**Culvert** – A structure comprised of one or more barrels, beneath an embankment and designed structurally to account for soil-structure interaction. These structures are hydraulically and structurally designed to convey water, sediment, debris, and, in many cases, aquatic and terrestrial organisms through roadway embankments. Culvert barrels have many sizes and shapes and have inverts that are either integral or open, i.e. supported by spread or pile-supported footings. Many culverts take advantage of headwater submergence of the inlet to increase hydraulic efficiency and economy.

**Delegated Program Manager (DPM)** – See Section 1-4.2

**Element Level Bridge Inspection Data** – Quantitative condition assessment data, collected during bridge inspections, that indicates the severity and extent of defects in bridge elements.

**Hands-on inspection** – Inspection within arm's length of the member. Inspection uses visual techniques that may be supplemented by nondestructive evaluation techniques.

**Highway Lid** – A structure built with green space that 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.

**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, inspection intervals, 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, inspection intervals, 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.

**National Tunnel Inventory (NTI)** – The aggregation of structure inventory and appraisal data collected nationally to fulfill the requirements of the National Tunnel Inspection Standards. The state of Washington shall prepare and maintain an inventory of all tunnels subject to the NTIS.

**Nationally Certified Bridge Inspector** – An individual meeting the team leader requirements of Section 1-4.3.

**Nonredundant Steel Tension Member (NSTM)** – A primary steel member fully or partially in tension, and without load path redundancy, system redundancy or internal redundancy, whose failure may cause a portion of or the entire bridge to collapse. These elements were formerly referred to as Fracture Critical Members (FCM).

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

**Rehabilitation** – The major work required to restore the structural integrity of a bridge as well as work necessary to correct major safety defects.

**Reportable Structure –** All bridges and tunnels reported respectively to the NBI and NTI. A bridge carrying vehicular 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 is reportable. All structures meeting the definition of tunnel are reportable.

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

**Statewide Program Manager (SPM)** – The individual in charge of the program with the overall responsibility to ensure the program conforms with the requirements of the NBIS and NTIS. See Section 1-4.1

**Superuser** – Bridgeworks/WSBIS account that has permissions that allows user to approve changes (release) in the application that other users do not have sufficient permissions to perform. Examples of these types of data changes are changes of Program Manager, changes to the owner, and obsoleting of structures.

**Tunnel** – 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).

**Washington State Bridge Inventory System (WSBIS)** – The aggregation of structure inventory, and appraisal data collected and used to fulfill the requirements of the NBIS/NTIS and additional data used to manage the state and local bridge inventories.

## 1-2 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 a registry of nationally certified bridge and tunnel inspectors that includes, at a minimum, a method to positively identify each inspector, inspector's qualification records, inspector's current contact information, and detailed information about any adverse action that may affect the good standing of the inspector.
- Maintaining a certification program for program managers, team leaders, and underwater bridge inspection divers.
- Performing regularly scheduled in-service bridge inspections. This includes, but is not limited to, routine, underwater, and nonredundant steel tension member 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:
  - Nonredundant Steel Tension Members
  - Underwater Bridge Elements
  - Complex Bridge Features
  - Tunnels

- Performing scour appraisals 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 critical findings 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. Washington State is currently transitioning to the Specifications for the National Bridge Inventory with full transition scheduled to be complete by March of 2028.
- 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 or 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.

## 1-3 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, Department of Enterprise Services, and other state agencies with bridges/tunnels subject to the NBIS/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. 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 have agreements with other agencies or consultants to inspect and manage their bridges/tunnels.

## 1-4 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.

### 1-4.1 *Statewide Program Manager (SPM)*

The Statewide Program Manager (SPM) is the individual in Washington State who leads the bridge inspection organization. The SPM has been assigned the duties and responsibilities for bridge inspection, reporting, and inventory and has the overall responsibility to ensure the program conforms with the requirements of the NBIS and NTIS. The SPM provides overall leadership and is available to inspection team leaders to provide guidance. This position is held by the Bridge Preservation Engineer, who must ensure that the organization fulfills its NBIS and NTIS responsibilities, see Appendix 1-C. To qualify as the SPM, WSDOT requires this individual to have a current 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 1-5.

### 1-4.2 *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-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 1-5.

***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.

### 1-4.3 *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 1-5.

### 1-4.4 *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.

### 1-4.5 *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.

### 1-4.6 *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 1-5.

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

### 1-4.7 *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.

## 1-5 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, DPMs, TLs, and UBIDs. 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.

### 1-5.1 *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-A, WSDOT Form 234-100.
- 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).
  - Registered Professional Engineering license(s).
  - Certificate of successful completion of an FHWA approved comprehensive bridge inspection course such as the WSDOT *Bridge Condition Inspection Training (BCIT)* course (10 day), *NHI Safety Inspection of In-Service Bridges* course (10day), or *NHI Safety Inspection of In-Service Bridge for Professional Engineers* course (5 day) and score 70% or greater on an end-of-course assessment.
  - Certificate of completion of an FHWA approved comprehensive tunnel inspection training course and a score 70% or greater on an end-of-course assessment if the team leader is expected to perform tunnel inspections.
  - Certificate of completion of an FHWA-approved NSTM bridge inspection training course and a score of 70% or greater on an end-of-course assessment if the team leader is expected to perform NSTM inspections.

  - Certificate of completion of an FHWA-approved underwater bridge inspection training course and a score of 70% or greater on an end-of-course assessment if the team leader is expected to perform underwater inspections.
  - Certificates of completion for any special technical courses related to in-service bridge and/or tunnel condition inspection.
  - Any additional information documenting the bridge and/or tunnel inspection experience of the applicant.
- Approved applicants are issued a WSDOT Inspection Identification Number that is acknowledged through an email response from the LPBE. The Inspector ID number is stored within the BridgeWorks application and is used to identify certified team leaders and the applicable inspection types that they are permitted to perform, see Table BIE01a - Report Types and Subtypes, within Appendix 2-C.
- In addition to the minimum qualifications, the SPM, TLs within the BPO, and the LPBE, are all required to be registered Professional Engineers in Washington State.

## 1-5.2 *Certification Renewal*

Certification renewal ensures that the PMs, TLs, and UBIDs in any agency maintain a minimum level of training in the latest practices and technology in the area of bridge or tunnel 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 pre-approved courses is located in Appendix 1-B. This process within the State of Washington consists of a fixed 60-month period established for each individual PM, TL and UBID. Within this 60-month period, the following course credit hours are required for continuing education training.

- State PM and TLs and UBIDs are required to have 80 hours.
- Local Agency PMs and TLs and UBIDs are required to have 40 hours.
- A 60-month certification period is to be managed between the individual and the designated PM.
- For bridge inspections, the *NHI Bridge Inspection Refresher Training* (BIRT) course or other State, local or other federally developed and approved instruction course must be taken at least once during each 60-month certification period.
- For tunnel inspections, the *NHI Tunnel Safety Inspection Refresher* (TIRT) course or other State, local or other federally developed and approved instruction course must be taken at least once during each 60-month certification period.
- The hours from BIRT or TIRT course count toward completion of the designated hours of continuing education training required to maintain certification.
- The BIRT or TIRT can be taken within six months either side of the established certification expiration date of the current 60-month period for each employee to extend certification for the next 60-month 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 60-month period. See Section 1-6.

### 1-5.3 *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 60-month 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.

## 1-6 Bridge Inspection Certification Probation, Suspension, Decertification and Reinstatement

To couple the process of certification above in Section 1-5, a process for decertification has been established to ensure that all PMs, TLs, UBIDs 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 1-5).
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 1-5 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.

## 1-7 Appendices

| | |
|---|---|
| Appendix 1-A | WSDOT Bridge/Tunnel Inspector Experience and Training Record Form (WSDOT Form 234-100) |
| Appendix 1-B | Continuing Education Course List |
| Appendix 1-C | SPM delegation letter |
| Appendix 1-D | DPM delegation letters |

# *Appendix 1-A WSDOT Bridge/Tunnel Inspector Experience and Training Record Form (WSDOT Form 234-100)*

Washington State Department of Transportation

## WSDOT Bridge/Tunnel Inspector Experience and Training Record

| Team Leader Name | Date |
|---|---|
| Agency Name | Phone |
| Address | Email |

**NBIS Qualification** - select one. See detailed list on page 2. All require completion of comprehensive bridge inspection training from WSDOT or NHI or equivalent.

☐ 1a - PE + Experience ☐ 1b - Experience (10 years) ☐ 2 - Experience (5 years)
☐ 3 - Bachelor's + EIT + Experience ☐ 4 - Associate's + Experience

| **Inspection Type Qualifications** | |
|---|---|
| **For each type, include course details below and attach course certificate** | |
| ☐ | Completed comprehensive bridge inspector training (NHI or equivalent) |
| ☐ | Completed NSTM training course (NHI or equivalent) |
| ☐ | Completed comprehensive tunnel inspector training (NHI or equivalent) |
| ☐ | Completed Underwater Bridge Inspection Diver training (NHI or equivalent) |

| **Education** | | | |
|---|---|---|---|
| ***Institution (ABET accredited program)*** | ***Major*** | ***Years*** | ***Degree*** |
| | | | |

| **Professional Registration** (WA preferred, otherwise list any one active licensure location) | | |
|---|---|---|
| ***State*** | ***Branch/Agency*** | ***Registration Number*** |
| | | |

| **Bridge Inspection Training** | | | |
|---|---|---|---|
| ***Course*** | ***Sponsor*** | ***Hours*** | ***Dates*** |
| | | | |

| **Special Technical Course** | | | |
|---|---|---|---|
| ***Course*** | ***Sponsor*** | ***Hours*** | ***Dates*** |
| | | | |

| **Bridge Inspection Experience** | | |
|---|---|---|
| ***Agency/Firm*** | ***Bridge Duties*** | ***Years*** |
| | | |

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

Applicant's Signature _____ Date _____

DOT Form 234-100
Revised 12/2022

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 _____

| Supplemental Training/Experience Information | | | |
|---|---|---|---|
| **Bridge Inspection Training** | | | |
| ***Course*** | ***Sponsor*** | ***Hours*** | ***Dates*** |
| | | | |
| | | | |
| **Special Technical Course** | | | |
| ***Course*** | ***Sponsor*** | ***Hours*** | ***Dates*** |
| | | | |
| | | | |
| **Bridge Inspection Experience** | | | |
| ***Agency/Firm*** | ***Bridge Duties*** | | ***Years*** |
| | | | |
| | | | |

| National Bridge Inspection Standards<br>Qualifications of Bridge Inspection Personnel (23 CFR §650.309)<br>Team Leader (summarized) | | | | |
|---|---|---|---|---|
| 1a | Registered PE *and* | BCIT or equivalent*** *and* | 6 months of bridge experience | |
| 1b | 10 years bridge inspection experience *and* | BCIT or equivalent*** | | |
| 2 | Five years of bridge inspection experience *and* | BCIT or equivalent* | | |
| 3 | Bachelor's degree in engineering from and accredited program *and* | EIT** and | Two years of bridge inspection experience and | BCIT or equivalent* |
| 4 | Associate's degree in engineering or engineering technology from an accredited program *and* | Four years of bridge inspection experience and | BCIT or equivalent* | |

*BCIT or equivalent requires successful completion of a Federal Highway Adminsitration (FHWA) approved comprehensive bridge inspection training course

**EIT requires successfully passed the NCEES Fundamentals of Engineering Exam

***Same as Program Manager

DOT Form 234-100
Revised 12/2022

# *Appendix 1-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 60 month 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 Bridge Inspection Techniques for Nonredundant Steel Tension Members (NSTM) | 25 hours |
| NHI Tunnel Safety Inspection | 31 hours |
| NHI Tunnel Safety Inspection Refresher WBT Prerequisite | 4 hours |
| NHI Tunnel Safety Inspection Refresher ILT | 17 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 Inspector's Reference Manual* (BIRM)
- *The Manual for Bridge Evaluation* (MBE)
- *Timber Bridges Manual* (USDA)
- *Specifications for the National Bridge Inventory* (SNBI)
- *Specifications for the National Tunnel Inventory* (SNTI)
- *Tunnel Operations, Maintenance, Inspection, and Evaluation* (TOMIE) *Manual*
- WSDOT *Transportation Structures Preservation Manual*

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# *Appendix 1-C SPM Delegation Letter*

Washington State Department of Transportation

Memorandum

November 16, 2023

TO: Roman Peralta, Bridge Preservation Engineer
Bridge and Structures Office, Development Division

THRU: Mark Gaines,
Development Division Director and State Design Engineer

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

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

This is to advise you that as the incumbent Bridge Preservation Engineer of the Bridge and Structures Office, you are hereby delegated authority as Program Manager for the statewide bridge inspection program, as defined in the National Bridge Inspection Standards (NBIS) 23 CFR §650.307(g), §650.307(e) (1) through (11), and the National Tunnel Inspection Standards (NTIS) 23 CFR §650.507(g), §650.507(e) (1), §650.507(e) (2), §650.507(e) (3) effective beginning on November 16, 2023.

These duties may be further delegated to individuals meeting the qualifications of 23 CFR §650.309(a) and §650.507(a). However, the responsibility must remain with you as the Program Manager in accordance with 23 CFR §650.307(f) and §650.507(f).

RME:tms

cc: Mark Gaines, Development Division Director, State Design Engineer
Evan Grimm, State Bridge & Structures Engineer
Loren Wilson, FHWA Washington Division Bridge Engineer

DOT Form 700-008 EF
Revised 5/99

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# *Appendix 1-D DPM Delegation Letters*

Washington State Department of Transportation

Memorandum

November 20, 2023

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

FROM: Roman G. Peralta, P.E. RGP
Bridge Preservation Engineer
MS: 47340

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

By authority granted to me as the Bridge Preservation Engineer and Statewide Bridge Program Manager, I am sub-delegating to you as the Washington State Ferry's Marine Project Engineer, Program Manager Duties for the federally reportable bridge inventory of the Washington Ferries. These duties are defined in the National Bridge Inspection Standards (NBIS) 23 CFR§650.307(g), §650.307(e)(3) through (11) for all the agency bridge inspection programs.

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

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

RGP:tms

Cc (email): Mark Gaines, Development Division Director and State Design Engineer
Evan Grimm, State Bridge and Structures Engineer
George Comstock, Coding & Appraisal Engineer
Loren Wilson, FHWA Washington Division Bridge Engineer
David Sowers, Director of Terminal Engineering
Bryant Bullamore, Construction Engineering Manager

DOT Form 700-008 EF
Revised 5/99

Washington State Department of Transportation

Memorandum

November 20, 2023

TO: Sonia Lowry, P.E.
Local Programs Bridge Engineer
MS: 47390

FROM: Roman G. Peralta, P.E. RGP
Bridge Preservation Engineer
MS: 47340

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

By authority granted to me as the Bridge Preservation Engineer and Statewide Bridge Program Manager, I am sub-delegating to you as the Local Programs Bridge Engineer, Program Manager Duties for the federally reportable inventory of Local Agency bridges and tunnels, as defined in the National Bridge Inspection Standards (NBIS) 23 CFR§650.307(g), §650.307(e) (3) through (11), and the National Tunnel Inspection Standards (NTIS) 23 CFR§650.507(g), §650.507(e) (1), §650.507(e) (2), §650.507(e) (3) for all the local agency bridge inspection programs.

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

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

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

RGP:tms

Cc (email): Mark Gaines, State Design Engineer
Evan Grimm, State Bridge and Structures Engineer
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DOT Form 700-008 EF
Revised 5/99

# Chapter 2 Bridge Files and Documentation

## 2-1 General

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

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

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

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

This chapter addresses the following topics associated with bridge files:

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

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

## 2-2 Maintaining Bridge and Tunnel 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. Owners should maintain a complete, accurate, and current file of each bridge and tunnel under their jurisdiction.

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

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

The remainder of this Section 2-2 describes WSDOT Bridge Preservation Office policy for maintaining bridge records. Local agencies are encouraged to follow a similar plan.

### BridgeWorks Digital Signature

Digital signatures can be applied to inspection reports as a feature within the BridgeWorks application. This feature is available to both state and local agency inspectors but is not a requirement at this time. Inspecting agencies that wish to maintain their current signature process will be able to do so.

Digital signatures are applied to a pdf document which contains all the information associated with the inspection report or reports, including photos, and attached files. In cases where multiple inspections are performed simultaneously (routine and non-redundant steel tension member (NSTM), for instance) both reports will be included in this single pdf document and the digital signature will apply to all reports.

The original digitally signed inspection report(s) will be retained within WSBIS in a secured WSDOT server that prevents alteration of these documents once signed. These original documents will be available for viewing and copying from both the BridgeWorks application and the BEISt website. Copies can be downloaded by anyone with access to these sources.

### Electronic Files

Electronic bridge files, including digitally signed inspection reports, are maintained on the BEISt internal website: http://beist/inventoryandrepair/inventory/bridge

This website contains the following:

1. Scanned copies of conventionally 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 from 2011 through 2024. Starting in 2025, various reports will replace the SIA sheet that include all SNBI data except for SNBI Section 7.5 Work Events. It's expected that this report will be added in the summer of 2025. Digitally signed inspection reports will include all the SNBI data.
3. Current inspection photographs in jpg format. Digitally signed inspection reports will include photos in the inspection report pdf document.
4. Current and historic repair recommendations displayed directly from the BPO database (See Section 2-3), dating back to approximately the year 2002. Digitally signed inspection reports will include all current repair recommendations in the inspection report pdf document.
5. Scanned copies of contract plans, as-builts when available, otherwise award plans. Note that the plan sheets on BEISt are not the official plans, which are owned by the WSDOT regions where the bridge is located.
6. In-house repair plans dating back to 2013.
7. Scanned copies of correspondence, historic repair and maintenance reports, miscellaneous studies, and other records are scanned from the paper files and loaded onto BEISt for selected bridges. This is generally done in response to a public disclosure request or a legal discovery requirement.

### Paper Files

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

1. All conventionally signed bridge inspection reports, including but not limited to routine, fracture critical or NSTM, 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. For inspection reports digitally signed within the BridgeWorks application, no paper files are required. As of 2022, documents digitally signed by another application are not approved for electronic storage without a conventional signature and stored as a paper file.
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. For inspection reports digitally signed within the BridgeWorks application, no paper files are required. As of 2022, documents digitally signed by another application are not approved for electronic storage without a conventional signature and stored as a paper file.
3. A current printout of any specific inspection requirements/procedures, usually but not necessarily associated with NSTM, underwater, or special inspection reports.
4. A stamped Load Rating Summary sheet which shows the controlling ratings shall be placed in the letter file. The original load rating calculations for state owned bridges shall be filed in the Risk Reduction section at the WSDOT Bridge Preservation Office.
5. Scour files are located in the Risk Reduction section at the WSDOT Bridge Preservation Office.
6. All current agreements with other agencies for maintenance, rehabilitation, or shared ownership.

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

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

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

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

WSDOT maintains a state Contract History database that records all contract work completed on state managed structures. This database correlates contract number and contract work to structures maintained by the WSDOT bridge inventory.

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

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

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

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

## 2-2.1 *Transferring Bridge Ownership and/or Program Manager*

Whenever a bridge transfers ownership and/or program manager responsibility, the entire bridge file, both paper and electronic, must be transferred to the new owner/ program manager. Bridge transfers must be acknowledged and documented by both program managers involved along with any additional deeds, agreements, plans or other documentation available. All transfer documentation must be retained in the bridge file. In some cases, the acknowledgement of the transfer by the program managers may be the only documentation available. See Appendix 2-B for a Record Change Form (WSDOT Form 220-033). For local agencies, this form should be submitted unsigned to the LPBE.

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

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

### 2-2.2 *Dead/Obsolete Bridge Files*

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

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

### 2-2.3 *Structures on WSDOT Right of Way*

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

## 2-3 Maintaining a State Bridge Inventory – WSBIS

Washington State is required by 23 CFR 650.315 to maintain an inventory of all bridges (structures) subject to the National Bridge Inspection Standards (NBIS), from which selected data is reported to FHWA as requested for entry into the National Bridge Inventory (NBI).

WSDOT submits FHWA data in October and March 15 of each year.

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.

National Bridge Element (NBE) data for structures on NHS routes is required by 23 CFR 650.315, and has been required since the implementation of the Moving Ahead for Progress in the 21st Century Act by the US Congress (MAP-21) in 2014. WSDOT collects element level data for all reportable structures. Data for those structures on NHS routes is translated into NBEs for submittal to the NBI. See Appendix 4-B for WSDOT Bridge Management System elements (BSME) to NBE translation specifications.

Data collected to meet the requirements of National Bridge Inspection Standards (NBIS) is also used by asset managers to comply with 23 CFR 500.107 which describes a Bridge Management System (BMS) for bridges on and off Federal-aid highways.

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

1. Whenever a database field has to be translated to match the SNBI, this translation must be clearly defined.

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

Starting in 2025, the WSBIS inventory will also include all features associated with a structure as required by the SNBI, including roadways, railroads, pathways, waterways, dry terrain, urban and "other" features.

## 2-3.1 *WSBIS Inventory and Data*

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

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

In general, these are structures that conform to the NBIS definition of a bridge and must be reported to the NBI when the structure 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, or a privately-owned bridge connected to a public road at both ends.
- 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 span length along the centerline of the roadway exceeds 20 feet AND is wider than 12 feet. The span length is measured from inside face to inside face of exterior walls for multicell structures or minimum clear span for single cell structures. This includes any structure with any portion directly under a lane or shoulder.

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

**SNBI** – Starting in 2026, the 2022 Specifications for the National Bridge Inventory (SNBI) will determine the NBI data reported to FHWA. These new specifications will replace the existing 1995 Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges. WSBIS will adapt to the SNBI specifications in phases between 2023 and 2026. See Section 2-3.1.G below.

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

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

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

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

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

Optional structures include any structure that the state or local agency manages as part of their structure inventory, but which do not qualify for reporting to the NBI or NTI. Typically this will include bridges with span lengths less than 20 feet (short spans), and pedestrian or railroad structures.

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

### 2-3.1.D Mandated Data in the WSBIS

All data fields defined in the SNBI 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 as defined in the WSDOT coding guide.

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

All bridges subject to the NBIS and carrying NHS routes are required to include WSDOT Bridge Management System (BMS) elements and translated to National Bridge Elements and included with the annual NBI data submittal. See Chapter 4 for detailed information on the translation process.

Starting in 2026, NBE data will be submitted to FHWA as part of the SNBI.

### 2-3.1.F Optional Data in the WSBIS

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

### 2-3.1.G Specifications for the National Bridge Inventory (SNBI) Data

Starting in 2025, all SNBI data except Section 7.5 Work Events, will be available for inspectors and inventory managers to populate data in accordance with the WSDOT coding guide Appendix 2-C. Work events are scheduled for deployment in the summer of 2025. Appendix 2-D includes 1995 FHWA coding guide fields that are still available for reference. Background information on these new specifications, including the complete March 2022 SNBI coding guide with errata#1 03/24 are available here: https://www.fhwa.dot.gov/bridge/nbis2022.cfm

## 2-3.2 *New Bridge Inventory in the WSBIS*

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

New bridges to the inventory must have a unique Structure Identifier Item BID01 (SNBI Item B.ID.01) 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 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, and historical significance.

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

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

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

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

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

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

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

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

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

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

There are several ways in which a single bridge can have more than one agency responsible for the bridge inventory data.

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

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

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

***Note:*** This situation applies to any combination of features, route owners, and federal reporting status. WSDOT will ask local agencies for specific data regarding local agency highway features and will provide the same to local agencies as needed to complete the structure record.

**Case 2: Local Agency-Owned Bridges Carrying Highway Traffic Over State Routes** – This case applies when the structure is owned by a local agency and carries a local agency highway feature and spans a state highway feature underneath. In this case, the local agency is responsible for the primary record (including federal reporting), and all local agency owned feature data. WSDOT is responsible for WSDOT feature data.

**Case 3: Local Agency-Owned Pedestrian Bridges Over State Routes** – This case applies when the structure is owned by a local agency and carries a non-highway feature (pedestrian, railroad, plaza, building, etc.), and spans a state highway feature underneath. In this case, WSDOT is responsible for the primary record and all WSDOT owned feature data. The local agency is responsible for local agency feature data. Note that these structures are never reported to the NBI.

**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. WSDOT will be responsible for the primary record unless a specific agreement is in place for the local agency to maintain the inventory. In this case, no records are reported to the NBI.

In all situations where there is shared responsibility between WSDOT and a local agency, the structure records in WSBIS must be shared, using the same structure identifier Item BID01. 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 structure carry a highway feature?
- Does the structure include a highway feature above or below the structure?
- Is the structure on state right-of-way? Who owns the structure?
- Who owns the various features on, below and above the structure?
- Are there any interagency agreements relevant to inspection and reporting responsibility?

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

### 2-3.4.B Shared Responsibility with Other States

WSDOT and local agencies share bridge recordkeeping and FHWA reporting responsibility for all bridges that cross state lines in accordance with the SNBI Responsibility to perform inspections maintenance and rehabilitation/replacement is established by agreements which must be kept on file.

See Appendix 2-F for a list of bridges crossing state boundaries.

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

Section 2-3.1 outlines 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.

**Closed Bridges Owned by Public Agencies** – 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 but are not connected to a public road on both ends. Private driveways or parking lot entries are not considered reportable.

**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.

## 2-4 FHWA Data Submittal Process

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

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

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

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

Data submitted to FHWA is used for performance measurements after the submittal, both by FHWA and WSDOT. Verifying timely inspections for the federally reported inspection types is a primary focus of these performance measures.

## 2-5 Responding to FHWA

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

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

**Communication Between FHWA and WSDOT** – Appendix 2-F 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.

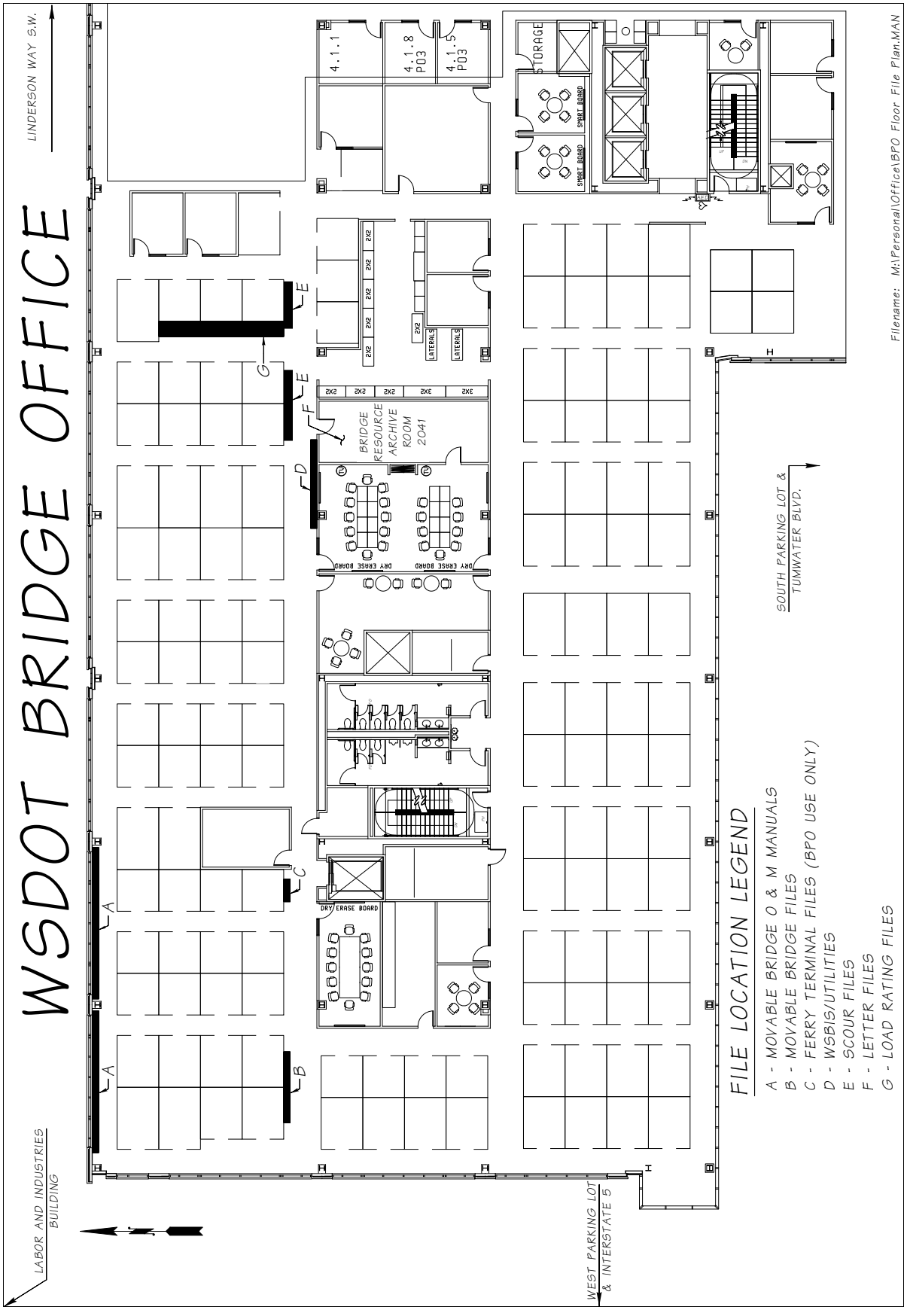
**Annual NBIS Program Review** – FHWA conducts an annual review of the bridge inspection organization within the state of Washington. The purpose of this review is to assure compliance with the NBIS. The review examines all facets of the inspection program – the effectiveness of the overall organization, 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. Additional information on the NBI and NBIS can be found on the FHWA Office of Bridges and Structures website at www.fhwa.dot.gov/bridge/nbis.htm.

## 2-6 Appendices

| | |
|---|---|
| Appendix 2-A | WSDOT BPO Floor Plan with File Locations |
| Appendix 2-B | Record Change Form (WSDOT Form 220-033) |
| Appendix 2-C | Washington State Bridge Inventory System Coding Guide |
| Appendix 2-D | 1995 NBI Coding Guide Items Retained for Reference |
| Appendix 2-E | Border Bridge Information |
| Appendix 2-F | WSDOT/FHWA Communication Protocol Flowchart |

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# *Appendix 2-A WSDOT BPO Floor Plan with File Locations*



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# *Appendix 2-B Record Change Form (WSDOT Form 220-033)*

Washington State Department of Transportation

## Record Change Form

**Record change requiring Statewide Program Manager (SPM) approval**

| | |
|---|---|
| Structure Identifier | Structure Number |
| Structure Name | Date of Record Change |
| Requesting Agency | Contact |
| Structure Obsoleted ☐ Yes ☐ No | Ownership Transfer ☐ Yes ☐ No |
| If replaced with new structure, provide new structure identifier, number and name | |
| Describe reason for requested change | |
| Ownership Transfer from _____ to _____ | |

_____ _____

Delegated Program Manager, if local agency record obsoleted — Date

_____ _____

Statewide Program Manager — Date

WSDOT Form 220-033
Revised 01/2021

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# *Appendix 2-C Washington State Bridge Inventory System Coding Guide*

Table 1 - WSBIS Items by Name and Tab Order

| WSBIS Item No. | WSBIS Item Name | SNBI Item No. | SNTI Item No. | Page No. |
|---|---|---|---|---|
| **Coding Guide Instructions** | | | | 2-C-19 |
| **Report Types Tab** | | | | |
| BIE01 | Report Types and Report Subtypes | B.IE.01 | D.2-D.6 | 2-C-25 |
| BIE05 | Inspection Interval | B.IE.05 | D.3 | 2-C-31 |
| BIE02 | Inspection Begin Date | B.IE.02 | D.2 | 2-C-32 |
| BIE03 | Inspection Completion Date | B.IE.03 | D.2 | 2-C-33 |
| BIE06 | Inspection Due Date | - | - | 2-C-34 |
| Override | Inspection Due Date Override | - | - | 2-C-34 |
| BIE11 | Report Type Notes | B.IE.11 | - | 2-C-35 |
| TD1 | Target Inspection Date - SNTI | - | D.1 | 2-C-35 |
| BIE07 | Risk-Based Inspection Interval Method | B.IE.07 | - | 2-C-36 |
| BIE04 | Nationally Certified Bridge/Tunnel Inspector | B.IE.04 | - | 2-C-37 |
| WIE05 | Co-Inspector Initials | - | - | 2-C-37 |
| WIE07 | Inspection Hours | - | - | 2-C-38 |
| WIE08 | Inspection Overtime Hours | - | - | 2-C-38 |
| WIE10 | Late Inspection Explanation - PM Oversight | - | - | 2-C-39 |
| WIE11 | Late Inspection - PM Response Date | - | - | 2-C-39 |
| WIE12 | Late Inspection - PM Approval | - | - | 2-C-39 |
| BIE08 | Inspection Quality Control Date | B.IE.08 | - | 2-C-40 |
| BIE12 | Inspection Equipment *(Summer 2025)* | B.IE.12 | - | 2-C-40 |
| **Critical Findings Tab** | | | | |
| WCF01 | Critical Finding Number | - | - | CH6 |
| WCF02 | Type of Critical Finding | - | - | CH6 |
| WCF03 | Entry Type | - | - | CH6 |
| WCF04 | Date of Finding or Entry Date | - | - | CH6 |
| WCF05 | Bridge Status | - | - | CH6 |
| WCF06 | Estimated Resolution Date | - | - | CH6 |
| WCF07 | Description | - | - | CH6 |
| WCF08 | Reported By | - | - | CH6 |
| WCF09 | Associated Repair | - | - | CH6 |
| **SNBI (SNTI) Tab** | | | | |
| **Component Condition Ratings** | | | | |
| BC12 | Overall Bridge Condition Classification | B.C.12 | | 2-C-43 |
| BC01 | FHWA Deck Overall Condition Rating | B.C.01 | - | 2-C-44 |
| WC01 | WSDOT Deck Overall Condition Rating | - | | 2-C-47 |
| BC05 | Bridge Railings Condition Rating | B.C.05 | | 2-C-48 |
| BC06 | Bridge Railing Transitions Condition Rating | B.C.06 | - | 2-C-50 |
| BC08 | Bridge Joints Condition Rating | B.C.08 | - | 2-C-51 |
| BC02 | Superstructure Overall Condition Rating | B.C.02 | - | 2-C-54 |
| BC14 | NSTM Inspection Condition | B.C.14 | | 2-C-57 |
| BC07 | Bridge Bearings Condition Rating | B.C.07 | - | 2-C-58 |
| BC03 | Substructure Overall Condition Rating | B.C.03 | - | 2-C-60 |

Table 1 - WSBIS Items by Name and Tab Order

| WSBIS Item No. | WSBIS Item Name | SNBI Item No. | SNTI Item No. | Page No. |
|---|---|---|---|---|
| BC15 | Underwater Inspection Condition | B.C.15 | - | 2-C-62 |
| BC04 | Culvert Overall Condition Rating | B.C.04 | - | 2-C-63 |
| BC11 | Scour Condition Rating | B.C.11 | - | 2-C-66 |
| BC09 | Channel Condition Rating | B.C.09 | - | 2-C-69 |
| BC10 | Channel Protection Condition Rating | B.C.10 | - | 2-C-71 |
| 1677 | Channel Protection Condition - NBI Disc. | - | - | 2-D-1 |
| 1679 | Pier/Abutment Protection - NBI Disc. | - | - | 2-D-2 |
| **Appraisals** | | | | |
| 1680 | Scour Critical - NBI Disc. | - | - | 2-D-3 |
| BAP03 | Scour Vulnerability | B.AP.03 | - | 2-C-73 |
| BAP04 | Scour Plan of Action | B.AP.04 | - | 2-C-75 |
| 1662 | Waterway - NBI Disc. | - | - | 2-D-4 |
| BAP02 | Overtopping Likelihood | B.AP.02 | - | 2-C-76 |
| BAP01 | Approach Roadway Alignment | B.AP.01 | - | 2-C-77 |
| BIR02 | Fatigue Details | B.IR.02 | - | 2-C-78 |
| BAP05 | Seismic Vulnerability | B.AP.05 | - | 2-C-78 |
| **Miscellaneous Fields** | | | | |
| WIE30 | Asphalt Depth | - | - | 2-C-79 |
| WIE31 | Design Curb Height | - | - | 2-C-80 |
| WIE32 | Bridge Vehicle Rail Height | - | - | 2-C-80 |
| WIE33 | Number of Utilities | - | - | 2-C-80 |
| WIE34 | Subject to NBIS Flag | - | - | 2-C-81 |
| BIE09 | Inspection Quality Assurance Date | B.IE.09 | - | 2-C-82 |
| **Inspection Flags** | | | | |
| WIE20 | Soundings Flag | - | - | 2-C-82 |
| WIE21 | Clearance Flag | - | - | 2-C-83 |
| WIE22 | Revise Rating Flag | - | - | 2-C-83 |
| WIE23 | Photos Flag | - | - | 2-C-84 |
| WIE25 | Roadside Hardware Flag | - | - | 2-C-84 |
| WIE24 | QA Flag | - | - | 2-C-85 |
| BW01 | Year Built | B.W.01 | A.1 | 2-C-85 |
| TA2 | Year Rebuilt - SNTI | - | A.2 | 2-C-86 |
| BW02 | Year Work Performed *(Summer 2025)* | - | - | 2-C-87 |
| BW03 | Work Performed *(Summer 2025)* | - | - | 2-C-87 |
| **Local Agency Appraisals** | | | | |
| 7664 | Optional Drain Condition | - | - | 2-C-88 |
| 7665 | Drain Status - Disc. | - | - | 2-D-6 |
| 7666 | Deck Scaling - Disc. | - | - | 2-D-6 |
| 7667 | Deck Scaling Percent - Disc. | - | - | 2-D-7 |
| 7669 | Deck Rutting - Disc. | - | - | 2-D-7 |
| 7670 | Deck Exposed Rebar - Disc. | - | - | 2-D-7 |
| 7672 | Curb Condition - Disc. | - | - | 2-D-7 |
| 7673 | Sidewalk Condition - Disc. | - | - | 2-D-8 |
| 7674 | Paint Condition - Disc. | - | - | 2-D-8 |
| 7681 | Approach Condition - Disc. | - | - | 2-D-8 |
| 7682 | Optional Retaining Wall Condition | - | - | 2-C-88 |

Table 1 - WSBIS Items by Name and Tab Order

| WSBIS Item No. | WSBIS Item Name | SNBI Item No. | SNTI Item No. | Page No. |
|---|---|---|---|---|
| 7683 | Pier Protection Condition - Disc. | - | - | 2-D-8 |
| **Bridge ID Tab** | | | | |
| BID01 | Structure ID | B.ID.01 | I.1 | 2-C-91 |
| BID03 | Previous Structure ID | B.ID.03 | - | 2-C-92 |
| WID01 | Structure Type | - | - | 2-C-92 |
| WID02 | Structure Number | - | - | 2-C-93 |
| WID03 | Structure Sort Number | - | - | 2-C-95 |
| BID02 | Structure Name | B.ID.02 | I.2 | 2-C-96 |
| 1232 | Features Intersected - NBI Disc. | - | - | 2-D-9 |
| 1256 | Facilities Carried - NBI Disc. | - | - | 2-D-9 |
| WID06 | Program Manager | - | - | 2-C-96 |
| 1286 | Custodian - NBI Disc. | - | - | 2-D-10 |
| 1019 | Owner - NBI Disc. | - | - | 2-D-10 |
| BCL01 | Owner | B.CL.01 | C.1 | 2-C-97 |
| BCL02 | Maintenance Responsibility | B.CL.02 | C.2 | 2-C-98 |
| BL02 | County Code | B.L.02 | I.4 | 2-C-100 |
| WL05 | City | - | - | 2-C-101 |
| BL03 | Place Code | B.L.03 | I.5 | 2-C-101 |
| BL04 | Highway Agency District | B.L.04 | I.6 | 2-C-108 |
| BL12 | Metropolitan Planning Organization | B.L.12 | - | 2-C-108 |
| WL06 | Section | - | - | 2-C-109 |
| WL07 | Township | - | - | 2-C-109 |
| WL08 | Range | - | - | 2-C-109 |
| 1285 | Toll Code - NBI Disc. | - | - | 2-D-11 |
| BCL05 | Toll | B.CL.05 | C.4 | 2-C-110 |
| 1289 | Temporary Structure - NBI Disc. | - | - | 2-D-11 |
| 1292 | Historical Significance (NRHP) - NBI Disc. | - | - | 2-D-12 |
| BCL04 | Historic Significance (NRHP) | B.CL.04 | - | 2-C-111 |
| WCL04 | Historical Significance - HAER | - | - | 2-C-112 |
| 7296 | Historical Significance - Local Agency - Disc. | - | - | 2-D-13 |
| 7281 | Legislative District 1 Disc. | - | - | 2-D-13 |
| 7283 | Legislative District 2 Disc. | - | - | 2-D-13 |
| WID04 | Special Structures Flag | - | - | 2-C-113 |
| BL07 | Border Structure ID | B.L.07 | - | 2-C-113 |
| BL08 | Border State or Country Code | B.L.08 | - | 2-C-114 |
| 1588 | Border Bridge Percent - NBI - Disc. | - | - | 2-D-13 |
| BL09 | Border Bridge Inspection Responsibility | B.L.09 | - | 2-C-114 |
| BL10 | Border Bridge Designated Lead State | B.L.10 | - | 2-C-115 |
| 7557 | Design Exception Date | - | - | 2-C-115 |
| WID05 | Obsolete Structure Flag | - | - | 2-C-115 |
| **Geometry Tab** | | | | |
| BG01 | NBIS Bridge Length | B.G.01 | - | 2-C-117 |
| BG02 | Total Structure Length | B.G.02 | G.1 | 2-C-120 |
| BG03 | Maximum Span Length | B.G.03 | - | 2-C-124 |
| BG04 | Minimum Span Length | B.G.04 | - | 2-C-126 |
| 1360 | Out-to-Out Deck Width - NBI Disc. | - | - | 2-D-16 |

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| WSBIS Item No. | WSBIS Item Name | SNBI Item No. | SNTI Item No. | Page No. |
|---|---|---|---|---|
| BG05 | Structure Width Out-to-Out | B.G.05 | - | 2-C-129 |
| 1356 | Curb-to-Curb Width - NBI Disc. | - | - | 2-D-14 |
| BG06 | Structure Width Curb-to-Curb | B.G.06 | G.3 | 2-C-135 |
| BG07 | Left Curb or Sidewalk Width | B.G.07 | G.4 | 2-C-140 |
| BG08 | Right Curb or Sidewalk Width | B.G.08 | G.5 | 2-C-143 |
| BG09 | Approach Roadway Width | B.G.09 | - | 2-C-146 |
| 1291 | Median Code - NBI Disc. | - | - | 2-D-17 |
| BG10 | Bridge Median | B.G.10 | - | 2-C-148 |
| 1310 | Skew Angle - NBI Disc. | - | - | 2-D-18 |
| BG11 | Skew Angle | B.G.11 | - | 2-C-150 |
| BG12 | Curved Bridge | B.G.12 | - | 2-C-151 |
| BG13 | Maximum Bridge Height | B.G.13 | - | 2-C-154 |
| BG14 | Sidehill Bridge | B.G.14 | - | 2-C-156 |
| BG15 | Irregular Deck Area | B.G.15 | - | 2-C-157 |
| BG16 | Calculated Deck Area | B.G.16 | - | 2-C-157 |
| WH12 | Minimum Vertical Clearance Over Deck | - | - | 2-C-158 |
| WH13 | Minimum Vertical Clearance Under Bridge | - | - | 2-C-159 |
| TA8 | Service in Tunnel - SNTI | - | A.8 | 2-C-161 |
| TG2 | Minimum Vertical Clearance Over Tunnel Roadway - SNTI | - | G.2 | 2-C-162 |
| TS1 | Number of Bores - SNTI | - | S.1 | 2-C-163 |
| TS2 | Tunnel Shape - SNTI | - | S.2 | 2-C-164 |
| TS3 | Portal Shape - SNTI | - | S.3 | 2-C-165 |
| TS4 | Ground Conditions - SNTI | - | S.4 | 2-C-165 |
| TS5 | Complex Tunnel - SNTI | - | S.5 | 2-C-166 |
| TL10 | Height Restrictions - SNTI | - | L.10 | 2-C-166 |
| TL11 | Hazardous Material Restriction - SNTI | - | L.11 | 2-C-167 |
| TL12 | Other Restrictions - SNTI | - | L.12 | 2-C-167 |
| **Features Tab** | | | | |
| 2000 | Main & Secondary Listing Code | - | - | 2-C-169 |
| 1432 | On / Under Code | - | - | 2-C-170 |
| 2402 | Crossing Description | - | - | 2-C-172 |
| BF03 | Feature Name | B.F.03 | I.10 | 2-C-173 |
| BL11 | Structure Location | B.L.11 | - | 2-C-174 |
| WF01 | Feature Type | - | - | 2-C-175 |
| BF01 | Feature Designation | B.F.01 | - | 2-C-177 |
| BF02 | Feature Location | B.F.02 | - | 2-C-178 |
| WF02 | Crossing Manager | - | - | 2-C-179 |
| BL05 | Latitude | B.L.05 | I.13 | 2-C-180 |
| BL06 | Longitude | B.L.06 | I.14 | 2-C-181 |
| WL09 | Local Agency Routing Map (Button) | - | - | 2-C-182 |
| WH25 | SNBI Reportable Flag | - | - | 2-C-182 |
| WH26 | SNTI Reportable Flag | - | - | 2-C-183 |
| WH27 | Bridge List Flag | - | - | 2-C-183 |
| BH18 | Crossing Structure ID | B.H.18 | - | 2-C-184 |
| BRT01 | Route Grid: Route Designation | B.RT.01 | - | 2-C-186 |
| WRT01 | Route Grid: Route Description | - | - | 2-C-187 |

Table 1 - WSBIS Items by Name and Tab Order

| WSBIS Item No. | WSBIS Item Name | SNBI Item No. | SNTI Item No. | Page No. |
|---|---|---|---|---|
| BRT02 | Route Grid: Route Number | B.RT.02 | I.7 | 2-C-187 |
| WRT02 | Route Grid: Route Milepost | - | - | 2-C-188 |
| BRT03 | Route Grid: Route Direction | B.RT.03 | I.8 | 2-C-189 |
| BRT04 | Route Grid: Route Type | B.RT.04 | I.9 | 2-C-190 |
| BRT05 | Route Grid: Service Type | B.RT.05 | - | 2-C-192 |
| 1435 | Route - NBI Disc. | - | - | 2-D-18 |
| 2440 | Milepost - NBI Disc. | - | - | 2-D-19 |
| 1433 | Highway Class - NBI Disc. | - | - | 2-D-19 |
| 1434 | Service Level - NBI Disc. | - | - | 2-D-20 |
| BH06 | LRS Route ID | B.H.06 | I.11 | 2-C-193 |
| BH07 | LRS Milepost | B.H.07 | I.12 | 2-C-194 |
| WH07 | LRS Milepost End | - | - | 2-C-194 |
| WH23 | LRS Directional Indicator | - | - | 2-C-195 |
| WH21 | LRS Ahead/Back Indicator | - | - | 2-C-196 |
| WH22 | LRS Ahead/Back Indicator End | - | - | 2-C-196 |
| WH19 | LRS ARM | - | - | 2-C-197 |
| WH20 | LRS ARM End | - | - | 2-C-197 |
| WH06 | LRS Date | - | - | 2-C-198 |
| WA09 | Speed Limit | - | - | 2-C-198 |
| BH08 | Lanes On Highway | B.H.08 | - | 2-C-199 |
| TA3 | Total Number of Lanes - SNTI | - | A.3 | 2-C-200 |
| TC3 | Direction of Traffic - SNTI | - | C.3 | 2-C-200 |
| 1490 | Lane Use Direction - NBI Disc. | - | - | 2-D-20 |
| BH03 | NHS Designation | B.H.03 | C.5 | 2-C-201 |
| 1483 | National Highway System (NHS) - NBI Disc. | - | - | 2-D-21 |
| BH05 | STRAHNET Designation | B.H.05 | C.6 | 2-C-202 |
| 1485 | STRAHNET Highway - NBI Disc. | - | - | 2-D-21 |
| 1489 | National Truck Network (NTN) - NBI Disc. | | - | 2-D-23 |
| BH04 | National Truck Freight Network (NHFN) | B.H.04 | - | 2-C-203 |
| BH01 | Functional Classification | B.H.01 | C.7 | 2-C-204 |
| 1487 | Functional Classification - NBI Disc. | - | - | 2-D-22 |
| BH02 | Urban Code | B.H.02 | C.8 | 2-C-205 |
| BCL06 | Emergency Evacuation Designation | B.CL.06 | - | 2-C-207 |
| BCL03 | Federal or Tribal Land Access | B.CL.03 | - | 2-C-208 |
| BH11 | AADT Year | B.H.11 | A.6 | 2-C-209 |
| BH09 | AADT Count | B.H.09 | A.4 | 2-C-209 |
| BH10 | AADT Truck Count | B.H.10 | A.5 | 2-C-210 |
| WH10 | AADT Truck Percent | - | A.5 | 2-C-210 |
| BH17 | Bypass Detour Length | B.H.17 | A.7 | 2-C-211 |
| BH12 | Highway Maximum Usable Vertical Clearance | B.H.12 | - | 2-C-213 |
| BH13 | Highway Minimum Vertical Clearance | B.H.13 | - | 2-C-215 |
| 1499 | Max Vertical Clearance Route | - | - | 2-C-217 |
| 2500 | Min Vertical Clearance Route | - | - | 2-C-217 |
| 2501 | Max Vertical Clearance Reverse | - | - | 2-C-219 |
| 2502 | Min Vertical Clearance Reverse | - | - | 2-C-219 |
| BH14 | Highway Minimum Horizontal Clearance, Left | B.H.14 | - | 2-C-220 |

Table 1 - WSBIS Items by Name and Tab Order

| WSBIS Item No. | WSBIS Item Name | SNBI Item No. | SNTI Item No. | Page No. |
|---|---|---|---|---|
| BH15 | Highway Minimum Horizontal Clearance, Right | B.H.15 | - | 2-C-223 |
| BH16 | Highway Maximum Useable Surface Width | B.H.16 | - | 2-C-226 |
| BRR01 | Railroad Service Type | B.RR.01 | - | 2-C-228 |
| WRR04 | Railroad Crossing SID | - | - | 2-C-230 |
| WRR06 | Railroad Milepost | - | - | 2-C-231 |
| WRR05 | Railroad Owner | - | - | 2-C-231 |
| WRR07 | Railroad Operator | - | - | 2-C-231 |
| WH27 | Bridge List | - | - | 2-C-191 |
| BRR02 | Railroad Minimum Vertical Clearance | B.RR.02 | - | 2-C-233 |
| BRR03 | Railroad Minimum Horizontal Offset | B.RR.03 | - | 2-C-235 |
| BN01 | Navigable Waterway | B.N.01 | - | 2-C-237 |
| BN02 | Navigable Minimum Vertical Clearance | B.N.02 | - | 2-C-238 |
| BN03 | Movable Bridge Maximum Navigation Vertical Clearance | B.N.03 | - | 2-C-251 |
| BN04 | Navigation Channel Width | B.N.04 | - | 2-C-253 |
| BN05 | Navigable Channel Minimum Horizontal Clearance | B.N.05 | - | 2-C-255 |
| BN06 | Substructure Navigable Protection | B.N.06 | - | 2-C-257 |
| **Discontinued as of 2025** | | | | |
| WH24 | NBI Reportable Flag - NBI Disc. | - | - | 2-D-23 |
| 1354 | Lanes Under | - | - | 2-D-24 |
| 1457 | Future ADT | - | - | 2-D-24 |
| 1463 | Future ADT Year | - | - | 2-D-24 |
| 1477 | Linear Sub Route | - | - | 2-D-25 |
| 1484 | Base Highway Network | - | - | 2-D-25 |
| 1486 | Federal Lands Highway - NBI Disc. | - | - | 2-D-25 |
| 1495 | Horizontal Clearance Reverse Route | - | - | 2-D-26 |
| 2412 | Maximum Vertical Clearance Over Deck Override | - | - | 2-D-27 |
| 2436 | Route Sequencer | - | - | 2-D-28 |
| 2437 | Bridge List Override | - | - | 2-D-28 |
| 2438 | Milepost Sequencer | - | - | 2-D-28 |
| **Materials & Types Tab** | | | | |
| 1532 | Main Span Material - NBI Disc. | - | - | 2-D-29 |
| 1533 | Main Span Design - NBI Disc. | - | - | 2-D-29 |
| 1538 | Number of Main Spans - NBI Disc. | - | - | 2-D-30 |
| 1535 | Approach Span Material - NBI Disc. | - | - | 2-D-31 |
| 1536 | Approach Span Design - NBI Disc. | - | - | 2-D-31 |
| 1541 | Number of Approach Spans - NBI Disc. | - | - | 2-D-31 |
| 1546 | Deck type - NBI Disc. | - | - | 2-D-32 |
| 1547 | Wearing Surface - NBI Disc. | - | - | 2-D-32 |
| 1548 | Membrane - NBI Disc. | - | - | 2-D-33 |
| 1549 | Deck Protection - NBI Disc. | - | - | 2-D-33 |
| BSP01 | Superstructure Configuration Designation | B.SP.01 | - | 2-C-259 |
| WSP01 | Superstructure Configuration Code | - | - | 2-C-259 |
| WSP02 | Span Description | - | - | 2-C-260 |
| BSP02 | Number of Spans | B.SP.02 | - | 2-C-260 |
| BSP03 | Number of Beam Lines | B.SP.03 | - | 2-C-263 |
| BSP04 | Span Material | B.SP.04 | - | 2-C-264 |

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| WSBIS Item No. | WSBIS Item Name | SNBI Item No. | SNTI Item No. | Page No. |
|---|---|---|---|---|
| BSP05 | Span Continuity | B.SP.05 | - | 2-C-266 |
| BSP06 | Span Type | B.SP.06 | - | 2-C-267 |
| BSP07 | Span Protective System | B.SP.07 | - | 2-C-269 |
| BSP08 | Deck Interaction | B.SP.08 | - | 2-C-270 |
| BSP09 | Deck Material & Type | B.SP.09 | - | 2-C-272 |
| BSP10 | Wearing Surface | B.SP.10 | - | 2-C-273 |
| BSP11 | Deck Protective System | B.SP.11 | - | 2-C-274 |
| BSP12 | Deck Reinforcing Protective System | B.SP.12 | - | 2-C-275 |
| BSP13 | Deck Stay-In-Place Forms | B.SP.13 | - | 2-C-276 |
| BSB01 | Substructure Configuration Designation | B.SB.01 | - | 2-C-277 |
| WSB01 | Substructure Configuration Code | - | - | 2-C-277 |
| WSB02 | Pier Description | - | - | 2-C-279 |
| BSB02 | Number of Substructure Units | B.SB.02 | - | 2-C-280 |
| BSB03 | Substructure Material | B.SB.03 | - | 2-C-281 |
| BSB04 | Substructure Type | B.SB.04 | - | 2-C-282 |
| BSB05 | Substructure Protective System | B.SB.05 | - | 2-C-284 |
| BSB06 | Foundation Type | B.SB.06 | - | 2-C-285 |
| BSB07 | Foundation Protective System | B.SB.07 | - | 2-C-287 |
| **Roadside Hardware** | | | | |
| BRH01 | Bridge Railings (Crash Test) | B.RH.01 | - | 2-C-290 |
| WRH01 | BRCT Document Year (YYYY) | - | - | 2-C-293 |
| BRH02 | Bridge Railings Transition (Crash Test) | B.RH.02 | - | 2-C-294 |
| WRH02 | BRTCT Document Year (YYYY) | - | - | 2-C-297 |
| **Load Rating Tab** | | | | |
| BLR01 | Design Load | B.LR.01 | - | 2-C-299 |
| BLR02 | Design Method | B.LR.02 | - | 2-C-300 |
| BLR03 | Load Rating Date | B.LR.03 | - | 2-C-301 |
| BLR04 | Load Rating Method | B.LR.04 | L.1 | 2-C-302 |
| BLR05 | Inventory Load Rating Factor | B.LR.05 | L.2 | 2-C-303 |
| BLR06 | Operating Load Rating Factor | B.LR.06 | L.3 | 2-C-304 |
| BLR07 | Controlling Legal Load Rating Factor | B.LR.07 | - | 2-C-304 |
| BLR08 | Routine Permit Loads | B.LR.08 | - | 2-C-305 |
| WLR01 | Reference Inspection Completion Date | - | - | 2-C-306 |
| WLR02 | Rated By | - | - | 2-C-307 |
| WLR09 | Overloads | - | - | 2-C-307 |
| BPS01 | Load Posting Status | B.PS.01 | L.4 | 2-C-308 |
| BPS02 | Posting Status Change Date | B.PS.02 | - | 2-C-309 |
| BEP01 | Legal Load Configuration | B.EP.01 | - | 2-C-309 |
| BEP02 | Legal Load Rating Factor | B.EP.02 | - | 2-C-310 |
| BEP03 | Posting Type | B.EP.03 | L.5, L.6 | 2-C-311 |
| BEP04 | Posting Value | B.EP.04 | L.7, L.8, L.9 | 2-C-312 |
| WEP02 | EV Included | - | - | 2-C-313 |
| WEP03 | Recommended Posting Type | - | - | 2-C-313 |
| WEP04 | Recommended Posting Value | - | - | 2-C-313 |
| **NBI Codes Discontinued** | | | | |
| 1550 | Design Load - NBI Disc. | - | - | 2-D-34 |

| Table 1 - WSBIS Items by Name and Tab Order | | | | |
|---|---|---|---|---|
| **WSBIS Item No.** | **WSBIS Item Name** | **SNBI Item No.** | **SNTI Item No.** | **Page No.** |
| 1293 | Open, Closed or Posted - NBI Disc. | - | - | 2-D-35 |
| 1660 | Operating Level - NBI Disc. | - | - | 2-D-35 |
| 1551 | Operating Rating Method - NBI Disc. | - | - | 2-D-36 |
| 1552 | Operating Rating Tons - NBI Disc. | - | - | 2-D-37 |
| 1554 | Inventory Rating Method - NBI Disc. | - | - | 2-D-36 |
| 1555 | Inventory Rating Tons - NBI Disc. | - | - | 2-D-37 |
| **Load Rating Posting Examples** | | | | |
| - | MUTCD R12-1 | - | - | 2-C-314 |
| - | MUTCD R12-2 | - | - | 2-C-314 |
| - | MUTCD R12-4 | - | - | 2-C-314 |
| - | MUTCD R12-5 | - | - | 2-C-315 |
| - | MUTCD R12-6 | - | - | 2-C-315 |
| - | MUTCD R12-7 | - | - | 2-C-315 |
| - | MUTCD R12-701 | - | - | 2-C-316 |
| - | MUTCD R12-702 | - | - | 2-C-316 |
| - | Single Unit Vehicles (SUV) - Single Configuration | - | - | 2-C-316 |
| - | Single Unit Vehicles (SUV) - Limited Configuration | - | - | 2-C-316 |
| - | Single Unit Vehicles (SUV) - All Configuration | - | - | 2-C-317 |
| **Waterway Tab** | | | | |
| 7832 | Water Type | - | - | 2-C-319 |
| 7833 | Flood Plain Intrusion | - | - | 2-C-319 |
| 7834 | Flood Control | - | - | 2-C-319 |
| 7835 | Scour History | - | - | 2-C-320 |
| 7836 | Streambed Material Type | - | - | 2-C-320 |
| 7837 | Substructure Stability | - | - | 2-C-320 |
| 7838 | Waterway Obstruction | - | - | 2-C-321 |
| 7839 | Streambed Stability | - | - | 2-C-321 |
| 7840 | Streambed Anabranch | - | - | 2-C-321 |
| 7841 | Piers in Water | - | - | 2-C-322 |
| **Discontinued Tab** | | | | |
| 2883 | Prop. Improvement Calculation | - | - | 2-D-39 |
| 1844 | Prop. Improvement Work Type | - | - | 2-D-40 |
| 1846 | Prop. Improvement Work Method | - | - | 2-D-40 |
| 1847 | Prop. Improvement Structure Length | - | - | 2-D-41 |
| 2853 | Prop. Improvement Roadway Width | - | - | 2-D-41 |
| 2860 | Prop. Imp. Cost per S.F. of Deck | - | - | 2-D-41 |
| 1867 | Prop. Imp. Structure Cost | - | - | 2-D-41 |
| 1873 | Prop. Imp. Roadway Cost | - | - | 2-D-41 |
| 2870 | Prop. Imp. Eng. and Misc. Cost | - | - | 2-D-42 |
| 1861 | Prop. Imp. Total Cost | - | - | 2-D-42 |
| 1879 | Prop. Improvement Estimate Year | - | - | 2-D-42 |
| 1022 | Urban Code - SNTI | - | - | 2-D-42 |
| 1188 | Latitude (NBI) | - | - | 2-D-43 |
| 1196 | Longitude (NBI) | - | - | 2-D-43 |
| 1288 | Parallel Structure | - | - | 2-D-43 |
| 1312 | Flared Flag | - | - | 2-D-44 |

| Table 1 - WSBIS Items by Name and Tab Order | | | | |
|---|---|---|---|---|
| **WSBIS Item No.** | **WSBIS Item Name** | **SNBI Item No.** | **SNTI Item No.** | **Page No.** |
| 1352 | Lanes On - NBI | - | - | 2-D-44 |
| 1378 | Vertical Underclearance Code - NBI | - | - | 2-D-44 |
| 1379 | Min Lateral Underclearance Right | - | - | 2-D-45 |
| 1382 | Lateral Underclearance Code | - | - | 2-D-47 |
| 1383 | Min Lateral Underclearance Left | - | - | 2-D-48 |
| 1386 | Navigation Control Code | - | - | 2-D-48 |
| 1387 | Navigation Vert Clearance | - | - | 2-D-49 |
| 1390 | Navigation Horiz Clearance | - | - | 2-D-50 |
| 1394 | Vertical Lift Min Clearance - NBI | - | - | 2-D-50 |
| 1436 | Route Direction | - | - | 2-D-50 |
| 1544 | Service On | - | - | 2-D-51 |
| 1545 | Service Under | - | - | 2-D-51 |
| 1657 | Structural Evaluation | - | - | 2-D-52 |
| 1658 | Deck Geometry | - | - | 2-D-52 |
| 1659 | Underclearances | - | - | 2-D-55 |
| 1684 | Bridge Rails Adequacy | - | - | 2-D-57 |
| 1685 | Bridge Rails Transition Adequacy | - | - | 2-D-59 |
| 1686 | Guardrails | - | - | 2-D-61 |
| 1687 | Terminal | - | - | 2-D-61 |
| 2537 | Alpha Span Type | - | - | 2-D-61 |
| 7710 | Sufficiency Rating | - | - | 2-D-62 |
| 7711 | SD/FO | - | - | 2-D-62 |
| **Auto-Generated Fields** | | | | |
| BL01 | State Code | B.L.01 | I.3 | 2-C-323 |
| I.15-I.18 | Border Tunnel Data | - | I.15-I.18 | 2-C-323 |
| N.1-N.3 | Navigable Waterway Data | - | N.1-N.3 | 2-C-323 |
| BIR01 | NSTM inspection Required | - | - | 2-C-323 |
| BIR03 | Underwater Inspection Required | B.IR.03 | - | 2-C-323 |
| BIR04 | Complex Feature - SNBI | B.IR.04 | - | 2-C-323 |
| BC13 | Lowest Condition Rating Code | B.C.13 | - | 2-C-323 |
| BIE10 | Inspection Data Update Date | B.IE.10 | - | 2-C-323 |

Table 2 - WSBIS Item Numbers in Sequence

| WSBIS Item No. | WSBIS Item Name | WSBIS Application Tab | Page No. |
|---|---|---|---|
| 1019 | Owner - NBI Disc. | Bridge ID Tab | 2-D-42 |
| 1022 | Urban Code - SNTI | Discontinued Tab | 2-D-42 |
| 1188 | Latitude (NBI) | Discontinued Tab | 2-D-49 |
| 1196 | Longitude (NBI) | Discontinued Tab | 2-D-43 |
| 1232 | Features Intersected - NBI Disc. | Bridge ID Tab | 2-D-9 |
| 1256 | Facilities Carried - NBI Disc. | Bridge ID Tab | 2-D-9 |
| 1285 | Toll Code - NBI Disc. | Bridge ID Tab | 2-D-11 |
| 1286 | Custodian - NBI Disc. | Bridge ID Tab | 2-D-10 |
| 1288 | Parallel Structure | Discontinued Tab | 2-D-43 |
| 1289 | Temporary Structure - NBI Disc. | Bridge ID Tab | 2-D-11 |
| 1291 | Median Code - NBI Disc. | Geometry Tab | 2-D-17 |
| 1292 | Historical Significance (NRHP) - NBI Disc. | Bridge ID Tab | 2-D-12 |
| 1293 | Open, Closed or Posted - NBI Disc. | Load Rating Tab | 2-D-35 |
| 1310 | Skew - NBI Disc. | Geometry Tab | 2-D-18 |
| 1312 | Flared Flag | Discontinued Tab | 2-D-44 |
| 1352 | Lanes On - NBI | Discontinued Tab | 2-D-44 |
| 1354 | Lanes Under | Feature Tab | 2-D-24 |
| 1356 | Curb-to-Curb Width - NBI Disc. | Geometry Tab | 2-D-14 |
| 1360 | Out-to-Out Deck Width - NBI Disc. | Geometry Tab | 2-D-16 |
| 1378 | Vertical Underclearance Code - NBI | Discontinued Tab | 2-D-44 |
| 1379 | Min Lateral Underclearance Right | Discontinued Tab | 2-D-45 |
| 1382 | Lateral Underclearance Code | Discontinued Tab | 2-D-47 |
| 1383 | Min Lateral Underclearance Left | Discontinued Tab | 2-D-48 |
| 1386 | Navigation Control Code | Discontinued Tab | 2-D-48 |
| 1387 | Navigation Vert Clearance | Discontinued Tab | 2-D-49 |
| 1390 | Navigation Horiz Clearance | Discontinued Tab | 2-D-50 |
| 1394 | Vertical Lift Min Clearance - NBI | Discontinued Tab | 2-D-50 |
| 1432 | On / Under Code | Feature Tab | 2-C-170 |
| 1433 | Highway Class - NBI Disc. | Feature Tab | 2-D-19 |
| 1434 | Service Level - NBI Disc. | Feature Tab | 2-D-20 |
| 1435 | Route - NBI Disc. | Feature Tab | 2-D-18 |
| 1436 | Route Direction | Discontinued Tab | 2-D-50 |
| 1457 | Future ADT | Feature Tab | 2-D-24 |
| 1463 | Future ADT Year | Feature Tab | 2-D-24 |
| 1477 | Linear Sub Route | Feature Tab | 2-D-25 |
| 1483 | National Highway System (NHS) - NBI Disc. | Feature Tab | 2-D-21 |
| 1484 | Base Highway Network | Feature Tab | 2-D-25 |
| 1485 | STRAHNET Highway - NBI Disc. | Feature Tab | 2-D-21 |
| 1486 | Federal Lands Highway - NBI Disc. | Feature Tab | 2-D-25 |
| 1487 | Functional Classification - NBI Disc. | Feature Tab | 2-D-22 |
| 1489 | National Truck Network (NTN) - NBI Disc. | Feature Tab | 2-D-23 |
| 1490 | Lane Use Direction - NBI Disc. | Feature Tab | 2-D-20 |
| 1495 | Horizontal Clearance Reverse Route | Feature Tab | 2-D-26 |
| 1499 | Max Vertical Clearance Route | Feature Tab | 2-C-217 |
| 1532 | Main Span Material - NBI Disc. | Materials & Types Tab | 2-D-29 |
| 1533 | Main Span Design - NBI Disc. | Materials & Types Tab | 2-D-29 |

Table 2 - WSBIS Item Numbers in Sequence

| WSBIS Item No. | WSBIS Item Name | WSBIS Application Tab | Page No. |
|---|---|---|---|
| 1535 | Approach Span Material - NBI Disc. | Materials & Types Tab | 2-D-31 |
| 1536 | Approach Span Design - NBI Disc. | Materials & Types Tab | 2-D-31 |
| 1538 | Number of Main Spans - NBI Disc. | Materials & Types Tab | 2-D-30 |
| 1541 | Number of Approach Spans - NBI Disc. | Materials & Types Tab | 2-D-31 |
| 1544 | Service On | Discontinued Tab | 2-D-51 |
| 1545 | Service Under | Discontinued Tab | 2-D-51 |
| 1546 | Deck type - NBI Disc. | Materials & Types Tab | 2-D-32 |
| 1547 | Wearing Surface - NBI Disc. | Materials & Types Tab | 2-D-32 |
| 1548 | Membrane - NBI Disc. | Materials & Types Tab | 2-D-33 |
| 1549 | Deck Protection - NBI Disc. | Materials & Types Tab | 2-D-33 |
| 1550 | Design Load - NBI Disc. | Load Rating Tab | 2-D-34 |
| 1551 | Operating Rating Method - NBI Disc. | Load Rating Tab | 2-D-36 |
| 1552 | Operating Rating Tons - NBI Disc. | Load Rating Tab | 2-D-37 |
| 1554 | Inventory Rating Method - NBI Disc. | Load Rating Tab | 2-D-36 |
| 1555 | Inventory Rating Tons - NBI Disc. | Load Rating Tab | 2-D-37 |
| 1588 | Border Bridge Percent - NBI Disc. | Bridge ID Tab | 2-D-13 |
| 1657 | Structural Evaluation | Discontinued Tab | 2-D-52 |
| 1658 | Deck Geometry | Discontinued Tab | 2-D-52 |
| 1659 | Underclearances | Discontinued Tab | 2-D-55 |
| 1660 | Operating Level - NBI Disc. | Load Rating Tab | 2-D-35 |
| 1662 | Waterway - NBI Disc. | SNBI (SNTI) Tab | 2-D-4 |
| 1677 | Channel Protection - NBI Disc. | SNBI (SNTI) Tab | 2-D-1 |
| 1679 | Pier/Abutment Protection - NBI Disc. | SNBI (SNTI) Tab | 2-D-2 |
| 1680 | Scour Critical - NBI Disc. | SNBI (SNTI) Tab | 2-D-3 |
| 1684 | Bridge Rails Adequacy | Discontinued Tab | 2-D-57 |
| 1685 | Bridge Rails Transition Adequacy | Discontinued Tab | 2-D-59 |
| 1686 | Guardrails | Discontinued Tab | 2-D-61 |
| 1687 | Terminal | Discontinued Tab | 2-D-61 |
| 1844 | Prop. Improvement Work Type | Discontinued Tab | 2-D-40 |
| 1846 | Prop. Improvement Work Method | Discontinued Tab | 2-D-40 |
| 1847 | Prop. Improvement Structure Length | Discontinued Tab | 2-D-41 |
| 1861 | Prop. Imp. Total Cost | Discontinued Tab | 2-D-42 |
| 1867 | Prop. Imp. Structure Cost | Discontinued Tab | 2-D-41 |
| 1873 | Prop. Imp. Roadway Cost | Discontinued Tab | 2-D-41 |
| 1879 | Prop. Improvement Estimate Year | Discontinued Tab | 2-D-42 |
| 2000 | Main & Secondary Listing Code | Feature Tab | 2-C-169 |
| 2402 | Crossing Description | Feature Tab | 2-C-172 |
| 2412 | Maximum Vertical Clearance Over Deck Override | Feature Tab | 2-D-27 |
| 2436 | Route Sequencer | Feature Tab | 2-D-28 |
| 2437 | Bridge List Override | Feature Tab | 2-D-28 |
| 2438 | Milepost Sequencer | Feature Tab | 2-D-28 |
| 2440 | Milepost - NBI Disc. | Feature Tab | 2-D-19 |
| 2500 | Min Vertical Clearance Route | Feature Tab | 2-C-217 |
| 2501 | Max Vertical Clearance Reverse | Feature Tab | 2-C-219 |
| 2502 | Min Vertical Clearance Reverse | Feature Tab | 2-C-219 |
| 2537 | Alpha Span Type | Discontinued Tab | 2-D-61 |

Table 2 - WSBIS Item Numbers in Sequence

| WSBIS Item No. | WSBIS Item Name | WSBIS Application Tab | Page No. |
|---|---|---|---|
| 2853 | Prop. Improvement Roadway Width | Discontinued Tab | 2-D-41 |
| 2860 | Prop. Imp. Cost per S.F. of Deck | Discontinued Tab | 2-D-41 |
| 2870 | Prop. Imp. Eng. and Misc. Cost | Discontinued Tab | 2-D-42 |
| 2883 | Prop. Improvement Calculation | Discontinued Tab | 2-D-39 |
| 7281 | Legislative District 1 - Disc. | Bridge ID Tab | 2-D-13 |
| 7283 | Legislative District 2 - Disc. | Bridge ID Tab | 2-D-13 |
| 7296 | Historical Significance - Local Agency - Disc. | Bridge ID Tab | 2-D-13 |
| 7557 | Design Exception Date | Bridge ID Tab | 2-C-115 |
| 7664 | Optional Drain Condition | SNBI (SNTI) Tab | 2-C-88 |
| 7665 | Drain Status - Disc. | SNBI (SNTI) Tab | 2-D-6 |
| 7666 | Deck Scaling - Disc. | SNBI (SNTI) Tab | 2-D-6 |
| 7667 | Deck Scaling Percent - Disc. | SNBI (SNTI) Tab | 2-D-7 |
| 7669 | Deck Rutting - Disc. | SNBI (SNTI) Tab | 2-D-7 |
| 7670 | Deck Exposed Rebar - Disc. | SNBI (SNTI) Tab | 2-D-7 |
| 7672 | Curb Condition - Disc. | SNBI (SNTI) Tab | 2-D-7 |
| 7673 | Sidewalk Condition - Disc. | SNBI (SNTI) Tab | 2-D-8 |
| 7674 | Paint Condition - Disc. | SNBI (SNTI) Tab | 2-D-8 |
| 7681 | Approach Condition - Disc. | SNBI (SNTI) Tab | 2-D-8 |
| 7682 | Optional Retaining Wall Condition | SNBI (SNTI) Tab | 2-C-88 |
| 7683 | Pier Protection Condition - Disc. | SNBI (SNTI) Tab | 2-D-8 |
| 7710 | Sufficiency Rating | Discontinued Tab | 2-D-62 |
| 7711 | SD/FO | Discontinued Tab | 2-D-62 |
| 7832 | Water Type | Waterway Tab | 2-C-319 |
| 7833 | Flood Plain Intrusion | Waterway Tab | 2-C-319 |
| 7834 | Flood Control | Waterway Tab | 2-C-319 |
| 7835 | Scour History | Waterway Tab | 2-C-320 |
| 7836 | Streambed Material Type | Waterway Tab | 2-C-320 |
| 7837 | Substructure Stability | Waterway Tab | 2-C-320 |
| 7838 | Waterway Obstruction | Waterway Tab | 2-C-321 |
| 7839 | Streambed Stability | Waterway Tab | 2-C-321 |
| 7840 | Streambed Anabranch | Waterway Tab | 2-C-321 |
| 7841 | Piers in Water | Waterway Tab | 2-C-322 |
| BAP01 | Approach Roadway Alignment | SNBI (SNTI) Tab | 2-C-77 |
| BAP02 | Overtopping Likelihood | SNBI (SNTI) Tab | 2-C-76 |
| BAP03 | Scour Vulnerability | SNBI (SNTI) Tab | 2-C-73 |
| BAP04 | Scour Plan of Action | SNBI (SNTI) Tab | 2-C-75 |
| BAP05 | Seismic Vulnerability | SNBI (SNTI) Tab | 2-C-78 |
| BC01 | FHWA Deck Overall Condition Rating | SNBI (SNTI) Tab | 2-C-44 |
| BC02 | Superstructure Overall Condition Rating | SNBI (SNTI) Tab | 2-C-54 |
| BC03 | Substructure Overall Condition Rating | SNBI (SNTI) Tab | 2-C-60 |
| BC04 | Culvert Overall Condition Rating | SNBI (SNTI) Tab | 2-C-63 |
| BC05 | Bridge Railings Condition Rating | SNBI (SNTI) Tab | 2-C-48 |
| BC06 | Bridge Railing Transitions Condition Rating | SNBI (SNTI) Tab | 2-C-50 |
| BC07 | Bridge Bearings Condition Rating | SNBI (SNTI) Tab | 2-C-58 |
| BC08 | Bridge Joints Condition Rating | SNBI (SNTI) Tab | 2-C-51 |
| BC09 | Channel Condition Rating | SNBI (SNTI) Tab | 2-C-69 |

Table 2 - WSBIS Item Numbers in Sequence

| WSBIS Item No. | WSBIS Item Name | WSBIS Application Tab | Page No. |
|---|---|---|---|
| BC10 | Channel Protection Condition Rating | SNBI (SNTI) Tab | 2-C-71 |
| BC11 | Scour Condition Rating | SNBI (SNTI) Tab | 2-C-66 |
| BC12 | Overall Bridge Condition Classification | SNBI (SNTI) Tab | 2-C-43 |
| BC13 | Lowest Condition Rating Code | Auto-Generated Fields | 2-C-323 |
| BC14 | NSTM Inspection Condition | SNBI (SNTI) Tab | 2-C-57 |
| BC15 | Underwater Inspection Condition | SNBI (SNTI) Tab | 2-C-62 |
| BCL01 | Owner | Bridge ID Tab | 2-C-97 |
| BCL02 | Maintenance Responsibility | Bridge ID Tab | 2-C-98 |
| BCL03 | Federal or Tribal Land Access | Feature Tab | 2-C-208 |
| BCL04 | Historic Significance (NRHP) | Bridge ID Tab | 2-C-111 |
| BCL05 | Toll | Bridge ID Tab | 2-C-110 |
| BCL06 | Emergency Evacuation Designation | Feature Tab | 2-C-207 |
| BEP01 | Legal Load Configuration | Load Rating Tab | 2-C-309 |
| BEP02 | Legal Load Rating Factor | Load Rating Tab | 2-C-310 |
| BEP03 | Posting Type | Load Rating Tab | 2-C-311 |
| BEP04 | Posting Value | Load Rating Tab | 2-C-312 |
| BF01 | Feature Designation | Feature Tab | 2-C-177 |
| BF02 | Feature Location | Feature Tab | 2-C-178 |
| BF03 | Feature Name | Feature Tab | 2-C-173 |
| BG01 | NBIS Bridge Length | Geometry Tab | 2-C-117 |
| BG02 | Total Structure Length | Geometry Tab | 2-C-120 |
| BG03 | Maximum Span Length | Geometry Tab | 2-C-124 |
| BG04 | Minimum Span Length | Geometry Tab | 2-C-126 |
| BG05 | Structure Width Out-to-Out | Geometry Tab | 2-C-129 |
| BG06 | Structure Width Curb-to-Curb | Geometry Tab | 2-C-135 |
| BG07 | Left Curb or Sidewalk Width | Geometry Tab | 2-C-140 |
| BG08 | Right Curb or Sidewalk Width | Geometry Tab | 2-C-143 |
| BG09 | Approach Roadway Width | Geometry Tab | 2-C-146 |
| BG10 | Bridge Median | Geometry Tab | 2-C-148 |
| BG11 | Skew Angle | Geometry Tab | 2-C-150 |
| BG12 | Curved Bridge | Geometry Tab | 2-C-151 |
| BG13 | Maximum Bridge Height | Geometry Tab | 2-C-154 |
| BG14 | Sidehill Bridge | Geometry Tab | 2-C-156 |
| BG15 | Irregular Deck Area | Geometry Tab | 2-C-157 |
| BG16 | Calculated Deck Area | Geometry Tab | 2-C-157 |
| BH01 | Functional Classification | Feature Tab | 2-C-204 |
| BH02 | Urban Code | Feature Tab | 2-C-205 |
| BH03 | NHS Designation | Feature Tab | 2-C-201 |
| BH04 | National Truck Freight Network (NHFN) | Feature Tab | 2-C-203 |
| BH05 | STRAHNET Designation | Feature Tab | 2-C-202 |
| BH06 | LRS Route ID | Feature Tab | 2-C-193 |
| BH07 | LRS Milepost | Feature Tab | 2-C-194 |
| BH08 | Lanes On Highway | Feature Tab | 2-C-199 |
| BH09 | AADT Count | Feature Tab | 2-C-209 |
| BH10 | AADT Truck Count | Feature Tab | 2-C-210 |
| BH11 | AADT Year | Feature Tab | 2-C-209 |

Table 2 - WSBIS Item Numbers in Sequence

| WSBIS Item No. | WSBIS Item Name | WSBIS Application Tab | Page No. |
|---|---|---|---|
| BH12 | Highway Maximum Usable Vertical Clearance | Feature Tab | 2-C-213 |
| BH13 | Highway Minimum Vertical Clearance | Feature Tab | 2-C-215 |
| BH14 | Highway Minimum Horizontal Clearance, Left | Feature Tab | 2-C-220 |
| BH15 | Highway Minimum Horizontal Clearance, Right | Feature Tab | 2-C-223 |
| BH16 | Highway Maximum Useable Surface Width | Feature Tab | 2-C-226 |
| BH17 | Bypass Detour Length | Feature Tab | 2-C-211 |
| BH18 | Crossing Structure ID | Feature Tab | 2-C-184 |
| BID01 | Structure ID | Bridge ID Tab | 2-C-91 |
| BID02 | Structure Name | Bridge ID Tab | 2-C-96 |
| BID03 | Previous Structure ID | Bridge ID Tab | 2-C-92 |
| BIE01 | Report Types and Report Subtypes | Report Types Tab | 2-C-25 |
| BIE02 | Inspection Begin Date | Report Types Tab | 2-C-32 |
| BIE03 | Inspection Completion Date | Report Types Tab | 2-C-33 |
| BIE04 | Nationally Certified Bridge/Tunnel Inspector | Report Types Tab | 2-C-37 |
| BIE05 | Inspection Interval | Report Types Tab | 2-C-31 |
| BIE06 | Inspection Due Date | Report Types Tab | 2-C-34 |
| BIE07 | Risk-Based Inspection Interval Method | Report Types Tab | 2-C-36 |
| BIE08 | Inspection Quality Control Date | Report Types Tab | 2-C-40 |
| BIE09 | Inspection Quality Assurance Date | SNBI (SNTI) Tab | 2-C-82 |
| BIE10 | Inspection Data Update Date | Auto-Generated Fields | 2-C-323 |
| BIE11 | Report Type Notes | Report Types Tab | 2-C-35 |
| BIE12 | Inspection Equipment (Summer 2025) | Report Types Tab | 2-C-40 |
| BIR01 | NSTM inspection Required | Auto-Generated Fields | 2-C-323 |
| BIR02 | Fatigue Details | SNBI (SNTI) Tab | 2-C-78 |
| BIR03 | Underwater Inspection Required | Auto-Generated Fields | 2-C-323 |
| BIR04 | Complex Feature - SNBI | Auto-Generated Fields | 2-C-323 |
| BL01 | State Code | Auto-Generated Fields | 2-C-323 |
| BL02 | County Code | Bridge ID Tab | 2-C-100 |
| BL03 | Place Code | Bridge ID Tab | 2-C-101 |
| BL04 | Highway Agency District | Bridge ID Tab | 2-C-107 |
| BL05 | Latitude | Feature Tab | 2-C-180 |
| BL06 | Longitude | Feature Tab | 2-C-181 |
| BL07 | Border Structure ID | Bridge ID Tab | 2-C-113 |
| BL08 | Border State or Country Code | Bridge ID Tab | 2-C-114 |
| BL09 | Border Bridge Inspection Responsibility | Bridge ID Tab | 2-C-114 |
| BL10 | Border Bridge Designated Lead State | Bridge ID Tab | 2-C-115 |
| BL11 | Structure Location | Feature Tab | 2-C-174 |
| BL12 | Metropolitan Planning Organization | Bridge ID Tab | 2-C-108 |
| BLR01 | Design Load | Load Rating Tab | 2-C-299 |
| BLR02 | Design Method | Load Rating Tab | 2-C-300 |
| BLR03 | Load Rating Date | Load Rating Tab | 2-C-301 |
| BLR04 | Load Rating Method | Load Rating Tab | 2-C-302 |
| BLR05 | Inventory Load Rating Factor | Load Rating Tab | 2-C-303 |
| BLR06 | Operating Load Rating Factor | Load Rating Tab | 2-C-304 |
| BLR07 | Controlling Legal Load Rating Factor | Load Rating Tab | 2-C-304 |
| BLR08 | Routine Permit Loads | Load Rating Tab | 2-C-305 |

Table 2 - WSBIS Item Numbers in Sequence

| WSBIS Item No. | WSBIS Item Name | WSBIS Application Tab | Page No. |
|---|---|---|---|
| BN01 | Navigable Waterway | Feature Tab | 2-C-237 |
| BN02 | Navigable Minimum Vertical Clearance | Feature Tab | 2-C-238 |
| BN03 | Movable Bridge Maximum Navigation Vertical Clearance | Feature Tab | 2-C-251 |
| BN04 | Navigation Channel Width | Feature Tab | 2-C-253 |
| BN05 | Navigable Channel Minimum Horizontal Clearance | Feature Tab | 2-C-255 |
| BN06 | Substructure Navigable Protection | Feature Tab | 2-C-257 |
| BPS01 | Load Posting Status | Load Rating Tab | 2-C-308 |
| BPS02 | Posting Status Change Date | Load Rating Tab | 2-C-309 |
| BRH01 | Bridge Railings (Crash Test) | Materials & Types Tab | 2-C-290 |
| BRH02 | Bridge Railings Transition (Crash Test) | Materials & Types Tab | 2-C-294 |
| BRR01 | Railroad Service Type | Feature Tab | 2-C-228 |
| BRR02 | Railroad Minimum Vertical Clearance | Feature Tab | 2-C-233 |
| BRR03 | Railroad Minimum Horizontal Offset | Feature Tab | 2-C-235 |
| BRT01 | Route Grid: Route Designation | Feature Tab | 2-C-186 |
| BRT02 | Route Grid: Route Number | Feature Tab | 2-C-187 |
| BRT03 | Route Grid: Route Direction | Feature Tab | 2-C-189 |
| BRT04 | Route Grid: Route Type | Feature Tab | 2-C-190 |
| BRT05 | Route Grid: Service Type | Feature Tab | 2-C-192 |
| BSB01 | Substructure Configuration Designation | Materials & Types Tab | 2-C-277 |
| BSB02 | Number of Substructure Units | Materials & Types Tab | 2-C-280 |
| BSB03 | Substructure Material | Materials & Types Tab | 2-C-281 |
| BSB04 | Substructure Type | Materials & Types Tab | 2-C-282 |
| BSB05 | Substructure Protective System | Materials & Types Tab | 2-C-284 |
| BSB06 | Foundation Type | Materials & Types Tab | 2-C-285 |
| BSB07 | Foundation Protective System | Materials & Types Tab | 2-C-287 |
| BSP01 | Superstructure Configuration Designation | Materials & Types Tab | 2-C-259 |
| BSP02 | Number of Spans | Materials & Types Tab | 2-C-260 |
| BSP03 | Number of Beam Lines | Materials & Types Tab | 2-C-263 |
| BSP04 | Span Material | Materials & Types Tab | 2-C-264 |
| BSP05 | Span Continuity | Materials & Types Tab | 2-C-266 |
| BSP06 | Span Type | Materials & Types Tab | 2-C-267 |
| BSP07 | Span Protective System | Materials & Types Tab | 2-C-269 |
| BSP08 | Deck Interaction | Materials & Types Tab | 2-C-270 |
| BSP09 | Deck Material & Type | Materials & Types Tab | 2-C-272 |
| BSP10 | Wearing Surface | Materials & Types Tab | 2-C-273 |
| BSP11 | Deck Protective System | Materials & Types Tab | 2-C-274 |
| BSP12 | Deck Reinforcing Protective System | Materials & Types Tab | 2-C-275 |
| BSP13 | Deck Stay-In-Place Forms | Materials & Types Tab | 2-C-276 |
| BW01 | Year Built | SNBI (SNTI) Tab | 2-C-85 |
| BW02 | Year Work Performed (Summer 2025) | SNBI (SNTI) Tab | 2-C-87 |
| BW03 | Work Performed (Summer 2025) | SNBI (SNTI) Tab | 2-C-87 |
| I.15-I.18 | Border Tunnel Data | Auto-Generated Fields | 2-C-323 |
| N.1-N.3 | Navigable Waterway Data | Auto-Generated Fields | 2-C-323 |
| Override | Inspection Due Date Override | Report Types Tab | 2-C-34 |
| TA2 | Year Rebuilt - SNTI | SNBI (SNTI) Tab | 2-C-86 |
| TA3 | Total Number of Lanes - SNTI | Feature Tab | 2-C-200 |

Table 2 - WSBIS Item Numbers in Sequence

| WSBIS Item No. | WSBIS Item Name | WSBIS Application Tab | Page No. |
|---|---|---|---|
| TA8 | Service in Tunnel - SNTI | Geometry Tab | 2-C-161 |
| TC3 | Direction of Traffic - SNTI | Feature Tab | 2-C-200 |
| TD1 | Target Inspection Date - SNTI | Report Types Tab | 2-C-35 |
| TG2 | Minimum Vertical Clearance Over Tunnel Roadway - SNTI | Geometry Tab | 2-C-162 |
| TL10 | Height Restrictions - SNTI | Geometry Tab | 2-C-166 |
| TL11 | Hazardous Material Restriction - SNTI | Geometry Tab | 2-C-167 |
| TL12 | Other Restrictions - SNTI | Geometry Tab | 2-C-167 |
| TS1 | Number of Bores - SNTI | Geometry Tab | 2-C-163 |
| TS2 | Tunnel Shape - SNTI | Geometry Tab | 2-C-164 |
| TS3 | Portal Shape - SNTI | Geometry Tab | 2-C-165 |
| TS4 | Ground Conditions - SNTI | Geometry Tab | 2-C-165 |
| TS5 | Complex Tunnel - SNTI | Geometry Tab | 2-C-166 |
| WA09 | Speed Limit | Feature Tab | 2-C-198 |
| WC01 | WSDOT Deck Overall Condition Rating | SNBI (SNTI) Tab | 2-C-47 |
| WCF01 | Critical Finding Number | Critical Findings Tab | CH6 |
| WCF02 | Type of Critical Finding | Critical Findings Tab | CH6 |
| WCF03 | Entry Type | Critical Findings Tab | CH6 |
| WCF04 | Date of Finding or Entry Date | Critical Findings Tab | CH6 |
| WCF05 | Bridge Status | Critical Findings Tab | CH6 |
| WCF06 | Estimated Resolution Date | Critical Findings Tab | CH6 |
| WCF07 | Description | Critical Findings Tab | CH6 |
| WCF08 | Reported By | Critical Findings Tab | CH6 |
| WCF09 | Associated Repair | Critical Findings Tab | CH6 |
| WCL04 | Historical Significance - HAER | Bridge ID Tab | 2-C-112 |
| WEP02 | EV Included | Load Rating Tab | 2-C-313 |
| WEP03 | Recommended Posting Type | Load Rating Tab | 2-C-313 |
| WEP04 | Recommended Posting Value | Load Rating Tab | 2-C-313 |
| WF01 | Feature Type | Feature Tab | 2-C-175 |
| WF02 | Crossing Manager | Feature Tab | 2-C-179 |
| WH06 | LRS Date | Feature Tab | 2-C-198 |
| WH07 | LRS Milepost End | Feature Tab | 2-C-194 |
| WH10 | AADT Truck Percent | Feature Tab | 2-C-210 |
| WH12 | Minimum Vertical Clearance Over Deck | Geometry Tab | 2-C-158 |
| WH13 | Minimum Vertical Clearance Under Bridge | Geometry Tab | 2-C-159 |
| WH19 | LRS ARM | Feature Tab | 2-C-197 |
| WH20 | LRS ARM End | Feature Tab | 2-C-197 |
| WH21 | LRS Ahead/Back Indicator | Feature Tab | 2-C-196 |
| WH22 | LRS Ahead/Back Indicator End | Feature Tab | 2-C-196 |
| WH23 | LRS Directional Indicator | Feature Tab | 2-C-195 |
| WH24 | NBI Reportable Flag - NBI Disc. | Feature Tab | 2-D-23 |
| WH25 | SNBI Reportable Flag | Feature Tab | 2-C-182 |
| WH26 | SNTI Reportable Flag | Feature Tab | 2-C-183 |
| WH27 | Bridge List Flag | Feature Tab | 2-C-183 |
| WID01 | Structure Type | Bridge ID Tab | 2-C-92 |
| WID02 | Structure Number | Bridge ID Tab | 2-C-93 |
| WID03 | Structure Sort Number | Bridge ID Tab | 2-C-95 |

Table 2 - WSBIS Item Numbers in Sequence

| WSBIS Item No. | WSBIS Item Name | WSBIS Application Tab | Page No. |
|---|---|---|---|
| WID04 | Special Structure Flag | Bridge ID Tab | 2-C-113 |
| WID05 | Obsolete Structure Flag | Bridge ID Tab | 2-C-115 |
| WID06 | Program Manager | Bridge ID Tab | 2-C-96 |
| WIE05 | Co-Inspector Initials | Report Types Tab | 2-C-37 |
| WIE07 | Inspection Hours | Report Types Tab | 2-C-38 |
| WIE08 | Inspection Overtime Hours | Report Types Tab | 2-C-38 |
| WIE10 | Late Inspection Explanation - PM Oversight | Report Types Tab | 2-C-39 |
| WIE11 | Late Inspection - PM Response Date | Report Types Tab | 2-C-39 |
| WIE12 | Late Inspection - PM Approval | Report Types Tab | 2-C-39 |
| WIE20 | Soundings Flag | SNBI (SNTI) Tab | 2-C-82 |
| WIE21 | Clearance Flag | SNBI (SNTI) Tab | 2-C-83 |
| WIE22 | Revise Rating Flag | SNBI (SNTI) Tab | 2-C-83 |
| WIE23 | Photos Flag | SNBI (SNTI) Tab | 2-C-84 |
| WIE24 | QA Flag | SNBI (SNTI) Tab | 2-C-85 |
| WIE25 | Roadside Hardware Flag | SNBI (SNTI) Tab | 2-C-84 |
| WIE30 | Asphalt Depth | SNBI (SNTI) Tab | 2-C-79 |
| WIE31 | Design Curb Height | SNBI (SNTI) Tab | 2-C-80 |
| WIE32 | Bridge Vehicle Rail Height | SNBI (SNTI) Tab | 2-C-80 |
| WIE33 | Number of Utilities | SNBI (SNTI) Tab | 2-C-80 |
| WIE34 | Subject to NBIS Flag | SNBI (SNTI) Tab | 2-C-81 |
| WL05 | City | Bridge ID Tab | 2-C-101 |
| WL06 | Section | Bridge ID Tab | 2-C-109 |
| WL07 | Township | Bridge ID Tab | 2-C-109 |
| WL08 | Range | Bridge ID Tab | 2-C-109 |
| WL09 | Local Agency Routing Map (Button) | Feature Tab | 2-C-182 |
| WLR01 | Reference Inspection Completion Date | Load Rating Tab | 2-C-306 |
| WLR02 | Rated By | Load Rating Tab | 2-C-307 |
| WLR09 | Overloads | Load Rating Tab | 2-C-307 |
| WRH01 | BRCT Document Year (YYYY) | Materials & Types Tab | 2-C-293 |
| WRH02 | BRTCT Document Year (YYYY) | Materials & Types Tab | 2-C-297 |
| WRR04 | Railroad Crossing SID | Feature Tab | 2-C-230 |
| WRR05 | Railroad Owner | Feature Tab | 2-C-231 |
| WRR06 | Railroad Milepost | Feature Tab | 2-C-231 |
| WRR07 | Railroad Operator | Feature Tab | 2-C-231 |
| WRT01 | Route Grid: Route Description | Feature Tab | 2-C-187 |
| WRT02 | Route Grid: Route Milepost | Feature Tab | 2-C-188 |
| WSB01 | Substructure Configuration Code | Materials & Types Tab | 2-C-277 |
| WSB02 | Pier Description | Materials & Types Tab | 2-C-279 |
| WSP01 | Superstructure Configuration Code | Materials & Types Tab | 2-C-259 |
| WSP02 | Span Description | Materials & Types Tab | 2-C-260 |
| - | MUTCD R12-1 | Load Rating Posting Examples | 2-C-314 |
| - | MUTCD R12-2 | Load Rating Posting Examples | 2-C-314 |
| - | MUTCD R12-4 | Load Rating Posting Examples | 2-C-314 |
| - | MUTCD R12-5 | Load Rating Posting Examples | 2-C-315 |
| - | MUTCD R12-6 | Load Rating Posting Examples | 2-C-315 |
| - | MUTCD R12-7 | Load Rating Posting Examples | 2-C-315 |

Table 2 - WSBIS Item Numbers in Sequence

| WSBIS Item No. | WSBIS Item Name | WSBIS Application Tab | Page No. |
|---|---|---|---|
| - | MUTCD R12-701 | Load Rating Posting Examples | 2-C-316 |
| - | MUTCD R12-702 | Load Rating Posting Examples | 2-C-316 |
| - | Single Unit Vehicles (SUV) - Single Configuration | Load Rating Posting Examples | 2-C-316 |
| - | Single Unit Vehicles (SUV) - Limited Configuration | Load Rating Posting Examples | 2-C-316 |
| - | Single Unit Vehicles (SUV) - All Configuration | Load Rating Posting Examples | 2-C-317 |

# Coding Guide Instructions

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

This coding guide also identifies data fields that are reported to the SNBI and SNTI with any discontinued NBI Items found in Appendix 2-D.

Some WSBIS field definitions vary from the SNBI or SNTI, and are automatically translated when submitted to FHWA. This coding guide attempts to identify all translated fields.

I. **Item Format**

Item formats have been migrated to the standard SNBI format, with some modifications. This new format will be used for fields that are either retained, added, or modified for reporting to the SNBI and SNTI.

The modified SNBI Header format includes the 4-5 digit item number and item name for both WSDOT (WSBIS) and SNBI/SNTI. The **WSBIS Item ID** leading digit has the following significance:

- Item numbers with a leading B are reported to FHWA, always to SNBI and sometimes to the SNTI
- Item numbers with a leading T are reported to FHWA, to the SNTI only
- Item numbers with a leading W are not reported to FHWA and are WSDOT use only
- Item numbers with a  leading number are not reported to the FHWA and are either local agency use or to be discontinued for NBI

| **Section Name** *(Old Item #### or Other Identifier)* | | | | | |
|---|---|---|---|---|---|
| **Format** | **SNBI Format** | **Frequency** | **WSBIS Item ID** | **SNBI Item ID** | **SNTI Item ID** |
| | | | | | |
| **Applicable Structure Types** | | | | | |
| | | | | | |
| **Specification** | | | **Commentary** | | |
| Requirements for reporting the data item. | | | Expanded guidance on the specification. | | |
| | | | | | |
| **Specification Continued, Commentary Continued, or Exampes** | | | | | |
| Additional space for Specification or Commentary, if needed. Examples are presented to further clarify the specification. Each item typically has brief examples. A more comprehensive example can be found at the end of each section or subsection. | | | | | |

The **SNBI/SNTI Format** box identifies the data type and size requirement for the Specifications for the National Bridge Inventory (aka the SNBI coding guide) or the Specifications for the National Tunnel Inventory (aka the SNTI coding guide).

The **Format** box identifies the data type and size limitations for data entry into BridgeWorks, using the following codes:

| | |
|---|---|
| N(x,y) | Numeric, with x identifying the total number of characters and y identifying the number of decimal places. This data format requires a decimal place and only allows numbers. For example N(4,1) would allow a number of 0.0 through 999.9. |
| AN(x) | Alphanumeric, with x identifying the total number of characters. This data format allows virtually any character to be placed in this field, either letters, numbers, dashes, spaces, etc. |
| Pulldown | Populated by using a pulldown menu of pre-selected options. |
| Date | Populated with a pop-up calendar or user data entry in mm/dd/yyyy format |
| Check Box | Clicking on the box adds a check mark, activating feature in BridgeWorks |
| Calculated | A calculated field, no direct data entry by user. |
| Integer | These fields are populated only by whole numbers, no decimals allowed. |

II. **Structure Types**

WSBIS currently maintains records for 4 structure types:

Type 1 - Bridges and culverts carrying public roadways

Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways

Type 3 - Tunnels carrying roadways within

Type 4 - Structures that do not carry or cross over/under a public roadway

See "Structure Type" Item WID01 for more details.

III. **Establishing the Inventory Record**

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

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

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

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

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

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

IV. **Reestablishing the Inventory Record**

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

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

V. **Updating the Inventory**

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

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

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

1. Review the data displayed in the BridgeWorks forms (tabs). All of the forms except BMS, Notes, Repairs, Photos, Files, and Letters are arranged with two data fields after the field name. The left side data field will display existing information. The right side data field is for entering update information.
2. Enter new coding values in each Data Entry Field that must be updated. Make sure your entry is complete. Pressing F9 on your keyboard or clicking the "Inspector Data Check" icon on the Control Data menu will run a limited data check process for the selected Control Data (CD). Pressing F11 or clicking the "In-Depth Data Check" icon will run a full data check process. BridgeWorks will then provide you with a list of errors or will let you know that no errors were found. This process can be run on UCD's or MCD's.

- If you are entering new data, simply enter the appropriate values in the field.
- If you are making a change to existing data, the entire field must be re coded. For example, if the name shown in Item 1232 - Features Intersected, has been misspelled, the entire name must be reentered, not just one or two letters corrected.
- If you want to blank out an entire field, type an asterisk (*) in the update field. The existing data contained in that field will be erased and the field will be blank after the record is processed. Some fields cannot be blank, in which case the asterisk will not be processed.

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

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

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

   Any errors found will be noted and returned to the bridge owner or Team Leader for corrections. Once the corrections are made, the UCD is again submitted for review. Once the Inventory Engineer is satisfied with the correctness of the UCD it is released to the Bridge Inventory. At this point, the UCD becomes an MCD and can no longer be changed. An MCD is a permanent part of the bridge record history and further changes must be made through the UCD process.
5. After release for digital signature, the inspectors will be notified by email to review and digitally sign the inspection report. Once signed, the completed inspection report will be available in the Records tab, Inspection Report subtab. Printout is optional for agency records. For the rare occasion when wet signatures are required, the Bridge Inspection Report and the WSBIS Bridge Inventory Report are printed (all relevant files included). The final validation of the inspection report is completed when the Bridge Inspection Team members sign the report. The report is then added to the inspection history in the official bridge file and the previous WSBIS Inventory Report is replaced with the current report.

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

## VI. Deleting/Transferring the Inventory Record

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

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

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

To obsolete the inventory record of a local agency structure, the bridge owner should send an email listing the control data for each bridge to be deleted to either the WSDOT Local Agency Bridge Engineer or the Local Agency Bridge Inventory Engineer. This email shall include the Structure Identification Number and Bridge Name along with instructions that the record is to be deleted. The Local Agency Bridge Engineer will request that the record be obsoleted under the procedures defined in Chapter 2 Section 2-3.3.

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

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

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

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

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

## Report Types Tab

| Report Types and Report Subtypes | | | | | |
|---|---|---|---|---|---|
| **Format**<br>Checkbox/ Pulldown | **SNBI Format**<br>AN(1) | **Frequency**<br>EI | **WSBIS Item ID**<br>BIE01 | **SNBI Item ID**<br>B.IE.01 | **SNTI Item ID**<br>D.2, D.4, D.5, D.6 |

**Applicable Structures**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Every structure in WSBIS must include at least one core report type and may also include additional supplemental report types as listed in Tables BIE01a, b and c below. For more detailed information on these report types, refer to WSBIM Chapter 3.<br><br>For Damage and Complex Feature supplemental report types, subtypes must also be coded as shown in Table BIE01a.<br><br>WSBIS report types are translated for SNBI and SNTI submittals as indicated in Table BIE01a.<br><br>Digital signature, lead inspector certification, and interval requirements are outlined in Table BIE01a. | **Editing Report Types**. A check is required in the Include in Report box on at least one Report Type every time you create an update. This check mark is reflected to the right of the Report Type label as a Green Check Mark indicating that this Report Type is the focus of the current update. Other Report Types not checked are not the current focus but should not be removed from the update in order to retain the continuity of the Structure record except under specific circumstances described below.<br><br>**Adding and Removing Report Types**. Under most circumstances the assigned report type(s) never change for the life of the structure. Occasionally users may need to add or remove a report type based on changed circumstances or simply to update the record with information not collected as part of a field inspection. Report types are added and removed using the "Select Report Types button in the lower right corner of the input form. Users must clearly understand how inspection reports should be used before modifying the report types associated with a structure. Please refer to Tables BIE01a through c and Chapter 3 for more information. |

Table BIE01a summarizes all the Report Types and Inspection Types, and how these fields relate to the SNBI and SNTI.

**Table BIE01a - Report Types and Subtypes**

| WSBIS Report Type | SNBI Inspection Type | SNTI Report Type | Subtype Code | WSBIS Report Subtype | Digital Signature | Cert Required | Interval |
|---|---|---|---|---|---|---|---|
| Initial[1] | 1-Initial | - | - | - | Yes | Yes | No |
| Routine (Disc) | - | - | - | - | - | - | - |
| Routine Bridge[1] | 2-Routine | - | - | - | Yes | Yes | Yes |
| Routine Tunnel[1] | - | Routine | - | - | Yes | Yes | Yes |
| Short Span | - | - | - | - | Yes | No | Yes |
| Condition | - | - | - | - | Yes | No | Yes |
| NSTM[1] | 4-NSTM | - | - | - | Yes | Yes | Yes |
| Underwater[1] | 3-Underwater | - | - | - | No | Yes | Yes |
| Damage | 5-Damage | Damage | A | Scour | Yes | Yes | No |
| | | | B | Flood | Yes | Yes | No |
| | | | C | Collision (Bridge Hit/Impact) | Yes | Yes | No |
| | | | D | Overload | Yes | Yes | No |
| | | | E | Fire | Yes | Yes | No |
| | | | G | Earthquake | Yes | Yes | No |
| | | | H | Fatigue | Yes | Yes | No |
| | | | I | Deterioration | Yes | Yes | No |
| | | | M | Erosion | Yes | Yes | No |
| | | | N | Unknown | Yes | Yes | No |
| | | | O | Other | Yes | Yes | No |
| | | | P | Bridge Rail | Yes | Yes | No |
| | | | S | Reported by Others (Bridge Hit/Impact | Yes | Yes | No |
| | | | T | Reported by Others - Fire | No[3] | No | No |
| | | | V | Reported by Others - Other Misc. | No[3] | No | No |
| Special Feature[1] (Disc) | - | - | Not shown | | Yes | Yes | Yes |

**Table BIE01a - Report Types and Subtypes**

| WSBIS Report Type | SNBI Inspection Type | SNTI Report Type | Subtype Code | WSBIS Report Subtype | Digital Signature | Cert Required | Interval |
|---|---|---|---|---|---|---|---|
| Complex Feature[1] | 6-In Depth | In Depth | 1 | Movable | Yes | Yes | Yes |
| | - | - | 2 | Floating | Yes | Yes | Yes |
| | | | 3 | Suspension | Yes | Yes | Yes |
| | | | 4 | Redundant Pin and Hanger | Yes | Yes | Yes |
| | | | 5 | Segmental | Yes | Yes | Yes |
| | | | 6 | Ferry Terminal | Yes | Yes | Yes |
| | | | 7 | High Strength Steel | Yes | Yes | Yes |
| - | - | - | 8 | Structure with Temporary Support | Yes | Yes | Yes |
| | | | 9 | Cable Stayed | Yes | Yes | Yes |
| | | | 0 | Other | Yes | Yes | Yes |
| In-Depth | 7-Special | Special | - | - | Yes | Yes | No |
| Interim | 7-Special | Special | - | - | Yes | Yes | Yes |
| UW Interim | 7-Special | Special | - | - | No | Yes | Yes |
| Primary Safety (Disc) | - | - | - | - | - | - | - |
| WSDOT Safety | - | - | - | - | Yes | No | Yes |
| Secondary Safety (Disc) | - | - | - | - | - | - | - |
| Local Agency Safety | - | - | - | - | Yes | No | Yes |
| Routine Mechanical[2] | - | - | - | - | No | Yes | Yes |
| Routine Electrical[2] | - | - | - | - | No | Yes | Yes |
| Geometric | - | - | - | - | No[3] | No | Yes |
| Inventory | - | - | - | - | No | No | No |
| Feature (Disc) | - | - | - | - | No | No | No |
| Equipment (Disc) | - | - | - | - | No[3] | No | Yes |
| 2 Man UBIT (Disc) | - | - | - | - | No[3] | No | Yes |
| Informational | - | - | - | - | No[3] | No | No |

**Table BIE01a - Report Types and Subtypes**

| WSBIS Report Type | SNBI Inspection Type | SNTI Report Type | Subtype Code | WSBIS Report Subtype | Digital Signature | Cert Required | Interval |
|---|---|---|---|---|---|---|---|
| Signed Informational | - | - | - | - | Yes | Yes | No |
| Scour Monitoring | 9-Scour Monitoring | - | - | - | No[3] | No | No |

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, WSDOT/Local Agency Safety or Condition report types). Refer to Chapter 3 for more detailed descriptions of report types.
2. Mechanical and Electrical report types created automatically by the Complex Structures system.
3. Digital signatures not normally used for these report types, but if associated with another report type that does use digital signature, all report types will be digitally signed.

Table BIE01b identifies seven "core" report types. Every structure in WSBIS must have one of these report types, and except when structures have multi-agency inspections, only one of these core reports should be associated with each structure. Their usage is summarized in this table but more detailed guidance is provided in Chapter 3.

**Table BIE01b - Core Report Types**

| Report Type | Structure Characteristics | Typical Examples |
|---|---|---|
| Initial | Structures subject to the NBIS | Highway bridges over 20 feet long receiving their first inspection after construction or significant rebuild. |
| Routine Bridge | Structures subject to the NBIS | Highway bridges over 20 feet long that do not need an Inital inspection. |
| Routine Tunnel | Structures subject to the NTIS | Tunnels carrying highways within |
| Short Span | Structures not subject to the NBIS or NTIS and carry public roadways | Highway bridges 20 feet or less in length |
| Condition | Structures not subject to the NBIS or NTIS and don't carry public roadways | Pedestrian bridges based on owner defined need |
| WSDOT Safety | Structure has a state highway undercrossing and is not owned/ maintained by WSDOT | Railroad bridges over state highway OR multi-agency inspection responsibility1 |
| Local Agency Safety | Structure has a local agency highway undercrossing and is not owned/ maintained by the local agency. | Railroad bridges over local agency highway OR multi-agency inspection responsibility1 |

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

Table BIE01c identifies supplemental report types that can be added to a structure record in addition to one of the core report types. Their usage is summarized in this table but more detailed guidance is provided in Chapter 3.

**Table BIE01c - Supplemental Report Types**

| Supplemental Report Type | Associated Core Report Type | Structure Characteristics | Typical Examples |
|---|---|---|---|
| NSTM | Routine Bridge | Use for bridges subject to the NBIS with non-redundant steel tension members (NSTM). | Steel Truss bridges. |
| Underwater | Routine Bridge | Use for bridges subject to the NBIS when piers or abutments are permanently underwater exceeding wading depths. | Bridges with foundations in deep water. |
| Special Feature (Disc) | Routine | Discontinued in 2024, replaced by Complex Feature | Suspension bridges, pin & hanger components |
| Complex Feature | Routine Bridge | Use for bridges subject to the NBIS with complex features. | Suspension bridges, pin & hanger components. |
| Damage | Any | Use when structure has sustained damage from a specific event, as opposed to environmental degradation or wear. | Earthquakes, floods, vehicle hits affecting bridges or tunnels. |
| In-Depth | Any | Use when a structure needs a one-time targeted inspection for any reason. | Preparing a detailed condition assessment for a repair or rehabilitation contract. |
| Interim | Routine Bridge/ Tunnel, Condition | Use when some structure components need more frequent inspection. Dovetail inspection date and frequency with associated report type. | Monitoring of localized deficiencies such as decayed timber, cracked steel components, structural movement, or scour accessible by wading. |
| UW Interim | Underwater | Use when some underwater structure components need more frequent inspections. Dovetail inspection date and frequency with Underwater report type. | Monitoring of localized deficiencies in underwater components such as decay, structural damage, or scour not accessible by wading. |
| Routine Mechanical | Routine Bridge/ Tunnel | Generated automatically when a mechanical inspection report is completed in the Complex Structures system. | Tunnels and movable bridges with mechanical components. |
| Routine Electrical | Routine Bridge/ Tunnel | Generated automatically when a electrical inspection report is completed in the Complex Structures system. | Tunnels and movable bridges with electrical components. |
| Geometric | Any | Use to document collection of vertical and horizontal clearance data | Bridges with highway and/or railroad undercrossings; through trusses or arches with superstructure over the deck. |

**Table BIE01c - Supplemental Report Types**

| Supplemental Report Type | Associated Core Report Type | Structure Characteristics | Typical Examples |
|---|---|---|---|
| Inventory | Any | Use when creating a new structure record or when an existing structure is significantly modified. | Adding a new structure to the inventory. Whenever a bridge is rehabilitated, widened, seismically retrofitted, or otherwise significantly modified. |
| Feature (Disc) | Any | Discontinued in 2024. | - |
| Primary Safety | - | Discontinued in 2024. Replaced by WSDOT Safety | - |
| Equipment (Disc) | - | Discontinued in 2024. Use Inspection Resources in appropriate inspection report type. | - |
| 2 Man UBIT (Disc) | - | Discontinued in 2024. Use Inspection Resources in appropriate inspection report type. | - |
| Informational | Any | Use to update a structure record with information not generally collected during a field inspection. | Updating route data, including ADT, functional classification, and NHS designation. Also used for ownership transfers and obsoleting structures. |
| Signed Informational | Any | Use to update a structure record with information normally collected during a field inspection. | Updating mistakes in a field inspection, generally done by that inspector. Updating condition information based on completed contracts (deck rehabs, etc) |
| Scour Monitoring | Any | Use to update a structure record with information from Scour POA monitoring during a triggering flood events. | When scour POA's are activated, use to record findings from POA monitoring work. Expect one report for each POA event. |

## Inspection Interval

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,0) | N(2,0) | EI | BIE05 | B.IE.05 | D.3 |

**Applicable Structures**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| For report types with intervals as noted in Table BIE01a, code the planned interval in months between the current and next scheduled inspection.<br><br>Code 0 for report types without intervals as noted in Table BIE01a. | The intent of this item is to report the planned interval at which the bridge is to be inspected per the NBIS and agency policies and procedures.<br><br>This interval should be evaluated after each inspection, and adjusted as necessary based on the Risk-Based Inspection Interval BIE07. When the intent is to simply adjust the next inspection date for scheduling purposes, do not adjust the interval, but instead use the Inspection Due Override Date (Override). For tunnels, also adjust the Routine Inspection Target Date TD1.<br><br>See Chapter 3 for more information on inspection intervals associated with each report type.<br><br>w/FHWA errata#1 03/24 |

## Inspection Begin Date

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | YYYYMMDD | EI | BIE02 | B.IE.02 | D.2 |

**Applicable Structures**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the date for the report type performed. For multiple day inspections, record the first day that field inspection begins.<br><br>Begin Date Tolerances: When initiating a current inspection, the begin date can be later than the inspection due date within a tolerance window that varies based on report type. See Chapter 3 for details.<br><br>When initiating a current inspection before the scheduled due date, the begin date tolerance will be adjusted to the new begin date. | The intent of this item is to report the inspection begin dates for the report types in Item BIE01, since the previous data submittal to FHWA.<br><br>If multiple site visits occur for scour monitoring inspections, for a triggering storm event, report the first site visit date for that storm event.<br><br>w/FHWA errata#1 03/24 |

## Inspection Completion Date

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | YYYMMDD | EI | BIE03 | B.IE.03 | - |

**Applicable Structures**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the completion date for the report type performed.<br><br>For single day inspections, report the same date that field inspection begins.<br><br>If multiple site visits occur for scour monitoring inspections, for a triggering storm event, report the date when monitoring ceases for that storm event. | The intent of this item is to report the field inspection completion dates for all inspections.<br><br>w/FHWA errata#1 03/24 |

**Examples**

A Routine Bridge and NSTM inspection started on August 1, 2020. The Routine inspection was completed on August 2, 2020, and the NSTM inspection was completed on August 4, 2020.

- Report 8/2/2024 for the Routine inspection.
- Report 8/4/2024 for the NSTM inspection.

An Underwater inspection started on August 31, 2020 and completed on September 1, 2020. Report 9/1/2024.

## Inspection Due Date

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Calculated | YYYYMMDD | EI | BIE06 | B.IE.06 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| This field is automatically calculated based on the inspection begin date BIE02 and interval BIE05.<br><br>When an inspection begins after the scheduled due date, this calculation will restore the next due date to the original due date in the next scheduled due year. | The intent of this item is to provide the inspection due date for the report types defined in the BIE01 (Report Type) where applicable.<br><br>This item is only calculated for report types which have an inspection interval. |

## Inspection Due Date Override

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | EI | Override | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification / Commentary**

This field should remain blank under most circumstances. However, in cases where the calculated inspection due date BIE06 needs to be adjusted, insert the desired next inspection date in this field.

In cases where the override date is earlier than the next calculated inspection due date, no further action is required.

In cases where the override date is later than the next calculated inspection due date, the following report types require explanation and approval:

- Routine Bridge
- Routine Tunnel
- NSTM
- Underwater
- Interim
- UW Interim

See items WIE10, WIE11 and WIE12 for details on the late inspection and approval process.

## Report Type Notes

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(unlimited) | AN (300) | EI | BIE11 | B.IE.11 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification / Commentary**

Briefly summarize the purpose and Spans/ Piers inspected for the following report types:

- NSTM
- Underwater
- Special Feature
- Damage
- In-Depth
- Service
- Interim
- UW Interim
- Signed Informational
- Scour Monitoring

This field can also be used as needed for any report type and other purposes, including but not limited to:

- Recording time on site and weather conditions.
- Acknowledging incorporation of QA inspection reports
- Summarize updated fields in informational reports
- Identify construction contracts in inventory reports

## Target Inspection Date - SNTI

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | EI | TD1 | - | D.1 |

**Applicable Structure Types**

- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Record the routine inspection target date.<br><br>Note that this date establishes the target month for all future inspections, but the actual future inspection days will fluctuate as needed for inspection scheduling and the actual future inspection years will advance as needed. | Initially, the target date is set by the program manager and should not be modified without prior notification to the FHWA Division Office.<br><br>This date is intended to provide the baseline for scheduling future routine tunnel inspections. Actual inspection begin date tolerances are allowed, see Chapter 3 for details. |

## Risk Based Inspection Interval Method

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BIE07 | B.IE.07 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

### Specification

Code the risk-based inspection interval method using one of the following codes.

| Code | Description |
|---|---|
| N | Not Applicable |
| 1 | Method 1 |
| 2 | Method 2 - Not used by WSDOT |
| * | Delete |

### Commentary

The intent of this item is to report the risk- based inspection interval method, described in the NBIS, for determining the inspection interval.

Method 1, as described in the NBIS, is when inspection intervals are determined by a simplified assessment of risk to classify each bridge into one of three risk levels with an inspection interval not to exceed 12, 24, 48, or 60 months.

Method 2, as described in the NBIS, is when inspection intervals are determined by a more rigorous assessment of risk to classify each bridge, or a group of bridges, into one of four risk levels with an inspection interval not to exceed 12, 24, 48, or 72 months.

As of January 1, 2024, enter 1 indicating Method 1 for the following report types:

- Routine Bridge (48 month max interval)
- NSTM (24 month max interval)
- Underwater (60 month max interval)

For all other report and structure types, enter N indicating not applicable.

w/FHWA errata#1 03/24

## Nat'l Certified Bridge & Tunnel Inspector *(Inspector Initials & Insp Cert #)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(15) | EI | BIE04 | B.IE.04 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the unique code identifying the Nationally Certified Bridge Inspector (team leader) responsible for the report type performed.<br><br>In WSBIS, the team leader certification number is selected by using the pulldown of inspector initials. In cases where multiple team leaders have the same initials, a separate pop-up window will display a full list of names associated with this initial, which the team leader will use to select the correct name. | The intent of this item is to indicate the Nationally Certified Bridge Inspector (team leader) present at the inspection, for each report type required by the NBIS and/or WSDOT.<br><br>Some report types do not require a Nationally Certified Bridge Inspector to lead an inspection. See Table BIE01a. |

## Co-Inspector Initials *(Old Item 2654)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | EI | WIE05 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification |
|---|
| Select the co-inspector initials from the pulldown menu who either assisted the lead inspector in performing an inspections or updated the bridge record using one of the reports types that doesn't require a lead inspector. See Table BIE01a.<br><br>In cases where there is no co-inspector, or the co-inspector is not listed in the pulldown menu, use the N/A inspector in the pulldown menu. |

## Inspection Hours *(Old Item 2642)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,1) | - | EI | WIE07 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

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

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

## Inspection Overtime Hours *(Old Item 2643)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,1) | - | EI | WIE08 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

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

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

## Late Inspection Explanation - PM Oversight *(Old Item 2900)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(500) | - | - | WIE10 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification**

For any SNBI or SNTI reportable inspection type, when an inspection is or will be performed later than the tolerance window as defined in Chapter 3, an explanation must be provided for the delinquency. Commonly acceptable explanations include:

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

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

## Late Inspection - PM Response Date *(Old Item 2901)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WIE11 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification**

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

This field can only be edited using the Inventory Management managed operation and as directed by the PM or DPM.

## Late Inspection - PM Approval *(Old Item 2902)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WIE12 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification**

Code Y – Approved or N – Disapproved to indicate the Program Manager's (PM) response.

This field can only be edited using the Inventory Management managed operation and as directed by the PM or DPM. If Washington State is under an active Plan of Corrective Action (PCA) then approval falls to the FHWA Washington Division Bridge Engineer.

## Inspection Quality Control Date

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Calculated | YYYYMMDD | EI | BIE08 | B.IE.08 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| This field is automatically generated, and is the same as Inspection Data Update Date B.IE.10. | Every inspection is reviewed by a Data Steward prior to release into the permanent record. This review is the lowest level of quality control and applies to every report type. Some reports receive additional reviews by inspection supervisors, following WSDOT and local agency procedures. |

## Inspection Equipment

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| - | AN(120) | EI | BIE12 | B.IE.12 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| TO BE IMPLEMENTED IN SUMMER OF 2025 | TO BE IMPLEMENTED IN SUMMER OF 2025 |

# Critical Findings Tab

| Critical Findings | | | | | |
|---|---|---|---|---|---|
| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
| - | - | - | - | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification / Commentary**

See Chapter 6 for all critical findings descriptions for the fields noted below:

| Code | Field Name |
|---|---|
| WCF01 | Critical Finding Number |
| WCF02 | Type of Critical Finding |
| WCF03 | Entry Type |
| WCF04 | Date of Finding or Entry Date |
| WCF05 | Bridge Status |
| WCF06 | Estimated Resolution Date |
| WCF07 | Description |
| WCF08 | Reported By |
| WCF09 | Associated Repair |

# SNBI (SNTI) Tab

## *Component Condition Ratings*

| Overall Bridge Condition Classification | | | | | |
|---|---|---|---|---|---|
| **Format** | **SNBI Format** | **Frequency** | **WSBIS Item ID** | **SNBI Item ID** | **SNTI Item ID** |
| Calculated | AN(1) | C | BC12 | B.C.12 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| This item is calculated. See Commentary.<br><br>**Code** / **Condition** / **Lowest Cond. Rating**<br>G / Good / 7, or 8<br>F / Fair / 5 or 6<br>P / Poor / 4, 3, 2, 1, or 0 | For the purposes of national performance measures, the method of assessment to determine the classification of a bridge is the minimum (i.e. lowest) condition rating code from the following items:<br><br>B.C.01 (*Deck Condition Rating*),<br><br>B.C.02 (*Superstructure Condition Rating*),<br><br>B.C.03 (*Substructure Condition Rating*), and<br><br>B.C.04 (*Culvert Condition Rating*). |

Table 20. Codes and descriptions for Items: BC01 through BC07, BC14 and BC15 condition ratings.

**Table 20 Overall Bridge Condition Classification Code**

| WSBIS Code | SNBI Code | Condition Description |
|---|---|---|
| N | N | Not Applicable - Component does not exist. |
| - | 9 | Not used in Washington state. |
| 8 | 8 | Very Good - Isolated or some inherent defects. |
| 7 | 7 | Good - Some minor defects. |
| 6 | 6 | Satisfactory - Widespread minor or isolated moderate defects. |
| 5 | 5 | Fair - Some moderate defects; strength and performance of the component are not affected. |
| 4 | 4 | Poor - Widespread moderate or isolated major defects; strength and/or performance of the component is affected. |
| 3 | 3 | Serious - Major defects; strength and/or performance of the component is seriously affected. Condition typically necessitates more frequent monitoring, load restrictions, and/or corrective actions. |
| 2 | 2 | Critical - Major defects; component is severely compromised. Condition typically necessitates frequent monitoring, significant load restrictions, and/or corrective actions in order to keep the bridge open. |
| 1 | 1 | Imminent failure - Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service. |
| 0 | 0 | Failed - Bridge is closed due to component condition, and is beyond corrective action. Replacement is required to restore service. |

# FHWA Deck Overall Condition Rating

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BC01 | B.C.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the deck component condition rating using one of the codes in Table 20.<br><br>Code N when Item B.SP.09 (*Deck Material and Type*) is 0.<br><br>Starting in 2025, FHWA Deck Overall Condition Ratings are coded strictly in accordance with Table 20.<br><br>This field is not rated based on BMS Element condition states.<br><br>For tunnels, the FHWA Deck Overall Condition Rating is used for roadways on lids above tunnels only. Decks and/or invert slabs within tunnels are not included in this rating. | This item represents the condition of the deck as determined from the inspection of all deck surfaces (top, underside, and edges).<br><br>Visual assessments may be supplemented with non-destructive or destructive testing results.<br><br>Inspection report comments required when the condition code is 5 or less. |

## Commentary Continued - FHWA Deck Overall Condition Rating

Use destructive or non-destructive testing results or visual condition indicators of materials covering the surfaces being assessed when top, underside or both surfaces are not visible for assessment. Past inspection reports and repair records may also provide supplemental information to aid in the determination of the condition rating.

Do not consider the condition of non-monolithic wearing surfaces (i.e. overlays), stay-in-place deck forms, joint assemblies, expansion devices, bridge rails, or scuppers when determining the condition rating code for this item, except insofar as they indicate the condition of the deck itself.

Consider the condition of a joint header only when the deck serves as a joint header.

For bridges with integral decks/top flanges (e.g. rigid frames, decked girders or tee beams, voided slab beams, box girders, etc.), the deck condition may affect the superstructure condition rating; however, the superstructure condition does not affect the deck condition rating.

The deck and superstructure condition ratings are the same for solid slab bridges.

w/ FHWA errata#1 03/24

## FHWA Deck Overall Condition Rating continued...

### Examples

Reinforced concrete (RC) bridge deck approximately 270' long x 40' wide with the following noted defects.

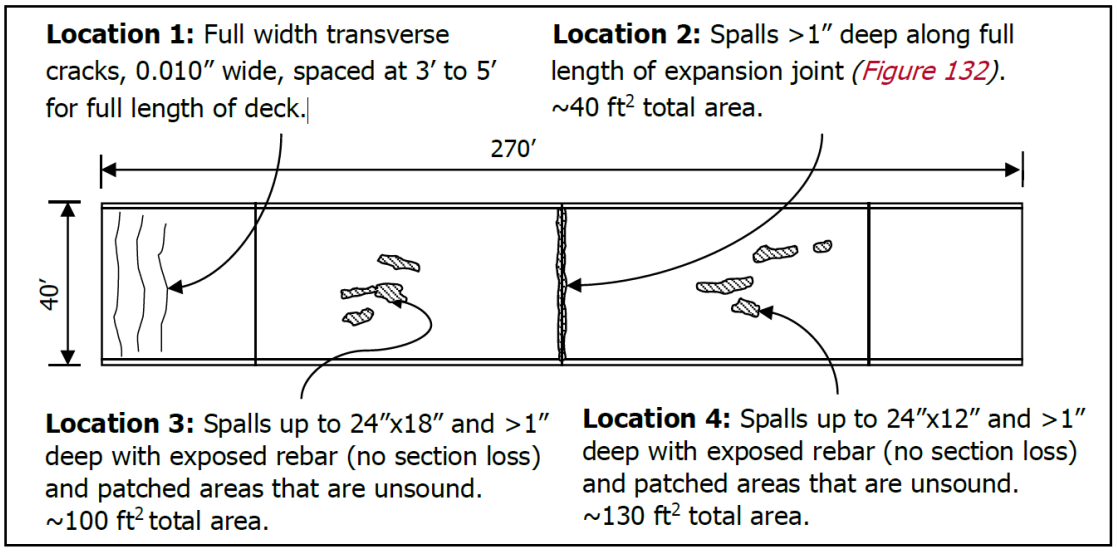



Figure 131. Deck plan view showing defects.



Figure 132. Deck spalling along joint. Location 2.

## FHWA Deck Overall Condition Rating continued...

### Examples



Figure 133. Typical deck spall with exposed rebar. Locations 3 and 4.

### Summary of Findings

| Location | Defect(s) | Severity | Extent |
|---|---|---|---|
| 1 | Cracking | Inherent | Throughout (widespread) |
| 2 | Spalling | Moderate | ~ 40 ft² (isolated) |
| 3 | Spalling with exposed rebar, patched area that is unsound | Moderate | ~ 100 ft² (isolated) |
| 4 | Spalling with exposed rebar, patched area that is unsound | Moderate | ~ 130 ft² (isolated) |

**Results:** There are several areas of isolated moderate defects that can best be characterized together as "some moderate defects." The rest of the deck surface has inherent defects. There are no defects visible on the underside of the deck, and none of the observed defects appear to indicate more significant problems. The deck is best characterized as having "some moderate defects." **Report 5.**

## WSDOT Deck Overall Condition Rating

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WC01 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

Code the deck component condition rating using one of the codes in Table WC01.

Code N when Item B.SP.09 (Deck Material and Type) is 0.

**Commentary**

The resulting deck condition code will not be reported to the SNBI but will support maintenance, repair, and asset management decisions for agency bridge owners in Washington State. The intent is to use this table exclusively to maintain historical deck condition data. This field is not rated based on Table 20.

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

This item represents the condition of the deck as determined from the inspection of all deck surfaces (top, underside, and edges).

Visual assessments may be supplemented with non-destructive or detructive testing results.

Perform a visual inspection of the bridge deck surface, subsurface (if accessible), and deck protection systems. Record observations on the extent of patches, spalls, and delaminations in the notes of the appropriate BMS deck element.

For tunnels, the WSDOT Deck Overall Condition Rating is used for roadways on lids above tunnels only. Decks and/or invert slabs within tunnels are not included in this rating.

**Table WC01 WSDOT Deck Overall Condition Rating Code**

| WSBIS Code | Percent of Concrete Deck Patches, Spalls and Delaminations (CS2+CS3+CS4) | Percent of Concrete Deck Soffit (CS3 Only) |
|---|---|---|
| N | N/A | N/A |
| 8 | None | None |
| 7 | None | None |
| 6 | < 1% | < 1% |
| 5 | 1% to 2% | 1% to 2% |
| 4 | 2% to 5% | 2% to 5% |
| 3 | > 5% | > 5% |

## Bridge Railings Condition Rating

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BC05 | B.C.05 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the bridge railing (traffic barrier) condition rating using one of the codes in Table 20.<br><br>Code N when there are no bridge railings present | This item addresses the condition of all types and shapes of bridge railings (parapets, median barriers, or structure mounted) located on the bridge or that cross over buried structures. The condition assessment includes the portions of the railings, posts, blocking, and curbs that are part of the bridge railing system.<br><br>Do not consider pedestrian railings when coding this item, except to the extent that the pedestrian railing is integral to the traffic barrier.<br><br>Inspection report comments required when the condition code is 5 or less.<br><br>Do not consider the condition of protective coatings and other protection systems when determining the condition rating code for this item, except to the extent that problems with the protective coating system are indicative of problems with the underlying railing material. |

## Bridge Railings Condition Rating continued...

### Examples

Steel W-beam bridge railing on both sides of a 300' long bridge. The following defect is noted:

Description: Damage-induced distortion of the rail for a length of 25'. Three posts are no longer connected to the deck. No other defects.

Defect: Distortion
Severity: Major
Extent: 25' of the railing (isolated)

Results: The railing is best characterized as having "isolated major defects." Report 4.



Figure 143. Collision-induced distortion of bridge railing.

## Bridge Railing Transitions Condition Rating

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BC06 | B.C.06 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the bridge railing (traffic barrier) transitions condition rating using one of the codes in Table 20.<br><br>Code N when there are no bridge railing transitions present. | This item addresses the condition of the transition from the bridge railing to the approach guardrail. The condition assessment includes the portions of the railings, posts, blocking, and curbs that are part of the bridge railing transitions.<br><br>Inspection report comments required when the condition code is 5 or less.<br><br>Do not consider the condition of protective coatings and other protection systems when determining the condition rating code for this item, except to the extent that problems with the protective coating system are indicative of problems with the underlying railing transition |

## Bridge Joints Condition Rating

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BC08 | B.C.08 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the bridge deck joint condition using one of the following codes in Table BC08.<br><br>The entire code description must be satisfied for the code to apply. | This item addresses the condition of all types and shapes of bridge deck joints. The condition assessment includes all aspects of the joints such as any seals, headers (metal or concrete), connections, and other metal members.<br><br>When a joint is designed as an open joint, leakage or lack of a seal is not considered a defect.<br><br>Do not consider the condition of protective coatings and other protection systems when determining the condition rating code for this item, except to the extent that problems with the protective coating system are indicative of problems with the underlying joint material.<br><br>In cases where the joint is not visible, the condition can be assessed based on other indirect indicators of the condition.<br><br>Inspection report comments required when the condition code is 5 or less. |

## Bridge Joints Condition Rating continued...

### Examples

Description: All compression seal joints are partially filled with debris, but are still free to move. Seals are intact.

Defect: Debris impaction
Severity: Minor
Extent: All joints (widespread)
Results: The joints are best characterized as having "widespread minor defects." Report 6.



Figure 147. Joint partially filled with debris.

Description: Strip seal joint 44' long at each end of a bridge. 3" deep x 12" wide x 6' long spall with exposed rebar in deck adjacent to joint header. Joint is loose, but functioning. Strip seal is intact. No other defects.

Defect: Adjacent deck or header
Severity: Moderate
Extent: 6' of one joint (isolated)
Results: The joints are best characterized as having "isolated moderate defects." Report 6.

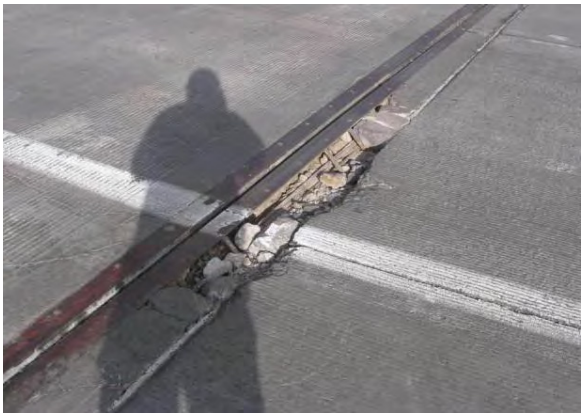


Figure 148. Spall in joint header. (Source: Colorado DOT)

## Bridge Joints Condition Rating continued...

### Examples Continued

Description: Compression seal joint 56' long at each end of a bridge. The seal is torn and partially pulled out for the full length of both joints. Performance of the joints is affected.

Defect: Seal damage Severity:
Moderate
Extent: All joints (widespread)
Results: The joints can best be characterized as having "widespread moderate defects." Report 4.



Figure 149. Joint seal is torn and partially pulled out.

**Table BC08 Bridge Joints Condition Rating Code**

| WSBIS Code | SNBI Code | Condition Description |
|---|---|---|
| N | N | Not Applicable - Bridge does not have deck joints. |
| - | 9 | Not used in Washington state. |
| 8 | 8 | Very Good - Isolated or some inherent defects. |
| 7 | 7 | Good - Some minor defects. |
| 6 | 6 | Satisfactory - Widespread minor or isolated moderate defects. |
| 5 | 5 | Fair - Some moderate defects. |
| 4 | 4 | Poor - Widespread moderate or isolated major defects. |
| 3 | 3 | Serious - Some major defects. |
| 2 | 2 | Critical - Widespread major defects. |
| 1 | 1 | Imminent failure - Joints have failed and are ineffective. |
| 0 | 0 | Failed - Joints have failed and present a safety hazard. |

## Superstructure Overall Condition Rating

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BC02 | B.C.02 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

### Specification

Code the superstructure component condition rating using one of the codes in Table 20.

Code N when M, A, or W is not reported for Item B.SP.01 (*Span Configuration Designation*).

### Commentary

This item represents the condition of the superstructure as determined from the inspection of all superstructure members.

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

Consider primary load carrying members when determining the condition rating code for this item. ~~which includes cross-frames and diaphragms for curved girder bridges~~. Consider secondary members only if they adversely impact the primary members. Visual assessments may be supplemented with non-destructive or destructive testing results.

The superstructure includes:

- members above the bearings for bridges with non-integral superstructure and substructure;
- girders/beams for integral superstructures;
- members above the spring line for arch bridges;
- slabs of concrete rigid frame bridges; and
- legs, knees and girders for concrete and steel rigid K-Frame or Delta-Frame bridges.

Consider the condition of ~~integral~~ headwalls and spandrel walls that are integral with the superstructure. Consider the condition of wingwalls that are integral with the superstructure (continuation of the superstructure), to the first expansion joint.

Do not consider the condition of bearings when determining the condition rating code for this item except to the extent that the bearings are causing distress in the superstructure.

Do not consider the condition of protective coating systems when determining the condition rating code for this item except to the extent that problems with the protective coating system are indicative of problems with the underlying superstructure material. A well-formed patina on weathering steel is considered a protective coating and is not considered a defect.

Do not consider the presence of drift, debris, and soil accumulation when determining the condition rating code for this item, except to the extent that these items are causing distress in the superstructure.

w/ FHWA errata#1 03/24

# Superstructure Overall Condition Rating

## Commentary Continued

Superstructure types without substructures may be affected by scour. When observed conditions are not consistent with the scour design or the assumptions used in the scour appraisal, scour is considered when reporting the code for this item. In this case, observed conditions also indicate a need to reevaluate Item B.AP.03 (Scour Vulnerability). Observed scour that is less than the tolerable limit determined in the scour appraisal does not affect this item.

For structures with integral decks/top flanges (e.g. rigid frames, decked girders or tee beams, voided slab beams, box girders, etc.), the deck condition may affect the superstructure condition rating; however, the superstructure condition does not affect the deck condition rating.

The deck and superstructure condition ratings are the same for solid slab bridges.

w/ FHWA errata#1 03/24

## Examples

Two-span steel truss. Each span is 200' long x 34' wide. The following defects are noted.

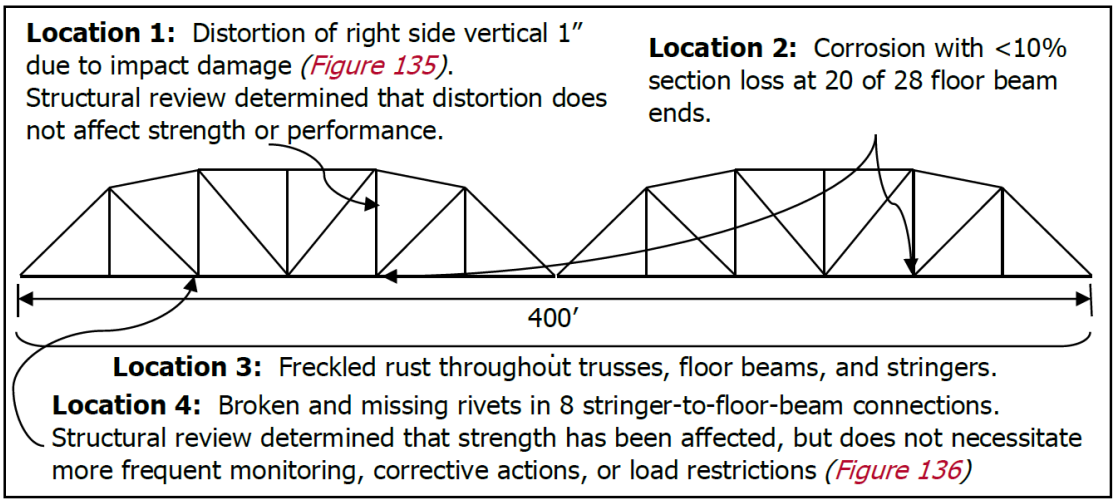



Figure 134. Elevation view of a truss bridge showing superstructure defect locations.



Figure 135. Distortion in truss vertical. Location 1. (Source: Colorado DOT)

## Superstructure Overall Condition Rating

### Examples Continued



Figure 136. Missing rivets in stringer-to-floor-beam connection. Location 4. (Source: Colorado DOT)

### Summary of Findings

| Location | Defect(s) | Severity | Extent |
|---|---|---|---|
| 1 | Distortion | Moderate | One location (isolated) |
| 2 | Corrosion with section loss | Moderate | More than a few locations (some) |
| 3 | Corrosion | Minor | Throughout (widespread) |
| 4 | Connection | Major | A few locations (isolated) |

**Results:** Isolated major defects affecting strength, and some moderate defects that do not affect strength or performance. Therefore, the superstructure is best characterized as having isolated major defects that do not necessitate more frequent monitoring, corrective actions, or load restrictions. **Report 4.**

## NSTM Inspection Condition

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BC14 | B.C.14 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the condition rating of the Non- Redundant Steel Tension Members (NSTM) using one of the codes in Table 20.<br><br>Do not report this item when Item B.IR.01 (NSTM Inspection Required) is N.<br><br>Code N when there is no NSTM report.<br><br>This field will not be reported to FHWA when there is no NSTM report. | This item represents the condition of NSTM(s) identified to be inspected in the NSTM inspection procedures, and incorporated into the superstructure or substructure condition rating.<br><br>Inspection report comments required when the condition code is 5 or less.<br><br>For a bridge with NSTM(s) in both the superstructure and substructure, report only the lower of the two condition values for the condition of the NSTM(s). |

## Bridge Bearings Condition Rating

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BC07 | B.C.07 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the bridge bearing condition rating using one of the codes in Table 20.<br><br>Code N for bridges without bearings.<br><br>Inspection report comments required when the condition code is 5 or less. | This item addresses the condition of all types and shapes of bridge bearings.<br><br>Do not consider the condition of protective coatings and other protection systems when determining the condition rating code for this item, except to the extent that problems with the protective coating system are indicative of problems with the underlying bearing material.<br><br>In cases where the bearing device is not visible, the condition can be assessed based on alignment, grade across the joint, or other indirect indicators of the condition. |

**Examples**

Description: 5 of 25 bearings have 10% bearing area loss.

Defect: Loss of bearing area
Severity:Moderate
Extent: 20% of bearings (some)
Results: The bearings are best characterized as having “some moderate defects.” Report 5.




Figure 144. Loss of bearing area for elastomeric bearing. (Source: Oregon DOT)

## Bridge Bearings Condition Rating continued...

### Examples Continued

Description: 8 of 20 bearings are rotated beyond performance limits. The anchor bolts at these locations are bent and the nuts are loose. Surface rust is present on all bearings.

Defect: Alignment and connection
Severity: Major
Extent: 8 bearings (widespread)

Defect: Corrosion
Severity: Minor
Extent: All bearings
Results: The bearings can best be characterized as having "major defects" affecting performance. Condition necessitates more frequent monitoring or corrective actions. Report 3.



Figure 145. Misaligned rocker bearing. (Source: Alaska DOT)

Description: 20 of 20 bearings have surface rust with no section loss. Bearings are free to move and alignment is as expected for temperature conditions.

Defect: Corrosion
Severity: Minor
Extent: All bearings
Results: The bearings are best characterized as having "widespread minor defects." Report 6.



Figure 146. Surface rust on moveable bearing.

## Substructure Overall Condition Rating

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BC03 | B.C.03 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

### Specification

Code the substructure component condition rating using one of the codes in Table 20.

Code N when only C and/or V is reported for Item B.SP.01 (Span Configuration Designation).

### Commentary

This item addresses the condition of piers, abutments, piles, footings, and other substructure members.

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

For bridges that have substructures not visible for inspection, use appropriate visual condition indicators from the superstructure or surrounding foundation materials to determine the applicable code. Visual assessments may be supplemented with non-destructive or destructive testing results.

Consider the condition of integral abutment wingwalls to the first construction or expansion joint when determining the condition rating code for this item.

Do not consider the condition of protective coatings, fenders and other substructure protection systems when determining the condition rating code for this item, except to the extent that these items indicate distress of the substructure, or adversely affect its condition.

Do not consider the presence of drift, debris, and soil accumulation when determining the condition rating code for this item, except to the extent that these items are causing distress in the substructure.

The substructure includes:

- backwalls and the members below the bearings for bridges with non-integral superstructure and substructure;
- members below the girders/beams for integral superstructures;
- thrust blocks and other members below the spring line for arch bridges;
- legs of concrete rigid frame bridges;
- abutments and footings/foundations below the leg bearings for concrete and steel rigid K-Frame or Delta-Frame bridges; and
- foundation piles exposed by erosion or scour.

When observed conditions are not consistent with the scour design or the assumptions used in the scour appraisal, scour is considered in the coding of this item. In this case, observed conditions also indicate a need to reevaluate Item B.AP.03 (Scour Vulnerability). Observed scour that is less than the tolerable limit determined in the scour appraisal does not affect this item.

## Substructure Overall Condition Rating continued...

### Examples

Four span prestressed concrete bridge with reinforced concrete abutments and piers. No defects at the abutments or at Pier 1. The following defects are noted at the other piers:

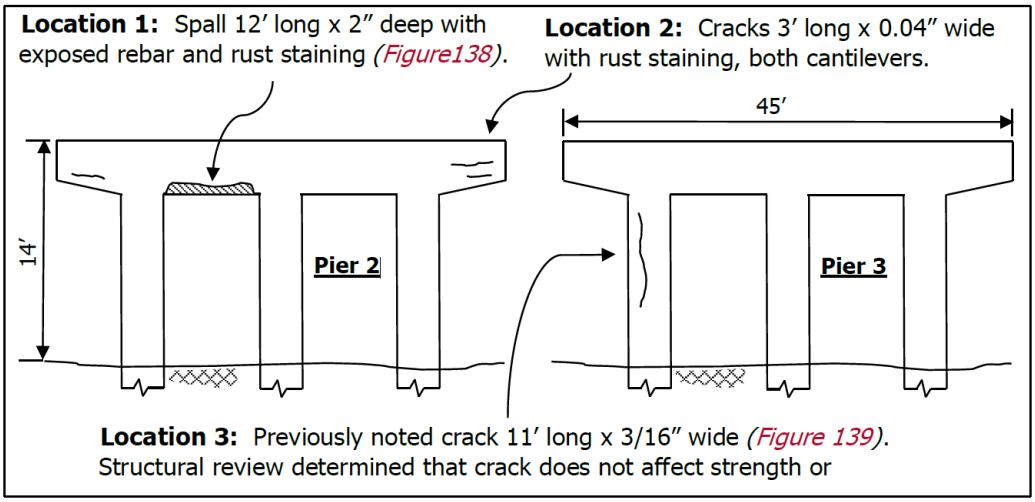



Figure 137. Elevation view of two concrete column piers showing substructure defect locations.



Figure 138. Spall in Pier 2 cap beam. Location 1.



Figure 139. Crack in Pier 3 column. Location 3.

### Summary of Findings

| Location | Defect(s) | Severity | Extent |
|---|---|---|---|
| 1 | Spall with exposed rebar; rust staining | Moderate | 12′ of one cap beam (isolated) |
| 2 | Cracking with rust staining | Moderate | 6′ of one cap beam (isolated) |
| 3 | Cracking | Moderate | 11′ crack in one column (isolated) |

**Results:** There are several areas of isolated moderate defects that can best be characterized together as "some moderate defects." Strength and performance of the component are not affected.
**Report 5.**

## Underwater Inspection Condition

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BC15 | B.C.15 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the condition rating of the underwater members of the substructure or culvert based on the underwater inspection using one of the codes in Table 20.<br><br>Code N when there is no Underwater Inspection report.<br><br>This field will not be reported to FHWA when there is no Underwater Inspection report.<br><br>w/ FHWA errata#1 03/24 | This item represents the condition of underwater members identified to be inspected in the underwater inspection procedures, and incorporated into the substructure or culvert condition rating.<br><br>Inspection report comments required when the condition code is 5 or less.<br><br>If this item has previously been reported because an underwater inspection is generally required,it should continue to be reported even for instances of unusually low flow where all portions of the substructure can be inspected by wading and probing, and an underwater inspection isnot required. This applies only if the low flow condition is truly unusual and is not likely to reoccur during the next inspection interval.<br><br>The requirement to report this item may change in the rare circumstance where long- term environmental conditions change for inspection access to underwater portions of the substructure or culvert.<br><br>w/ FHWA errata#1 03/24 |

## Culvert Overall Condition Rating

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BC04 | B.C.04 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the culvert component condition rating using one of the codes in Table 20.<br><br>Code N when C or V is not reported for Item B.SP.01 (Span Configuration Designation).<br><br>Water Detention Vaults shall be coded as culverts,<br><br>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.<br><br>Culverts with structure lengths greater than 20 feet are NBI reportable regardless of fill depth.<br><br>Culverts with structure lengths less than or equal to 20 feet are inventoried and coded in accordance with short span inspection requirements. | This item addresses the condition of culverts. The condition assessment includes footings, piles, and other foundation members when present.<br><br>Inspection report comments required when the condition code is 5 or less. |

# Culvert Overall Condition Rating continued...

## Commentary Continued

For culverts that have components not visible for inspection, use appropriate visual condition indicators from the roadway or surrounding foundation materials to determine the applicable code. Visual assessments may be supplemented with non-destructive or destructive testing results.

Consider the condition of integral wingwalls and headwalls to the first construction or expansion joint when determining the condition rating code for this item.

Do not consider the condition of protective coatings and other culvert protection systems when determining the condition rating code for this item, except to the extent that these items indicate distress of the culvert, or adversely affect its condition.

Do not consider the presence of drift, debris, and soil accumulation when determining the condition rating code for this item, except to the extent that these items are causing distress in the culvert.

The culvert includes:

- buried pipe or box;
- footings below the walls of a 3-sided box; and
- foundation piles exposed by erosion or scour.

When observed conditions are not consistent with the scour design or the assumptions used in the scour appraisal, scour is considered in the coding of this item. In this case, observed conditions also indicate a need to reevaluate Item B.AP.03 (Scour Vulnerability). Observed scour that is less than the tolerable limit determined in the scour appraisal does not affect this item.

## Examples

Three-span corrugated metal pipe culvert. Each pipe is 8' in diameter and 100' long. The pipes are spaced 4' apart. The following defects are noted.

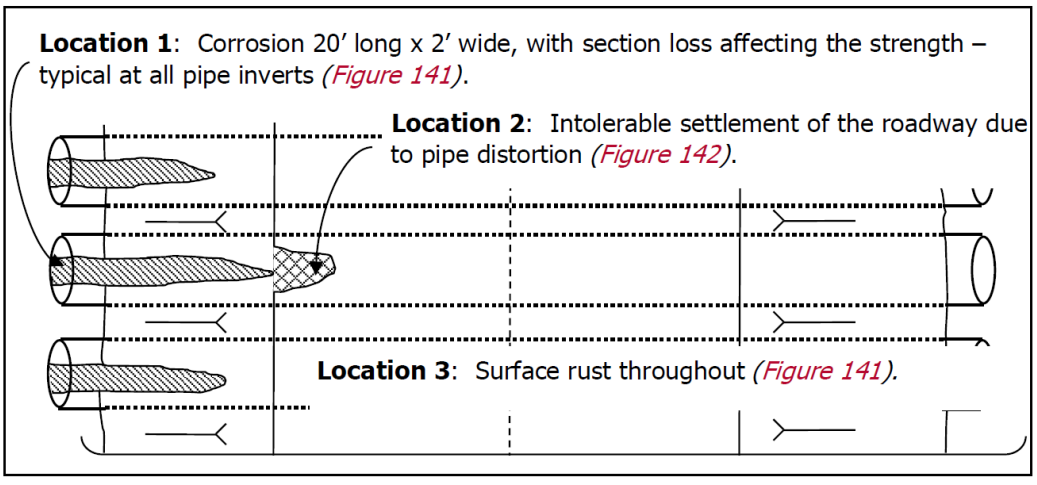



Figure 140. Plan view of pipe culvert showing defects.

## Culvert Overall Condition Rating continued...

### Examples Continued



Figure 141. Corroded pipe culvert invert. Location 1 and 3. (Source: Alaska DOT)



Figure 142. Roadway settlement over pipe culvert. Location 2. (Source: Alaska DOT)

### Summary of Findings

| Location | Defect(s) | Severity | Extent |
|---|---|---|---|
| 1 | Corrosion with section loss | Major | 20% of total barrel length (some) |
| 2 | Distortion | Major | Isolated |
| 3 | Corrosion | Minor | Throughout (widespread) |

**Results:** The culvert has major defects that, together, seriously affect strength and performance. The condition necessitates more frequent monitoring or corrective actions. **Report 3.**

## Scour Condition Rating

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BC11 | B.C.11 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the scour condition that represents the observed or measured scour using one of the following codes in Table BC11. The entire code description must be satisfied for the code to apply. | Refer to Item B.AP.03 (Scour Vulnerability) to verify if the bridge has been determined to be stable or unstable for appraised scour conditions.<br><br>Consider design scour depth and critical scour depth, commonly found in hydraulic designs, scour evaluations, and POAs, when determining the scour condition ratings.<br><br>A note in the Bridge Inspection report is required when the code is less than 7.<br><br>When observed conditions are not consistent with the scour design or the assumptions used in the scour appraisal, this indicates a need to reevaluate Item B.AP.03 (Scour Vulnerability).<br><br>Consider the condition of scour countermeasures that are placed for pier/abutment scour protection. General guideline is that countermeasures placed under the bridge within the limits of the bridge rail envelope are placed for scour protection. Contact the BPO scour engineer for further direction.<br><br>Large Woody Material (LWM) placed below the bridge is not for scour protection. It's primary purpose is for habitat and channel complexity but has a secondary purpose of controlling flow, preventing channel/thalweg migration, and promoting a natural meandering channel. |

## Scour Condition Rating continued...

### Examples

Description: Three span scour critical bridge founded on spread footings not on bedrock. The scour elevation for three spread footings at Pier 2 is at the bottom of the footings with one footing having one foot of undermining at one corner. Agency plans to monitor more frequently to keep the bridge open until repairs are completed.

Severity: Major
Extent: 3 of 6 pier footings
Results: The scour condition is best characterized as "major scour" that necessitates more frequent monitoring. Bridge is seriously affected. Report 3.



Figure 153. Exposed column footing in stream.

Description: Scour critical bridge. Critical scour limit was established in the Plan of Action. Inspectors measured the following streambed cross-section (Figure 154).

Severity: Minor (scour at Bent 3, does not exceed tolerable limit)
Extent: One of five substructure units (Isolated).
Results: The scour condition is best characterized as "isolated minor scour." Report 7.

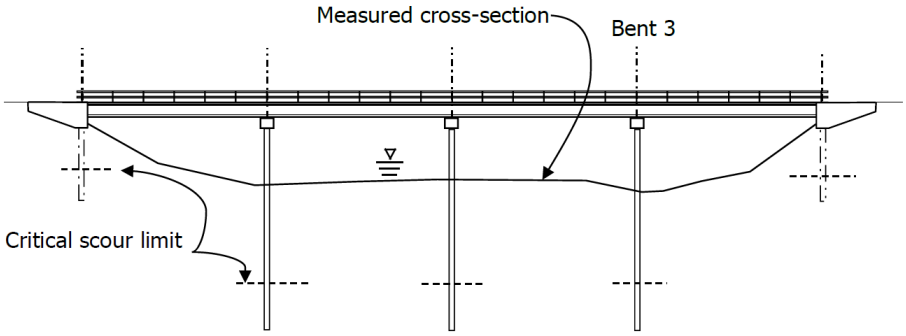



Figure 154. Elevation view showing scour elevations and stream cross-section for a bridge.

## Scour Condition Rating continued...

### Examples Continued

Description: Scour critical bridge. Critical scour limit was established in the Plan of Action. Inspectors measured the following streambed cross-section (Figure 155), which indicates a scour depth at one bent that is below the critical scour elevation.

Severity: Moderate
Extent: 2 of 5 substructure units (some)
Severity: Major
Extent: 1 of 5 substructure units (isolated)
Results: The scour condition is best characterized as “major scour”. The bridge is closed until corrective actions are completed. Report 1.

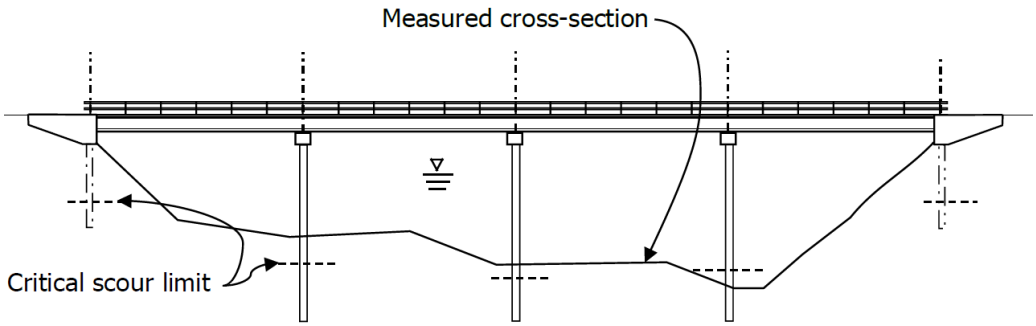



Figure 155. View showing critical scour limits and stream cross-section for a bridge.

Description: Bridge was appraised for scour vulnerability and not considered scour critical. No scour calculations and no structural stability analysis were performed. Piles are end bearing on rock. Inspectors measured the following streambed cross-section, which indicates a scour depth at two piers that is not consistent with the scour assessment assumptions.

Severity: Moderate
Extent: 1 of 5 substructure units (isolated)
Severity: Major
Extent: 1 of 5 substructure units (isolated)
Results: The scour condition is best characterized as “isolated major scour”. The defects warrant a structural and/or hydraulic review to determine the effect on strength and/or stability of the bridge. Report 4.

Since observed conditions are not consistent with the scour appraisal assumptions, then scour is considered in the coding of B.C.03 (Substructure Condition Rating). In this case, observed conditions also indicate a need to reevaluate Item B.AP.03 (Scour Vulnerability).

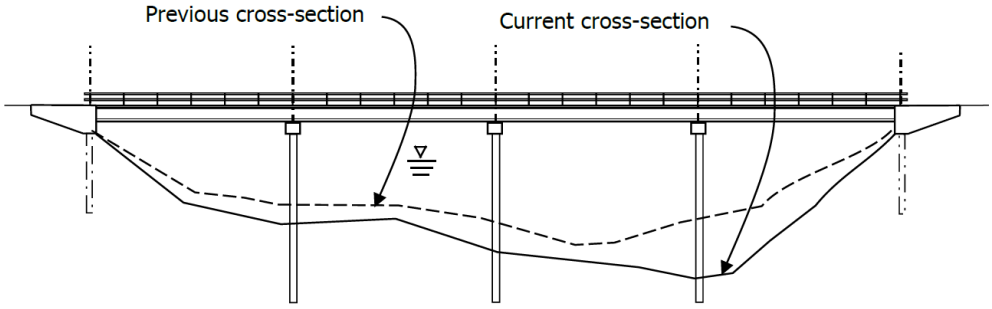



Figure 156. View showing current cross-section and previous cross-section for a bridge over water.

**Table BC11 Scour Condition Rating Code**

| WSBIS Code | Description |
|---|---|
| N | Bridge does not have a waterway or relief for waterway feature type. |
| 8 | No scour or insignificant scour. |
| 7 | Some minor scour. |
| 6 | Widespread minor or isolated moderate scour. |
| 5 | Moderate scour; strength and stability of the bridge are not affected. |
| 4 | Widespread moderate or isolated major scour; strength and/or stability of the bridge is affected. |
| 3 | Major scour; strength and/or stability of the bridge is seriously affected. Condition typically necessitates more frequent monitoring, load restrictions, and/or corrective actions. |
| 2 | Major scour; strength and/or stability of the bridge is severely compromised. Condition typically necessitates frequent monitoring, significant load restrictions, and/or corrective actions to keep the bridge open. |
| 1 | Bridge is closed to traffic due to scour condition. Channel rehabilitation may return the bridge to service. |
| 0 | Bridge is closed due to scour condition, and is beyond corrective action. Bridge replacement is needed to restore service. |

## Channel Condition Rating

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BC09 | B.C.09 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the channel condition using one of the following codes in Table BC09.<br><br>The entire code description must be satisfied for the code to apply. | This item is used to provide a condition rating for the channel at the bridge. Consider the channel upstream and downstream only insofar as it threatens the bridge and approach roadway.<br><br>Inspection report comments required when the condition code is **7** or less.<br><br>The condition of channel protection devices is addressed under a separate item. Refer to Item B.C.10 (Channel Protection Condition Rating).<br><br>For concrete lined channels, channel defects typically do not apply, except for Aggradation and Debris. The condition of the channel lining would be addressed by Item B.C.10 (Channel Protection Condition Rating). |

## Channel Condition Rating continued...

### Examples

Single span bridge. Channel is aggrading and requires periodic excavation to maintain a tolerable hydraulic opening. The thalweg has migrated such that flow is directed at one abutment (Figure 150) and threatens the approach roadway. However, a structural and hydraulic review has determined that the stability of the bridge is not impacted.

Defects: Aggradation and migration
Severity: Moderate
Extent: Widespread
Results: The channel can best be characterized as having "widespread moderate defects." Report 4.



Figure 150. Bridge elevation view of channel condition. (Source: Alaska DOT)



Figure 151. Looking downstream from bridge at excavated material. (Source: Alaska DOT)

**Table BC09 Channel Condition Rating Code**

| WSBIS Code | Description |
|---|---|
| N | Not Applicable - Bridge does not have a waterway or relief for waterway feature type. |
| 8 | Very good - No defects or inherent defects only. |
| 7 | Good - Some minor defects. |
| 6 | Satisfactory - Widespread minor or isolated moderate defects. |
| 5 | Fair - Moderate defects; bridge and approach roadway are not threatened. |
| 4 | Poor - Widespread moderate or isolated major defects; bridge and/or approach roadway is threatened. |

**Table BC09 Channel Condition Rating Code**

| WSBIS Code | Description |
|---|---|
| 3 | Serious - Major defects; bridge or approach roadway is seriously threatened. Condition typically necessitates more frequent monitoring, load restrictions, and/or corrective actions. |
| 2 | Critical - Major defects. Bridge or approach roadway is severely threatened. Condition typically necessitates frequent monitoring, significant load restrictions, and/or corrective actions in order to keep the bridge open. |
| 1 | Imminent failure - Bridge is closed to traffic due to channel condition. Channel rehabilitation may return the bridge to service. |
| 0 | Failed - Bridge is closed due to channel condition, and is beyond corrective action. Bridge location or design can no longer accommodate the channel, and bridge replacement is needed to restore service. |

## Channel Protection Condition Rating

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BC10 | B.C.10 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the condition of the channel protection device(s) using one of the following codes in Table BC10.<br><br>The entire code description must be satisfied for the code to apply. | This item is used to provide a condition rating for channel protection devices.<br><br>Inspection report comments required when the condition code is **7** or less.<br><br>Evaluate the condition and effectiveness of channel protection devices installed on banks or in the stream to mitigate channel issues that may impact the bridge. When reporting this item, consider erosion and scour, damage (unraveling, displacement, separation, and sagging), and material defects (scaling, abrasion, spalling, corrosion, cracking, splitting, and decay).<br><br>Countermeasures placed specifically for scour protection of the piers or abutments are not considered in this condition rating. General guideline is that countermeasures placed under the bridge within the limits of the bridge rail envelope are placed for scour protection. Contact the BPO scour engineer for further direction.<br><br>Large Woody Material (LWM) placed below the bridge is not for scour protection. It's primary purpose is for habitat and channel complexity but has a secondary purpose of controlling flow, preventing channel/thalweg migration, and promoting a natural meandering channel. |

## Channel Protection Condition Rating continued...

### Commentary Continued

Channel protection devices are considered countermeasures that control, inhibit, delay, or minimize stream instability and scour problems, including river training and armoring countermeasures.

River training countermeasures may include: spurs, bendway weirs, guide banks, drop structures, and check dams. Additional river training countermeasures can be found in HEC-23 and elsewhere.

Armoring countermeasures may include: rock riprap, grouted riprap, concrete slope paving, articulating concrete blocks, gabion mattresses, and grout-filled mats. Additional armoring countermeasures can be found in HEC-23 and elsewhere.

For bridges that have countermeasures not visible for inspection, use appropriate visual condition indicators to determine the applicable code. These may include measurements taken at the bridge face(s) during every inspection to help determine degree of degradation, aggradation, and/or channel migration.

For this item, a minor defect does not limit the effectiveness of the channel protection, while a moderate defect may limit its effectiveness. A major defect indicates that the channel protection is missing or is no longer effective as determined by a hydraulic review.

### Example

Description: Some stones are missing and revetment has limited effectiveness. Streambed is scouring and undermining the remaining riprap and culvert.

Defects: Scour and damage
Severity: Moderate
Extent: Widespread
Results: The channel can best be characterized as having “widespread moderate defects.” Performance of the channel protection is affected. Report 4.



Figure 152. Scour and missing riprap at concrete box culvert outlet.

**Table BC10 Channel Protection Condition Rating Code**

| WSBIS Code | Description |
|---|---|
| N | Not Applicable - Bridge does not have a waterway/relief for waterway feature type OR channel protection devices do not exist AND have never existed at the bridge. |
| 8 | Very good - Isolated or some inherent defects. |
| 7 | Good - Some minor defects. |

**Table BC10 Channel Protection Condition Rating Code**

| WSBIS Code | Description |
|---|---|
| 6 | Satisfactory - Widespread minor or isolated moderate defects. |
| 5 | Fair - Some moderate defects; performance of the channel protection is not affected. |
| 4 | Poor - Widespread moderate or isolated major defects; performance of channel protection is affected. |
| 3 | Serious - Major defects; performance of channel protection is seriously affected. Condition typically necessitates more frequent monitoring or corrective actions. |
| 2 | Critical - Major defects; channel protection is severely compromised. Condition typically necessitates more frequent monitoring or corrective actions. |
| 1 | Imminent failure - Channel protection has failed, but corrective action could restore it to working condition. |
| 0 | Failed - Channel protection is beyond repair and must be replaced. |

## Scour Vulnerability

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | I | BAP03 | B.AP.03 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the scour vulnerability of the bridge using one of the following codes in Table BAP03:<br><br>Code N if the bridge does not cross over a waterway as indicated in Item B.F.01 (Feature Type). | The intent of this item is to record the status and vulnerability determination from scour appraisals required by the NBIS.<br><br>The codes for this item are based on the appraised scour vulnerability as described in HEC-18, Evaluating Scour at Bridges; HEC-23, Bridge Scour and Stream Instability Countermeasures; and HEC-20, Stream Stability at Highway Structures.<br><br>Scour appraisals are typically performed by a multidisciplinary team of hydraulic, geotechnical, and structural engineers (Scour Appraisal Team).<br><br>FHWA Hydraulic Technical Advisories, and manuals, and software can be found at: https://www.fhwa.dot.gov/engineering/hydraulics/<br><br>Refer to item B.C.11 (Scour Condition Rating) in the Component Condition Ratings subsection to address field observed scour conditions and the effect on bridge components. |

## Scour Vulnerability continued...

### Commentary Continued

Use code B when designed, installed, and functioning countermeasures are used to address potential scour and to maintain bridge stability for new or existing bridges, or bridges with unknown foundations.

Use code B when the Scour Appraisal Team determines that the in-place, non-designed countermeasures are fully functioning and are appropriate to mitigate the risk of scour.

Use code C for bridges that could become unstable for the potential scour, and temporary countermeasures are installed that were not designed.

**Table BAP03 Scour Vulnerability Code**

| WSBIS Code | SNBI Code | Condition Description |
|---|---|---|
| N | - | Not applicable, no waterway or relief for waterway feature type. |
| 0 | 0 | Scour appraisal has not been completed. |
| A | A | Scour appraisal completed. Bridge determined to be stable for scour. |
| Z | A | Scour appraisal completed. Bridges over a waterway with the substructure elements set well back from the waterway such that the 500-year flood will not inundate them, and channel migration potential will not reach them. |
| B | B | Scour appraisal completed. Bridge determined to be stable for scour, dependent upon designed and functioning countermeasures. |
| C | C | Scour appraisal completed. Bridge could become unstable for scour. Temporary (not designed) countermeasure installed to mitigate scour. Bridge is scour critical. |
| D | D | Scour appraisal completed. Bridge is, or may become, unstable for scour. Bridge is scour critical. |
| E | E | Scour appraisal has not been completed. Temporary (not designed) countermeasure installed to mitigate scour. |
| U | U | Scour appraisal has not been completed due to unknown foundations. |
| * | - | Delete |

## Scour Plan of Action

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | I | BAP04 | B.AP.04 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code whether the bridge has a scour plan of action (POA) implemented using one of the following codes in Table BAP04.<br><br>This item not reported to FHWA if the bridge does not cross over a waterway as indicated in Item B.F.01 (Feature Type). | The NBIS requires a scour POA for bridges over water that are determined to be scour critical or have unknown foundations.<br><br>More information on scour POA can be found at the FHWA Hydraulics Engineering website: www.fhwa.dot.gov/engineering/hydraulics/bridgehyd/poa.cfm.<br><br>Use code 0 if a bridge was considered scour critical, but now has designed, installed, and fully functional scour countermeasures.<br><br>Code X when structure does not pass over a waterway, and a scour plan of action is not applicable.<br><br>A scour POA is a document that addresses, based on risk, a schedule for repair or installation of scour countermeasures, and/or the monitoring, inspection, closing, and opening a bridge to traffic during and after flood events to protect the traveling public.<br><br>A scour POA is implemented when those responsible for actions under the plan are aware of their responsibilities, and are exercising them when called for during or after a triggering event.<br><br>A bridge should have a scour POA when it could become unstable for scour, and temporary countermeasures are installed that were not designed. |

**Table BAP04 Scour Plan of Action Code**

| WSBIS Code | SNBI Code | Condition Description |
|---|---|---|
| 0 | 0 | Waterway present, but a scour POA is not required. |
| N | N | A scour POA is required, but not implemented. |
| Y | Y | A scour POA is required and implemented. |
| X | - | Not Applicable (no waterway or relief for waterway feature type) |

## Overtopping Likelihood

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BAP02 | B.AP.02 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the likelihood of the waterway overtopping the bridge using one of the following codes in Table BAP02.<br><br>When this field is coded N, it is not reported to FHWA. | An overtopping occurrence is when the waterway overtops the riding surface carried on the bridge.<br><br>Bridge overtopping likelihood, since the year built (B.W.01), is typically determined from historical bridge inspection or maintenance records, hydraulic studies, local residents/landowners, and/or site indicators including highwater marks on the bridge or its surroundings, debris remains on bridge upper members, etc.<br><br>For newer bridges with limited historical inspection or maintenance information, hydraulic design information can be used to establish an overtopping likelihood.<br><br>This item does not apply to the likelihood of the waterway overtopping approach roadways. |

**Table BAP02 Overtopping Likelihood Code**

| WSBIS Code | SNBI Code | Condition Description |
|---|---|---|
| 0 | 0 | Never |
| 1 | 1 | Remote – once every 100 years or less frequently |
| 2 | 2 | Very low – once every 51 to 99 years |
| 3 | 3 | Low – once every 26 to 50 years |
| 4 | 4 | Moderate – once every 11 to 25 years |
| 5 | 5 | High – once every 3 to 10 years |
| 6 | 6 | Very High – once every 2 years or more frequently |
| N | - | Not Applicable (no waterway or relief for waterway feature type) |

# Approach Roadway Alignment

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BAP01 | B.AP.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the ~~operating~~ speed reduction at the bridge using one of the following codes.<br><br>**Code** **Description**<br>G Good<br>F Fair<br>P Poor<br><br>w/errata#1 03/24 | This item identifies bridges that do not function adequately due to the horizontal or vertical alignment of the bridge and approach roadway. It is not intended that the alignment be compared to current standards, but rather to the existing roadway alignment.<br><br>The basic criterion is how the alignment of the bridge and approach roadway relates to the general highway alignment for the section of highway the bridge carries. |

**Examples**

Do not consider speed reductions due to the bridge width or intersecting highways when reporting this item.

The posted speed at the bridge is compared to the posted speed of the general highway segment. Operating speed at the bridge is used in place of posted speed at the bridge when a posted speed is not present at the bridge. Operating speed of the general highway segment is used in place of posted speed of the general highway segment when a posted speed is not present on the general highway segment.

Use code G when the ~~operating~~ speed is no different at the bridge than the rest of the highway segment that crosses the bridge.

Use code F when the ~~operating~~ speed is noticeably different at the bridge than the rest of the highway segment that crosses the bridge.

Use code P when the ~~operating~~ speed is substantially different at the bridge than the rest of the highway segment that crosses the bridge.

w/errata#1 03/24

## Fatigue Details

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | I | BIR02 | B.IR.02 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code whether the bridge has AASHTO fatigue category E or E' details using one of the following codes in Table BIR02.<br><br>When this field is coded X, it is not reported to FHWA. | This item provides data to identify bridges that have details most prone to fatigue.<br><br>Refer to the BIRM or AASHTO LRFD Bridge Design Specifications for fatigue categories. |

**Table BIR02 Fatigue Details Code**

| WSBIS Code | SNBI Code | Description |
|---|---|---|
| N | N | Primary steel elements with no E/E' details |
| Y | Y | Primary steel elements with E/E' details |
| X | - | No primary steel elements, not applicable |

## Seismic Vulnerability

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | I | BAP05 | B.AP.05 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

**Specification**

Code the seismic vulnerability of the bridge using one of the following codes in Table BAP05.

**Commentary**

This item provides available information resulting from seismic evaluation and retrofit programs that an agency may have performed of their own volition. The codes allow for a broad interpretation based on the reporting agency's methods and evaluation criteria.

In lieu of agency-developed evaluation criteria, refer to the FHWA Seismic Retrofitting Manual for Highway Structures: Part 1 – Bridges, Publication No. FHWA-HRT-06-032, January 2006, for guidance on assessing the vulnerability of highway structures to the effects of earthquakes, and implementing retrofit measures to improve performance.

Use code A when bridge is designed to meet applicable performance criteria established by the design specifications in effect at the time of construction and bridge would be expected to meet current agency established performance criteria. Structures designed in accordance with AASHTO Guide Specifications for LRFD Bridge Design Second Edition 2011 or later should be coded A.

Use code C when only certain portions of the bridge have been retrofitted but not all portions of the bridge have been retrofitted to meet agency performance criteria.

**Table BAP05 Seismic Vulnerability Code**

| WSBIS/SNBI Code | Description |
|---|---|
| 0 | Seismic evaluation not completed. |
| N | Bridge does not require seismic evaluation due to low anticipated ground motion or agency prioritization. |
| A | Seismic evaluation completed. Bridge determined to meet the agency's performance criteria established for the evaluation without need for retrofit. |
| B | Seismic evaluation completed. Satisfactory performance is dependent upon a designed, installed, and functioning retrofit. Retrofit is in place. |
| C | Seismic evaluation completed. Satisfactory performance is dependent upon a designed, installed, and functioning retrofit. Partial retrofit is in place. |
| D | Seismic evaluation completed. Satisfactory performance is dependent upon a designed, installed, and functioning retrofit. Retrofit is not in place. |

## FHWA Risk Category

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Calculated | - | - | WAP10 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

The FHWA Risk Category is not used until FHWA Metrics for the Oversight of the National Bridge Inspection Program (the 23 metrics) are finalized in the near future.

## *Miscellaneous Fields*

## Asphalt Depth (inches) *(Old Item 2610)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(5,2) | - | - | WIE30 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

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.

## Design Curb Height *(Old Item 2611)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(5,2) | - | - | WIE31 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

**Specification**

Code the curb height shown on current bridge plans in inches.

Code 0 when there is no curb.

## Bridge Vehicle Rail Height (inches) *(Old Item 2612)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(5,2) | - | - | WIE32 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

**Specification**

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

## Number of Utilities *(Old Item 2675)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WIE33 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

**Specification**

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.

Code 9 if more than nine utilities are attached to the bridge.

Code 0 if there are no utilities.

## Subject to NBIS Flag *(Old Item 2614)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WIE34 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

### Specification

This field identifies whether or not the bridge is or will be subject to the National Bridge Inspection Standards (NBIS). Newly inventoried bridges should be coded based on final configuration and expected use.

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

### Commentary

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

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

Structures not subject to the NBIS include:

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

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

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

| Inspection Quality Assurance Date | | | | | |
|---|---|---|---|---|---|
| **Format** | **SNBI Format** | **Frequency** | **WSBIS Item ID** | **SNBI Item ID** | **SNTI Item ID** |
| Pulldown | YYYYMMDD | EI | BIE09 | B.IE.09 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the date that the QA review was completed.<br><br>This field is not reported to the FHWA when a QA review was not performed. | The intent of this item is to identify inspections that have had independent QA reviews to measure or verify the overall quality of the inspection program.<br><br>Agency QA procedures often vary in the definition of a review period and number of inspections reviewed. Bridge inspections might be randomly selected for agency QA reviews or selected based on representative bridge type, region, district, or other agency defined bridge populations. |

## *Inspection Flags*

| Soundings Flag *(Old Item 2693)* | | | | | |
|---|---|---|---|---|---|
| **Format** | **SNBI Format** | **Frequency** | **WSBIS Item ID** | **SNBI Item ID** | **SNTI Item ID** |
| Pulldown | - | - | WIE20 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| This code indicates whether or not soundings of the streambed (streambed cross sections at the bridge) are required.<br><br>**Code** — **Description**<br>Y — Soundings need to be taken<br>* — 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.<br><br>Note: Pedestrian bridges over waterways are managed for soundings and may be coded Y as appropriate. |

## Clearance Flag *(Old Item 2694)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WIE21 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| This field indicates that an inspection team should collect clearance data.<br><br>**Code** — **Description**<br>C — Measure horizontal/lateral and vertical clearances<br>* — Null field, measurements are not required, or were just collected | This field is coded as part of the inspection planning process, and instructs the inspector to collect and record clearance measurements in accordance with WSDOT policy (see Chapter 3) and as indicated in the 2694 inspection note. Note that all vertical clearances in, on and under the structure need to be collected unless otherwise noted.<br><br>After measurements are collected and documents given to a Geometric Engineer for processing, change this code from C to * (null). |

## Revise Ratings Flag *(Old Item 2688)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WIE22 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| 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.<br><br>**Code** — **Description**<br>Y — Yes, review rating<br>* — Null field, rating review is not required | See Section 5-2. |

## Photos Flag *(Old Item 2691)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WIE23 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| This code indicates whether or not the structure needs photos taken.<br><br>**Code** — **Description**<br>D — Deck photo needed<br>E — Elevation or tunnel portal photo needed<br>P — Deck and Elevation photos needed<br>* — Null field, photos are not required | |

## Roadside Hardware Flag

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WIE25 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the inspection type or scour monitoring performed using one of the following codes.<br><br>**Code** — **Description**<br>Y — Yes<br>* — Delete | |

| QA Flag *(Old Item 2695)* | | | | | |
|---|---|---|---|---|---|
| **Format** | **SNBI Format** | **Frequency** | **WSBIS Item ID** | **SNBI Item ID** | **SNTI Item ID** |
| Pulldown | - | - | WIE24 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| This code indicates whether or not a quality assurance report was created for this structure.<br><br>**Code** — **Description**<br>Y — Quality assurance report on file<br>* — Null field | |

## *Work Events*

| Year Built | | | | | |
|---|---|---|---|---|---|
| **Format** | **SNBI Format** | **Frequency** | **WSBIS Item ID** | **SNBI Item ID** | **SNTI Item ID** |
| N(4,0) | N(4,0) | I | BW01 | B.W.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the year in which original construction was completed and the bridge was able to carry traffic.<br><br>For phased construction, report the year in which the first phase was completed and the bridge was able to carry traffic. | This date reflects the date when construction was completed, regardless of when the bridge was opened to traffic.<br><br>Rehabilitation and/or widening of a bridge does not change the year built. If any portion of the bridge remains, the year built does not change.<br><br>Provide a best estimate when the year built is unknown; do not assign a default value. |

## Year Rebuilt - SNTI

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,0) | N(4,0) | - | TA2 | - | A.2 |

**Applicable Structure Types**

- **Type 3 - Tunnels carrying roadways within**

### Specification

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

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

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

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

Safety feature replacement or upgrading (for example, bridge rail, approach guardrail or impact attenuators).

Painting of structural steel.

Overlay of bridge deck.

Utility work.

Emergency repair to restore structural integrity to the previous status following an accident.

Retrofitting to correct a deficiency which does not substantially alter physical geometry or increase the load-carrying capacity.

Work performed to keep a structure operational while plans for complete rehabilitation or replacement are under preparation (for example, adding a substructure element or extra girder).

## Year Work Performed

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,0) | N(4,0) | I | BW02 | B.W.02 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| TO BE IMPLEMENTED IN SUMMER OF 2025 | TO BE IMPLEMENTED IN SUMMER OF 2025 |

## Work Performed

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(120) | AN(120) | I | BW03 | B.W.03 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| TO BE IMPLEMENTED IN SUMMER OF 2025 | TO BE IMPLEMENTED IN SUMMER OF 2025 |

## Optional Condition Ratings

| Optional Drain Condition *(LP View Only - Old Item 7664)* | | | | | |
|---|---|---|---|---|---|
| **Format** | **SNBI Format** | **Frequency** | **WSBIS Item ID** | **SNBI Item ID** | **SNTI Item ID** |
| Pulldown | - | - | LP01 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

This is the condition rating of the drains in the bridge deck.A rating of 5 should be used to indicate the drains are completely plugged with dirt and debris. Use Table LP01 Condition Rating for Drains.

**Table LP01 Optional Drain Condition Rating Code**

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

| Optional Retaining Wall Condition *(LP View Only - Old Item 7682)* | | | | | |
|---|---|---|---|---|---|
| **Format** | **SNBI Format** | **Frequency** | **WSBIS Item ID** | **SNBI Item ID** | **SNTI Item ID** |
| Pulldown | - | - | LP02 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

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

Wingwalls and curtain walls should not be considered under this code as they are considered part of the abutment. Use Table LP02 Condition Rating for Retaining Walls.

**Table LP02 Optional Retaining Wall Condition Rating Code**

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

**Table LP02 Optional Retaining Wall Condition Rating Code**

| WSBIS Code | Condition Description |
|---|---|
| 4 | Poor Condition. Advanced deficiencies such as section loss, deterioration, cracking, spalling, or scour. |
| 3 | Serious Condition. Loss of section, deterioration, spalling, or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present. |
| 2 | Critical Condition. Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete maybe present or scour may have removed substructure support. Unless closely monitored, it may be necessary to close the bridge until corrective action is taken. |
| 1 | Imminent Failure Condition. Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service. |
| 0 | Failed Condition. Out of service. Beyond corrective action. |

# Bridge (Tunnel) ID Tab

| Structure ID | | | | | |
|---|---|---|---|---|---|
| **Format** | **SNBI Format** | **Frequency** | **WSBIS Item ID** | **SNBI Item ID** | **SNTI Item ID** |
| AN(8) | AN(15) | I | BID01 | B.ID.01 | I.1 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| WSBIS/Bridgeworks data stewards assign Structure Identifier (SID) numbers to all structures that qualify for inclusion in the Washington State Bridge Inventory System (WSBIS). See Chapter 2 for more details.<br><br>Do not change the SID once it has been assigned and recorded. There may be exceedingly rare circumstances (none so far in WSBIS history) that require a one-time change. In that event, report the previous SID under BID03.<br><br>Except in cases where elevated ramps merge or split, report all spans from abutment to abutment as one bridge. | This field must be unique for every structure in the Washington State Bridge Inventory.<br><br>When a new structure replaces an old structure, a new unique SID must be coded. The old SID cannot be recycled.<br><br>When any portion of the existing bridge is retained for a rehabilitated or partially replaced bridge, it is preferable to retain the existing SID.<br><br>The BPO and LP Data Stewards assign SID 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. |

**Commentary Continued**

It is preferable that any bridge or bridges with a closed median, where the area between the two roadways on the bridge is bridged over and can support traffic, be reported as one bridge. Closed medians may have either mountable or non-mountable curbs or barriers.

It is preferable that separate superstructures with an open median (not meeting the closed median criteria above) sharing a common substructure unit or units be reported as two bridges.

It is preferable that separate bridge numbers be reported for each mainline bridge and the ramp that connects to the mainline bridge, when the ramp has at least one distinct abutment and is greater than 20 feet in length. It is also preferable that separate bridge numbers be reported for a bridge that divides into two or more separate bridges, or two or more bridges that merge into one single bridge. In both cases, the separating point between bridges should be the closest deck joint, or substructure unit to the separating point, or other logical and reasonable location as determined by the bridge owner.

Double deck bridges may be reported as one or two bridges. However, all related data items need to be compatible with the method selected.

Consult with the local FHWA division office contact for questions concerning assigning bridge numbers to unique or complex bridges.

## Previous Structure ID

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(8) | AN(15) | I | BID03 | B.ID.03 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the bridge number previously associated with the bridge that has been replaced by the inventoried bridge, or when the inventoried bridge number has changed.<br><br>Code 0 if no previous bridge number. | The purpose of this item is to retain a link to data for previous bridge numbers associated with this bridge in the NBI. |

## Structure Type

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | I | WID01 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

WSBIS currently maintains records for 4 structure types and each structure in WSBIS can only be one structure type. Public Roadways are Functionally Classified roadways as defined in BH01.

| | |
|---|---|
| Type 1 | Bridges and culverts carrying public roadways |
| Type 2 | Pedestrian, railroad and other non-vehicular bridges over public roadways |
| Type 3 | Tunnels carrying roadways within |
| Type 4 | Structures that do not carry or cross over/under a public roadway |

**New functionality as of 2025 in WSBIS:**

**All the tabs and fields are dynamically set to display the releveant fields per structure type.**

**Equally, what's relevant to each structure is represented per Inspection report pdf.**

## Structure Type continued...

### Commentary

**Type 1 structures** may or may not be reported to FHWA, but must always carry vehicular traffic, and almost always carry public roadways. There are occasions where Type 1 structures carry private or restricted roadways when these structures are connected to the public roadway system, and separated only by an "authorized use only" sign or a gate that is not permanently closed.

**Type 2 structures** are not reported to FHWA. These structures do not carry vehicular traffic, except for maintenance vehicles on bike paths and other non-vehicular routes not connected to the public roadway system. These structures must carry public highways under the structure.

**Type 3 structures** tunnels that carry vehicular traffic on public roadways within, and are reportable to FHWA. Railroad and pedestrian structures under public roadways that are structurally considered tunnels are coded as type 1 structures.

**Type 4 structures** do not cross over or under a public roadway and are not reported to FHWA, but are maintained in WSBIS at the structure owners convenience. WSDOT maintains these records for pedestrian or utility bridges on WSDOT right of way.

**For more information on how Structure Types relate to Features see Items WF01 and BF02..**

## Structure Number *(Old Name Bridge Number)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(13) | - | I | WID02 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

### Specification / Commentary

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 blank.

WSDOT owned structure numbers are formatted as follows:

» [route number] / [alphanumeric character string]

WSDOT structure numbers follow several rules:

1. The forward slash (/) is always in the 4th position, with leading blanks as needed. For example, structures on I-5 are coded with two leading blanks followed by a 5 and a forward slash. Structures 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.

## Structure Number continued...

### Specification / Commentary Continued

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 |

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.

### Examples

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 |

## Structure Sort Number

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(20) | - | I | WID03 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

### Specification / Commentary

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

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.

## Structure Name

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(50) | AN(300) | I | BID02 | B.ID.02 | I.2 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the commonly known name(s) for the bridge. For more than one name, report all names with the most common name first.<br><br>Code multiple names separated by pipe ( \| ) delimiters. | This is the name of the structure, either as determined by legislative action or as determined by the structure owner. If the structure name is more than one word, separate words with a blank space. If the name of the structure exceeds the 50 character limit, use abbreviations to shorten it. |

## Program Manager

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | I | WID06 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification / Commentary**

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.

This field is set during record creation. After the record has been created this field can only be changed by the Super User Account.

## Owner

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(4) | I | BCL01 | B.CL.01 | C.1 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Specification Continued |
|---|---|
| Code the agency that has ownership of the bridge using one of the following codes in Table BCL01.<br><br>Use the hierarchy of State, Federal, county, city, railroad, and other private entity for multiple owners of a bridge.<br><br>If the owner and maintenance responsibility are not the same agency they should have an agreement and it should be part of the bridge record. | Use codes FL01 through FLX for Federal Lands Management agencies identified at the following FHWA website: https://highways.dot.gov/federal-lands/transportation.<br><br>Use code T for transit agency or authority for air, bus, light rail, and port regardless of whether the entity is considered State, local, or private.<br><br>Use code P for private owners other than railroad or transit.<br><br>Use code R for highway bridges owned by railroad entities that are not considered a transit agency or authority. |

**Table BCL01 Owner Code**

| WSBIS/SNBI Code | SNTI Code | Description |
|---|---|---|
| S01 | 001 | State transportation department |
| S02 | 011 | State park, forest, or reservation agency |
| S03 | 031 | State toll authority |
| S22 | 001 | State Ferries |
| S91 | 001 | Canada |
| S92 | 001 | Idaho |
| S93 | 001 | Oregon |
| SX | 021 | Other State agency |
| L01 | 002 | County highway agency |
| L03 | 004 | City or municipal highway agency |
| L04 | 012 | County park, forest, or reservation agency |
| L06 | 012 | City park, forest, or reservation agency |
| L05 | 032 | County toll authority |
| L07 | 032 | City or other toll authority |
| LX1 | 025 | Other county agency |
| LX2 | 025 | Other city or local agencies |
| FX | 060 | Other Federal agency |
| FL01 | 062 | Bureau of Indian Affairs (BIA) |
| FL02 | 068 | Bureau of Land Management (BLM) |
| FL03 | 069 | Bureau of Reclamation (USBR) |
| FL04 | 063 | U.S. Fish and Wildlife Service (FWS) |
| FL05 | 066 | National Park Service (NPS) |
| FL06 | 070 | Corps of Engineers (Civil) |
| FL08 | 070 | Corps of Engineers (Military) |
| FL07 | 064 | U.S. Forest Service (USFS) |
| I | 061 | Indian Tribal Government |
| D01 | 072 | Air Force |
| D02 | 074 | Army |
| D03 | 073 | Navy/Marines |
| T | 027 | Transit agency/authority |
| P | 026 | Private |
| R | 027 | Railroad |
| X | 080 | Other/Unknown |

WSDOT Commentary:
The following codes are not used by any structures within Washington State and have been removed from the above table:

F01-Agriculture Research Service (ARS), F02-Department of Energy (DOE), F03-General Services Administration (GSA), F04-National Aeronautics and Space Administration (NASA), F05-Smithsonian – National Zoo, F06-Tennessee Valley Authority (TVA), F07-U.S. Department of Veterans Affairs, F08-Federal Emergency Management Agency (FEMA), F09-International Boundary and Water Commission-United States Section (USIBWC), D04-Pentagon, D05-National Security Agency (NSA), DX-Other Department of Defense, FL0X-Other Federal Lands Management Agency, D04-Pentagon, L02-Town or township highway agency, U-Unknown

## Maintenance Responsibility

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(4) | I | BCL02 | B.CL.02 | C.2 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the agency that has primary maintenance responsibility for the bridge using one of the codes listed in Table BCL01 Owner Code.<br><br>If the owner and maintenance responsibility are not the same agency they should have an agreement and it should be part of the bridge record. | Use the hierarchy of State, Federal, county, city, railroad, and other private entity for determining primary responsibility for maintenance of a bridge.<br><br>Use codes FL01 through FLX for Federal Lands Management agencies identified at the following FHWA website https://flh.fhwa.dot.gov/programs/fltp/.<br><br>Use codes D01 through DX for bridges maintained by the Department of Defense.<br><br>Use code T for transit agency or authority for air, bus, light rail, and port regardless of whether the entity is considered State, local, or private.<br><br>Use code P for private entities other than railroad or transit.<br><br>Use code R for highway bridges maintained by railroad entities that are not considered a transit agency or authority. |

## County

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,0) | - | I | BL02 | B.L.02 | I.4 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

Code the FIPS code for the county in which the bridge is located. See Table BL02.

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

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

Use the FIPS codes in the current version of the Census of Population and Housing - Geographic Identification Code Scheme to determine the appropriate code.

County and county equivalent entity codes can be found through a link at the following web site: https://www.fhwa.dot.gov/bridge/nbi.cfm

For border bridges, the Neighboring State reports this item as part of their abbreviated bridge record. For more information, see the Border Bridges section of this document.

**Table BL02 County Code**

| WSBIS Code | SNBI/SNTI Code | County Name | WSBIS Code | SNBI/SNTI Code | County Name |
|---|---|---|---|---|---|
| 1 | 001 | Adams | 21 | 041 | Lewis |
| 2 | 003 | Asotin | 22 | 043 | Lincoln |
| 3 | 005 | Benton | 23 | 045 | Mason |
| 4 | 007 | Chelan | 24 | 047 | Okanogan |
| 5 | 009 | Clallam | 25 | 049 | Pacific |
| 6 | 011 | Clark | 26 | 051 | Pend Oreille |
| 7 | 013 | Columbia | 27 | 053 | Pierce |
| 8 | 015 | Cowlitz | 28 | 055 | San Juan |
| 9 | 017 | Douglas | 29 | 057 | Skagit |
| 10 | 019 | Ferry | 30 | 059 | Skamania |
| 11 | 021 | Franklin | 31 | 061 | Snohomish |
| 12 | 023 | Garfield | 32 | 063 | Spokane |
| 13 | 025 | Grant | 33 | 065 | Stevens |
| 14 | 027 | Grays Harbor | 34 | 067 | Thurston |
| 15 | 029 | Island | 35 | 069 | Wahkiakum |
| 16 | 031 | Jefferson | 36 | 071 | Walla Walla |
| 17 | 033 | King | 37 | 073 | Whatcom |
| 18 | 035 | Kitsap | 38 | 075 | Whitman |
| 19 | 037 | Kittitas | 39 | 077 | Yakima |
| 20 | 039 | Klickitat | | | |

## City

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WL05 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

Code the city name the bridge is located in.

Code 0 (unincorporated) if the bridge is not within a city.

This field is the current list of Incorporated City data from OFM (2020 Census Data). The preceding number associated with the city name in the dropdown list is the retired 1990 FIPS federal census place code.

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

## Place Code

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | N(5,0) | I | BL03 | B.L.03 | I.5 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the FIPS Place code for the City, Town, and Census-Designated Place (CDP) where the bridge is located. See Table BL03.<br><br>Code 0 (unincorporated) if there is no FIPS place code where the bridge is located.<br><br>See the following links for more information:<br>https://www.usgs.gov/us-board-on-geographic-names<br><br>https://www.usgs.gov/national-hydrography/national-hydrography-dataset | Use the FIPS codes in the current version of the Census of Population and Housing - Geographic Identification Code Scheme to determine the city, town, or other census designated place code, regardless of ownership. |

**Table BL03 Place Code**

| City/Town/ Village | Place Code | City/Town/ Village | Place Code | City/Town/ Village | Place Code |
|---|---|---|---|---|---|
| UNINCORPORATED = 0 | | | | | |
| Aberdeen | 00100 | Geneva CDP | 26420 | Oso CDP | 52110 |
| Aberdeen Gardens CDP | 00135 | George | 26455 | Othello | 52215 |
| Acme CDP | 00275 | Gig Harbor | 26735 | Otis Orchards-East Farms CDP | 52267 |
| Addy CDP | 00380 | Glacier CDP | 26875 | Outlook CDP | 52285 |
| Ahtanum CDP | 00800 | Gleed CDP | 26945 | Oyehut CDP | 52378 |
| Airway Heights | 00905 | Glenwood CDP | 27225 | Pacific | 52495 |
| Albion | 01010 | Gold Bar | 27365 | Pacific Beach CDP | 52530 |
| Alder CDP | 01045 | Goldendale | 27435 | Packwood CDP | 52600 |
| Alderton CDP | 01150 | Gorst CDP | 27680 | Palouse | 52950 |
| Alderwood Manor CDP | 01185 | Graham CDP | 27785 | Parker CDP | 53265 |
| Alger CDP | 01255 | Grand Coulee | 27855 | Parkland CDP | 53335 |
| Algona | 01290 | Grand Mound CDP | 27890 | Parkwood CDP | 53440 |
| Allyn CDP | 01430 | Grandview | 27925 | Pasco | 53545 |
| Almira | 01500 | Granger | 27960 | Pataha CDP | 53660 |
| Altoona CDP | 01745 | Granite Falls | 27995 | Pateros | 53720 |
| Amanda Park CDP | 01780 | Grapeview CDP | 28135 | Pe Ell | 53930 |
| Amboy CDP | 01850 | Grayland CDP | 28345 | Peaceful Valley CDP | 53800 |
| Ames Lake CDP | 01920 | Grays River CDP | 28450 | Picnic Point CDP | 54213 |
| Anacortes | 01990 | Green Bluff CDP | 28590 | Pine Grove CDP | 54405 |
| Anatone CDP | 02025 | Greenwater CDP | 28695 | Point Roberts CDP | 55015 |
| Anderson Island CDP | 02060 | Hamilton | 29255 | Pomeroy | 55120 |
| Arlington | 02585 | Hansville CDP | 29430 | Port Angeles | 55365 |
| Arlington Heights CDP | 02620 | Harrah | 29710 | Port Angeles East CDP | 55400 |
| Artondale CDP | 02910 | Harrington | 29745 | Port Gamble Tribal Comm.CDP | 55612 |
| Ashford CDP | 03005 | Hartline | 29920 | Port Hadlock-Irondale CDP | 55620 |
| Asotin | 03075 | Hat Island CDP | 30030 | Port Ludlow CDP | 55645 |
| Auburn | 03180 | Hatton | 30060 | Port Orchard | 55785 |
| Bainbridge Island | 03736 | Hazel Dell CDP | 30305 | Port Townsend | 55855 |
| Bangor Base CDP | 04100 | Herron Island CDP | 30690 | Porter CDP | 55540 |
| Banks Lake South CDP | 04125 | High Bridge CDP | 30750 | Poulsbo | 55995 |
| Barberton CDP | 04195 | Hobart CDP | 31495 | Prairie Heights CDP | 56150 |
| Baring CDP | 04300 | Hockinson CDP | 31530 | Prairie Ridge CDP | 56170 |
| Barney's Junction CDP | 04347 | Hogans Corner CDP | 31540 | Prescott | 56240 |
| Barstow CDP | 04370 | Home CDP | 31985 | Prosser | 56450 |
| Basin City CDP | 04405 | Hoodsport CDP | 32125 | Puget Island CDP | 56555 |
| Battle Ground | 04475 | Hoquiam | 32300 | Pullman | 56625 |
| Bay Center CDP | 04615 | Humptulips CDP | 32650 | Purdy CDP | 56660 |
| Bay View CDP | 04790 | Hunts Point | 32755 | Puyallup | 56695 |

**Table BL03 Place Code**

| City/Town/ Village | Place Code | City/Town/ Village | Place Code | City/Town/ Village | Place Code |
|---|---|---|---|---|---|
| Beacon Hill CDP | 04825 | Ilwaco | 33000 | Queets CDP | 56905 |
| Beaux Arts Village | 04895 | Inchelium CDP | 33105 | Quilcene CDP | 56975 |
| Belfair CDP | 05140 | Index | 33175 | Qui-nai-elt Village CDP | 57030 |
| Bell Hill CDP | 05245 | Indianola CDP | 33280 | Quincy | 57115 |
| Bellevue | 05210 | Ione | 33560 | Raft Island CDP | 57140 |
| Bellingham | 05280 | Issaquah | 33805 | Rainier | 57220 |
| Benton City | 05560 | Jamestown CDP | 33890 | Ravensdale CDP | 57395 |
| Bethel CDP | 05735 | Kahlotus | 34575 | Raymond | 57430 |
| Beverly CDP | 05770 | Kalama | 34645 | Reardan | 57465 |
| Bickleton CDP | 05980 | Kapowsin CDP | 34890 | Redmond | 57535 |
| Big Lake CDP | 06050 | Kayak Point CDP | 34915 | Renton | 57745 |
| Bingen | 06085 | Keller CDP | 34960 | Republic | 57850 |
| Birch Bay CDP | 06190 | Kelso | 35065 | Richland | 58235 |
| Black Diamond | 06330 | Kendall CDP | 35135 | Ridgefield | 58410 |
| Blaine | 06505 | Kenmore | 35170 | Ritzville | 58725 |
| Blyn CDP | 06855 | Kennewick | 35275 | River Road CDP | 58777 |
| Bonney Lake | 07170 | Kent | 35415 | Riverbend CDP | 58742 |
| Bothell | 07380 | Ketron Island CDP | 35450 | Riverpoint CDP | 58768 |
| Bothell East CDP | 07390 | Kettle Falls | 35485 | Riverside | 58795 |
| Bothell West CDP | 07395 | Key Center CDP | 35555 | Roche Harbor CDP | 59075 |
| Boulevard Park CDP | 07397 | Keyport CDP | 35625 | Rochester CDP | 59110 |
| Bow CDP | 07450 | Kingston CDP | 35870 | Rockford | 59145 |
| Boyds CDP | 07485 | Kirkland | 35940 | Rock Island | 59180 |
| Brady CDP | 07590 | Kitsap Lake CDP | 36010 | Rockport CDP | 59250 |
| Bremerton | 07695 | Kittitas | 36045 | Rocky Point CDP | 59390 |
| Brewster | 07835 | Klickitat CDP | 36115 | Ronald CDP | 59635 |
| Bridgeport | 07870 | Krupp | 36395 | Roosevelt CDP | 59705 |
| Brier | 07940 | La Center | 36710 | Rosalia | 59775 |
| Brinnon CDP | 08080 | Lacey | 36745 | Rosburg CDP | 59845 |
| Browns Point CDP | 08325 | La Grande CDP | 36920 | Rosedale CDP | 59880 |
| Brush Prairie CDP | 08465 | La Conner | 36780 | Roslyn | 60055 |
| Bryant CDP | 08500 | LaCrosse | 36850 | Roy | 60160 |
| Bryn Mawr-Skyway CDP | 08552 | Lake Bosworth CDP | 37077 | Royal City | 60230 |
| Buckley | 08570 | Lake Cassidy CDP | 37100 | Ruston | 60510 |
| Bucoda | 08605 | Lake Cavanaugh CDP | 37105 | Ryderwood CDP | 60580 |
| Buena CDP | 08640 | Lake Forest Park | 37270 | Salmon Creek CDP | 61000 |
| Bunk Foss CDP | 08770 | Lake Goodwin CDP | 37287 | Sammamish | 61115 |
| Burbank CDP | 08780 | Lake Holm CDP | 37345 | Santiago CDP | 61235 |
| Burien | 08850 | Lake Ketchum CDP | 37415 | Satsop CDP | 61350 |
| Burley CDP | 08885 | Lake Marcel-Stillwater CDP | 37538 | Schwana CDP | 61925 |
| Burlington | 08920 | Lake McMurray CDP | 37526 | Seabeck CDP | 62120 |

**Table BL03 Place Code**

| City/Town/ Village | Place Code | City/Town/ Village | Place Code | City/Town/ Village | Place Code |
|---|---|---|---|---|---|
| Camano CDP | 09365 | Lake Morton-Berrydale CDP | 37567 | SeaTac | 62288 |
| Camas | 09480 | Lake Roesiger CDP | 37672 | Seattle | 63000 |
| Canterwood CDP | 09810 | Lake Shore CDP | 37830 | Sedro-Woolley | 63210 |
| Canyon Creek CDP | 09820 | Lake Stevens | 37900 | Sekiu CDP | 63245 |
| Carbonado | 09970 | Lake Stickney CDP | 37917 | Selah | 63280 |
| Carlsborg CDP | 10075 | Lake Tapps CDP | 37920 | Sequim | 63385 |
| Carnation | 10215 | Lakeland North CDP | 37420 | Shadow Lake CDP | 63545 |
| Carson CDP | 10320 | Lakeland South CDP | 37430 | Shelton | 63735 |
| Cascade Valley CDP | 10455 | Lakeview CDP | 37926 | Shoreline | 63960 |
| Cashmere | 10495 | Lakewood | 38038 | Silvana CDP | 64190 |
| Castle Rock | 10565 | Lamont | 38215 | Silver Firs CDP | 64380 |
| Cathcart CDP | 10600 | Langley | 38355 | Silverdale CDP | 64365 |
| Cathlamet | 10635 | Larch Way CDP | 38420 | Sisco Heights CDP | 64610 |
| Cavalero CDP | 10645 | Latah | 38495 | Skamokawa Valley CDP | 64755 |
| Centerville CDP | 11090 | Laurier CDP | 38705 | Skokomish CDP | 64775 |
| Central Park CDP | 11195 | Leavenworth | 38845 | Skykomish | 64855 |
| Centralia | 11160 | Lebam CDP | 38880 | Snohomish | 65170 |
| Chain Lake CDP | 11325 | Lewisville CDP | 39212 | Snoqualmie | 65205 |
| Chehalis | 11475 | Lexington CDP | 39230 | Snoqualmie Pass CDP | 65275 |
| Chelan | 11615 | Liberty Lake | 39335 | Soap Lake | 65345 |
| Chelan Falls CDP | 11685 | Lind | 39510 | South Bend | 65625 |
| Cheney | 11825 | Lochsloy CDP | 39860 | South Cle Elum | 65765 |
| Cherry Grove CDP | 12015 | Lofall CDP | 39930 | South Creek CDP | 65810 |
| Chewelah | 12140 | Long Beach | 40070 | South Hill CDP | 65922 |
| Chico CDP | 12175 | Longbranch CDP | 40105 | South Prairie | 66045 |
| Chinook CDP | 12315 | Longview | 40245 | South Wenatchee CDP | 66185 |
| Clallam Bay CDP | 12525 | Longview Heights CDP | 40270 | Southworth CDP | 66220 |
| Clarkston | 12630 | Loomis CDP | 40350 | Spanaway CDP | 66255 |
| Clarkston Heights-Vineland CDP | 12680 | Loon Lake CDP | 40385 | Spangle | 66290 |
| Clayton CDP | 12735 | Lower Elochoman CDP | 40570 | Spokane | 67000 |
| Cle Elum | 12945 | Lyle CDP | 40735 | Spokane Valley | 67167 |
| Clear Lake CDP | 12820 | Lyman | 40770 | Sprague | 67175 |
| Clear Lake CDP | 12840 | Lynden | 40805 | Springdale | 67210 |
| Clearview CDP | 12875 | Lynnwood | 40840 | St. John | 60860 |
| Cliffdell CDP | 13015 | Mabton | 40980 | Stansberry Lake CDP | 67435 |
| Clinton CDP | 13155 | Machias CDP | 41470 | Stanwood | 67455 |
| Clover Creek CDP | 13215 | Malden | 42275 | Starbuck | 67490 |
| Clyde Hill | 13365 | Malo CDP | 42310 | Startup CDP | 67595 |
| Cohassett Beach CDP | 13595 | Malone CDP | 42345 | Steilacoom | 67770 |
| Colfax | 13785 | Malott CDP | 42380 | Steptoe CDP | 67805 |
| College Place | 13855 | Maltby CDP | 42415 | Stevenson | 67875 |

**Table BL03 Place Code**

| City/Town/ Village | Place Code | City/Town/ Village | Place Code | City/Town/ Village | Place Code |
|---|---|---|---|---|---|
| Colton | 13890 | Manchester CDP | 42450 | Sudden Valley CDP | 68200 |
| Colville | 14170 | Mansfield | 42800 | Sultan | 68260 |
| Conconully | 14310 | Manson CDP | 42835 | Sumas | 68330 |
| Concrete | 14380 | Maple Falls CDP | 43010 | Summit CDP | 68365 |
| Connell | 14485 | Maple Heights-Lake Desire CDP | 43062 | Summit View CDP | 68410 |
| Conway CDP | 14520 | Maple Valley | 43150 | Summitview CDP | 68417 |
| Copalis Beach CDP | 14660 | Maplewood CDP | 43255 | Sumner | 68435 |
| Cosmopolis | 14870 | Marblemount CDP | 43325 | Suncrest CDP | 68460 |
| Cottage Lake CDP | 14940 | Marcus | 43395 | Sunday Lake CDP | 68480 |
| Cougar CDP | 15010 | Marietta-Alderwood CDP | 43491 | Sunland Estates CDP | 68557 |
| Coulee City | 15080 | Marine View CDP | 43552 | Sunnyside | 68750 |
| Coulee Dam | 15115 | Markham CDP | 43640 | Sunnyslope CDP | 68785 |
| Country Homes CDP | 15150 | Marrowstone CDP | 43762 | Suquamish CDP | 69170 |
| Coupeville | 15185 | Martha Lake CDP | 43815 | Swede Heaven CDP | 69280 |
| Covington | 15290 | Maryhill CDP | 43885 | Tacoma | 70000 |
| Cowiche CDP | 15325 | Marysville | 43955 | Taholah CDP | 70175 |
| Crescent Bar CDP | 15603 | Mattawa | 44165 | Tampico CDP | 70245 |
| Creston | 15710 | May Creek CDP | 44260 | Tanglewilde CDP | 70280 |
| Crocker CDP | 15780 | McChord AFB CDP | 41155 | Tehaleh CDP | 70543 |
| Curlew CDP | 16165 | McCleary | 41225 | Tekoa | 70560 |
| Curlew Lake CDP | 16170 | McKenna CDP | 41645 | Tenino | 70630 |
| Cusick | 16340 | McMillin CDP | 41785 | Terrace Heights CDP | 70805 |
| Custer CDP | 16375 | Mead CDP | 44480 | Thorp CDP | 71225 |
| Dallesport CDP | 16550 | Meadow Glade CDP | 44620 | Three Lakes CDP | 71330 |
| Danville CDP | 16585 | Meadowdale CDP | 44585 | Tieton | 71400 |
| Darrington | 16690 | Medical Lake | 44690 | Tokeland CDP | 71680 |
| Dash Point CDP | 16760 | Medina | 44725 | Toledo | 71785 |
| Davenport | 16795 | Mercer Island | 45005 | Tonasket | 71890 |
| Dayton | 16970 | Mesa | 45180 | Toppenish | 71960 |
| Deep River CDP | 17215 | Metaline | 45285 | Torboy CDP | 71995 |
| Deer Park | 17320 | Metaline Falls | 45320 | Touchet CDP | 72030 |
| Deming CDP | 17495 | Methow CDP | 45355 | Town and Country CDP | 72170 |
| Des Moines | 17635 | Midland CDP | 45495 | Tracyton CDP | 72205 |
| Desert Aire CDP | 17617 | Mill Creek | 45865 | Trout Lake CDP | 72450 |
| Disautel CDP | 17880 | Mill Creek East CDP | 45870 | Tukwila | 72625 |
| Dixie CDP | 18055 | Millwood | 45985 | Tumwater | 72905 |
| Dollars Corner CDP | 18198 | Milton | 46020 | Twin Lakes CDP | 73065 |
| Donald CDP | 18265 | Mineral CDP | 46090 | Twisp | 73080 |
| Duluth CDP | 18775 | Minnehaha CDP | 46125 | Union CDP | 73255 |
| DuPont | 18965 | Mirrormont CDP | 46215 | Union Gap | 73290 |
| Duvall | 19035 | Moclips CDP | 46405 | Union Hill-Novelty Hill CDP | 73307 |
| East Cathlamet CDP | 19290 | Monroe | 46685 | Uniontown | 73360 |

**Table BL03 Place Code**

| City/Town/ Village | Place Code | City/Town/ Village | Place Code | City/Town/ Village | Place Code |
|---|---|---|---|---|---|
| East Port Orchard CDP | 19770 | Monroe North CDP | 46725 | University Place | 73465 |
| East Renton Highlands CDP | 19857 | Montesano | 46895 | Upper Elochoman CDP | 73580 |
| East Wenatchee | 20155 | Morton | 47175 | Vader | 73780 |
| Eastmont CDP | 19630 | Moses Lake | 47245 | Valley CDP | 73885 |
| Easton CDP | 19700 | Moses Lake North CDP | 47280 | Vancouver | 74060 |
| Eatonville | 20260 | Mossyrock | 47315 | Vantage CDP | 74200 |
| Edgewood | 20645 | Mountlake Terrace | 47490 | Vashon CDP | 74305 |
| Edison CDP | 20680 | Mount Vista CDP | 47630 | Vaughn CDP | 74445 |
| Edmonds | 20750 | Mount Vernon | 47560 | Venersborg CDP | 74585 |
| Elbe CDP | 20890 | Moxee | 47665 | Verlot CDP | 74760 |
| Electric City | 21030 | Mukilteo | 47735 | Waitsburg | 75565 |
| Elk Plain CDP | 21205 | Naches | 47805 | Walla Walla | 75775 |
| Ellensburg | 21240 | Napavine | 47980 | Walla Walla East CDP | 75810 |
| Elma | 21450 | Naselle CDP | 48015 | Waller CDP | 75905 |
| Elmer City | 21485 | Navy Yard City CDP | 48225 | Wallula CDP | 75985 |
| Endicott | 21730 | Neah Bay CDP | 48295 | Wapato | 76125 |
| Enetai CDP | 21800 | Neilton CDP | 48330 | Warden | 76160 |
| Entiat | 22010 | Nespelem | 48540 | Warm Beach CDP | 76195 |
| Enumclaw | 22045 | Nespelem Community CDP | 48550 | Washougal | 76405 |
| Ephrata | 22080 | Newcastle | 48645 | Washtucna | 76440 |
| Erlands Point CDP | 22115 | Newport | 48820 | Waterville | 76510 |
| Eschbach CDP | 22150 | Nile CDP | 49030 | Wauna CDP | 76615 |
| Esperance CDP | 22255 | Nisqually Indian Comm. CDP | 49193 | Waverly | 76720 |
| Everett | 22640 | Nooksack | 49275 | Wenatchee | 77105 |
| Everson | 22745 | Normandy Park | 49415 | West Clarkston-Highland CDP | 77297 |
| Fairchild AFB CDP | 22955 | North Bend | 49485 | West Pasco CDP | 77612 |
| Fairfield | 22990 | North Bonneville | 49555 | Westport | 77630 |
| Fairwood CDP | 23160 | North Fort Lewis CDP | 49765 | West Richland | 77665 |
| Fairwood CDP | 23165 | North Lynnwood CDP | 49940 | Wheeler CDP | 78050 |
| Fall City CDP | 23200 | North Omak CDP | 50007 | Whidbey Island Station CDP | 78155 |
| Farmington | 23340 | North Puyallup CDP | 50115 | White Center CDP | 78225 |
| Federal Way | 23515 | North Sultan CDP | 50183 | White Salmon | 78330 |
| Felida CDP | 23550 | North Yelm CDP | 50210 | White Swan CDP | 78365 |
| Fern Prairie CDP | 23690 | Northport | 50045 | Wilbur | 78680 |
| Ferndale | 23620 | Northwest Stanwood CDP | 50195 | Wilderness Rim CDP | 78780 |
| Fife | 23795 | Oakesdale | 50325 | Wilkeson | 78925 |
| Fife Heights CDP | 23830 | Oak Harbor | 50360 | Willapa CDP | 78995 |
| Finley CDP | 23865 | Oakville | 50430 | Wilson Creek | 79135 |

**Table BL03 Place Code**

| City/Town/ Village | Place Code | City/Town/ Village | Place Code | City/Town/ Village | Place Code |
|---|---|---|---|---|---|
| Fircrest | 23970 | Ocean City CDP | 50500 | Winlock | 79275 |
| Five Corners CDP | 24188 | Ocean Park CDP | 50535 | Winthrop | 79380 |
| Fobes Hill CDP | 24425 | Ocean Shores | 50570 | Wishram CDP | 79485 |
| Fords Prairie CDP | 24565 | Ocosta CDP | 50675 | Wollochet CDP | 79555 |
| Forks | 24810 | Odessa | 50745 | Woodinville | 79590 |
| Fort Lewis CDP | 24915 | Okanogan | 50920 | Woodland | 79625 |
| Four Lakes CDP | 25300 | Olympia | 51300 | Woods Creek CDP | 79825 |
| Fox Island CDP | 25370 | Omak | 51340 | Woodway | 79835 |
| Frederickson CDP | 25475 | Onalaska CDP | 51410 | Yacolt | 79975 |
| Freeland CDP | 25510 | Orchards CDP | 51795 | Yakima | 80010 |
| Friday Harbor | 25615 | Orient CDP | 51830 | Yarrow Point | 80150 |
| Garfield | 26140 | Oroville | 51970 | Yelm | 80220 |
| Garrett CDP | 26245 | Orting | 52005 | Zillah | 80500 |

## Highway Agency District

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(2) | I | BL04 | B.L.04 | I.6 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the WSDOT region in which the bridge is located using one of the following codes in Table BL04.<br><br>A region boundary map can be found at: https://www.wsdot.wa.gov/data/tools/geoportal/. | |

**Table BL04 Highway Agency District - 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 |

## Metropolitan Planning Organization (MPO)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(300) | I | BL12 | B.L.12 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the name(s) of the Metropolitan Planning Organization(s) (MPO) in which the bridge is located, regardless of bridge owner or maintenance responsibility.<br><br>Code each MPO when the bridge is located on a boundary between MPOs. Report multiple MPOs separated by pipe ( \| ) delimiters.<br><br>Code N if Bridge is not located in an MPO. | MPO maps are available here:<br><br>https://www.wsdot.wa.gov/data/tools/geoportal/<br><br>Note that this field does not apply to Regional Transportation Planning Organizations (RTPO's). |

## Section/Township/Range

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,0) | - | - | WL06, WL07,WL08 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

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 WL06 – Section**
This is the number of the section in which the structure is located. Enter a numeric code from 01 to 36.

**WSBIS Item WL07 – 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 WL08 – 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 https://www.wsdot.wa.gov/data/tools/geoportal/.

## Toll

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | I | BCL05 | B.CL.05 | C.4 |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**
- **Type 3 - Tunnels carrying public roadways within**

| Specification | Commentary |
|---|---|
| Code the toll status of the bridge **using** one of the following codes in Table BCL05.<br><br>Structures are considered tolled if only a portion of the bridge is tolled such as if an HOV Toll (HOT) lane is on the same bridge as a freeway. | Use code 1 when tolls on a toll bridge are paid specifically to use the bridge and not part of a facility which requires an FHWA Toll Agreement (23 U.S.C. 129).<br><br>Use code 2 when an interstate highway toll bridge is under a FHWA Toll Agreement (23 U.S.C. 129). Bridge has a separate agreement from the highway segment.<br><br>Use code 3 when the tolls on a toll road are paid to use the facility, which includes the roadway and the bridge. No FHWA Toll Agreement or unknown whether a toll agreement exists.<br><br>Use code 4 when the bridge is on an Interstate toll highway segment under a FHWA Toll Agreement (23 U.S.C. 129). Bridge is a part of the toll segment.<br><br>More tolling program information related to 23 U.S.C. 129 can be found at: https://www.fhwa.dot.gov/ipd/tolling_and_pricing/ and in the FHWA Informational Memorandum - Federal Tolling Programs under the Moving Ahead for Progress in the 21st Century Act. |

**Table BCL05 Toll Code**

| WSBIS Code | SNTI Code | Description |
|---|---|---|
| 1 | 1 | Toll bridge or tunnel not under FHWA Toll Agreement |
| 2 | 1 | Toll bridge or tunnel under FHWA Toll Agreement |
| 3 | 2 | Bridge or tunnel carries a toll road not under FHWA Toll Agreement |
| 4 | 2 | Bridge or tunnel carries a toll road under FHWA Toll Agreement |
| N | 0 | Bridge or tunnel does not carry a toll road and is not a toll bridge or tunnel |

# Historic Significance (NRHP)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | I | BCL04 | B.CL.04 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

## Specification

Code the historic significance of the bridge using one of the following codes.

| Code | Description |
|---|---|
| 1 | Bridge is on the National Register |
| 2 | Bridge is eligible for the National Register |
| 3 | Bridge is in a historic district that is on or eligible for the National Register, and contributes to the eligibility of the district |
| 4 | Bridge is in a historic district that is on or eligible for the National Register, but does not contribute to the eligibility of the district |
| 5 | Bridge is potentially eligible for the National Register, or potentially contributes to a historic district, but has not been evaluated according to the criteria for listing |
| 6 | Bridge is on a State or local historic register, but is not eligible for the National Register |
| 7 | Historic significance of the bridge has not been determined |
| N | Bridge is not eligible for the National Register, and is not in a historic district eligible for the National Register or when other codes do not apply. |

## Commentary

This item is used to report the historic significance of bridges. Bridges that are historically significant are subject to Section 106 of the National Historic Preservation Act of 1966, and 36 CFR 800 (Protection of Historic Properties). 36 CFR 800 governs the Section 106 process, and outlines how agencies are to consult with various parties, identify historic properties, and assess the effects of undertakings to properties.

Undertakings to historically significant bridges or their surroundings are also subject to Section 4(f) of the Department of Transportation Act of 1966, and 23 CFR Part 774 (Parks, Recreation Areas, Wildlife and Waterfowl Refuges, and Historic Sites). 23 CFR Part 774 governs the Section 4(f) process, considers how the property is used as a resource, and outlines the project approval process when undertakings are proposed.

36 CFR Part 70 (National Register of Historic Places) identifies the attributes that may make a property historically significant, and prescribes the evaluation criteria and procedures for listing properties on the National Register.

Determinations of eligibility are generally not made with the purpose of eventual listing on the National Register of Historic Places. Rather, the evaluation criteria for listing is used to assess historical significance with the purpose of assessing the effects of undertakings, and to fulfill the goals of 23 USC 144(g) Historic Bridges. Determinations of eligibility are normally made by the relevant federal agency, typically FHWA for highway bridges, and can change when circumstances or conditions change, such as age or bridge integrity. As such, the eligibility status and reported code can change with time.

| Commentary Continued - Historic Significance (NRHP) |
|---|
| Use code 2 when the bridge has been determined to be eligible for listing on the National Register even though the nomination and listing process have not concluded or are not being pursued.<br><br>Use code 5 when the bridge has attributes that may make it historically significant as indicated by the National Register criteria for evaluation and listing. This code may also apply when a bridge was previously evaluated but requires reevaluation because its current attributes, such as age, may make it historically significant.<br><br>Use code 6 when a bridge has local historic value, but has been determined to be not eligible for the National Register. Undertakings may be subject to the Section 4(f) process, but without the same level of consultation as prescribed by Section 106.<br><br>Use code N when the other codes do not apply. |

## Historical Significance – HAER

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | I | WCL04 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification**

This item identifies historical significance based on a criteria established by the Historic American Engineering Record (HAER). Use one of the following codes from Table WCL04.

**Table WCL04 Historical Significance - HAER**

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

## Special Structure Flag

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | -I | WID04 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification**

Code the structures that are inspected by the BPO Special Structures group.

| Code | Description |
|---|---|
| Y | Yes, structure inspected by the BPO Special Structures group. |
| * | Null, structure not inspected by the BPO Special Structures group. |

## Border Structure ID

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(8) | AN(15) | I | BL07 | B.L.07 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

**Specification**

Code the neighboring State's exact bridge number as used in their Item B.ID.01 (SID).

Code N when the bridge does not cross a border with another State or Country.

Code 0 when the bordering country does not have a bridge number.

Washington State has no tunnels across it's borders. See Auto-Generated Section.

**Commentary**

For the purposes of the NBI, only bridges that cross a State or international border are considered border bridges.

The Neighboring State reports this item as part of their abbreviated bridge record. For more information, see the Border Bridges section of this document.

## Border State or Country Code

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN (2) | I | BL08 | B.L.08 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Use one of the following codes below.<br><br>**Code** — **Description**<br>410 — Oregon<br>160 — Idaho<br><br>Leave blank if structure does not cross a border.<br><br>Washington State has no tunnels across it's borders. See Auto-Generated Section. | See WSBIM Appendix 2-F for a listing of border bridges on the Washington State inventory. |

## Border Bridge Inspection Responsibility

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(1) | - | I | BL09 | B.L.09 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the border bridge inspection responsibility for any entity within the State geographical boundaries, regardless of ownership, using one of the following codes.<br><br>**Code** — **Description**<br>0 — No responsibility<br>1 — Shared responsibility with border State or country<br>2 — Full responsibility<br><br>Leave blank if structure does not cross a border.<br><br>Washington State has no tunnels across it's borders. See Auto-Generated Section. | Agency inspection responsibility must be documented in interagency agreements or memorandums of understanding and included as part of the bridge file or record. |

## Border Bridge Designated Lead State

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | N(2,0) | I | BL10 | B.L.10 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Use one of the following codes below.<br><br>**Code** **Description**<br>530 Washington<br>410 Oregon<br>160 Idaho<br><br>Leave blank if structure does not cross a border<br><br>Washington State has no tunnels across it's borders. See Auto-Generated Section. | If Washington is the designated lead state, all inventory data will be reported to the SNBI. If another state is designated, then WSDOT will only report the following fields, which must match the data reported by the border state: |

**WSBIS Item 7557 – Design Exception Date (LP view only)** **Date**

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

If a design exception has been granted by the FHWA to permit a deviation from required standards, this is the effective date of FHWA approval. For example, if approval to build a one-lane bridge on a low volume road was granted, enter the date approval was given for this exception. If no design exception has been granted, leave this field blank.

## Obsolete Structure Flag (Inv MO only)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Checkbox | - | I | WID05 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

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

# Geometry Tab

## NBIS Bridge Length

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(7,1) | N(7,1) | I | BG01 | B.G.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Record the NBIS bridge length to the nearest tenth of a foot measured along the roadway centerline between undercopings of abutments or spring lines of arches.<br><br>For filled or closed spandrel arches, measure along the roadway centerline from inside faces of exterior spring lines.<br><br>For other bridges under fill, measure along the roadway centerline from inside faces of exterior walls; this includes multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening.<br><br>Vaulted abutments and enclosed spans or sections are included in the NBIS bridge length.<br><br>Record the field measured NBIS bridge length when Item B.G.02 (Total Bridge Length) is less than 30 ft. | NBIS bridge 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 includes multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening. (23 CFR 650.305)<br><br>Structures that meet the NBIS bridge definition, and NBIS applicability in 23 CFR 650.303, are reported to FHWA.<br><br>The roadway centerline is the physical center of the portion of the roadway for the movement of vehicles, regardless of striping, and exclusive of shoulders. The length for curved structures would be measured along the curved centerline.<br><br>When item B.G.02 (Total Bridge Length) is greater than 30.0 feet the value for this item may be estimated from plans or drawings, or estimated using the observed difference between items B.G.02 (Total Bridge Length) or B.G.03 (Maximum Span Length) and the NBIS bridge definition. |

## NBIS Bridge Length continued...

### Examples

Record measurement A.

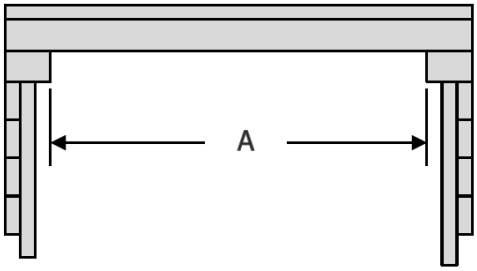



Figure 14. Profile view of a single span bridge with pile bent abutments.

Record measurement A.

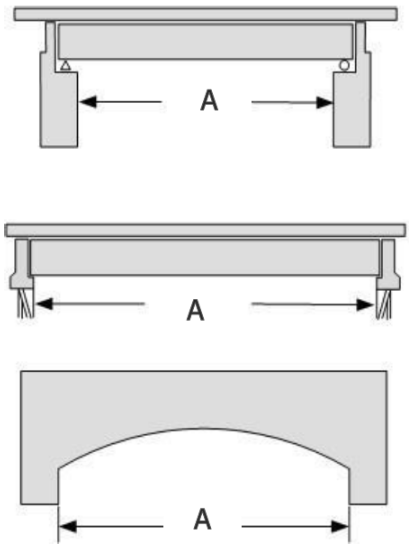



Figure 15. Profile views of various single span bridges.

Record measurement A.

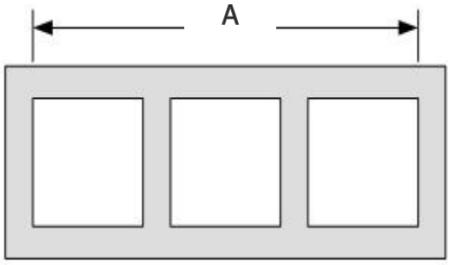



Figure 16. Profile view of a four-sided, multi-cell culvert under fill.

Record measurement A.

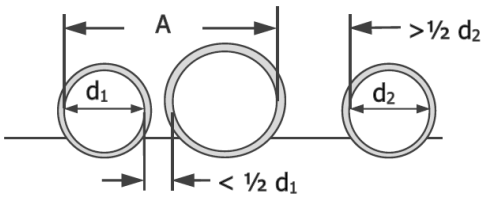



Figure 17. Profile view of a multi-pipe culvert under fill.

## NBIS Bridge Length continued...

### Examples Continued

Skewed multi-pipe bridge under highway has an opening of 20.85 ft measured along the center of the roadway. Record 20.9.

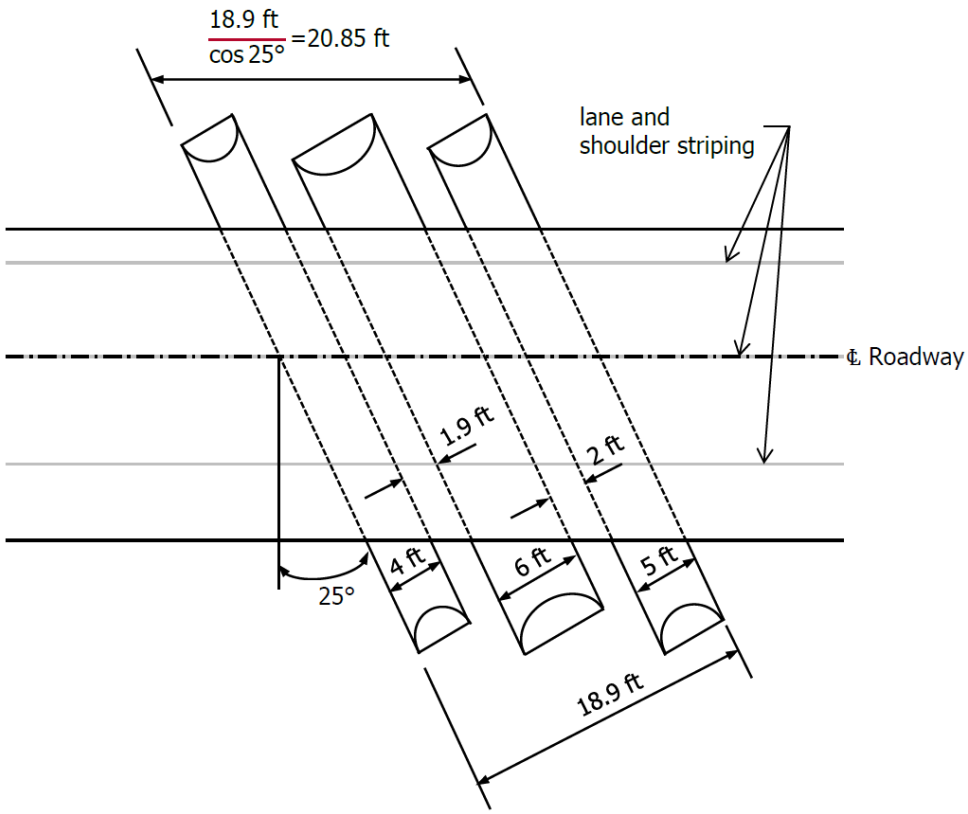



Figure 18. Plan view of a skewed, multi-pipe culvert under fill.

## Total Stucture Length

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(7,1) | N(7,1) | I | BG02 | B.G.02 | G.1 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

### Specification

This field applies to all structure types, including vehicular, pedestrian, and railroad bridges; and tunnels.

**Bridges**
Record the total length of the bridge to the nearest tenth of a foot measured along the roadway centerline from back- to-back of backwalls or from paving notch to paving notch at abutments.

For filled or closed spandrel arches, measure along the roadway centerline from inside faces of exterior spring lines when well-defined backwalls or paving notches do not exist.

For other bridges under fill, measure along the roadway centerline from inside faces of exterior walls.

For bridges with vaulted abutments and enclosed spans or sections, measure from back-to-back of backwalls or from paving notch to paving notch inclusive of the vaulted abutments and enclosed spans.

**Tunnels**
Record the length of the tunnel to the nearest foot. The length shall be measured along the centerline of the roadway.

### Commentary

**Bridges**
The total bridge length measurement can be used with the bridge width out-to-out to calculate an estimated deck area.

The roadway centerline is the physical center of the portion of the roadway for the movement of vehicles, regardless of striping, and exclusive of shoulders. The total bridge length for curved bridges is measured along the curved centerline.

For pedestrian RR and other non-vehicular structures, code this field when the owning agency performs Condition Inspections. The intent is to provide deck square footages associated with structure condition codes.

**Tunnels**
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.

## Total Stucture Length continued...

### Examples

Record measurement A.

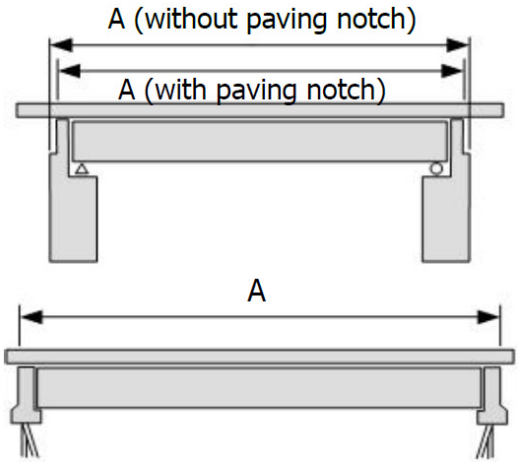



Figure 19. Profile views of various single span bridges.

Record measurement A.

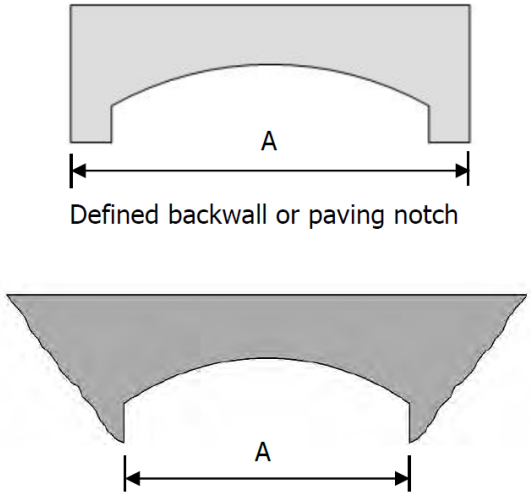



Figure 20. Profile views of various spandrel arches.

Report measurement A.

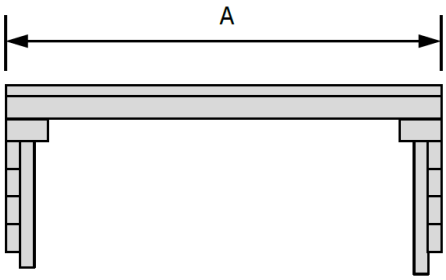



Figure 21. Profile view of a single span bridge with pile bent abutments.

## Total Stucture Length continued...

### Examples Continued

Record measurement A.

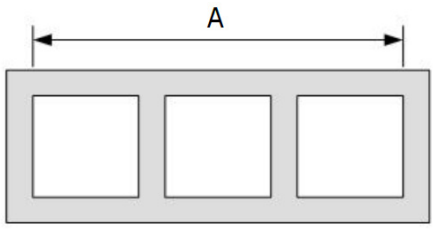



Figure 22. Profile view of a four-sided, multi-cell culvert under fill.

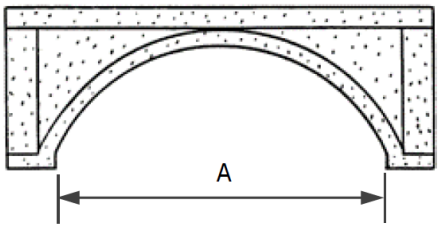



Figure 23. Profile view of a culvert under fill.

Record measurement A.

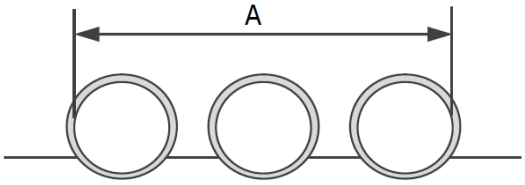



Figure 24. Profile view of a multi-pipe culvert under fill.

Four span bridge with variable skews. Total bridge length is measured along the roadway centerline from back-to-back of backwalls at abutments. Record 477.6.

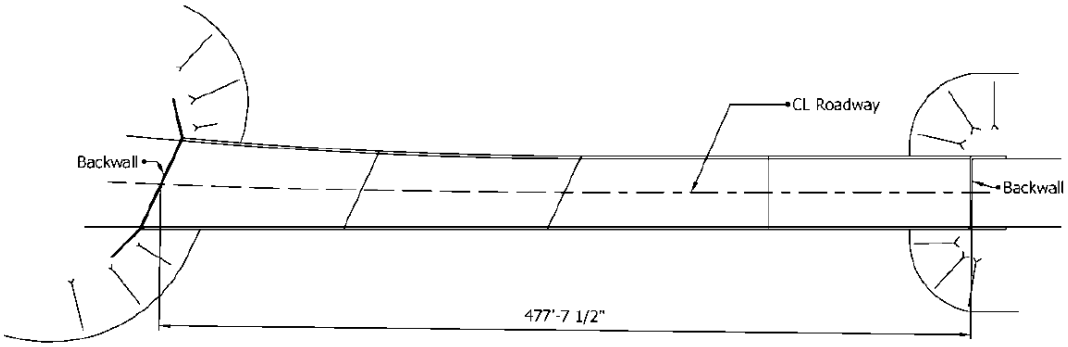



Figure 25. Plan view of a four-span bridge with variable skews.

Three span curved bridge. Total bridge length is measured along the roadway centerline from back-to-back of backwalls at abutments. Record 504.0.

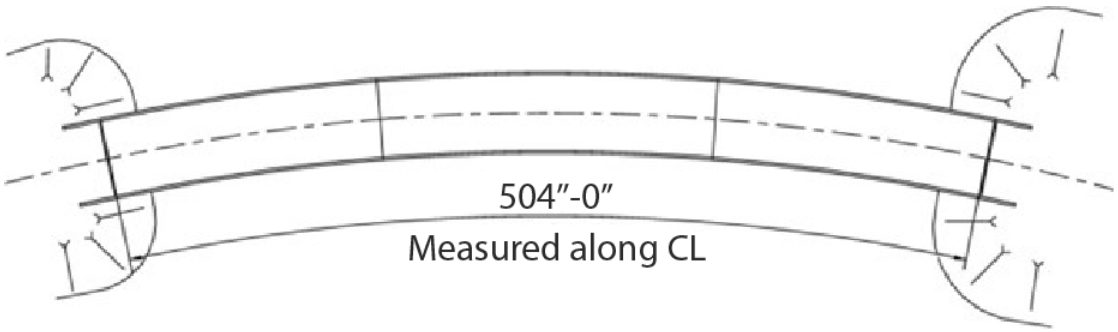



Figure 26. Plan view of a three-span curved bridge.

## Total Stucture Length continued...

### Examples Continued

Skewed pipe bridge under a highway has an opening of 20.85 ft measured along the roadway centerline. Report 20.9.

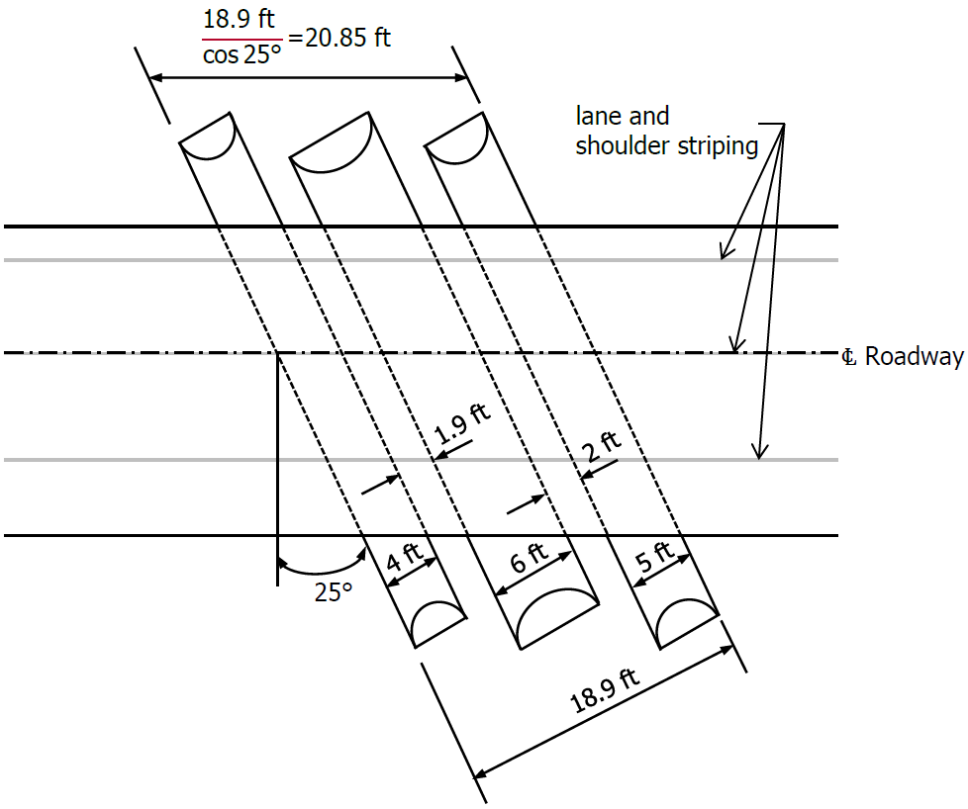



Figure 27. Plan view of a skewed, multi-pipe culvert under fill.

## Maximum Span Length

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(5,1) | N(5,1) | I | BG03 | B.G.03 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Record the length of the maximum span to the nearest tenth of foot, measured from centerline of bearing to centerline of bearing, along the roadway centerline | For rigid frames, arches, pipes, integral abutments, or similar type bridges where there is not a clear centerline of bearing, use the clear open distance between piers, bents, w alls, or abutments.<br><br>The roadway centerline is the physical center of the portion of the roadway for the movement of vehicles, regardless of striping, and exclusive of shoulders. The length for curved bridges would be measured along the curved centerline.<br><br>For bridges with in-span hinges or bearings, measure from centerline of substructure bearing to centerline of substructure bearing, or clear open distance between substructure units when there is not a clear centerline of bearing.<br><br>For bridges with single spans this item has the same value as B.G.04 (*Minimum Span Length).*<br><br>w/FHWA errata#1 03/24 |

## Maximum Span Length continued...

### Examples

Record measurement A.

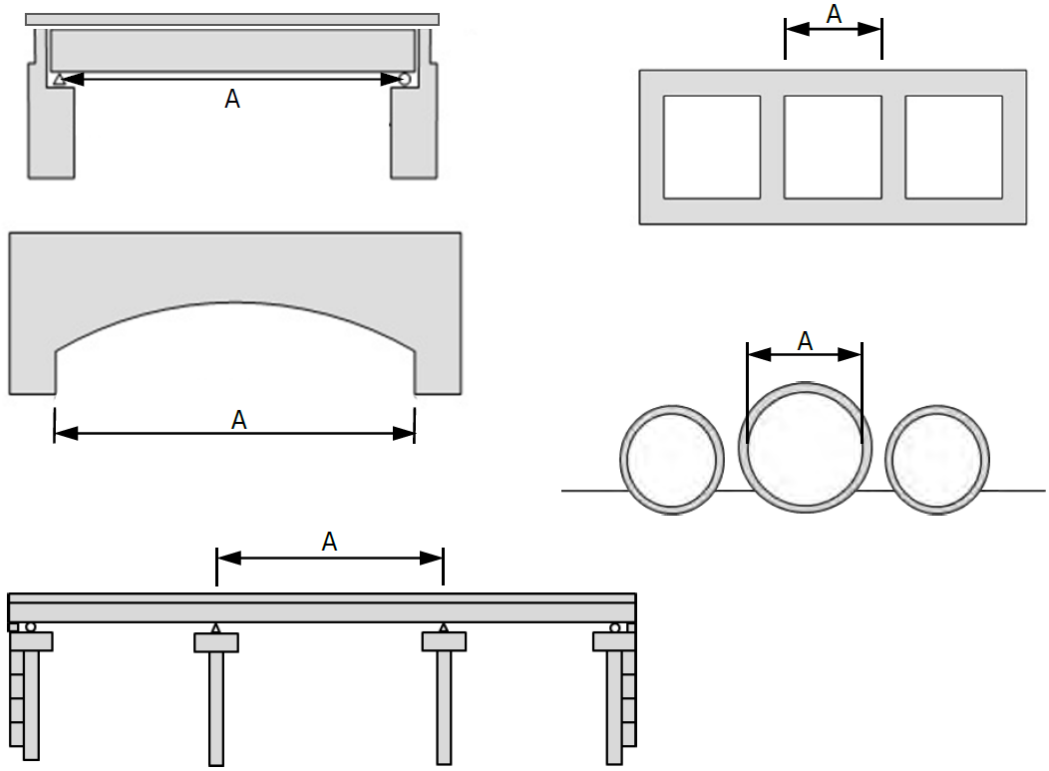



Figure 28. Profile views of various bridge types.

Four span bridge with variable skews. Span lengths are measured from centerline of bearing to centerline of bearing along the roadway centerline. Report 120.1.

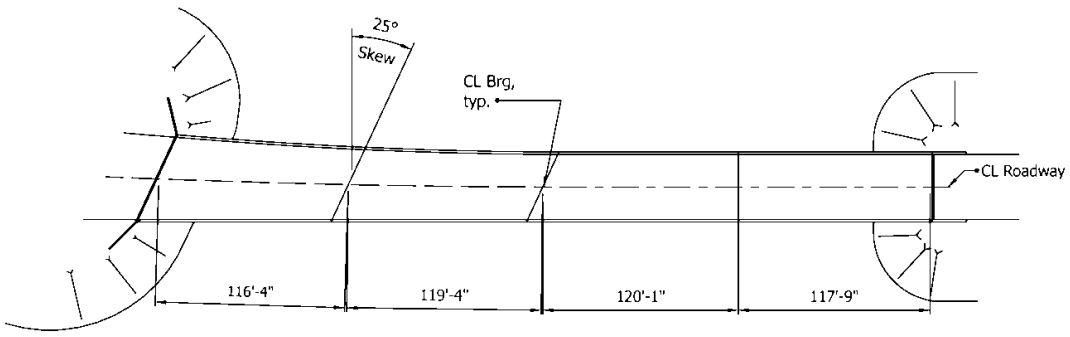



Figure 29. Plan view of a four-span bridge with variable skews.

## Maximum Span Length continued...

### Examples Continued

Three span curved bridge. Span lengths are measured from centerline of bearing to centerline of bearing along the curved roadway centerline. Report 190.0.

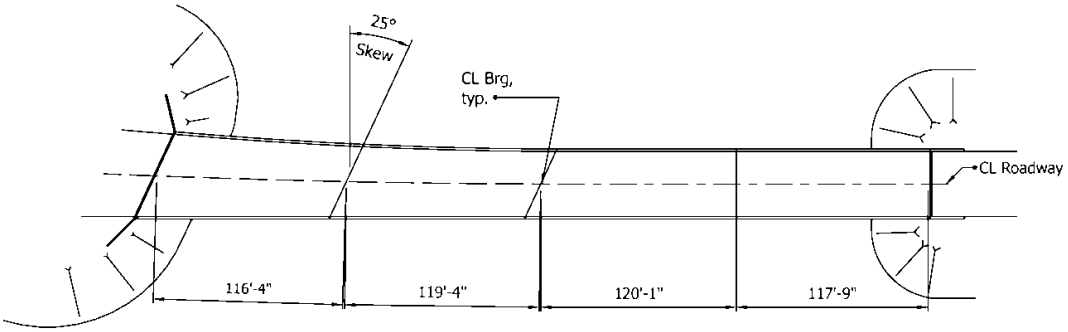



Figure 30. Plan view of a three-span curved bridge.

## Minimum Span Length

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(5,1) | N(5,1) | I | BG04 | B.G.04 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Record the length of the minimum span to the nearest tenth of foot, measured from centerline of bearing to centerline of bearing, along the roadway centerline. | For rigid frames, arches, pipes, integral abutments, or similar type bridges where there is not a clear centerline of bearing, use the clear open distance between piers, bents, walls, or abutments.<br><br>The roadway centerline is the physical center of the portion of the roadway for the movement of vehicles, regardless of striping, and exclusive of shoulders. The length for curved bridges would be measured along the curved centerline.<br><br>For bridges with in-span hinges or bearings, measure from centerline of substructure bearing to centerline of substructure bearing, or clear open distance between substructure units when there is not a clear centerline of bearing.<br><br>For bridges with single spans this item has the same value as B.G.04 *(Minimum Span Length)*.<br><br>w/FHWA errata#1 03/24 |

## Minimum Span Length continued...

### Examples

Record measurement A.

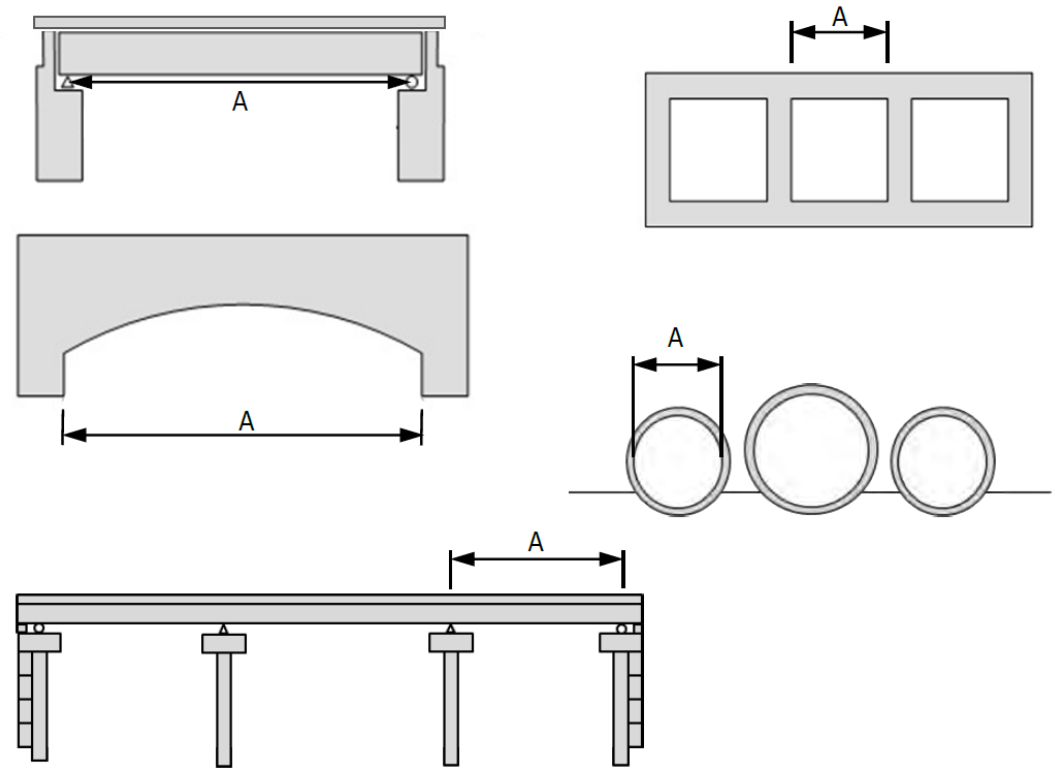



Figure 31. Profile views of various bridge types.

Four span bridge with variable skews. Span lengths are measured from centerline of bearing to centerline of bearing along the roadway centerline. Report 116.3.

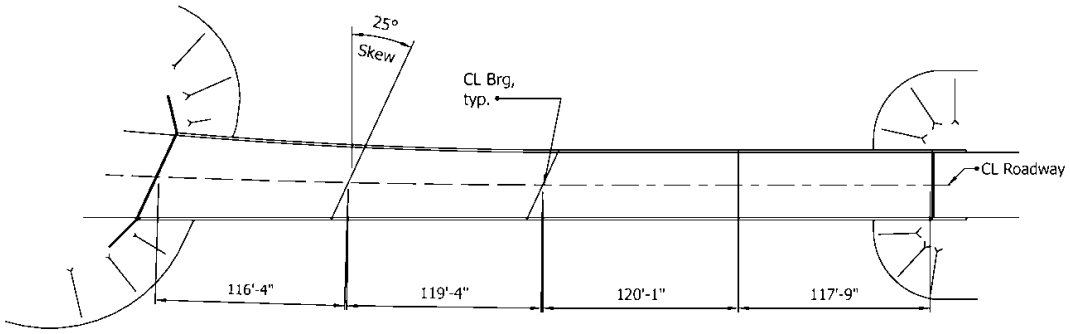



Figure 32. Plan view of a four-span bridge with variable skews.

## Minimum Span Length continued...

### Examples Continued

Three span curved bridge. Span lengths are measured from centerline of bearing to centerline of bearing along the curved roadway centerline. Report 155.0.

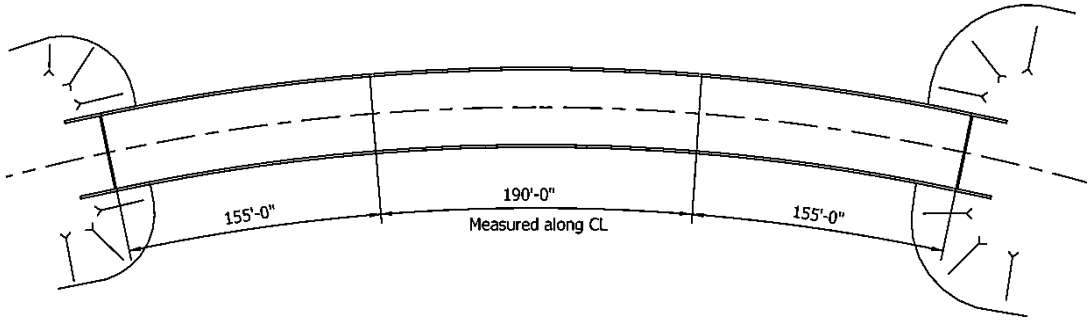



Figure 33. Plan view of a three-span curved bridge.

## Structure Width Out-to-Out

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,1) | N(4,1) | I | BG05 | B.G.05 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not cross over or under a public roadway**

### Specification

This field applies to all structure types, including vehicular, pedestrian, and railroad bridges; and tunnels.

**Bridges**
Record the minimum out-to-out width measured perpendicular to the centerline of the roadway to the nearest tenth of a foot.

For multiple (double) deck bridges that are inventoried as one bridge, measure all levels, and report the sum of the measurements to account for the total width carried on the bridge.

For bridges under fill, measure the width from out-to-out of the headwalls or barrel ends.

For sidehill bridges, measure the out-to-out structure width.

For bridges that carry multiple types of service, for example highway, pedestrian, and railroad, measure the out-to-out width that encompasses all service types.

For bridges that don't have a fully defined deck, measure to the widest point of the structure.

**Tunnels**
Record the most restrictive minimum distance between inside faces of tunnel.

See Figure 2.6.1

### Commentary

For bridges under fill, the reported value can be limited to the width of the roadway section over the bridge for unusual situations where the bridge continues far beyond the roadway cross-section, and a lesser width would likely be constructed for a replacement project.

For bridges under fill, in which the features that define the out-to-out width are not parallel, report the minimum out-to-out width.

## Structure Width Out-to-Out continued...

### Examples

Record measurement A.

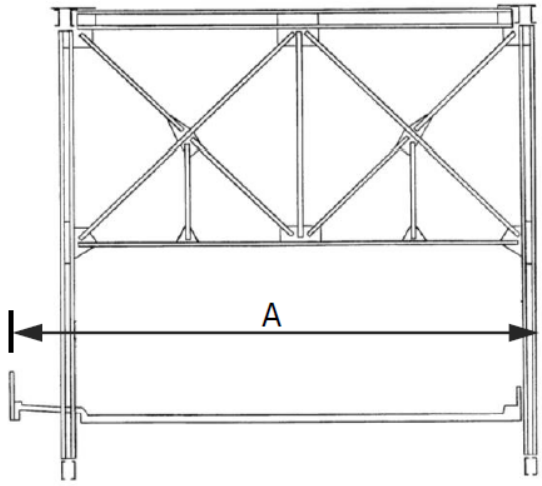



Figure 34. Cross-section view of a through truss bridge.

Record measurement A.

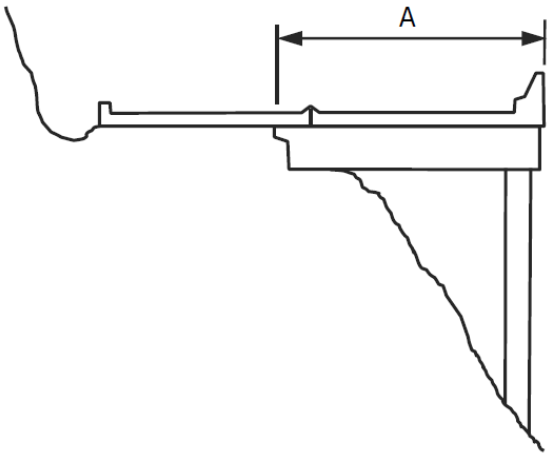



Figure 35. Cross-section view of a sidehill bridge.

## Structure Width Out-to-Out continued...

### Examples Continued

Record measurement A.

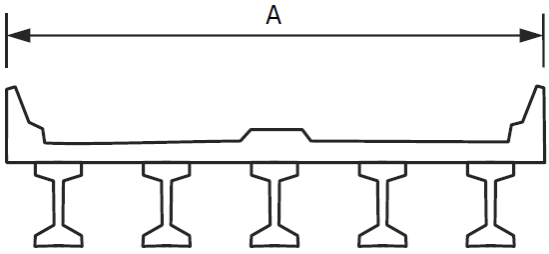



Figure 36. Cross-section view of a multi-girder bridge.

Record measurement A.

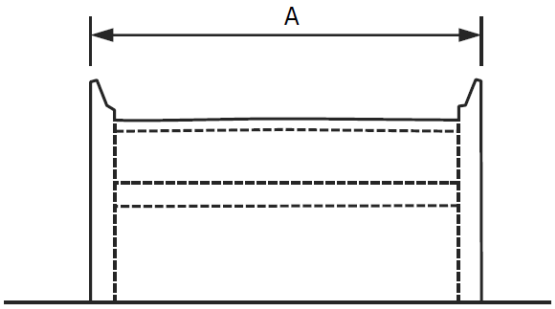



Figure 37. Cross-section view of a filled arch bridge or culvert under fill with headwalls.

Record measurement A.

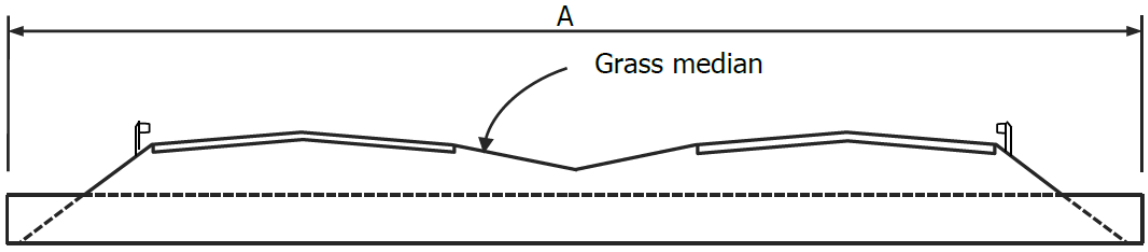



Figure 38. Cross-section view of a pipe culvert under fill.

## Structure Width Out-to-Out continued...

### Examples Continued

Record measurement A.

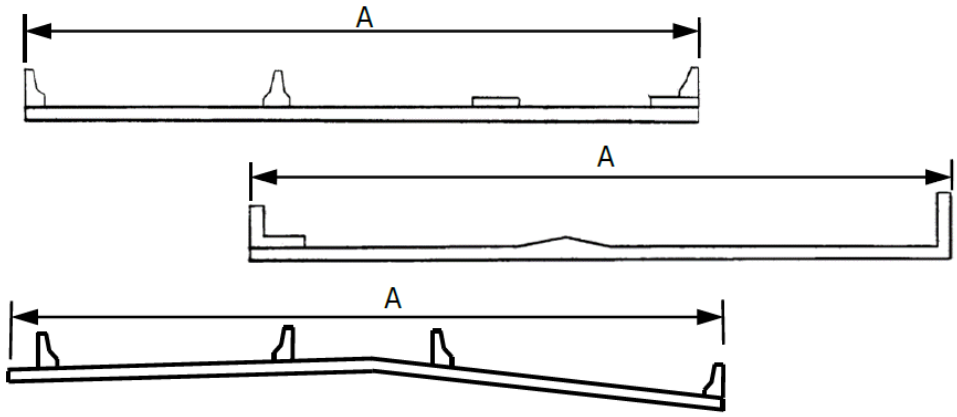



Figure 39. Cross-section views of various bridge decks with medians.

Record measurement A.

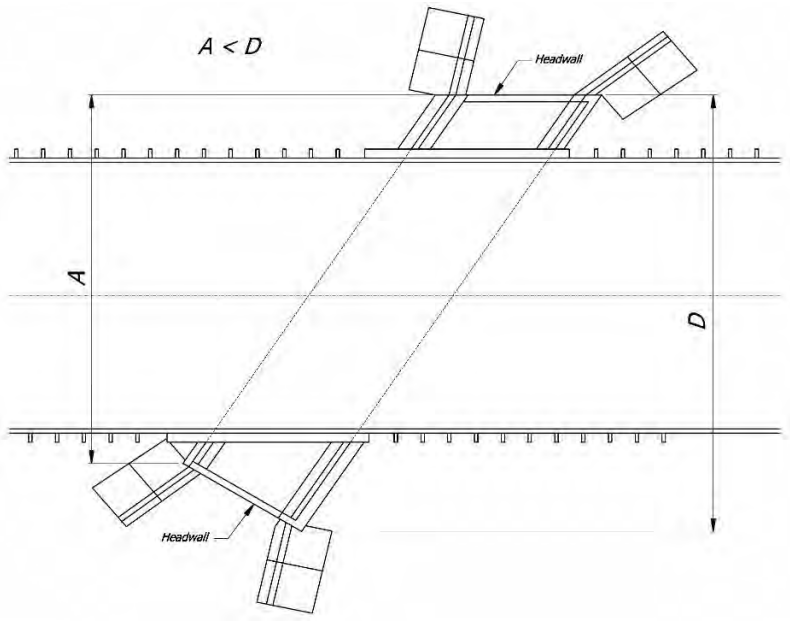



Figure 40. Plan view of a bridge with non-parallel fascias.

## Structure Width Out-to-Out continued...

### Examples Continued

Record measurement A.

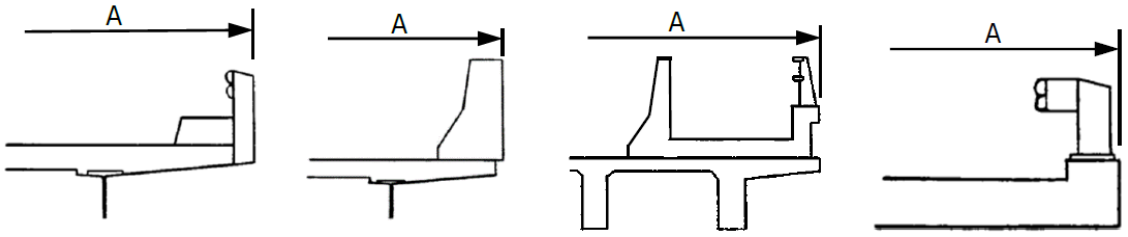



Figure 41. Partial cross-section views of various bridge decks with railings.

Record measurement A.

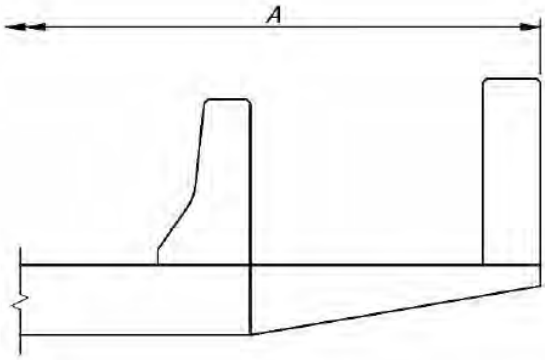



Figure 42. Cross-section view of a sidewalk retrofit.

## Structure Width Out-to-Out continued...

### Example - Tunnel Structure Width Out-to-Out

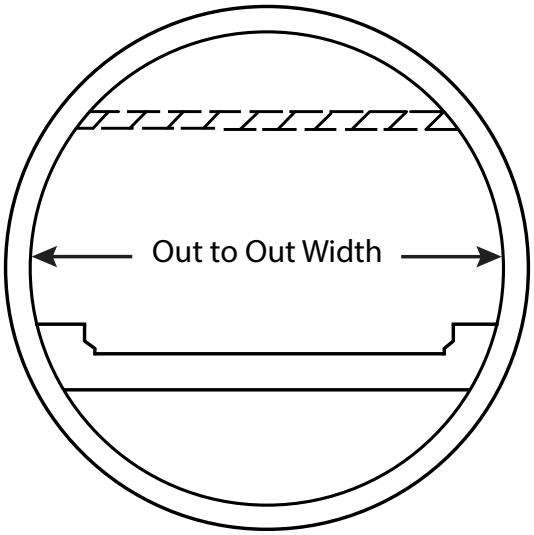



Figure 2.6.1 - Drawing of tunnel width out to out

## Structure Width Curb-to-Curb

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,1) | N(4,1) | I | BG06 | B.G.06 | G.3 |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

### Specification

This field applies to Type 1 and 3 structure types, including vehicular bridges and tunnels.

**Bridges**

Record the sum of the most restrictive minimum usable distances for all roadways carried by the bridge. Measure the distance perpendicular to the centerline of the roadway between curbs or rails to the nearest tenth of a foot. Exclude from the usable distance measurement non-mountable medians, sidewalks, structurally inadequate shoulders, and other non-mountable areas.

The measurement for this item shall be compatible with the measurements used for Item B.H.08 (Lanes On Highway), Item B.G.09 (Approach Roadway Width), and Item B.H.09 (Annual Average Daily Traffic).

For multiple (double) deck bridges that are inventoried as one bridge, measure all levels, and report the sum of the most restrictive minimum usable distances carried by the bridge.

For sidehill bridges measure the actual full curb- to-curb roadway width.

For bridges that carry multiple types of service, for example highway, pedestrian, and railroad, report the usable distance that serves the highway service as denoted by curb or barrier separation, or other delineation that separates the service types.

**Tunnels**

Record the most restrictive minimum distance between curbs or rails on the mainline tunnel roadway. 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. Raised or non-mountable medians, and barrier widths are to be excluded from the summation.

## Structure Width Curb-to-Curb continued...

### Commentary

**Bridges**

Usable roadway width includes the width of traffic lanes and the widths of shoulders.

Shoulders must be contiguous with the traveled way 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 bridges under fill, the usable roadway width crossing the bridge is commonly the same value reported for Item B.G.09 (Approach Roadway Width).

A barrier or curb greater than 6 inches high may be considered non-mountable for these specifications.

**Tunnels**

FHWA has indicated that double decked tunnels (Alaskan Way Tunnel) should be coded for the minimum deck width for a single level.

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.

Raised or non-mountable medians, and barrier widths are to be excluded from the summation.

See Figure 2.6.2

## Structure Width Curb-to-Curb continued...

### Examples

Record measurement A.

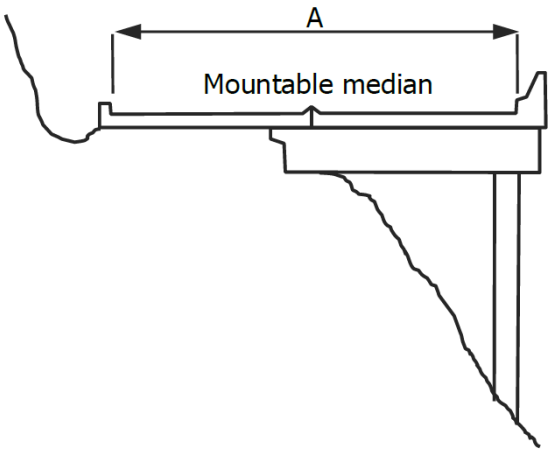



Figure 43. Cross-section view of a sidehill bridge.

Record measurement A.

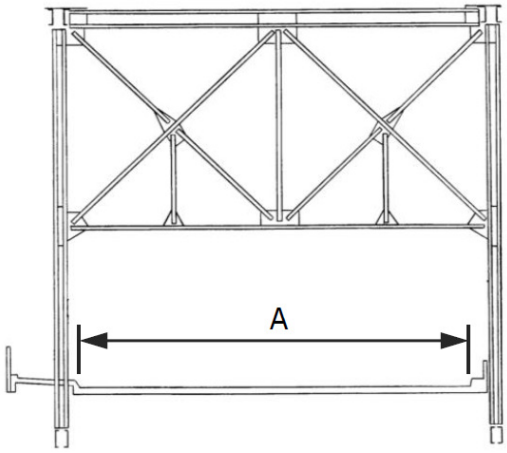



Figure 44. Cross-section view of a through truss bridge.

Record measurement A.

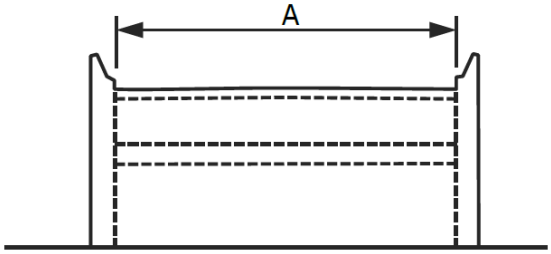



Figure 45. Cross-section view of a filled arch bridge or culvert under fill with headwalls.

Record measurement A.

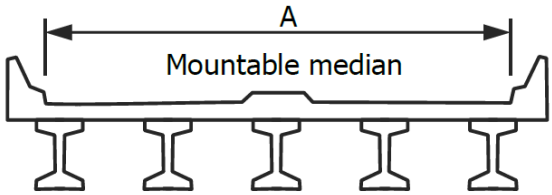



Figure 46. Cross-section view of a multi-girder bridge.

Record the sum of A+B.

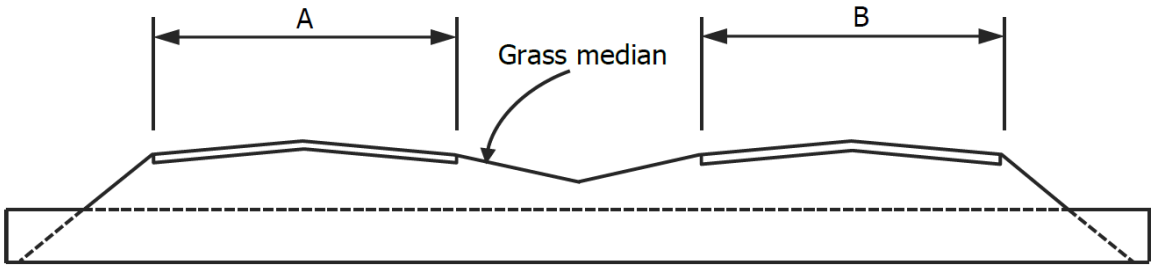



Figure 47. Cross-section view of a pipe culvert under fill.

## Structure Width Curb-to-Curb continued...

### Examples Continued

Record measurement A.

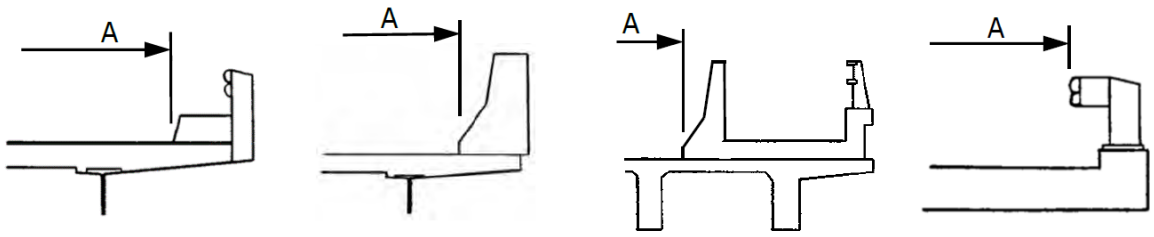



Figure 48. Partial cross-section views of various bridge decks with railings.

Record measurement A.

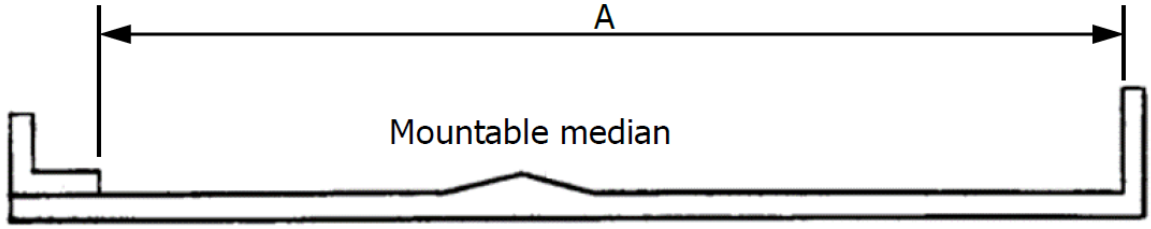



Figure 49. Cross-section view of a bridge deck with mountable median.

Record the sum of A+B+C.

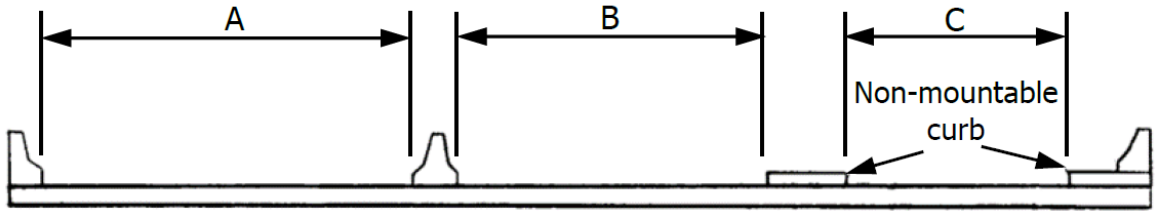



Figure 50. Cross-section view of a bridge deck with non-mountable curb and median barrier.

Record the sum of A+B.

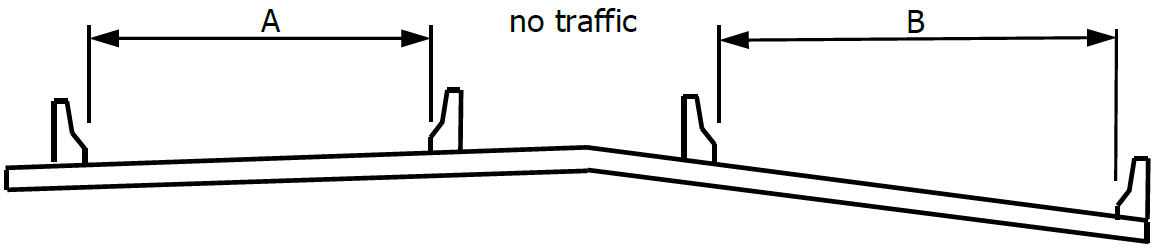



Figure 51. Cross-section view of a bridge deck with multiple median barriers.

## Structure Width Curb-to-Curb continued...

### Example - Tunnel Structure Width Curb-to-Curb

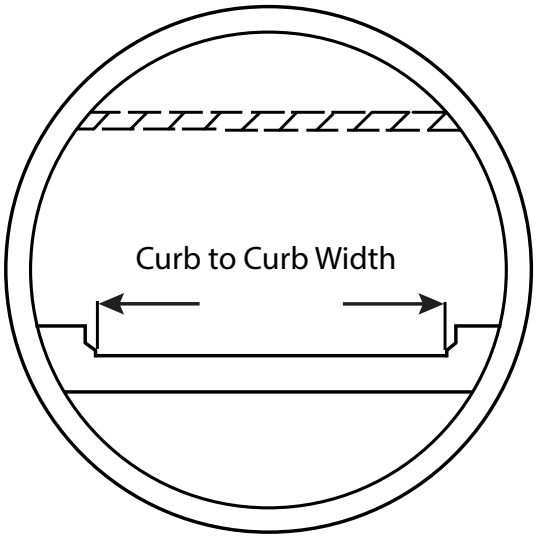



Figure 2.6.2 - Drawing of tunnel width curb to curb

## Left Curb or Sidewalk Width

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,1) | N(3,1) | I | BG07 | B.G.07 | G.4 |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**
- **Type 3 - Tunnels carrying public roadways within**

### Specification

This field applies to Type 1 and 3 structure types, including vehicular bridges and tunnels.

**Bridges**
Record the minimum width of the left curb or sidewalk to the nearest tenth of a foot from the face of bridge rail to the face of curb. Measure the width perpendicular to the centerline of the roadway.

Record 0.0 when the face of the curb does not extend beyond the face of the bridge rail.

Record 0.0 when there is no left curb or sidewalk.

Left and right are determined based on the direction of the inventoried route carried by the bridge, commonly west to east or south to north.

When a defined longitudinal joint exists between the curb and the sidewalk, such as a granite curb and concrete sidewalk, measure the width from the face of bridge rail to the face of the granite curb.

**Tunnels**
Record the minimum width of the left sidewalk to the nearest tenth of a foot from the face of tunnel liner to the face of curb. Measure the width perpendicular to the centerline of the roadway.Record 0 when the face of the curb does not extend beyond the face of tunnel liner.

Record 0 when the face of curb does not extend beyond the face of tunnel liner.

Left and right are determined on the basis of the inventoried route carried within the tunnel, commonly west to east or south to north.

See Figure 2.6.3

## Left Curb or Sidewalk Width continued...

### Examples

Record measurement C.

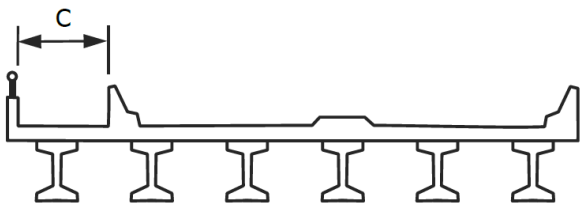



Figure 52. Cross-section view of a multi-girder bridge.

Record measurement C.

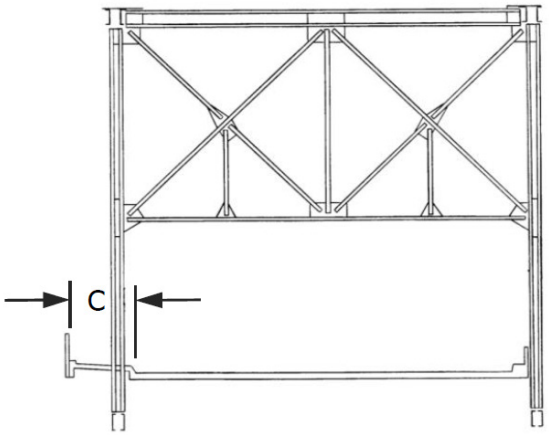



Figure 53. Cross-section view of a through truss bridge.

Record measurement C.




Figure 54. Cross-section view of a slab bridge.

Record measurement C.

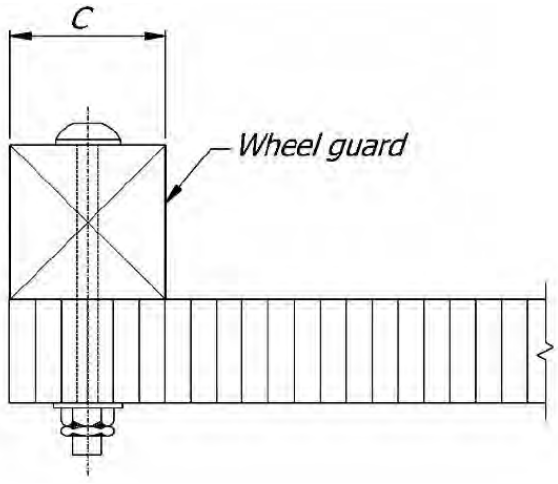



Figure 55. Cross-section view of a timber wheel guard.

## Left Curb or Sidewalk Width continued...

### Examples Continued

Record measurement C.

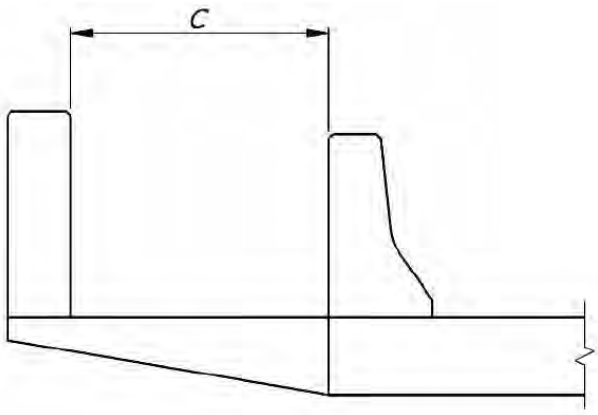



Figure 56. Cross-section view of a sidewalk retrofit.

Record measurement C.

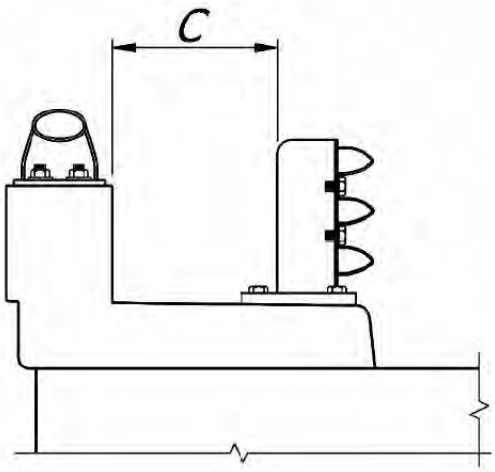



Figure 57. Cross-section view of a sidewalk retrofit.

Record measurement for left sidewalk width.

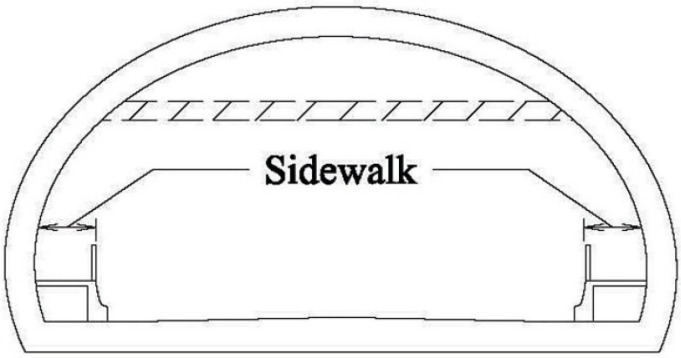



Figure 2.6.3 - Drawing of Sidewalk Width

## Right Curb or Sidewalk Width

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,1) | N(3,1) | I | BG08 | B.G.08 | G.5 |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**
- **Type 3 - Tunnels carrying public roadways within**

### Specification

This field applies to Type 1 and 3 structure types, including vehicular bridges and tunnels.

**Bridges**
Record the minimum width of the right curb or sidewalk to the nearest tenth of a foot from the face of bridge rail to the face of curb. Measure the width perpendicular to the centerline of the roadway.

Record 0.0 when the face of the curb does not extend beyond the face of the bridge rail.

Record 0.0 when there is no right curb or sidewalk.

**Tunnels**
Record the minimum width of the right sidewalk to the nearest tenth of a foot from the face of tunnel liner to the face of curb. Measure the width perpendicular to the centerline of the roadway.

Record 0 when the face of curb does not extend beyond the face of tunnel liner.

Left and right are determined on the basis of the inventoried route carried within the tunnel, commonly west to east or south to north.

Right and left is determined based on the direction of the inventoried route carried by the bridge, commonly west to east or south to north.

When a defined longitudinal joint exists between the curb and the sidewalk, such as a granite curb and concrete sidewalk, measure the width from the face of bridge rail to the face of the granite curb.

See Figure 2.6.3a

## Right Curb or Sidewalk Width continued...

### Examples

Record measurement C.

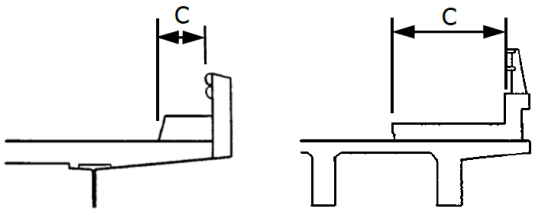



Figure 58. Partial cross-section views of various bridge decks with railings.

Record measurement C.

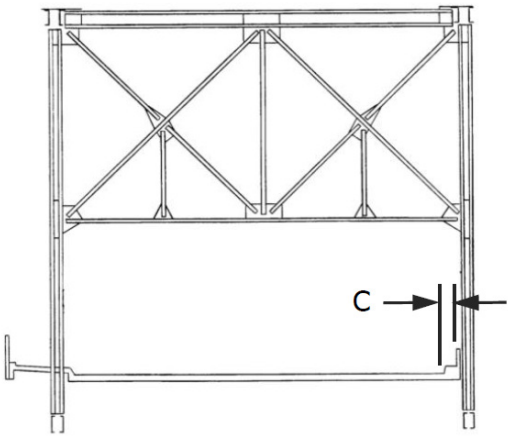



Figure 59. Cross-section view of a through truss bridge.

Record measurement C.

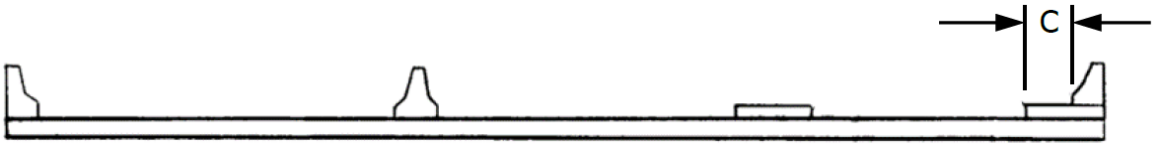



Figure 60. Cross-section view of a slab bridge wi th various medians.

Record measurement C.

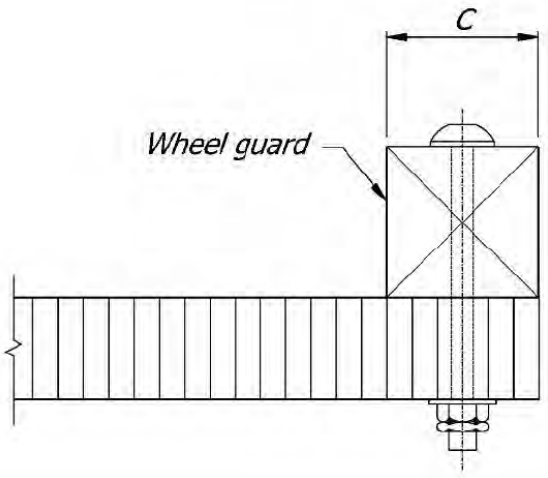



Figure 61. Cross-section view of a timber wheel guard.

## Right Curb or Sidewalk Width continued...

**Examples Continued**

Record measurement C.

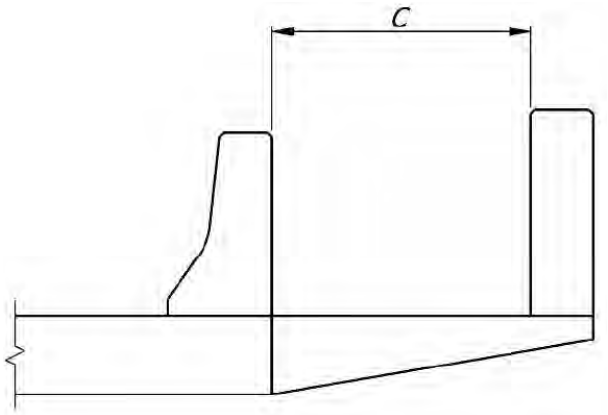



Figure 62. Cross-section view of a sidewalk retrofit.

Record measurement C.

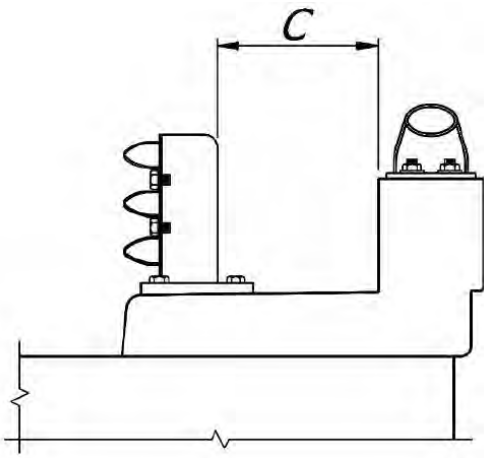



Figure 63. Cross-section view of a sidewalk retrofit.

Record measurement for right sidewalk width.

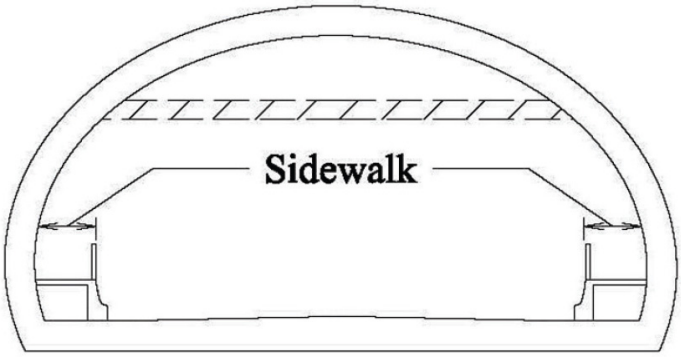



Figure 2.6.3a - Drawing of Sidewalk Width

## Approach Roadway Width

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,1) | N(4,1) | I | BG09 | B.G.09 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Record the minimum usable approach roadway width within 100' of the bridge to the nearest tenth of a foot.<br><br>Exclude from the usable distance measurement: non-mountable medians, sidewalks, and other protected areas with non- mountable curbs or barriers.<br><br>Record the lesser of the two approach roadway widths for bridges that carry two-way traffic.<br><br>Record the width at the approach end for bridges that carry one-way traffic.<br><br>For double decked structures, this item should be coded as the sum of the usable roadway widths for the approach roadway.<br><br>If a ramp is adjacent to the through lanes approaching the structure, it shall be included in the approach roadway width. | Usable roadway width includes the width of traffic lanes and the width of shoulders.<br><br>Shoulders must be contiguous with the traveled way 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.<br><br>A curb greater than 6 inches high may be considered non-mountable for these specifications. |

## Approach Roadway Width continued...

### Examples

Both roadways are carried on one bridge. Record the sum of measurements A and B.

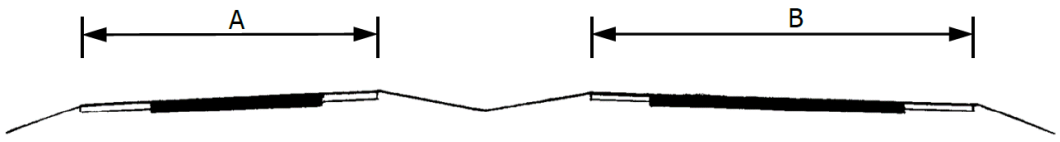



Figure 64. Cross-section view of two approach roadways that are carried across one bridge.

Mainline and Ramp are both carried on one bridge. Record the sum of measurements A and B.

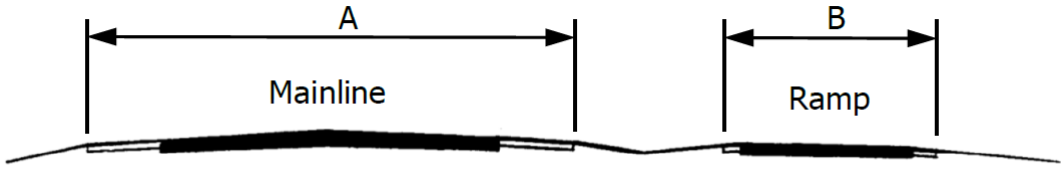



Figure 65. Approach roadway cross-section view for a mainline and a ramp that are carried across one bridge.

Mainline and Ramp are carried on separate bridges.

- Record measurement A for the Mainline bridge.
- Record measurement B for the Ramp bridge.

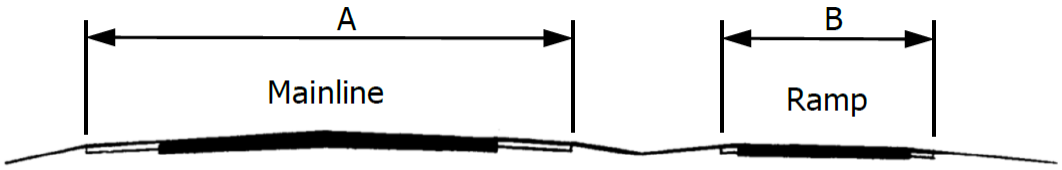



Figure 66. Approach roadway cross-section view for a mainline and a ramp that are carried across separate bridges.

# Bridge Median

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(1) | AN(1) | I | BG10 | B.G.10 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

## Specification

Code the type of bridge median using one of the following codes.

| Code | Description |
|---|---|
| 0 | No median |
| 1 | Open median |
| 2 | Closed median (mountable) |
| 3 | Closed median (non-mountable) |

Parallel bridges carrying a single divided route (usually interstates) are coded 0 unless there is a median on the bridge deck itself.

Parallel bridges with divided or undivided routes separated only by a longitudinal deck joint are coded 1 when traffic cannot safely traverse the joint width. If the joint width is safely traversable, use one of the remaining codes. Joint condition does not affect the coding of this item.

Adjacent bridges carrying separate routes are coded 0 unless there is a median on the bridge deck itself.

## Commentary

A barrier or curb greater than 6 inches high may be considered non-mountable for these specifications.

For bridges with a longitudinal joint, use code 1 when traffic cannot safely traverse the joint width. If the joint width is safely traversable, use one of the remaining codes. Joint condition does not affect the coding of this item.

Code 0 for bridges that do not have a median, including bridges that carry adjacent traffic lanes separated only by centerline, edge line, or channelization striping, with or without a traversable longitudinal joint.

Code 1 for structures that pass continuously under separated roadways on fill without any barriers in place – usually culverts.

Code 2 for bridges with medians that are either flush or mountable, with or without a traversable longitudinal joint, including areas that are striped to designate a median.

Code 3 for non-mountable medians, including medians separated with vertical curbs 6” high or greater, guardrails, or concrete rails.

## Bridge Median continued...

### Examples

Each example below represents a single bridge.

Code 1.

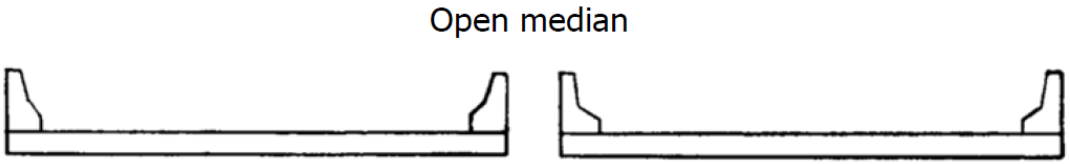



Figure 67. Cross-section view of a bridge deck with open median.

Code 2.

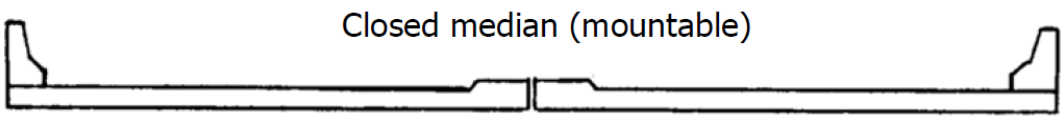



Figure 68. Cross-section view of a bridge deck with closed median (mountable)

Code 3.

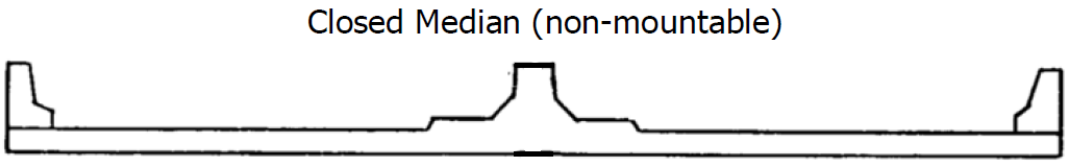



Figure 69. Cross-section view of a bridge deck with closed median (non-mountable).

## Skew Angle

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(2,0) | N(2,0) | I | BG11 | B.G.11 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the skew angle to the nearest degree. Measure the skew angle between the centerline of a substructure unit and a line perpendicular to the roadway centerline.<br><br>Code the maximum skew when skews vary amongst substructure units.<br><br>Code 0 if there is no skew. | The skew angle can be taken directly from the plans, if available, or measured in the field. |

**Example**

Record the skew as the result of Sin-1(A/C), Cos-1(B/C) or Tan-1 (A/B).

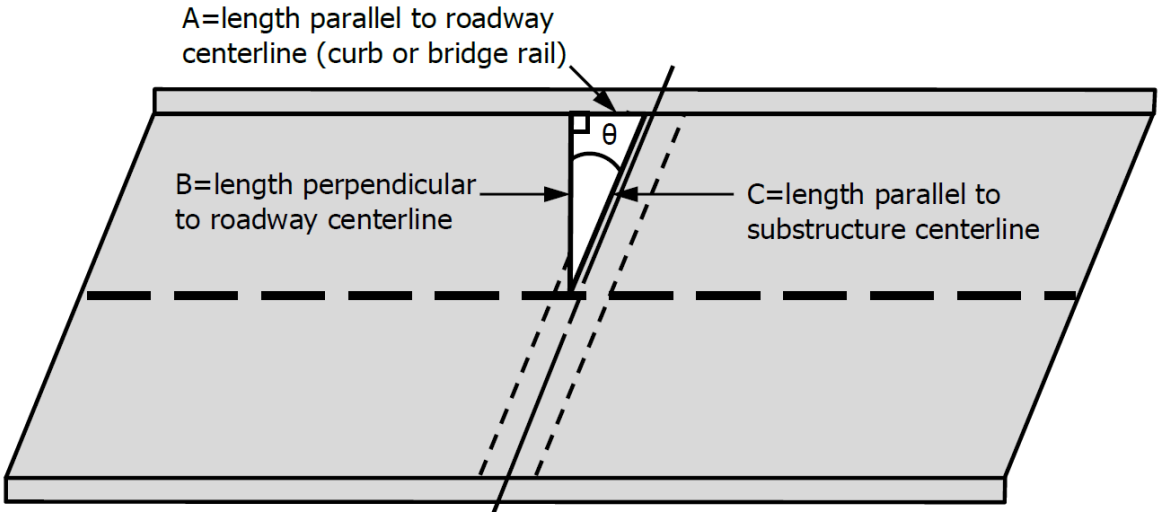



Figure 70. Plan view of a bridge deck indicating skew determination.

# Curved Bridge

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(2) | I | BG12 | B.G.12 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code whether the bridge is horizontally curved using one of the following codes.<br><br>**Code** — **Description**<br>CU — Curved girder(s)<br>CP — Piecewise straight girders<br>CK — Kinked girder(s)<br>N — Not curved | A bridge is considered horizontally curved when at least one partial or full length girder line forms a curve using either a curved girder(s), piecewise straight girders forming a segmented/chorded curve, or a kinked girder(s).<br><br>For this specification, a piecewise straight girder line is comprised of girders with a longitudinal axis that changes orientation at one or more supports. The girder line may be simply supported or continuous at supports. A kinked girder is a girder with a longitudinal axis that changes orientation at a location(s) along the girder length excluding at the supports.<br><br>~~Diaphragm and cross-frame members in horizontally curved bridges are primary members.~~<br><br>Use code N for bridges that have curved deck geometry, or may be striped as curved, but the girders do not form a curve.<br><br>w/ FHWA errata#1 03/24 |

## Curved Bridge

### Examples

Record CU.



Figure 71. Curved bridge with curved girders. (Source: Alaska DOT)

Record CP.

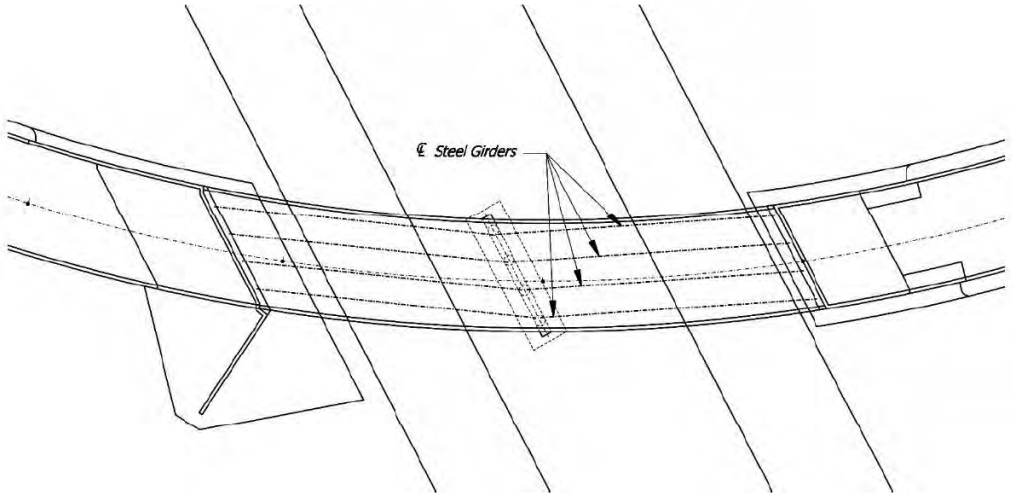



Figure 72. Plan view of a curved bridge with piecewise straight girders.

## Curved Bridge

### Examples Continued

Record CK.

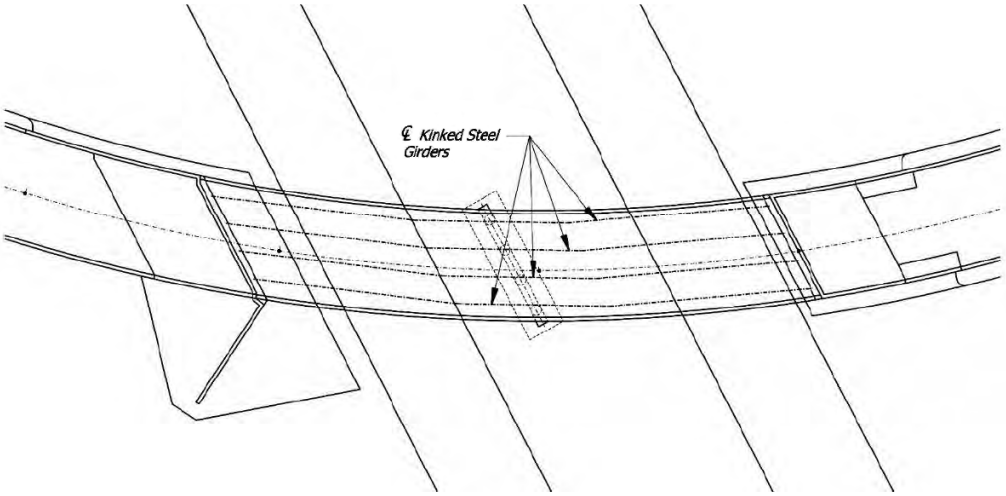



Figure 73. Plan view of a curved bridge with kinked girders.

## Maximum Bridge Height

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,0) | N(4,0) | I | BG13 | B.G.13 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Record the maximum height from top of deck to ground line or water surface elevation, whichever yield the largest value, rounded to the nearest foot. | For double-deck bridges inventoried as one bridge, measure from top of deck of the lower deck. For double-deck bridges inventoried as two bridges, measure from the top of deck of the inventoried bridge.<br><br>For bridges under fill, excluding closed spandrel arches, measure from top of slab, or top of pipe, to water surface elevation. When there is no waterway feature, measure to inside bottom of pipe, inside of floor slab, or ground line when the bottom is unexposed or the bridge is bottomless. For closed spandrel arches measure from top of roadway surface.<br><br>Ground line represents dry terrain or pavement. ~~pavement, or waterway bottom.~~<br><br>Use the water surface elevation at the time the value for this item is established.<br><br>This item may be estimated by field observation or from plans when it is not practical or is infeasible to measure, or height is more than 30 ft.<br><br>This item does not need to be updated due to fluctuations in water surface elevation.<br><br>w/ FHWA errata#1 03/24 |

## Maximum Bridge Height continued...

**Example**

Bridge carries SR170 over Felix Creek and County Trail. Report 27.

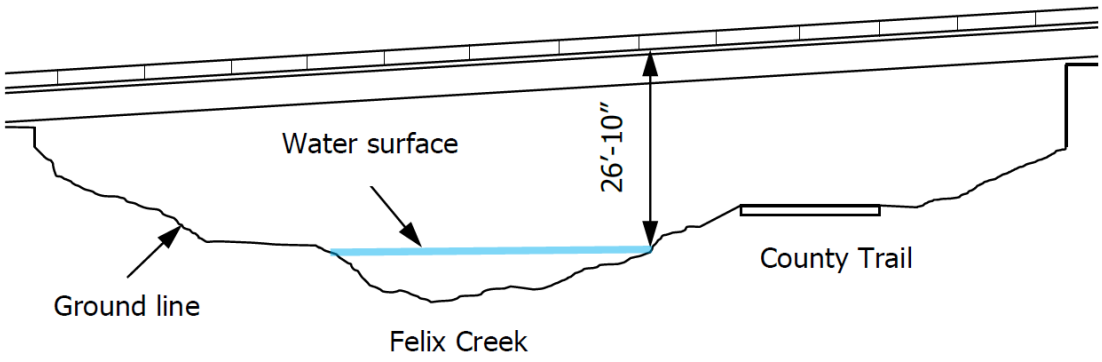



Figure 74. Profile view of a bridge over a creek and trail.

# Sidehill Bridge

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | I | BG14 | B.G.14 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the inspection type or scour monitoring performed using one of the following codes.<br><br>**Code** — **Description**<br>N — Not a sidehill bridge<br>Y — Is a sidehill bridge | A sidehill bridge is a structure built onto the side of terrain or earth material with the roadway centerline running nearly parallel to the face of the terrain or material. The roadway is carried partially on structure and partially on terrain that has been modified by cutting or filling to form the required roadway subgrade elevation.<br><br>For sidehill bridges, Item B.G.06 (Structure Width Curb-to-Curb) is typically larger than Item B.G.05 (Structure Width Out-to-Out).<br><br>For sidehill bridges with irregular geometry, reporting the actual deck area in Item B.G.15 (Irregular Deck Area) provides a more accurate value than using the default calculation described for that item.<br><br>Use code N when no portion of the bridge is a sidehill structure. |

**Example - Sidehill Bridge**

A bridge is built onto the side of a hill with the roadway partially on ground and partially on structure. Report Y.

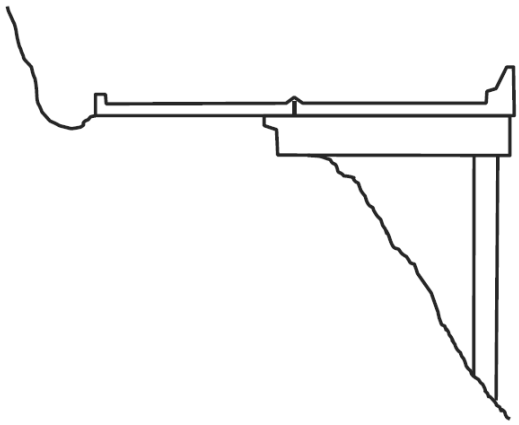


Figure 75. Cross-section view of a sidehill bridge.

## Irregular Deck Area

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(10,1) | N(10,1) | I | BG15 | B.G.15 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not cross over or under a public roadway**

| Specification | Commentary |
|---|---|
| Record the total deck area rounded to the nearest tenth of a square foot.<br><br>**Leave this field blank when BG16 Calculated Deck Area accurately represents deck area.**<br><br>Only report this item when the actual area is obtained from plans or measurement of bridges with irregular geometry.<br><br>The limits of measurement shall be in accordance with Items B.G.05 (Structure Width Out-to-Out) and B.G.02 (Total Structure Length).<br><br>For bridges that carry multiple types of service, for example highway and railroad, report the deck area that encompasses all service types. | Reporting the deck area calculated from plans may more accurately reflect the deck area for bridges with unusual geometry (e.g. flared, sidehill, or bifurcated structures), or through structures with cantilevered sidewalks.<br><br>This item can improve the accuracy of national performance measure computations, estimating cost, etc. |

## Calculated Deck Area

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Calculated | N(10,1) | I | BG16 | B.G.16 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not cross over or under a public roadway**

| Specification | Commentary |
|---|---|
| The default calculation for bridges is the value reported in Item B.G.05 (Structure Width Out-to- Out) multiplied by the value reported in Item B.G.02 (Total Structure Length) rounded to the nearest tenth of a square foot. | This default deck area will be used for national bridge performance measures unless the Irregular Deck Area B.G.15 is coded. |

## Min. Vert. Clearance Over Deck (ft & in) *(Old Item 1370)*

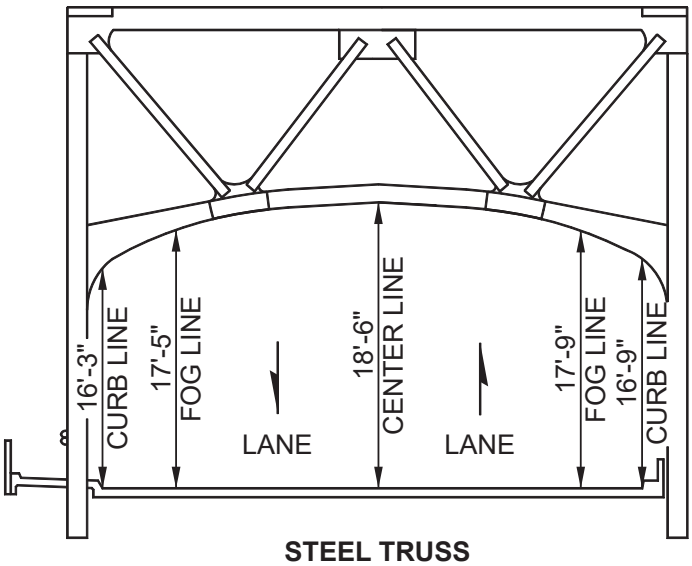
| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,0) | - | EI | WH12 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Specification Continued |
|---|---|
| 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. |

**Example - Min Vert. Clearance Over Deck (ft & in)**




**STEEL TRUSS**

CODE: **1603**

Figure 1370

## Min. Vert. Clearance Under Bridge (ft & in) *(Old Item 1374)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,0) | - | EI | WH13 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**

### Specification

Code the minimum vertical clearance from the roadway (travel lanes only)* or railroad track beneath the structure to the underside of the superstructure.

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.

Roadway standard minimum clearance is 16' - 6" and RR standard minimum clearance is 22' - 6".

### Specification Continued

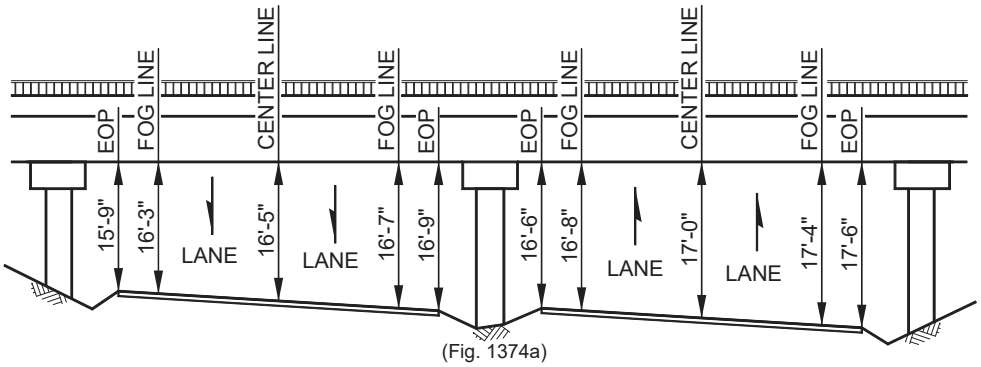
The information to be recorded is the actual minimum vertical clearance over the traveled way to the structure, in feet and inches, rounded to the lesser inch (e.g., 16′ 3¾″ is to be coded 1603). When a restriction is 100 feet or greater, code 9912.

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.

* Traveled way, or travel lanes, is between fog lines and excludes shoulders or gore areas. In cases where there are no fog lines, judgement shall be used to determine edges of traveled way.

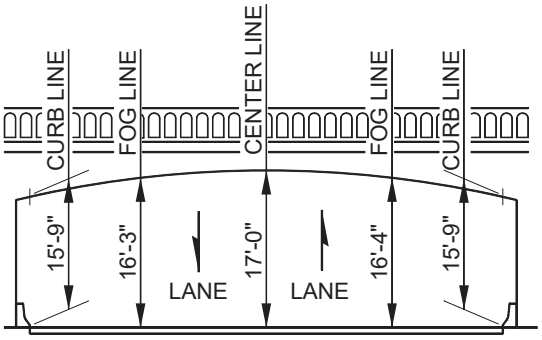
## Min. Vert. Clearance Under Bridge (ft & in) continued... *(Old Item 1374)*

### Examples



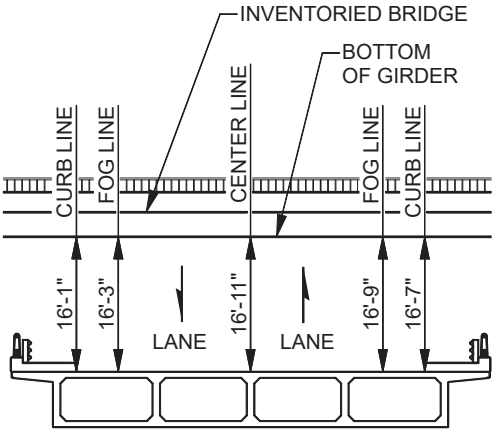

(Fig. 1374a)
**DIVIDED HIGHWAY**
CODE: 1603

Figure 1374a



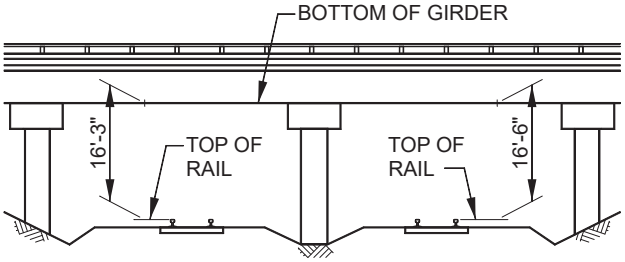

(Fig. 1374b)
**UNDIVIDED HIGHWAY**
CODE: 1603

Figure 1374b




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

Figure 1374c




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

Figure 1374d

## Service In Tunnel - SNTI

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(1,0) | - | I | TA8 | - | A.8 |

**Applicable Structure Types**

- **Type 3 - Tunnels carrying public roadways within**

| Specification | Commentary |
|---|---|
| Code the type of service in the tunnel using a 1-digit code.<br><br>The types of service in the tunnel and shall be coded using one of the following codes in Table TA8. | Railroad types include freight, light rail, commuter rail, high-speed, electrified, and transit.<br><br>Use code 3 for bicycles and other non- highway modes of human transportation not covered in other codes (e.g., golf carts). |

**Table TA8 Service In Tunnel Code - SNTI**

| WSBIS/SNTI Code | Description |
|---|---|
| 1 | Highway |
| 2 | Highway and Railroad |
| 3 | Highway and Pedestrian |
| 4 | Highway, Railroad and Pedestrian |
| 5 | Other |

## Min. Vert. Clear. Over Tunnel Rdwy - SNTI

| Format | SNTI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(5,1) | N(5,1) | I | TG2 | - | G.2 |

**Applicable Structure Types**

- **Type 3 - Tunnels carrying roadways within**

| Specification | Specification Continued |
|---|---|
| Code 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. |

**Examples - Min. Vert. Clear. Over Tunnel Rdwy - SNTI**

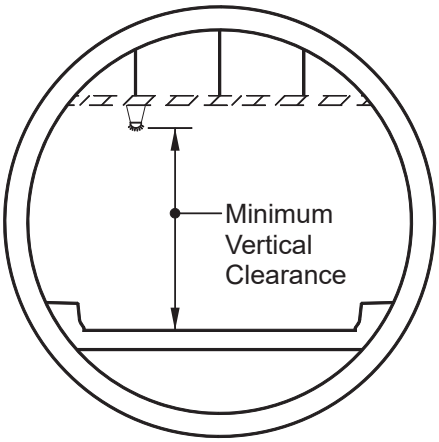



Figure TG2a

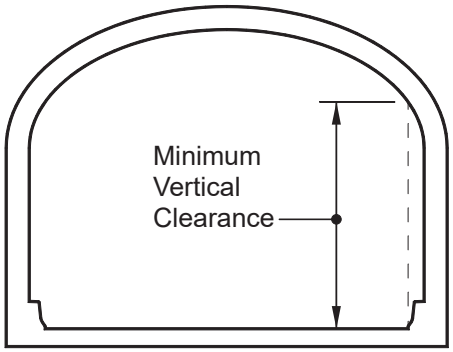



Figure TG2b

## *Tunnel Shape*

### Number of Bores - SNTI

| Format | SNTI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | N(1,0) | I | TS1 | - | S.1 |

**Applicable Structure Types**

- **Tunnels carrying public roadways within**

| Specification | Commentary |
|---|---|
| Code the one digit number defining the number of bores in a tunnel.<br><br>When recording and coding for this item, use the number of bores associated with Item ID I. - Tunnel Number. | Definition of a Tunnel Bore - an underground passageway for vehicles that pass under a mountain, waterway, or an urban area.<br><br>A ramp should not be counted as a bore unless it is being coded as a separate tunnel. |

**Examples - Number of Bores - SNTI**

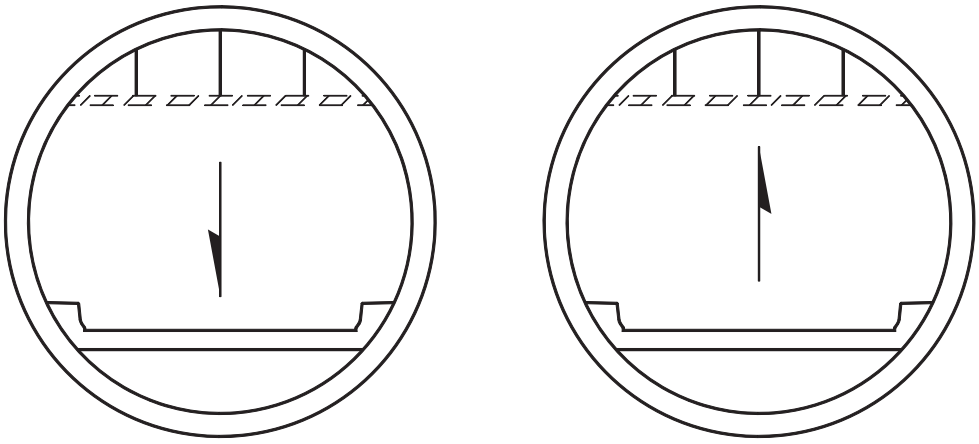


Figure TS1a Two Bores

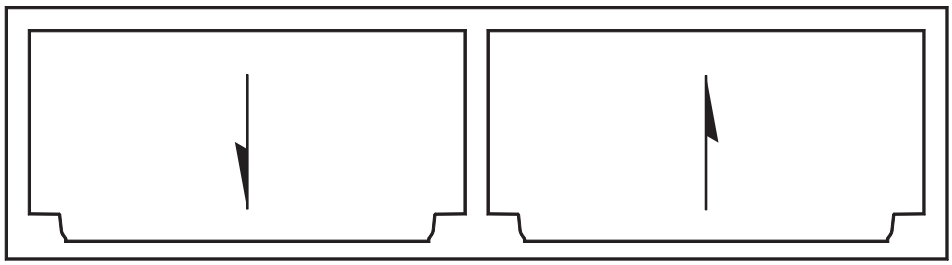


Figure TS1b One Bore

## Tunnel Shape - SNTI

| Format | SNTI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | N(1,0) | I | TS2 | - | S.2 |

**Applicable Structure Types**

- **Tunnels carrying public roadways within**

| Specification | Commentary |
|---|---|
| Code the type of tunnel shape. | Definition of a Tunnel Bore - an underground passageway for vehicles that pass under a mountain, waterway, or an urban area.<br><br>A ramp should not be counted as a bore unless it is being coded as a separate tunnel. |

| Code | Description |
|---|---|
| 1 | Oval |
| 2 | Horseshoe |
| 3 | Rectangular |
| 4 | Circular |

**Examples - Tunnel Shape - SNTI**

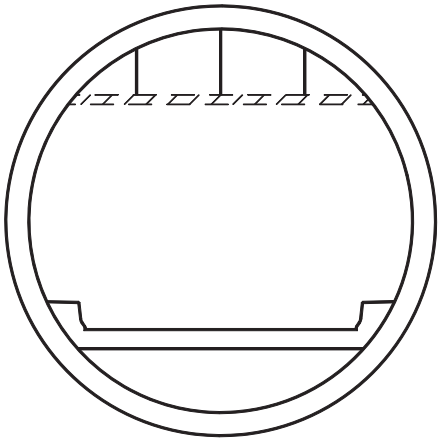


Figure TS2a Circular Tunnel

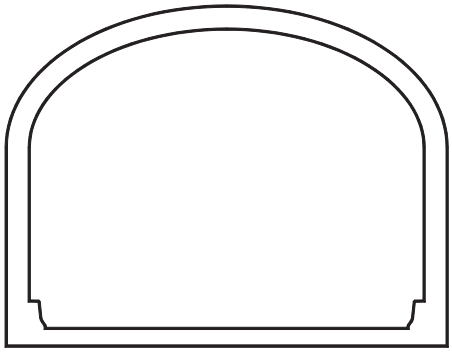


Figure TS2b Horseshoe Tunnel

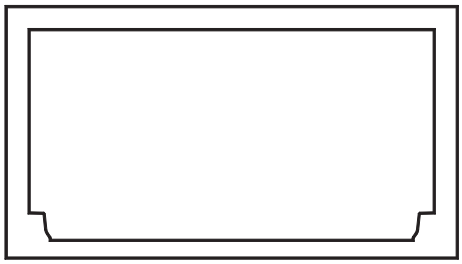


Figure TS2c Rectangular Tunnel

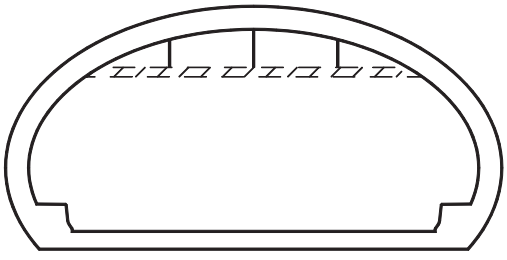


Figure TS2d Oval Tunnel

## Portal Shape - SNTI

| Format | SNTI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | N(1,0) | I | TS3 | - | S.3 |

**Applicable Structure Types**

- **Tunnels carrying public roadways within**

| Specification | Commentary |
|---|---|
| Code the type of portal shape.<br><br>Code: 1 = Oval; 2 = Horseshoe; 3 = Rectangular; 4 = Circular; 5 = Other | See example shapes shown for Item ID TS2 Tunnel Shape: Figures TS2a, TS2b, TS2c, TS2d. |

## Ground Conditions - SNTI

| Format | SNTI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | N(1,0) | I | TS4 | - | S.4 |

**Applicable Structure Types**

- **Tunnels carrying public roadways within**

| Specification | Commentary |
|---|---|
| Code the type of ground conditions.<br><br>1 Soil<br>2 Rock<br>3 Mixed Face | **Soil** is used to define ground conditions consisting primarily of clay, silt, sand, gravel or a mixture.<br><br>**Rock** is used to define ground conditions consisting primarily of material that has rock structure in weathered to sound condition.<br><br>**Mixed Face** usually refers to a situation where the soil conditions vary along the length and/or height of the tunnel. |

## Complex Tunnel - SNTI

| Format | SNTI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | N(1,0) | I | TS5 | | S5 |

**Applicable Structure Types**

- **Tunnels carrying public roadways within**

| Specification | Commentary |
|---|---|
| Code whether the tunnel is complex using one of the following codes:<br><br>**Code** — **Description**<br>0 — The tunnel is not complex<br>1 — The tunnel is complex<br><br>Do not report this item for bridges that do not have steel members as indicated in Items B.SP.04 (Span Material) and B.SB.03 (Substructure Material). | A complex tunnel is characterized by advanced or unique structural elements or functional systems.<br><br>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 of a shorter length, not requiring any ventilation, and may or may not have lighting installed |

### *Tunnel Restrictions*

## Height Restrictions - SNTI

| Format | SNTI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | N(1,0) | I | TL10 | - | L.10 |

**Applicable Structure Types**

- **Tunnels carrying public roadways within**

| Specification | Commentary |
|---|---|
| Code whether the tunnel has a height restriction using one of the following codes:<br><br>**Code** — **Description**<br>1 — Yes, there is a height restriction, with measured clearance < 14’-4”<br>0 — No, there is no height restriction, with measured clearance => 14’-4” | |

## Hazardous Material Restriction - SNTI

| Format | SNTI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | N(1,0) | I | TL11 | - | L.11 |

**Applicable Structure Types**

- **Tunnels carrying public roadways within**

| Specification | Commentary |
|---|---|
| Code whether the tunnel has a hazardous material restriction using one of the following codes<br><br>**Code** — **Description**<br>1 — Yes, there is a hazardous material restriction<br>0 — No, there is no hazardous material restriction | |

## Other Restrictions - SNTI

| Format | SNTI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | N(1,0) | I | TL12 | - | L.12 |

**Applicable Structure Types**

- **Tunnels carrying public roadways within**

| Specification | Commentary |
|---|---|
| Code whether the tunnel has a restriction other than load posting, height or hazardous material using one of the following codes:<br><br>**Code** — **Description**<br>1 — Yes, there are other restrictions<br>0 — No, there are no other restrictions | Other restrictions could include width restrictions or requirements for police escorts for permit vehicles. |

# Features Tab

## Main & Secondary Listing Code

| Format | SNBI Format | Frequency | WSBIS Item | SNBI Item | SNTI Item |
|---|---|---|---|---|---|
| Calculated | - | I | 2000 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specifications**

The Main Listing Code (M) is used to represent the structure itself and is created when the structure is inventoried. There is only ever, one Main listing per structure.

- Typically this is the most significant highway feature carried by the bridge
- But in the case of Tunnels, Railroads or Pedestrian structures - it represents the highway under

The Secondary Listing Code (S) is used to represent any and all other features.

The main & secondary listing code is fully automated and relates to Item 1432.

## On / Under Code

| Format | SNBI Format | Frequency | WSBIS Item | SNBI Item | SNTI Item |
|---|---|---|---|---|---|
| Calculated | - | I | 1432 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specifications**

This field is now auto-calculated (with INV editability) when new features are added and the feature type and feature location have been specified.

**WSBIS has four categories of On/Under codes:**

**0** - represents there is no highway feature associated with the structure (only used with Mains)

**1** - represents the ON record - signifies that the highway (roadway) route or feature is carried on a structure - but not over a tunnel.

**2, B-T** - represents the UNDER record(s) - signifies that the highway/hpms (roadway) or other feature goes under the structure if it's a bridge, and through a structure if it's a tunnel.

- The under type code must be 2 and then an alphabetic letter (2, B, C, D, etc).
- If routes or features goes under a bridge 2, B, C, D, etc. consecutively for all
- If the structure is a tunnel, code 2.

**3-9, U-Z** - represents the ABOVE record(s) - signifies that a bridge is carried above another bridge.

- The above type code must start with 3, 4, 5, etc and then if more are needed use R through Z, consecutively for all.
- This code will also be used with Tunnels to represent what's above a tunnel
- The SNTI makes no distinction for tunnels, and WSBIS treats all tunnel records as Under records.

**Table 1432 On / Under Code**

| WSBIS Code | SNBI/SNTI Code | Description |
|---|---|---|
| 0 | - | No highway/hpms feature on/under (Mains only) |
| 1 | - | Highway/hpms feature is on the structure |
| 2, B - T | - | Features go under a bridge or through a tunnel |
| 3 - 9, U - Z | - | Bridge above a bridge or feature above a tunnel |

## On / Under Code continued...

### Specifications Continued

Additionally, in WSBIS each structure type corresponds to a single main listing, with a minimum of one secondary listing (can have many) and the appropriate on/under code associated, as follows:

**(M1) Main Carried Feature = Represents the Type 1 structure and:**

- Is always a highway feature carried on the bridge as the M1
- Can have S1's as additional highway features carried on (like ramps alongside mainline)
- Can have any feature type below/under S2, B-T
- Can have bridge above S3-9, U-Z

**(M2) Main Below Feature = Represents the Type 2 structure and:**

- The S1 feature is always carried on as the bridge (typically a railroad or pedestrian)
- Is always a highway feature below/under as the M2
- Can have any additional feature type below/under
- Cannot have a bridge above (*even if there is a bridge above, don't represent on type 2*)

**(M2) Main Below Feature = Represents the Type 3 structure and:**

- Is always a highway feature carried 'within' the tunnel as the M2
- Can have additional highway features carried 'within' as SB-T
- Can have any feature types above, except for waterway or relief for waterway S3-9, U-Z
- Sidewalks within a tunnel do not count as Pathway features carried within (see Table WF01)
- Must have at least one above feature S3-9, U-Z

**(M0) Main - Carried Feature = Represents the Type 4 structure and:**

- The M0 is always the carried feature and can be any feature type except:
  - » highway, waterway, or relief for waterway
- Can have any feature type below/under (S2, B-T) except for highway
- The M0 will have a route grid to associate route and milepost to the structure.
  - » Local Agencies and BPO will use their known method of input (Route as 5 digit number and Milepost with two digits after decimal)

## Crossing Description

| Format | SNBI Format | Frequency | WSBIS Item | SNBI Item | SNTI Item |
|---|---|---|---|---|---|
| AN(50) | - | I | WF03 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

### Specification

This item describes the bridge crossing description from the perspective of the inventory route.

The crossing description field is used within all public facing applications like:

- Bridge Vertical Clearance Trip Planner (BVCTP)
- Bridge public facing GIS map services
- Other Internal Agency applications using our data

### Examples

For Carried, Top & Lower Level Features (C,T,L)

- Roadname OVER Roadname (SR 512 OVER I-5)
- BNSF Railroad over Roadname
- Pedestrian bridge over Roadname

For Below Features (B)

- Roadname UNDER Roadname (I-5 UNDER SR 512)
- Waterway UNDER Roadname
- BNSF Railroad UNDER Roadname

For Above Features (A)

- Use Generic phrase: Bridge above Bridge
- Use Generic phrase: Dry Terrain above Tunnel

## Feature Name

| Format | SNBI Format | Frequency | WSBIS Item | SNBI Item | SNTI Item |
|---|---|---|---|---|---|
| AN(300) | AN(300) | I | BF03 | B.F.03 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the commonly known name(s) for the feature reported in Item B.F.01 (Feature Type). If the feature has no commonly known name, provide a general description.<br><br>For more than one name, report all names with the most common name first.<br><br>When applicable, report the route number first followed by other names.<br><br>Code multiple names separated by pipe ( \| ) delimiters. | This item has correlating data for each feature reported for Item B.F.01 (Feature Type).<br><br>The owner may include directional or other descriptive information in this field. Official names and local names may be included.<br><br>For border bridges, the Neighboring State reports this item for all highway features carried on or passing above the bridge, as part of their abbreviated bridge record. For more information, see the Border Bridges section of this document. |

**Examples**

I-90, commonly named Massachusetts Turnpike. Report I-90|Massachusetts Turnpike.

I-64, with no commonly known name. Report I-64.

US 50 & US 301 carried on one highway commonly named John Hanson Highway. Report US 50|US 301|John Hanson Highway.

I-95S carried on the lower deck of the George Washington Bridge. Report I95S|George Washington Bridge - Lower Deck.

I-495 northbound. Report I-495 NB.

A bridge carries I-68 eastbound (commonly named Harry Byrd Expressway), and State Route 17 northbound (commonly named Paris Pike) over County Route 603 (commonly named Blue Ridge Mountain Road), the Appalachian Trail, and Postage Creek. I-68 eastbound and State Route 17 northbound share a common highway that is not divided at the bridge. Above the bridge is a ramp connecting I-68 westbound to County Route 603 southbound.

- Report I-68|Harry Byrd Expressway|SR17|Paris Pike for I-68/SR17.
- Report County Route 603|Blue Ridge Mountain Road for County Route 603.
- Report I-68 WB to County Route 603 SB for the ramp.
- Report Appalachian Trail for the pathway.
- Report Postage Creek for the waterway.

## Structure Location

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(25) | AN(300) | EI | BL11 | B.L.11 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

### Specification

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

For each feature type use the following examples:

**Highway**

- 19.3 E JCT SR 203
- 14.7 E MASON CO

**Railroad**

- Railroad milepost, yard name or other railroad identifying location

**Pedestrian**

- leave blank

**Waterway or Relief for Waterway**

- navigable waterways use channel milepoint, node or nearest port
- non-navigable waterways leave blank

**Urban Feature**

- leave blank

**Dry Terrain**

- leave blank

**Other**

- leave blank

## Feature Type

| Format | SNBI Format | Frequency | WSBIS Item | SNBI Item | SNTI Item |
|---|---|---|---|---|---|
| Pulldown | - | I | WF01 | W.F.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

### Specification

All bridges have one feature carried on the bridge and one feature below the bridge. Some bridges have several features that are above, below, or carried on the bridge.

Code the feature type that is above, below, or carried on the bridge using one of the following descriptions in Table WF01.

### Examples

A bridge carries I-66 eastbound and I-66 westbound over County Route 601 and Passage Creek. I-66 eastbound and westbound are divided at the bridge by an opening between two superstructure units supported by abutments common to both superstructures.

- Report H01 for I-66 eastbound.
- Report H02 for I-66 westbound.
- Report H03 for County Route 601.
- Report W01 for Passage Creek.

A bridge carries I-68 eastbound and State Route 17 northbound over County Route 603, the Appalachian Trail, and Postage Creek. I-68 eastbound and State Route 17 northbound share a common highway that is not divided at the bridge. Above the bridge is a ramp connecting I-68 westbound to County Route 603 southbound.

- Report H01 for I-68/SR17.
- Report H02 for County Route 603.
- Report H03 for the ramp.
- Report P01 for the Appalachian Trail.
- Report W01 for Postage Creek.

A bridge carries Brookside Glen Drive over Union Creek. The bridge carries sidewalks on the north and south sides.

- Report H01 for Brookside Glen Drive.
- Report P01 for the sidewalks.
- Report W01 for Union Creek.

**Table WF01 Feature Type - Specifications**

| WSBIS/SNBI Code | SNTI Code | Description |
|---|---|---|
| Highway (H##) | - | Use code H for each unique highway feature. All public highways, roads or streets carried on, above, and below the bridge. Note for divided highways/roadways, where traffic flows in only one direction, there will be two separate features; one for each direction. Also note that "stacked" bridges will reference each other.<br><br>Report one highway feature for a highway that is designated with two or more route numbers.<br><br>This item does not include ancillary structures and utilities.<br><br>For multi-level interchanges, report highway features directly above and below the bridge.<br><br>The presence of a flush or mountable median ~~on the bridge~~ does not in itself indicate that the highway is divided.<br><br>For a double deck bridge that is inventoried with one unique bridge number, report a feature for each deck level, (see Item BF02). |
| Railroad (RR##) | - | Use code R for each railroad service type listed in Item B.RR.01 (*Railroad Service Type*). All railroads carried on and below the bridge, including light rail and trolleys with tracks. If tracks are missing and no formal railway is present, code as Other feature type.<br><br>Code a railroad feature for each separate railroad service type, as identified in Item B.RR.01 (*Railroad Service Type*), that is carried on or passes below the bridge.<br><br>When a track carries multiple railroad service types, code only one feature.<br><br>When multiple tracks carry the same railroad service type(s), code only one feature. |
| Pathway (P##) | - | Use code P for separated pathways carried on or are below the bridge, that are dedicated for pedestrian, bicycle, equestrian, including railroad grades that have been repurposed as pathways, or other non-highway modes of human transportation not covered in other codes. Sidewalks on the bridge (or within a tunnel) are not included as Pathways carried or Pathways Below, these are covered in Items BG07 and BG08.<br><br>Note only one pathway feature is needed even if there are multiple pathways present. Do not include informal pathways. |
| Waterway (W##) | - | Use code W for each unique waterway. All waterways below the bridge, including canals, wasteway ditches, and intermittent streams with a defined channel. Siphons are not considered waterways, but are coded as Other features instead.<br><br>Do not use for roadside ditches or pipes that typically only carry roadway runoff from rain events are not considered waterways. |
| Relief for Waterway (F##) | - | Use code F for bridges where one or more spans provide waterway openings for flow only during flood stages to provide additional hydraulic capacity, such as relief channels, as relief for waterway below the bridge. A relief is a channel constructed to be dry except during major floods. It is specifically designed to pass some of the floodwaters from the adjacent waterway.<br><br>If there is a question regarding what constitutes a relief for waterway, contact the scour team for clarification. |

**Table WF01 Feature Type - Specifications**

| WSBIS/SNBI Code | SNTI Code | Description |
|---|---|---|
| Urban (B##) | - | Use code B for urban features such as buildings, parking lots, etc as urban features carried on or below the bridge. Reporting more than one Urban feature is optional. |
| Dry Terrain or side slope (D##) | - | Use code D for features such as a natural depression (dry terrain) or sidehill slope when there is no discernable waterway channel, locations that have seasonal snowmelt or other intermittent runoff without a defined channel (like agricultural field drainage).<br><br>Note that this feature is only used if there is no other feature under the bridge and none of the other feature codes apply. |
| Other (X##) | - | Use code X when no other code applies for features that exist on or below the bridge. Examples include siphons, abandoned railroads not converted to pathways, and large utilities not attached to the bridge.<br><br>Note utilities attached to the bridge are not considered a separate feature. Reporting more than one Other feature is optional. |

## Feature Designation

| Format | SNBI Format | Frequency | WSBIS Item | SNBI Item | SNTI Item |
|---|---|---|---|---|---|
| AN(3) | (AN3) | I | BF01 | B.F.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

This field is auto-sequenced after choosing the Feature Type in Item WF01.

The ## characters in the feature type codes (Table WF01) are auto-assigned with sequential numbers and leading zeros, based on each feature type for submittal to SNBI (e.g., H01, H02, etc.).

## Feature Location

| Format | SNBI Format | Frequency | WSBIS Item | SNBI Item | SNTI Item |
|---|---|---|---|---|---|
| AN(1) | AN(1) | I | BF02 | B.F.02 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

### Specification

Code the location for the feature type reported in Item WF01, that is above, below, or carried on the bridge using one of the following codes.

| Code | Description |
|---|---|
| C | Carried on the bridge |
| A | Above bridge |
| B | Below bridge |
| T | Top level |
| L | Lower level |

### Commentary

This item has a corresponding auto-sequenced code for each feature reported for Item B.F.01 (Feature Type Designation).

Use code T for the top level of a double deck bridge that is inventoried using one unique bridge number.

Use code L for the lower level of a double deck bridge that is inventoried using one unique bridge number.

For border bridges, the Neighboring State reports this item for all highway features carried on or passing above the bridge, as part of their abbreviated bridge record. For more information, see the Border Bridges section of this document.

## Feature Location continued...

### Examples

A bridge carries I-66 eastbound and I-66 westbound over County Route 601 and Passage Creek. I-66 eastbound and westbound are divided at the bridge by an opening between two superstructure units supported by abutments common to both superstructures.

- Report C for I-66 eastbound.
- Report C For I-66 westbound.
- Report B for County Route 601.
- Report B for Passage Creek.

A bridge carries I-68 eastbound and State Route 17 northbound over County Route 603, the Appalachian Trail, and Postage Creek. I-68 eastbound and State Route 17 northbound share a common highway that is not divided at the bridge. Above the bridge is a ramp connecting I-68 westbound to County Route 603 southbound.

- Report C for I-68/SR17.
- Report B for County Route 603.
- Report A for the ramp.
- Report B for the Appalachian Trail.
- Report B for Postage Creek.

A bridge carries Brookside Glen Drive over Union Creek. The bridge carries sidewalks on the north and south sides.

- Report C for Brookside Glen Drive.
- Report C for the sidewalks.
- Report B for Union Creek.

## Crossing Manager

| Format | SNBI Format | Frequency | WSBIS Item | SNBI Item | SNTI Item |
|---|---|---|---|---|---|
| Pulldown | - | I | WF02 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

### Specification

The Crossing Manager is the Program Manager responsible for the route identified in Item B.RT.02, whether that route is on or under the structure.

## Latitude

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(9,6) | N(9,6) | I | BL05 | B.L.05 | I.13 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the latitude of the bridge in decimal degrees at the location of the bridge following agency procedures.<br><br>w/FHWA errata#1 03/24<br><br>**For Item Id WL10 Latitude End:** This field will be coded when the Structure Type is a 2 or 4 and is only for the Carried feature.<br><br>**Submittal to SNBI/SNTI** will report the H01C record. | Mapping of bridges by FHWA will assume that the reported value is based on World Geodetic System 1984.<br><br>The format accommodates reporting a negative sign which is counted as a digit. FHWA will adjust the polarity when it is incorrectly reported.<br><br>The reported value does not need to be at the same location as the LRS mile point reported in Item B.H.07. LRS bridge mile point locations occurring on a chorded shape file created using only roadway mile points do not always correspond with the true latitude of a bridge.<br><br>w/FHWA errata#1 03/24 |

**Examples**

Latitude is 50° 10’ 00.00” N. Report 50.166667.

Latitude is 53° 52.457' N. Report 53.874285.

## Longitude

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(9,6) | N(9,6) | I | BL06 | B.L.06 | I.14 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the longitude of the bridge in decimal degrees at the location of the bridge following agency procedures.<br><br>BPO/Local Agencies code this field with a negative sign when entering data.<br><br>w/FHWA errata#1 03/24<br><br>**For Item Id WL11 Longitude End:** This field will be coded when the Structure Type is a 2 or 4 and is only for the Carried feature.<br><br>**Submittal to SNBI/SNTI** will report the H01C record. | Mapping of bridges by FHWA will assume that the reported value is based on World Geodetic System 1984.<br><br>The format accommodates reporting a negative sign which is counted as a digit. FHWA will adjust the polarity when it is incorrectly reported.<br><br>The reported value does not need to be at the same location as the LRS mile point reported in Item B.H.07 LRS bridge mile point locations occurring on a chorded shape file created using only roadway mile points do not always correspond with the true longitude of a bridge.<br><br>w/FHWA errata#1 03/24 |

**Examples**

Longitude is 125° 10’ 00.00” W. Report -125.166667.

Longitude is 166° 32.784333' W. Report -166.546406.

## Local Agency Routing Map *(Button)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| - | - | - | WL09 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

The Local Agency Routing Web Map was built to give access to authoritative gis datasets for SNBI data acquisition, in one easy to access location. This map is dynamic and may be revised periodically

The datasets within this web map include (but are not limited to):
LRS Local Agency Public Routes/Roads, County Road (CRAB), Non-State NHS, Nat'l Truck Network, Nat'l Highway Freight Network, STRAHNET, FRA Railroad, City, County, Place Code, Urban and Urbanized areas, Metro Planning Org, Township, Range and Section, BIA Reservations, and BIA Off-Reservation Trust Lands.

## SNBI Reportable Flag

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WF04 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

Indicate if the feature is to be included in the National Bridge Inventory data submittal or not.

Feature types required to be reported to the SNBI include all features carried, below and above for structures that are subject to the NBIS.

| Code | Description |
|---|---|
| Y | Include for submittal to SNBI |
| N | Do NOT include for submittal to SNBI |

## SNTI Reportable Flag

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WF05 | - | - |

**Applicable Structure Types**

- **Type 3 - Tunnels carrying roadways within**

**Specification**

Indicate if the feature is to be included in the National Tunnel Inventory data submittal or not.

| Code | Description |
|---|---|
| Y | If the feature type is a tunnel |
| N | If the feature type is NOT a tunnel |

## Bridge List Flag

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WF07 | - | - |

**Applicable Structure Types** *(structures maintained by WSDOT Bridge Preservation)*

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

Indicate if the feature is to be included or not in the Bridge List M 23-09.

Features that should be included for the Bridge List are determined by what state owned highway is carried on or is below the structure.

**For Local Agency owned structures, this item should always be coded 2.**

| Code | Description |
|---|---|
| 1 | If the highway feature type should be included in the Bridge List |
| 2 | If the highway feature type should NOT be included in the Bridge List |

## Crossing Structure ID *(Crossing Bridge Number)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(15) | AN(15) | I | BH18 | B.H.18 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**

| Specification | Commentary |
|---|---|
| Record the exact structure number(s) as assigned in Item B.ID.01 for the bridge carrying a highway feature that is located directly above or below the inventoried highway bridge.<br><br>Do not report this item when the highway bridge does not pass above or below another bridge, or passes above or below a bridge that is not reportable to the SNBI.<br><br>**Submittal to SNBI/SNTI** will report only Structure Type 1. | The intent of this item is to capture the structure number for bridges of a multi-level interchange, where bridges pass directly above or below other bridges.<br><br>For border bridges, the Neighboring State reports this item for all highway features that pass above the bridge, as part of their abbreviated bridge record. For more information, see the Border Bridges section of this document. |

## Crossing Structure ID continued... *(Crossing Bridge Number)*

**Example**

The inventoried bridge number 300000B-X636010 passes above bridge number 300000B-X638012 and passes below 300000B-X635010 and 30000B-X634010. *(Figure 104)*

- Report 300000B-X638012 for the bridge below.
- Report 300000B-X635010 for the bridge above.
- Report 300000B-X634010 for the other bridge above.

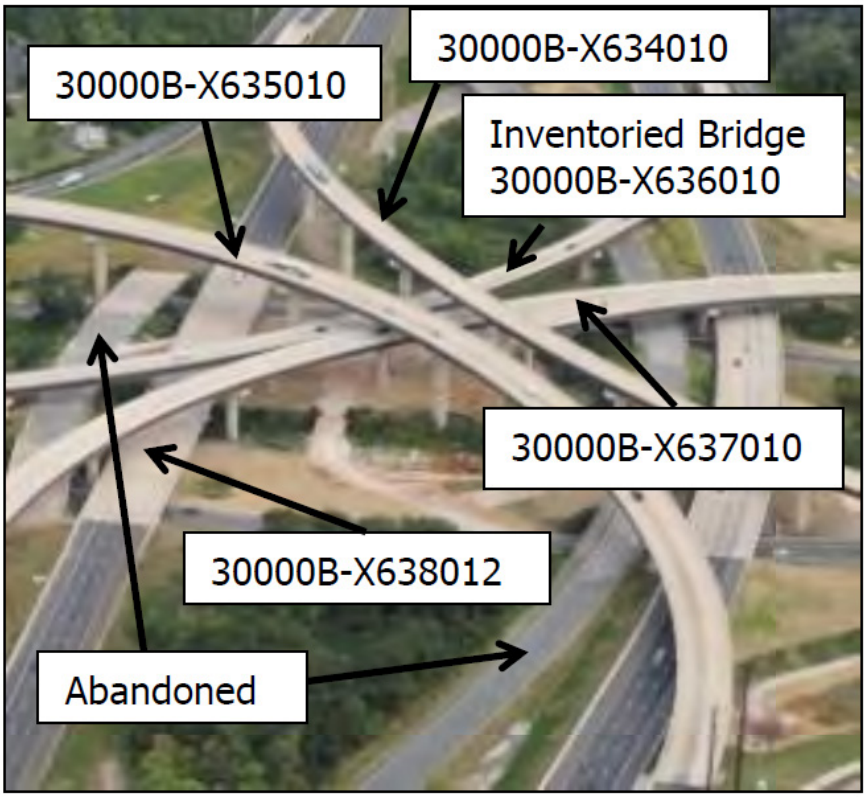



Figure 104. Multi-level interchange with bridges passing above and below other bridges. (Source: Maryland Transportation Authority)

## *Route Grid:* Route Designation

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BRT01 | B.RT.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| This field is auto-sequenced when data is entered in to the Route Grid field for the highway feature reported in Item WF01 (Feature Type).<br><br>The ## characters in the codes are auto-assigned with sequential numbers and leading zeros, for each unique route designation carried on the highway feature (e.g., R01, R02, etc.). | This item captures how routes that share the reported highway feature are designated.<br><br>Each highway feature has at least one route designation.<br><br>Typically, the route with the highest-class route type is listed first, using the hierarchy shown in Item B.RT.04 (Route Type). An interstate is considered the highest-class route.<br><br>If the highway feature is carried on a ramp bridge, report all applicable routes for the highways that are being connected.<br><br>For border bridges, the Neighboring State reports this item for all highway features carried on the bridge, as part of their abbreviated bridge record. For more information, see the Border Bridges section of this document. |

**Examples**

I-35 southbound. Report R01.

Local road with no known route number. Report R01.

I-66 and State Route 17 northbound share one highway that is not divided at the bridge.

- Report R01 for I-66.
- Report R02 for State Route 17.

A ramp bridge departs from I-66 westbound and enters I-81 southbound.

- Report R01 for I-66.
- Report R02 for I-81.

One highway feature is signed for both State Highway 43 and Harlem Avenue.

- Report R01 for State Highway 43.

Do not report a route record for Harlem Avenue.

## *Route Grid:* Route Description

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(50) | - | I | WRT01 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

Code the route description name for the route reported in B.F.03 Feature Name.

**Examples State:**
I-5 NB

US 2

**Examples Local:**
Lindeke St.

## *Route Grid:* Route Number

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(15) | AN(15) | I | BRT02 | B.RT.02 | I.7 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

Code the route number for the route reported in Item B.RT.01 (Route Designation).

**State:**
If the route is a state route WSDOT will code for mainline or associated mainline only, as a 5 digit number: 00005, 00020, 00405

If route is a local road, WSDOT will code zeros for all local agency roads, as a 5 digit number: 00000

If a highway carries multiple routes, report only those routes that have a unique route number (signed route).

If a highway carries only routes without route numbers, report one route designation.

**Local:**
Local Agencies can choose to code using zeros as five digits (00000) or they can choose to use their own road number reference here, like a CRAB route id - as 5 digit number.

## *Route Grid:* **Route Milepost**

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(5,2) | - | I | WRT02 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

**State:**
Code the milepost associated with the mainline route reported in B.RT.02. Or if local road (00000) code 0.00. Code to 2 decimal places.

**Local:**
Code the milepost associated with the chosen route reported in B.RT.02. If using 5 digit zeros, code as 0.00. Code to 2 decimal places.

## *Route Grid:* **A/B**

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(1) | - | - | - | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

Code the ahead/back status of the route reported in B.RT.02 if route is a state highway and only if location is a Backmile. See Item WH21 for more information. This field has been added to the Route Grid for mainline state highways and only when applicable.

If route number in BRT02 is a local road (00000), leave field blank.

## *Route Grid:* Direction

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(2) | AN(2) | I | BRT03 | B.RT.03 | I.8 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

Record the designated route direction for the route reported in Item B.RT.01 (Route Designation) using one of the following codes in Table BRT03.

- Use code NS when the route is not divided at the bridge, and carries traffic in both north and south directions.
- Use code EW when the route is not divided at the bridge, and carries traffic in both east and west directions.
- Use the designated route direction for the departure or entrance route when a bridge only carries a ramp; i.e. Item B.RT.05 (Service Type) is 7.
- Use the most applicable code when a route does not have a designated route direction.

For border bridges, the Neighboring State reports this item for all highway features carried on the bridge, as part of their abbreviated bridge record. For more information, see the Border Bridges section of this document.

**Examples**

I-35 southbound. Report SB.

State Highway 9W is not divided at the bridge and carries traffic in north and south directions. Report NS.

A ramp bridge departs from I-66 westbound and enters I-81 southbound.

- Report WB for the route designated as I-66.
- Report SB for the route designated as I-81.

Bridge carries I-81 northbound and I-64 eastbound.

- Report NB for the route designated as I-81.
- Report EB for the route designated as I-64.

**Table BRT03** *Route Grid:* **Direction Code**

| WSBIS/SNBI Code | SNTI Code | Description |
|---|---|---|
| NB | 1 | Northbound |
| EB | 2 | Eastbound |
| SB | 3 | Southbound |
| WB | 4 | Westbound |
| NS | 0 | Northbound and Southbound |
| EW | 0 | Eastbound and Westbound |

## *Route Grid*: Route Type

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(1) | AN(1) | I | BRT04 | B.RT.04 | I.9 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the route type for the route reported in Item B.RT.01 (Route Designation) using one of the following codes in Table BRT04. | Use code 4 for parish routes or other county route equivalents.<br><br>Use code 5 for city or other municipal streets.<br><br>Use code 6 when a public highway passes through Federal lands such as national parks, national forests, or DOD facilities and does not meet the description of codes 1 through 5.<br><br>Use code 7 when a public highway passes through State lands such as State parks or State forests and does not meet the description of codes 1 through 5.<br><br>Use code X when a public highway is not designated as one of the defined route type codes.<br><br>For border bridges, the Neighboring State reports this item for all highway features carried on the bridge, as part of their abbreviated bridge record. For more information, see the Border Bridges section of this document. |

## *Route Grid*: Route Type continued...

**Examples**

Highway feature is signed for both I-35 and US-77.

- Report 1 for the route designated as I-35.
- Report 2 for the route designated as US-77.

Route is signed I-35 southbound. Report 1.

Route is signed State Highway 9W. Report 3.

A ramp bridge departs from VA-7 westbound and enters I-81 southbound.

- Report 3 for the route designated as VA-7.
- Report 1 for the route designated as I-81.

**Table BRT04** *Route Grid*: **Route Type Code**

| WSBIS/SNBI Code | SNTI Code | Description |
|---|---|---|
| 1 | 1 | Interstate Route |
| 2 | 2 | U.S. Route |
| 3 | 3 | State Route |
| 4 | 4 | County Route |
| 5 | 5 | City Street |
| 6 | 6 | Federal lands road |
| 7 | 7 | State lands road |
| X | 8 | Other |

## *Route Grid:* Service Type

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(1) | AN(1) | I | BRT05 | B.RT.05 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

### Specification

Code the designated service type for the route reported in Item B.RT.01 (Route Designation), using one of the following codes.

| Code | Description |
|---|---|
| 1 | Mainline |
| 2 | Alternate |
| 3 | Bypass |
| 4 | Spur |
| 6 | Business |
| 7 | Ramp, connector, etc. |
| 8 | Service or frontage road |
| X | Other |

### Commentary

The service type designation is determined by the agency, and typically included as part of the signage for the route.

Use code 7 for all types, arrangements, and sizes of turning roadways that connect two or more highways at an interchange.

Use code 8 for frontage roads. These are typically parallel to the traveled way, may be provided on one or both sides of the mainline, and may or may not be continuous. A frontage road may include a U-turn lane.

For Federal agency roads, report the most logical description of the service type compared to other routes within the facility.

For border bridges, the Neighboring State reports this item for all highway features carried on the bridge, as part of their abbreviated bridge record. For more information, see the Border Bridges section of this document.

### Examples

A ramp bridge connects I-66 westbound to I-81 southbound. Report 7.

I-35W southbound. Report 1.

## LRS Route ID

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(20) | AN(20) | I | BH06 | B.H.06 | I.11 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| The LRS Route ID is coded to correspond to the location of the structure as it relates to the LRS.<br><br>**Where there is no LRS Route ID use: 000GEOMETRY in the field to represent WSDOT GIS functionality.**<br><br>**For Local Agency LRS Route ID's use the route data available within the Local Agency Routing Map.**<br><br>Report the LRS Route ID defined by the State Linear Referencing System (LRS) that is reported to HPMS for the highway feature in Item B.F.01 (Feature Type). The HPMS information reported to FHWA consists of both the Local Agency Public Roads (LAPR) LRS and the Washington State Route LRS.<br><br>**Submittal to SNBI** will be translated to - Report N if an LRS Route ID has not been assigned or doesn't exist. When submitted to FHWA the LRS Route ID must match the HPMS data exactly.<br><br>**Submittal to SNTI** allows up to 120 characters for this field, so complete data is submitted. | The LRS Route ID is not necessarily the same number as the route number (signed) posted along the highway, but is a number used to uniquely identify a route using the State Route Number, Related Route Type, and Related Route Qualifier combined to create the route identifier (LRS Route ID).<br><br>When the LRS Route ID is combined with a route measure (SRMP or ARM), events can be placed on the LRS for GIS analysis and mapping purposes.<br><br>Refer to the FHWA HPMS Field Manual at https://www.fhwa.dot.gov/policyinformation/hpms/fieldmanual/.<br><br>For border bridges, the Neighboring State reports this item for all highway features carried on the bridge, as part of their abbreviated bridge record. For more information, see the Border Bridges section of this document. |

### Examples

**State Route LRS Examples:**

005
005LX10130
090Q527650

**LAPR Route LRS Examples**

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

## LRS Milepost

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(8,3) | N(8,3) | I | BH07, WH07 | B.H.07 | I.12 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| The LRS Milepost for the highway feature in Item B.H.06, is coded to correspond to the orientation of the structure as it relates to the LRS.<br><br>Code to three decimal places.<br><br>**Leave null if the milepost is not available or if no milepost exists (off system, no LRS Route, 000GEOMETRY)**<br><br>**Carried:**<br>For highway features that carry an LRS route, report the milepost point at the beginning of the bridge. Typically, both the LRS and the structure are oriented in the same direction (the lowest milepost on the structure is the beginning of the structure). In cases where the LRS and the structure are oriented in opposing directions, record the milepost from the end of the structure instead of the beginning.<br><br>**Below:**<br>When the LRS route passes below the bridge, report the mile point on the LRS route where the bridge is first encountered. WSDOT uses a milepost value that represents the point as centered under the structure above. This is done for visualization purposes as well as representing that either side of the bridge could be the lowest of the two edges encountered.<br><br>**For Item WH07 LRS Milepost End**: this item is auto-calculated based on the structure length in Item B.G.02 for highway carried features.<br><br>**Submittal to SNBI** will report the LRS Milepost point to the nearest thousandth of a mile. | The LRS mile point is used to establish the location of the bridge along the LRS route.<br><br>If the highway does not carry an LRS route, report the most appropriate mile point.<br><br>The mile point must be consistent with the LRS route and LRS milepost system defined by the State Linear Referencing System (LRS) that is reported to HPMS for the highway feature in Item B.F.01 (Feature Type). The HPMS information reported to FHWA consists of both the Local Agency Public Roads (LAPR) LRS and the Washington State Route LRS.<br><br>Refer to the FHWA HPMS Field Manual at https://www.fhwa.dot.gov/policyinformation/hpms/fieldmanual/.<br><br>For border bridges, the Neighboring State reports this item for all highway features carried on the bridge, as part of their abbreviated bridge record. For more information, see the Border Bridges section of this document. |

## LRS Milepost continued...

**Examples**

LRS Mile Point from HPMS is 130.344. Report 130.344.

LRS Mile Point from HPMS is 9.600. Report 9.600.

The highway does not carry an LRS route. The beginning of the bridge is 0.2 miles past the 34.0 mile marker. Report 34.2.

## LRS Directional Indicator

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | I | WH23 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification**

The directional indicator specifies if the inventory route carries traffic in the direction of increasing mileposts, decreasing mileposts or both.

**Code B if the local agency roadway has two-way traffic on route with an " i " directional indicator.**

State route ramps will always be " i " directional indicator even when it serves decreasing direction.

| Code | Description |
|---|---|
| I | Increasing direction (single direction of travel, divided highway) |
| D | Decreasing direction (single direction of travel, divided highway) |
| B | Both directions (two-way direction of travel, undivided roadway) |
| * | Null, no inventory route available or no milepost exists (off system, no LRS Route, 000GEOMETRY) |

**Commentary**

**Increasing** - milepost numbers increase when traveling the roadway in the increasing direction.

**Decreasing** - milepost numbers decrease when traveling the roadway in the decreasing direction.

**Bothways** - use the increasing milepost number to represent the two-way location.

## LRS Ahead/Back Indicator

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(15) | - | - | WH21, WH22 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

### Specification

Report the ahead/back status of the route reported in B.RT.02 if route is a state highway.

Code B only when there is Back mileage value otherwise leave null.

If route is a local agency road, leave field blank.

| Code | Description |
|---|---|
| B | Back milepost |
| * | Null, is either an Ahead milepost or does not apply |

**For Item WH22 A/B End:** this only applies for state routes that have a change in ahead/back values within the length of the bridge. Will not apply to local agency roads.

### Commentary

Ahead/Back Indicators (A/B) - The State Route Milepost Back (B) indicator designates whether the milepost value is the 'back' duplicate of a milepost value 'ahead' on the route. Ahead values have an implied 'A' (null).

A back SRMP occurs as a result of:

- A realignment that lengthens a section of an SR other than at the end of the route.
- Adding mileage to the beginning of an SR.

## LRS Accumulated Route Mileage (ARM)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(15) | - | I | WH19, WH20 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| The LRS ARM for the highway feature in Item B.H.06, is coded to correspond to the same location as Item B.H.07. Leave null if the milepost in B.H.07 is null.<br><br>Code to three decimal places.<br><br>**State Routes:**<br>This value may or may not be the same as the LRS Milepost value as reported in Item B.H.07.<br><br>**Local Agency Roads:**<br>This value will always be the identical values as the LRS Milepost value as reported in Item B.H.07.<br><br>**For Item WH20 LRS ARM End:** this item is auto-calculated based on the structure length in Item B.G.02 for highway carried features.<br><br>**Submittal to SNBI** will report the LRS ARM point to the nearest thousandth of a mile. | Accumulated Route Mileage (ARM) is an accrual of mileage from the beginning of a route to the end of the route |

## LRS Date

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | I | WH06 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification**

This is the date for which the measure values used to update the data set, were valid.

**State Routes:**
Use the LRS Date field from the route data within the Local Agency Routing Map or other known GIS/HPMS LRS data locations (workbench data).

**Local Agency Roads:**
Use the LRS Date field from the route data within the Local Agency Routing Map.

## Speed Limit

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Integer | - | I | WA09 | - | |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification / Commentary**

This field applies to Local Agencies only.

Code the speed limit in miles per hour for the inventory route at the bridge site.

# Lanes On Highway

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(2,0) | N(2,0) | I | BH08 | B.H.08 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the number of highway traffic lanes for the highway feature reported in Item B.F.01 (Feature Type).<br><br>Code 1 when a highway is signed or striped for one-lane, but carries two-way traffic.<br><br>Code 1 for a highway feature carried on the bridge when Item B.G.06 (Structure Width Curb-to-Curb) is less than 16 feet and the bridge is not striped for full width traffic lanes. | For highway features carried on the bridge, include all lanes that are striped or otherwise operated as full width highway traffic lanes, auxiliary lanes (e.g. merge lanes, ramp lanes, turn lanes), and special use lanes that run the entire length of the bridge.<br><br>For highway features below the bridge that are not carried on another bridge, include all lanes that are striped or otherwise operated as full width highway traffic lanes, auxiliary lanes (e.g. merge lanes, ramp lanes, turn lanes), and special use lanes that pass below the entire width of the bridge. |

## Commentary Continued

Do not include pedestrian sidewalks, bike paths, or railroad tracks as lanes, unless the railroad tracks are concurrent with the highway lanes.

For double deck bridges and parallel bridges, report the number of lanes consistent with the highway feature reported in Item B.F.01 (Feature Type).

For sidehill bridges, report the total number of lanes for the highway feature regardless if carried on the bridge or terrain/earth material.

## Examples

Highway feature carried on the bridge has one lane. Report 1.

Highway feature carries two-way traffic on unstriped lanes and has a curb-to-curb width of 18 ft. Report 2.

Double deck bridge inventoried as one unique bridge number. Highway feature on top level carries five lanes. Highway feature on lower level carries five lanes.

- Report 5 for the highway feature on the top level.
- Report 5 for the highway feature on the lower level.

## Total Number of Lanes - SNTI

| Format | SNTI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(2,0) | N(2,0) | I | TA3 | | A.3 |

**Applicable Structure Types**

- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the number of highway traffic lanes being carried through the tunnel.<br><br>Code 4 when there are two lanes inbound, two lanes outbound.<br><br>Code 3 when there is one lane inbound, two lanes outbound.<br><br>**Submittal to SNTI** will report all lane quantities across all highway features as a single number. | Include all lanes that are striped or otherwise operated as full width highway traffic lanes and run the entire length of the tunnel (e.g. merge lanes, ramp lanes, and left-turn lanes).<br><br>Do not include pedestrian sidewalks, bike paths, or rail lines |

## Direction of Traffic - SNTI

| Format | SNTI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | N(1,0) | I | TC3 | | C.3 |

**Applicable Structure Types**

- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the direction of traffic of the inventory route identified in Item B.H.06 LRS Route ID as a 1 digit number using one of the codes in Table TC3.<br><br>This item must be compatible with other traffic-related items such as:<br><br>WSBIS Item B.H.08 – Lanes on Highway<br><br>WSBIS Item B.H.09 – Annual Average Daily Traffic<br><br>WSBIS Item B.H.16 – Horizontal Route Clearance<br><br>WSBIS Item B.G.06 – Curb-to-Curb. | Code 3, Variable traffic is intended to cover those tunnels in which the direction of traffic can be changed.<br><br>One lane 2-way traffic occurs when 2 lanes approach a narrow unstriped tunnel requiring vehicles to alternate turns through the tunnel.<br><br>When coding a tunnel with multiple bores, if traffic moves in both directions regardless of the individual traffic direction of a single bore, code as 2-way traffic. |

**Table TC3 Direction of Traffic - SNTI Code**

| WSBIS Code | NTI Code | Description |
|---|---|---|
| 0 | 0 | No public roadway on or under structure. |
| 1 | 1 | 1 way traffic on inventory route |
| 2 | 2 | 2 way traffic on inventory route |

| | | |
|---|---|---|
| 3 | 3 | 2 way and reversible traffic on inventory route |
| 4 | 3 | Reversible traffic only on inventory route |
| 5 | 4 | 2 way traffic on 1 lane bridge (curb-to-curb must be <16 ft.) |

SNTI Commentary:

WSDOT provides additional codes to address reversible traffic lanes, which are translated to SNTI codes as shown above.

## NHS Designation

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(1) | AN(1) | I | BH03 | B.H.03 | C.5 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the NHS designation for the highway feature reported in Item B.F.01 (Feature Type), using one of the following codes in Table BH03. | The National Highway System (NHS) includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility. The NHS was developed by the U.S. Department of Transportation (DOT) in cooperation with the states, local officials, and metropolitan planning organizations (MPOs). The NHS includes the following subsystems of highways: Interstate, other principal arterials, STRAHNET, major STRAHNET connectors, and intermodal connectors.<br><br>NHS routes and connectors are identified in the HPMS.<br><br>State maps of the NHS can be found at: https://www.fhwa.dot.gov/planning/national_highway_system/nhs_maps/.<br><br>For border bridges, the Neighboring State reports this item for all highway features carried on the bridge, as part of their abbreviated bridge record. For more information, see the Border Bridges section of this document. |

**Table BH03 NHS Designation Code**

| WSBIS/SNBI Code | SNTI Code | Description |
|---|---|---|
| N | 0 | Non-NHS |
| Y | 1 | NHS |

## STRAHNET Designation

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(1) | AN(1) | I | BH05 | B.H.05 | C.6 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the Strategic Highway Network (STRAHNET) designation for the highway feature reported in Item B.F.01 (Feature Type), using one of the following codes in Table BH05. | The STRAHNET is a system of Interstate and primary highways and connectors that provide access to major US military installations and strategic ports, and provides continuity and emergency capabilities for defense purposes. The STRAHNET is determined by the Surface Deployment and Distribution Command (SDDC) in coordination with FHWA.<br><br>STRAHNET routes and STRAHNET Connector routes can be found on NHS State maps at: https://www.fhwa.dot.gov/planning/national_highway_system/nhs_maps. |

**Table BH05 STRAHNET Designation Code**

| WSBIS/SNBI Code | SNTI Code | Description |
|---|---|---|
| 1 | 1 | STRAHNET route |
| 2 | 1 | STRAHNET Connector route |
| N | 0 | Not a STRAHNET route |

## National Highway Freight Network (NHFN)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,0) | N(3,0) | I | BH04 | B.H.04 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the National Highway Freight Network (NHFN) designation for the highway feature reported in Item B.F.01 (Feature Type), using one of the following codes in Table BH04. | This item is used to identify the National Highway Freight Network and to report to Congress on the conditions and performance of the network. This item is also used with other items to classify bridges according to serviceability, safety, and essentiality for public use and considers the potential impacts to emergency evacuation routes and to regional and national freight and passenger mobility if the serviceability of the bridge is restricted or diminished.<br><br>More information can be found at: https://ops.fhwa.dot.gov/Freight/infrastructure/nfn/index.htm. |

**Table BH04 National Highway Freight Network Code**

| WSBIS/SNBI Code | Description |
|---|---|
| 1 | Primary Highway Freight System |
| 2 | Interstate portions not on the Primary Highway Freight System |
| 3 | Critical Rural Freight Corridor |
| 4 | Critical Urban Freight Corridor |
| N | Not on the NHFN |

## Functional Classification

| Format | SNBI Format | Frequency | WSBIS Item | SNBI Item | SNTI Item |
|---|---|---|---|---|---|
| AN(1) | AN(1) | I | BH01 | B.H.01 | C.7 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

### Specifications

Code the functional classification for the highway feature reported in Item B.F.01 (Feature Type) using one of the following codes in Table BH01.

The WSDOT Functional Classification Map is available at https://www.wsdot.wa.gov/data/tools/geoportal/?config=functionalclass

### Commentary

Ensure that the functional classification designated in this item is consistent with the HPMS.

When one highway feature carries multiple route types, report the code for the highest-class route following the hierarchy in the code descriptions; Interstate being the highest class.

Use code 7 for State or Federal parkways and other park roads unless there is a through highway designated at a higher classification.

FHWA Highway Functional Classification Concepts, Criteria, and Procedures website: https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/.

**Table BH01 Functional Classification**

| WSBIS SNBI/SNTI Code | WSBIS SNBI/SNTI Description | OLD 1487 Code & Description |
|---|---|---|
| 1 | Interstate | 1 - Rural Principal Arterial – Interstate |
| 2 | Principal Arterial - Other Freeways | 5 - Rural Principal Arterial - Other Freeways or Exp. |
| 3 | Principal Arterial - Other | 2 - Rural Principal Arterial – Other |
| 4 | Minor Arterial | 6 - Rural Minor Arterial |
| 5 | Major Collector | 7 - Rural Major Collector |
| 6 | Minor Collector | 8 - Rural Minor Collector |
| 7 | Local | 9 - Rural Local |
| 1 | Interstate | 11 - Urban Principal Arterial – Interstate |
| 2 | Principal Arterial - Other Freeways | 12 - Urban Principal Arterial – Oth. Freeways/Exp. |
| 3 | Principal Arterial - Other | 14 - Urban Principal Arterial - Other |
| 4 | Minor Arterial | 16 - Urban Minor Arterial |
| 5 | Major Collector | 17 - Urban Major Collector |
| 6 | Minor Collector | 18 - Urban Minor Collector |
| 7 | Local | 19 - Urban Local |

## Urban Code

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(5) | N(5,0) | I | BH02 | B.H.02 | C.8 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the urbanized area code consistent with the State's HPMS urban boundaries for the highway feature reported in Item B.F.01 (Feature Type) at the bridge using one of the codes listed in Table BH02.<br><br>**Submittal to SNBI/SNTI** will report this item using the H01C record only. | Download the Urban Code listings from: https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural.html<br><br>FHWA approves adjusted urban boundaries submitted by State DOT planning offices. State's HPMS urban boundaries are based on the FHWA-approved adjusted urban boundaries.<br><br>State maps of the unadjusted U.S. Census urban boundaries with highways (map layers: Labels, Transportation, and Urban Areas checked) can be found at: https://tigerweb.geo.census.gov. |

**Table BH02 Urban Code**

| WSBIS Code | Urban Area Name |
|---|---|
| | **Urbanized Areas (populations of 50,000 or more)** |
| 06652 | Bellingham-Ferndale |
| 09946 | Bremerton-Port Orchard-Bainbridge Island |
| 44479 | Kennewick-Pasco-Richland |
| 49312 | Lewiston-Clarkston |
| 51283 | Longview-Kelso |
| 55333 | Marysville-Tulalip |
| 60490 | Mount Vernon-Burlingto-Sedro-Woolley |
| 65242 | Olympia-Lacey-Tumwater |
| 80389 | Seattle-Tacoma-Everett |
| 83764 | Spokane-Spokane Valley |
| 71317 | Vancouver-Camas-Battle Ground |
| 91405 | Walla Walla-Milton-Freewater |

**Table BH02 Urban Code**

| WSBIS Code | Urban Area Name |
|---|---|
| 93862 | Wenatchee-East Wenatchee |
| 97507 | Yakima-Selah-Union Gap |
| **Urban Areas (populations between 5,000 - 49,000)** | |
| 99998 | Aberdeen-Hoquiam |
| 99998 | Anacortes |
| 99998 | Belfair |
| 99998 | Birch Bay-Blaine |
| 99998 | Centralia-Chehalis |
| 99998 | Chelan-Manson |
| 99998 | Cheney |
| 99998 | Colville |
| 99998 | Connell |
| 99998 | Duvall |
| 99998 | Ellensburg |
| 99998 | Ephrata |
| 99998 | Freeland |
| 99998 | Grandview |
| 99998 | Granite Falls |
| 99998 | Hood River |
| 99998 | Lynden |
| 99998 | Monroe |
| 99998 | Montesano-Elma |
| 99998 | Moses Lake |
| 99998 | North Bend |
| 99998 | Oak Harbor |
| 99998 | Ocean Park |
| 99998 | Ocean Shores |
| 99998 | Omak-Okanogan |
| 99998 | Othello |
| 99998 | Port Angeles |
| 99998 | Port Hadlock-Irondale |
| 99998 | Port Townsend |
| 99998 | Prosser |
| 99998 | Pullman |
| 99998 | Quincy |
| 99998 | Ridgefield |
| 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 |
| **Non Urban/Urbanized Areas (populations less than 5,000)** | |
| 99999 | Rural area (pop. less than 5k) |

## Emergency Evacuation Designation

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(1) | AN(1) | I | BCL06 | B.CL.06 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code whether the route carried on the bridge is an emergency evacuation route using one of the following codes.<br><br>**This applies to Highway Carried Features only.**<br><br>**Code** — **Description**<br>N — Not an Emergency evacuation route<br>Y — Emergency evacuation route | This item is used by FHWA with other items, as per 23 U.S.C. 144(b), to classify bridges according to serviceability, safety, and essentiality for public use and considers the potential impacts to emergency evacuation routes and to regional and national freight and passenger mobility if the serviceability of the bridge is restricted or diminished.<br><br>Emergency evacuation routes may be designated for various events such as hurricanes, earthquakes, tsunami, dam failure, and other hazardous events.<br><br>Refer to the State Emergency Management Agency for designated emergency evacuation routes. |

# Federal or Tribal Land Access

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(30) | AN(30) | I | BCL03 | B.CL.03 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

## Specification

Code the Federally managed and/or Indian Tribal Government lands using one or more of the following codes, for the bridge owned by a State or local agency and carrying a highway that leads to or traverses through the Federal or Tribal lands.

Report multiple codes separated by pipe ( | ) delimiters.

| Code | Description |
|---|---|
| N | Not applicable |
| BIA | Indian Tribal Government or Bureau of Indian Affairs |
| BLM | Bureau of Land Management |
| NPS | National Park Service |
| USACE | U.S. Army Corps of Engineers |
| USBR | Bureau of Reclamation |
| USFS | U.S. Forest Service |
| USFWS | U.S. Fish & Wildlife Service |
| X | Other |

Report N when the highway carried by the bridge is not owned by a State or local agency and/or does not lead to or traverse through Federal or Tribal lands.

## Commentary

This item is used to identify bridges owned by State or local agencies on highways that lead to and/or traverse through any Federally managed land or Tribal government property. These bridges may be eligible to receive funding from the Federal Lands Access Program under 23 U.S.C. 204.

Consider those bridges that are located on the identified highway to the nearest intersecting highway owned by a State or local agency.

For assistance in locating Federal properties, contact Federal Lands Highway at: https://highways.dot.gov/federal-lands/about/contacts.

## Annual Average Daily Traffic Year (AADT Year)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,0) | N(4,0) | I | BH11 | B.H.11 | A.6 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification / Commentary**

Record the year represented by the Annual Average Daily Traffic (AADT) in Item B.H.09.

Code all four digits of the year.

AADT Year information for Washington State Routes is available at the link in Item B.H.09 Annual Average Daily Traffic.

## Annual Average Daily Traffic (AADT Count)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(6,0) | N(6,0) | I | BH09 | B.H.09 | A.4 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification / Commentary**

Record the Annual Average Daily Traffic (AADT) from the most recent count for the highway feature reported in Item B.F.01 (Feature Type).

The AADT must be compatible with the other items reported for the highway feature.

Record the design AADT for a newly inventoried highway feature when actual AADT information is not yet available.

Record the last open AADT for a highway feature that is temporarily closed until repair or replacement can be completed.

The AADT should be updated at intervals in accordance with the standards for the HPMS and standards/policies within the State.

All traffic, including trucks, is counted in the AADT. The number of trucks counted in the AADT is reported in Item B.H.10 (Annual Average Daily Truck Traffic).

When HPMS or other planning data are not available, use a best estimate based on site familiarity or functional classification in accordance with State standards and policies.

AADT information for Washington State routes is available at: https://wsdot.public.ms2soft.com/tcds/tsearch.asp?loc=Wsdot&mod=TCDS

## Annual Average Daily Truck Traffic (AADT Truck Count)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(6,0) | N(6,0) | I | BH10 | B.H.10 | A.5 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the Average Annual Daily Truck Traffic (AADTT) from the most recent count for the highway feature reported in Item B.F.01 (Feature Type).<br><br>The AADTT must be compatible with the other items reported for the highway feature.<br><br>Code the design AADTT for a newly inventoried highway feature when actual AADTT information is not yet available.<br><br>Code the last open AADTT for a highway feature that is temporarily closed until repair or replacement can be completed. | The AADTT should be updated at intervals in accordance with the standards for the HPMS and standards/policies within the State.<br><br>When HPMS or other planning data are not available, use a best estimate based on site familiarity or functional classification in accordance with State standards and policies.<br><br>Do not include vans, pickup trucks, and other light delivery trucks in the AADTT. The AADTT represents vehicle classes 4-13 as described in FHWA's Traffic Monitoring Guide at: https://www.fhwa.dot.gov/policyinformation/tmguide/. |

## AADT Truck Percent

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(2,0) | - | I | WH10 | - | A.5 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the number of trucks (heavy vehicles engaged primarily in the transport of good and materials, or in the delivery of services other than public transportation: AASHTO's definition) in the form of a percentage derived from the total AADT for the roadway segment indicated in B.F.01.<br><br>Do not include vans, pickup trucks and other light delivery trucks in this percentage. | SNTI Commentary:<br>The SNTI 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 |

# Bypass Detour Length

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,0) | N(3,0) | I | BH17 | B.H.17 | A.7 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the length to the nearest mile of the total additional travel for a vehicle to bypass the bridge for the highway feature reported in Item B.F.01 (Feature Type), that passes below or is carried on the bridge.<br><br>Code 999 where a detour does not exist.<br><br>Code 0 for available ground level bypass.<br><br>Code 1 when the highway feature is carried by a bridge, is not at an interchange, and a parallel bridge can be used as a temporary bypass with a reasonable amount of crossover grading. | Determine bypass detour length by evaluating the potential to move traffic, including military vehicles and trucks, around bridges.<br><br>Avoid detour routes that have load, height, or capacity limitations unacceptable for the additional traffic detoured onto them.<br><br>Consider using the parallel bridge of dual bridges or temporary culverts if emergency detours can be constructed with a reasonable amount of grading within the existing right-of-way.<br><br>Consider using ramps and/or frontage roads in interchanges.<br><br>Review plans for strategic bridge detour routes. |

## Bypass Detour Length continued...

### Examples

Diamond interchange. Bridge can be bypassed. Report 0.

Cloverleaf. Bridge cannot be bypassed; 18-mile detour. Report 18.

Highway feature carried on the bridge with a 4-mile detour *(Figure 102)*. Report 4.

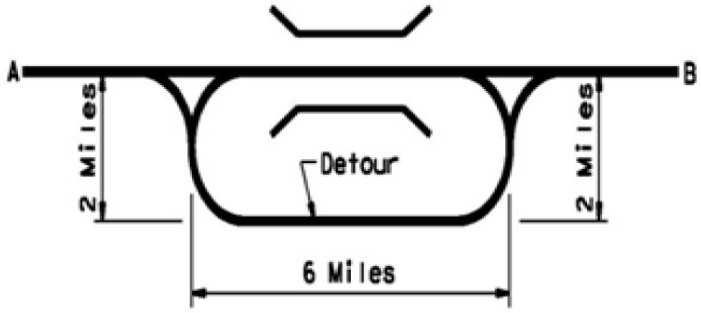



Figure 102. Detour map for a highway feature carried on the bridge.

Highway feature passes below the bridge with a 0-mile detour *(Figure 103)*. Report 0.

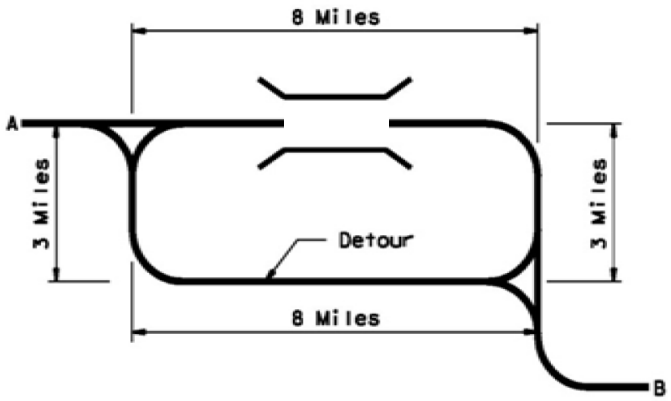



Figure 103. Detour map for a highway feature that passes below the bridge.

## Highway Maximum Usable Vertical Clearance *(Hwy Max Usable Vert Cl)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,1) | N(3,1) | EI | BH12 | B.H.12 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the minimum vertical clearance for the highway feature reported in Item B.F.01 (Feature Type), measured over the 10-foot-wide envelope of the traveled part of the highway, that provides for the maximum usable clearance envelope, rounded down to the nearest tenth of a foot.<br><br>Measure the vertical clearance plumb from the deck or highway surface to the lowest bridge member restriction, appurtenance (signs, utilities, etc.) attached to the bridge, or other structure.<br><br>Code 99.9 when the clearance is 100 feet or greater or no restriction exists above the highway. | This item identifies the maximum height of a notional 10-foot wide vehicle that can pass on the highway feature(s) reported in Item B.F.01 (Feature Type). This information is sometimes used for preliminary military routing.<br><br>The data may not represent the absolute minimum clearance over the highway feature. Refer to Item B.H.13 (Highway Minimum Vertical Clearance) for the absolute minimum clearance.<br><br>The traveled part of the highway feature does not include shoulders.<br><br>These data may be different than the posted vertical clearance due to agency vertical clearance posting policies and procedures. These data are not sufficient for permit routing as the location of the 10-foot-wide envelope that provides for the maximum usable clearance is not reported.<br><br>For a double decked bridge inventoried as one bridge, report this information for each highway feature on each level of the bridge.<br><br>Update field measurements when alterations are made to the bridge or highway that affect the previously measured clearance.<br><br>Reporting this item is optional for highway features below the bridge that do not carry NHS routes as identified in Item B.H.03 (NHS Designation).<br><br>Clearances greater than 30 feet may be estimated. |

## Highway Maximum Usable Vertical Clearance cont... *(Hwy Max Usable Vert Cl)*

### Examples

The bridge has a 13'-9" maximum usable vertical clearance *(Figure 81)*. Report 13.7.

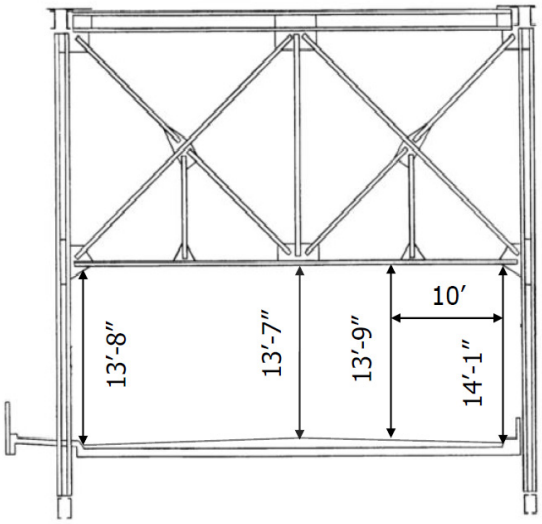



Figure 81. Cross-section view of through truss bridge showing vertical clearances.

The bridge carries a highway with no vertical clearance restrictions *(Figure 82)*. Report 99.9.

Arthur Road passes below the bridge and has an 18'-5" maximum usable vertical clearance. SR70 also passes below the bridge and has a 19'-11" maximum usable vertical clearance.

- Report 18.4 for the Arthur Road highway feature.
- Report 19.9 for the SR70 highway feature.

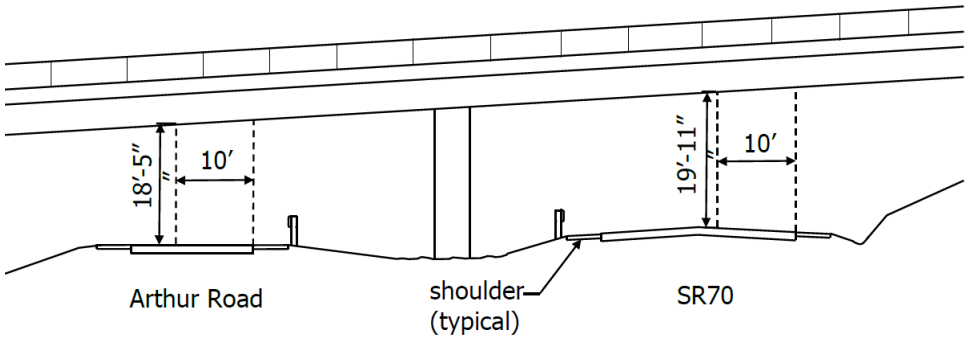



Figure 82. Elevation view with two separate highway features passing below the bridge.

## Highway Minimum Vertical Clearance *(Hwy Min Vert Cl)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,1) | N(3,1) | EI | BH13 | B.H.13 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the minimum vertical clearance measured over the highway feature reported in Item B.F.01 (Feature Type), rounded down to the nearest tenth of a foot.<br><br>Measure the vertical clearance plumb from the deck or highway surface (including paved or stabilized shoulders) to the lowest bridge member restriction, appurtenance (signs, utilities, etc.) attached to the bridge, or other structure.<br><br>Code 99.9 when the clearance is 100 feet or greater or no restriction exists above the highway. | Several measurements may need to be made to determine the minimum vertical clearance. However, only the minimum measurement is reported.<br><br>Shoulders must be contiguous with the traveled way 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. Refer to agency policy for when and where stabilized shoulders are used. When it is not readily known if stabilized construction details were used, the presence of rutting, heaving, water retention, or other distress may be used as indicators that the shoulder is not stabilized.<br><br>These data may be different than the posted vertical clearance due to agency vertical clearance posting policies and procedures.<br><br>Update field measurements when alterations are made to the bridge or highway that affect the previously measured clearance.<br><br>Clearances greater than 30 feet may be estimated. |

## Highway Minimum Vertical Clearance cont... *(Hwy Min Vert Cl)*

### Examples

The bridge has a 13'-7" minimum vertical clearance *(Figure 83)*. Report 13.5.

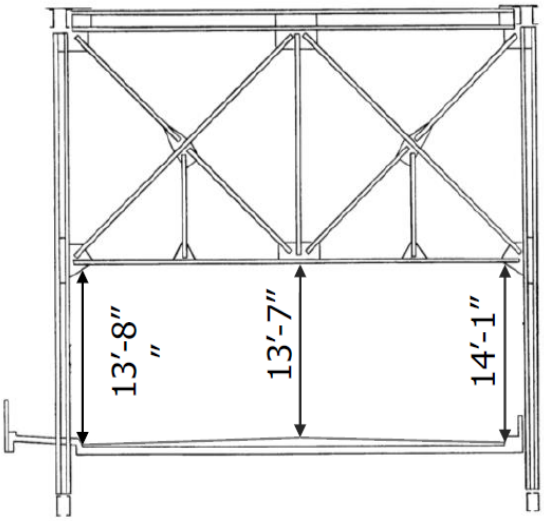



Figure 83. Cross-section view of a through truss bridge showing minimum vertical clearance.

The bridge carries a highway with no vertical clearance restrictions. Report 99.9.

Two highway features below the bridge. Arthur Road passes below the bridge and has an 18'-3" minimum vertical clearance. SR70 also passes below the bridge and has a 19'-9" minimum vertical clearance.

- Report 18.2 for the Arthur Road highway feature.
- Report 19.7 for the SR70 highway feature.

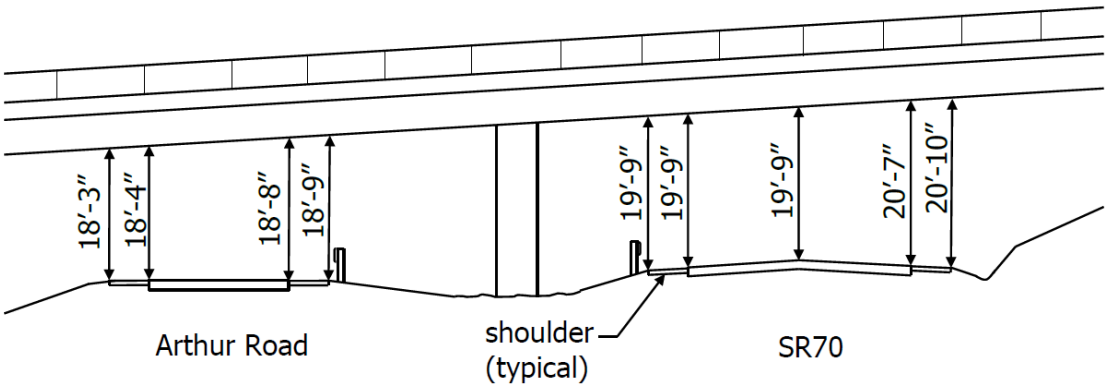



Figure 84. Elevation view with two separate highway features passing below the bridge.

## Max & Min Vertical Clearance Route *(Max Vert Cl Route, Min Vert Cl Route)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,0) | - | EI | 1499, 2500 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

### Specification

Code the practical maximum and minimum vertical clearances over the inventory route identified (travel lanes only*), in the direction of increasing mileposts, whether the route is on the structure or under the structure.

* Travel lanes or traveled way, is between fog lines and excludes shoulders or gore areas. In cases where there are no fog lines, judgement shall be used to determine edges of traveled way.

**Field 1499** identifies the maximum vertical clearance for the lane that will carry the highest load, ****tallest lane - lowest value****.

**Field 2500** identifies the minimum vertical clearance for the lane that will carry the highest load, ****lowest lane - lowest value****.

When no vertical clearance restriction exists leave these items blank.

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

### Specification Continued

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.

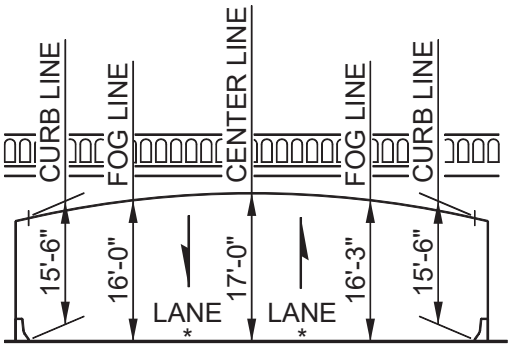
**Undivided Roadways:**
When the entire undivided inventory route (two-way direction of travel) passes on or under a structure, only code Items 1499 Max Route and 2500 Min Route as measured.

**Divided Roadways:**
Increasing inventory route, (single direction of travel only, includes ramps) passes on or under a structure, only code Items 1499 Max Route and 2500 Min Route as measured.

See Item W.H.23 LRS Directional Indicator for more clarification.

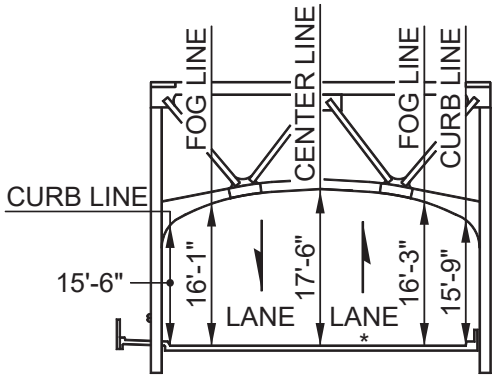
**Submittal to SNBI** will not report these items. See Items B.H.12/B.H.13.

### Examples




**UNDIVIDED HIGHWAY EXAMPLE**
Figure 1499a

Figure 1499a

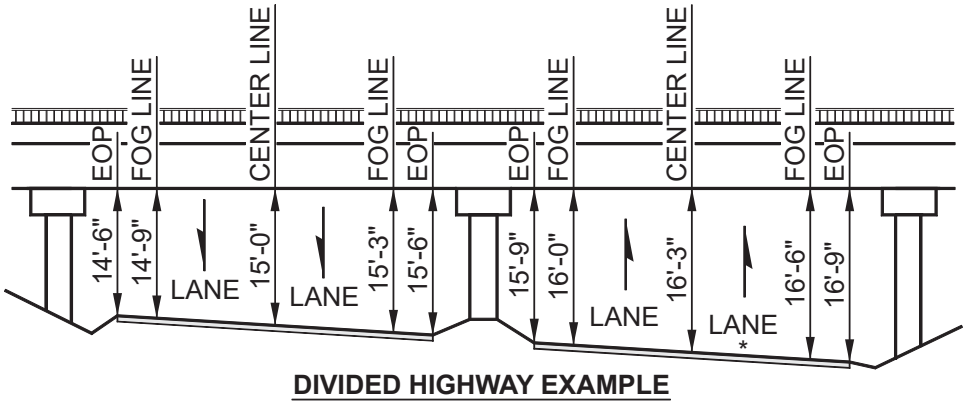



**STEEL TRUSS EXAMPLE**
Figure 1499b

Figure 1499b

## Max & Min Vertical Clearance Route continued... *(Max Vert Cl Route)*

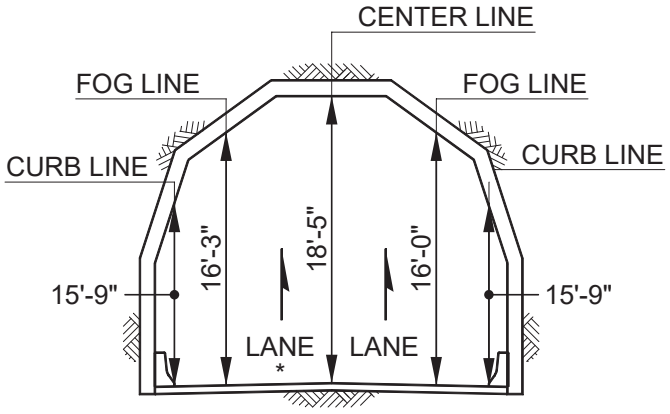
### Examples Continued




**DIVIDED HIGHWAY EXAMPLE**

Figure 1499c

Figure 1499c




**TUNNEL**

Figure 1499d

Figure 1499d

## Max & Min Vertical Clearance Reverse *(Max Vert Cl Reverse, Min Vert Cl Reverse)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,0) | - | EI | 2501, 2502 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

### Specification

Code the practical maximum and minimum vertical clearances over the inventory route identified (travel lanes only*), in the direction of decreasing mileposts, whether the route is on the structure or under the structure.

* Travel lanes or taveled way, is between fog lines and excludes shoulders or gore areas. In cases where there are no fog lines, judgement shall be used to determine edges of traveled way.

**Field 2501** identifies the maximum vertical clearance for the lane that will carry the highest load, ****tallest lane - lowest value****.

**Field 2502** identifies the minimum vertical clearance for the lane that will carry the highest load, ****lowest lane - lowest value****.

When no vertical clearance restriction exists leave these items blank.

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

**Submittal to SNBI** will not report these items. See Items B.H.12/B.H.13.

### Specification Continued

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.

**Undivided Roadways:**
There is never a case for undivided roadways to be coded in the Reverse fields. Code Items 1499 and 2500 instead.

**Divided Roadways:**
Decreasing inventory route (single direction of travel only*) passes on or under a structure, only code Items 2501 Max Reverse and 2502 Min Reverse as measured.

*applies to State ramps that serve decreasing direction of travel or decreasing direction of travel for a divided local road.

See Item W.H.23 LRS Directional Indicator for more clarification.

## Highway Minimum Horizontal Clearance, Left *(Min Horiz Clrnc Left)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,1) | N(3,1) | EI | BH14 | B.H.14 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the minimum horizontal clearance on the left, for the highway feature below the bridge reported in Item B.F.01 (Feature Type), rounded down to the nearest tenth of a foot.<br><br>This only applies to highway features below the bridge.<br><br>Measure from the left edge line of the highway (excluding shoulders, turn lanes, acceleration, or deceleration lanes) in the direction of travel to the nearest substructure unit, rigid barrier, oncoming traffic lane, or toe of slope that is steeper than 1 to 3 (vertical to horizontal).<br><br>Report 99.9 when the clearance is 100 feet or greater.<br><br>Report 0 when the highway is a two-way highway that is not divided at the bridge.<br><br>**Submittal to SNBI** will not report this item for highway feature(s) carried on the bridge.<br><br>w/FHWA errata#1 03/24 | This item provides data for the highway feature(s) reported in Item B.F.01 (Feature Type) that pass below the bridge.<br><br>Highways undivided at the bridge are reported as 0 due to the adjacent oncoming traffic lane which provides no horizontal clearance to the left.<br><br>Reinforced concrete and masonry traffic safety features are considered rigid barriers; metal and timber railings are not considered rigid barriers.<br><br>Clearances greater than 30 feet may be estimated. |

## Highway Minimum Horizontal Clearance, Left cont... *(Min Horiz Clrnc Left)*

### Examples

Highway feature below the bridge carries 1-way traffic, looking in the direction of travel *(Figure 85)*. Report 20.0.

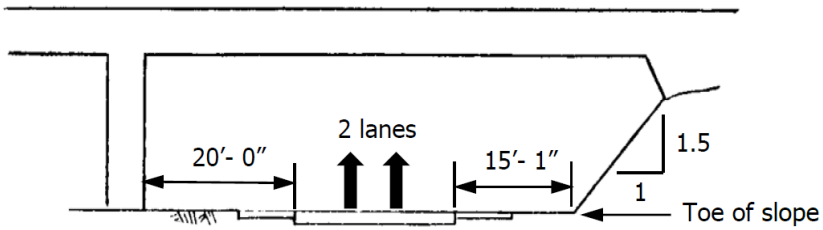



Figure 85. Bridge elevation view of horizontal clearances for a 2-lane highway with 1-way traffic below the bridge.

Highway feature below the bridge carries two-way traffic *(Figure 86)*. Report 0.

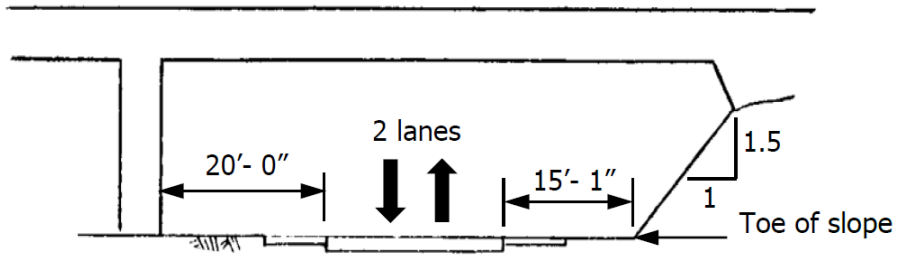



Figure 86. Bridge elevation view of horizontal clearances for a 2-lane highway with 2-way traffic below the bridge.

Two highway features below the bridge for a highway that is divided at the bridge. One highway feature carries 1-way traffic southbound and one carries 1-way traffic northbound *(Figure 87)*.

- Report 18.0 for the southbound highway feature.
- Report 19.0 for the northbound highway feature.

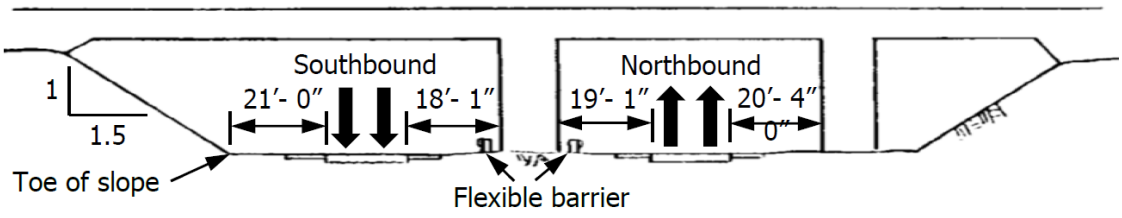



Figure 87. Bridge elevation view of horizontal clearances for separate southbound and northbound highway features below the bridge, with flexible barriers.

## Highway Minimum Horizontal Clearance, Left cont... *(Min Horiz Clrnc Left)*

### Examples Continued

Two highway features below the bridge for a highway that is divided at the bridge. One highway feature carries 1-way traffic eastbound and one carries 1-way traffic westbound *(Figure 88)*.

- Report 35.5 for the eastbound highway feature.
- Report 35.5 for the westbound highway feature.

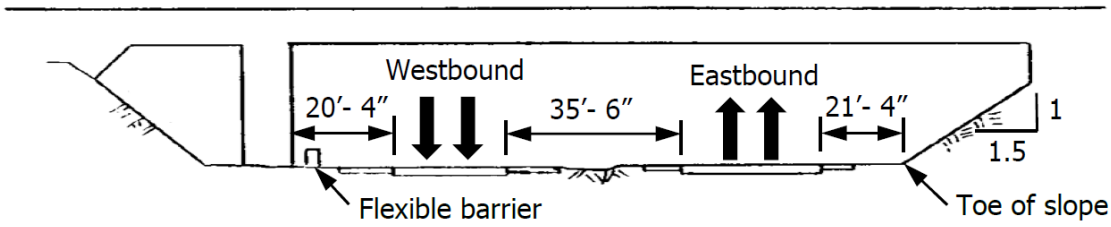



Figure 88. Bridge elevation view of horizontal clearances for separate westbound and eastbound highway features below the bridge, with flexible barrier.

Highway feature below the bridge carries 1-way ramp traffic, looking in the direction of travel *(Figure 89)*. Report 14.5.

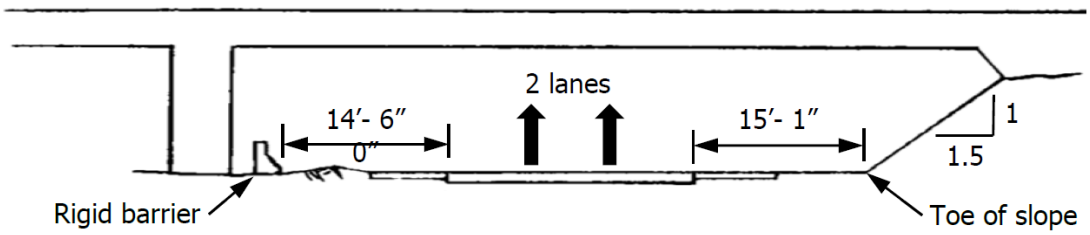



Figure 89. Bridge elevation view of horizontal clearances for a 2-lane, 1-way highway feature below the bridge, with a rigid barrier.

Highway feature below the bridge carries 1-way mainline traffic and 1-way ramp traffic, looking in the direction of travel *(Figure 90)*. Report 20.0.

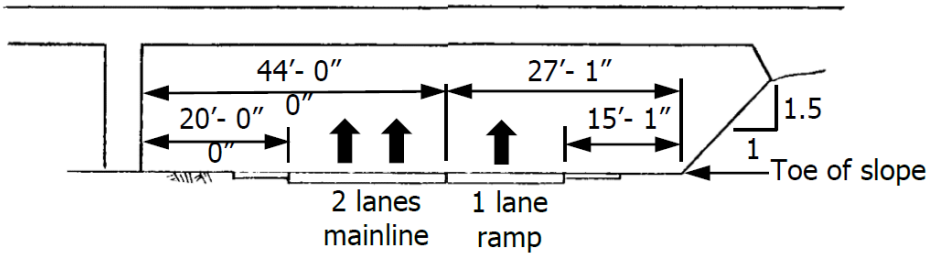



Figure 90. Bridge elevation view of horizontal clearances for a highway feature below the bridge carrying mainline and ramp.

## Highway Minimum Horizontal Clearance, Right *(Min Horiz Clrnc Right)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,1) | N(3,1) | EI | BH15 | B.H.15 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the minimum horizontal clearance on the right, for the highway feature below the bridge reported in Item B.F.01 (Feature Type), rounded down to the nearest tenth of a foot.<br><br>This only applies to highway features below the bridge.<br><br>Measure from the right edge line of the highway (excluding shoulders, turn lanes, acceleration, or deceleration lanes) in the direction of travel to the nearest substructure unit, rigid barrier, oncoming traffic lane or toe of slope that is steeper than 1 to 3 (vertical to horizontal).<br><br>Report 99.9 when the clearances are 100 feet or greater.<br><br>**Submittal to SNBI** will not report this item for highway feature(s) carried on the bridge.<br><br>w/FHWA errata#1 03/24 | This item provides data for the highway feature(s) reported in Item B.F.01 (Feature Type) that pass below the bridge.<br><br>Reinforced concrete and masonry traffic safety features are considered rigid barriers; metal and timber railings are not considered rigid barriers.<br><br>Clearances greater than 30 feet may be estimated. |

## Highway Minimum Horizontal Clearance, Right cont... *(Min Horiz Clrnc Right)*

### Examples

Highway feature below the bridge carries 1-way traffic, looking in the direction of travel *(Figure 91)*. Report 15.0.

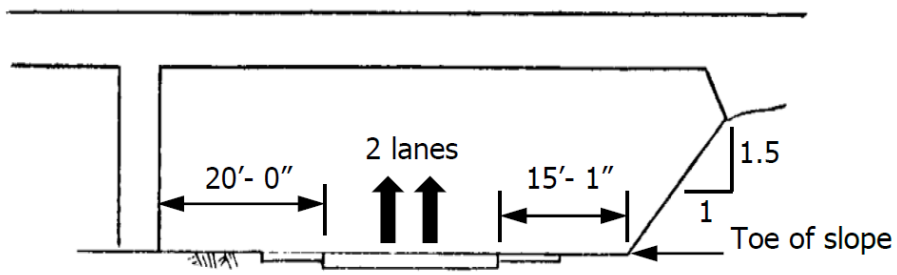



Figure 91. Bridge elevation view of horizontal clearances for a 2-lane highway feature with 1-way traffic below the bridge.

Highway feature below the bridge carries two-way traffic *(Figure 92)*. Report 15.0.

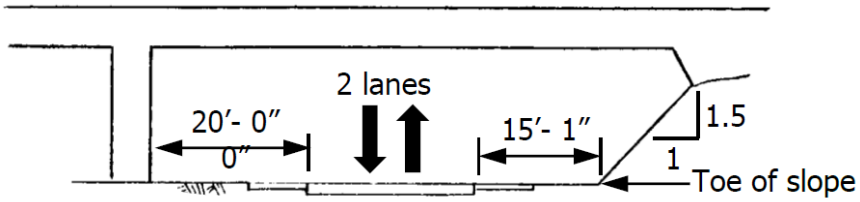



Figure 92. Bridge elevation view of horizontal clearances for a 2-lane highway feature with 2-way traffic below the bridge.

Two highway features below the bridge for a highway that is divided at the bridge. One highway feature carries 1-way traffic southbound and one carries 1-way traffic northbound *(Figure 93)*.

- Report 21.0 for the southbound highway feature.
- Report 20.3 for the northbound highway feature.

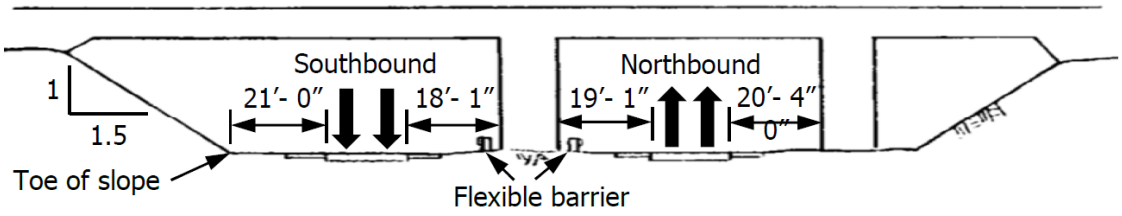



Figure 93. Bridge elevation view of horizontal clearances for separate southbound and northbound highway features below the bridge, with flexible barriers.

## Highway Minimum Horizontal Clearance, Right cont... *(Min Horiz Clrnc Right)*

**Examples Continued**

Two highway features below the bridge for a highway that is divided at the bridge. One highway feature carries 1-way traffic eastbound and one carries 1-way traffic westbound *(Figure 94)*.

Report 21.3 for the eastbound highway feature.

Report 20.3 for the westbound highway feature.

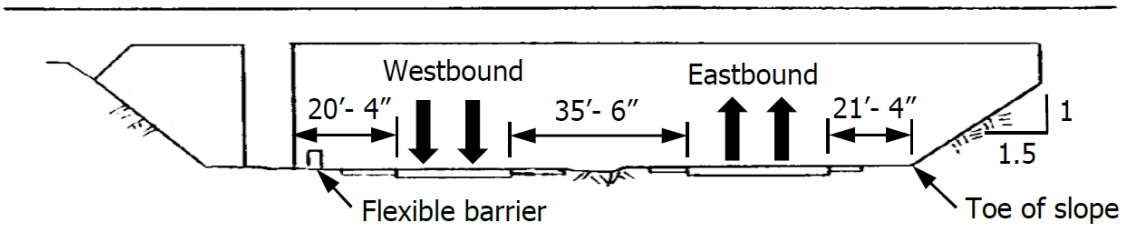



Figure 94. Bridge elevation view of horizontal clearances for separate westbound and eastbound highway features below the bridge, with a flexible barrier.

Highway feature below the bridge carries 1-way ramp traffic, looking in the direction of travel *(Figure 95)*. Report 15.0.

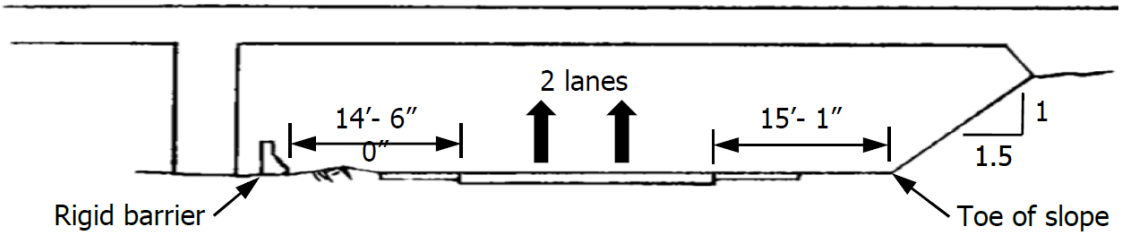



Figure 95. Bridge elevation view of horizontal clearances for a 2-lane, 1-way highway feature below the bridge, with a rigid barrier.

Highway feature below the bridge carries 2-way traffic *(Figure 96)*. Report 14.5.

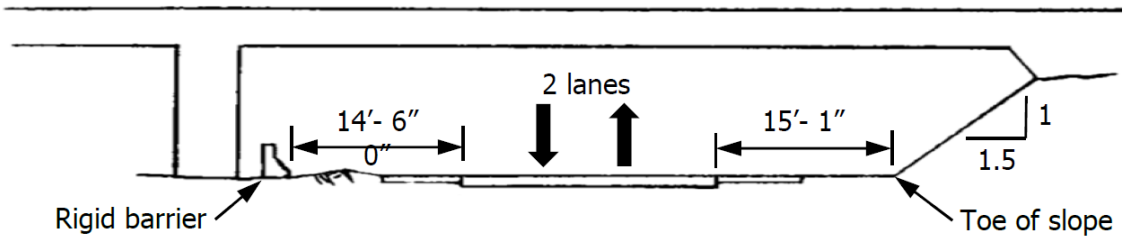



Figure 96. Bridge elevation view of a 2-lane, 2-way highway feature below the bridge, with a rigid barrier.

## Highway Minimum Horizontal Clearance, Right cont... *(Min Horiz Clrnc Right)*

### Examples Continued

Highway feature below the bridge carries 1-way mainline traffic and 1-way ramp traffic, looking in the direction of travel *(Figure 97)*. Report 15.0.

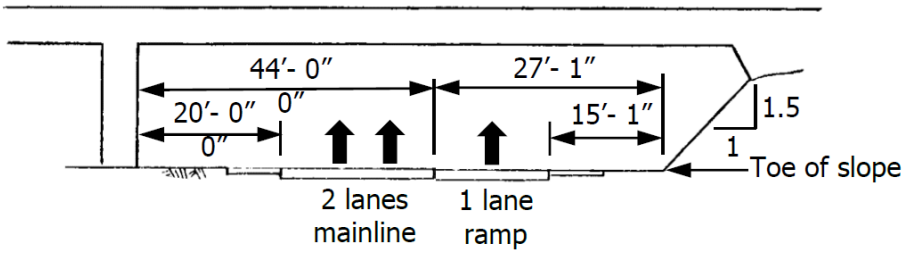



Figure 97. Bridge elevation view of horizontal clearances for highway feature carrying mainline and ramp traffic below the bridge.

## Highway Maximum Usable Surface Width *(Max Horiz Clrnc Route)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,1) | N(3,1) | EI | BH16 | B.H.16 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the maximum usable surface width for the highway feature reported in Item B.F.01 (Feature Type) that passes below or is carried on the bridge, rounded down to the nearest tenth of a foot.<br><br>Measure the width perpendicular to the centerline of the highway (including paved or stabilized shoulders).<br><br>Report 99.9 when the surface width is 100 feet or greater. | Shoulders are included when they are contiguous with the traveled way and 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 considered a shoulder for this item. Refer to agency policy for when and where stabilized shoulders are used. When it is not readily known if stabilized construction details were used, the presence of rutting, heaving, water retention, or other distress may be used as indicators that the shoulder is not stabilized. |

### Commentary Continued

Flush (striped) and mountable medians are not considered restrictions.

A curb greater than 6 inches high may be considered non-mountable for these specifications.

Use the least restrictive configuration when movable rigid barriers are used to accommodate reversible lanes for non-construction-related applications.

Submittal to SNBI for this item is optional for highway features below the bridge that do not carry NHS routes as identified in Item B.H.03 (NHS Designation).

## Highway Maximum Usable Surface Width cont... *(Max Horiz Clrnc Route)*

### Examples

Two highway features below the bridge. One highway feature carries eastbound traffic and one carries westbound traffic *(Figure 98)*.

- Report 34.6 for the eastbound highway feature.
- Report 42.4 for the westbound highway feature.

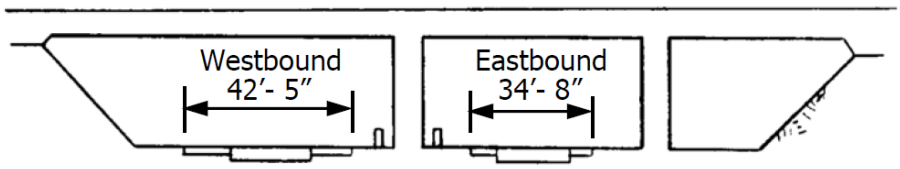



Figure 98. Bridge elevation view of two separate highway features below the bridge.

One highway feature carried on the bridge. Highway feature carries 2-way traffic that is not divided at the bridge *(Figure 99)*. Report measurement A.

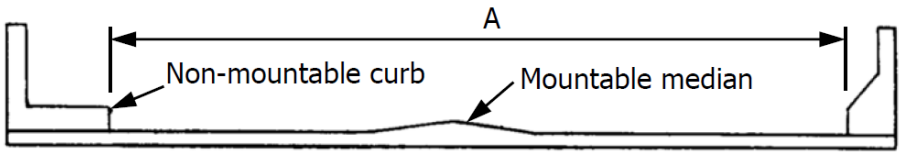



Figure 99. Cross-section view of a highway feature carried on the bridge with a mountable median.

Two highway features carried on the bridge. Highway 1 (H01) and Highway 2 (H02) are divided at the bridge by the non-mountable median *(Figure 100)*.

- Report measurement A for H01.
- Report measurement B for H02.

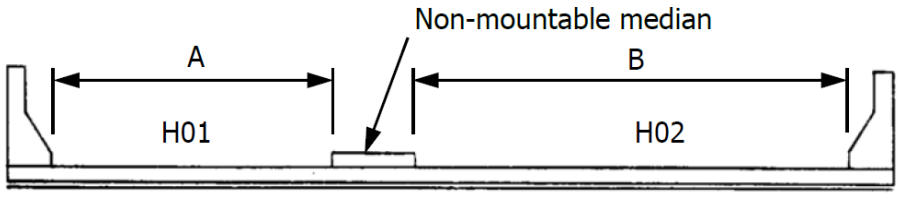



Figure 100. Cross-section view of two highway features carried on the bridge with a non-mountable median.

## Highway Maximum Usable Surface Width cont... *(Max Horiz Clrnc Route)*

**Examples Continued**

Two highway features carried on the pipe culvert under fill. Highway 1 (H01) and Highway 2 (H02) are divided at the bridge *(Figure 101)*.

- Report measurement A for H01.
- Report measurement B for H02.

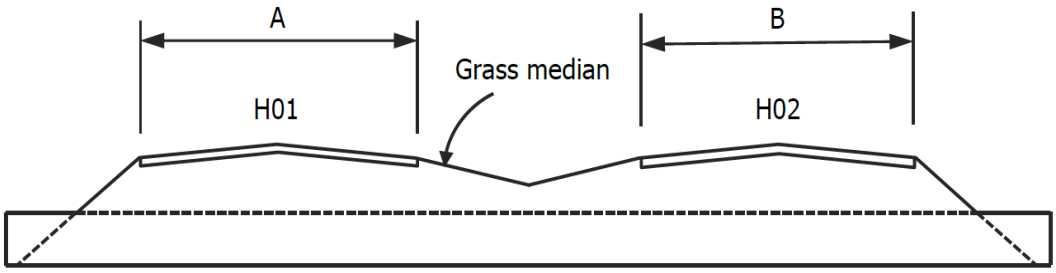



Figure 101. Cross-section view of two highway features carried on the pipe culvert under fill with a grass median.

## *Features - Railroads*

## Railroad Service Type

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(2) | AN(2) | I | BRR01 | B.RR.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the designated railroad service type for the railroad feature reported in Item B.F.01 (Feature Type) using one of the following codes.<br><br>**Code** — **Description**<br>F — Freight<br>FE — Freight - electrified<br>P — Passenger<br>PE — Passenger - electrified<br>M — Multiple services - not electrified<br>ME — Multiple services - electrified<br>I — Inactive | Electrified is intended for electricity-powered rail lines and third-rails, but not for battery or fuel cell powered lines.<br><br>Use code M when multiple rail services (such as freight and passenger rail) use the same tracks and both services are not electrified.<br><br>Use code ME when multiple rail services (such as freight and passenger rail) use the same tracks, and at least one is electrified. |

## Railroad Service Type continued...

### Examples

The bridge carries two highway features separated by two electrified passenger rail tracks (i.e. one railroad feature). Two railroad tracks pass below the bridge that both carry freight (i.e. one railroad feature).

- Report PE for the railroad feature carried on the bridge.
- Report F for the railroad feature below the bridge.

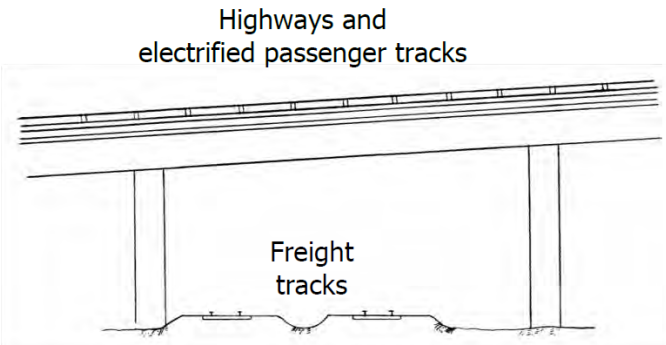



Figure 105. Bridge elevation view with two electrified passenger rail tracks carried on the bridge and two freight rail tracks below the bridge.

Two railroad tracks below the bridge. One carries passenger rail service and one carries freight (i.e. two railroad features).

- Report P for the passenger rail feature.
- Report F for the freight rail feature.

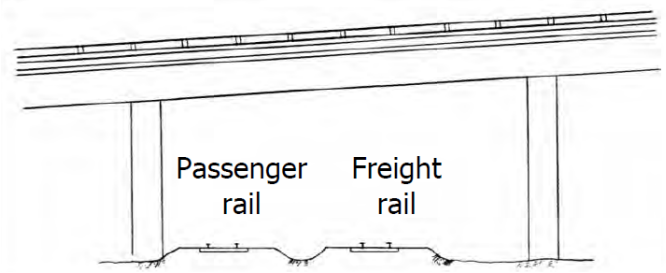



Figure 106. Bridge elevation view with one passenger rail and one freight rail track below the bridge.

Two railroad tracks below the bridge that both carry freight and passenger service (i.e. one railroad feature). Report M.

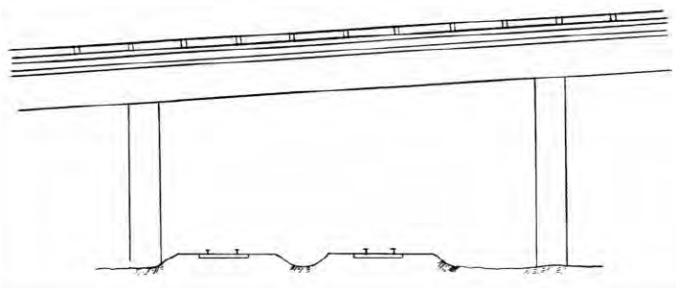


Figure 107. Bridge elevation view with two freight/passenger rail tracks below the bridge.

## Railroad Service Type continued...

### Examples Continued

Two railroad tracks below the bridge. One carries electrified passenger service and one carries non-electrfied passenger service (i.e. two railroad features).

- Report PE for the electrified passenger rail feature.
- Report P for the non-electrified passenger rail feature.

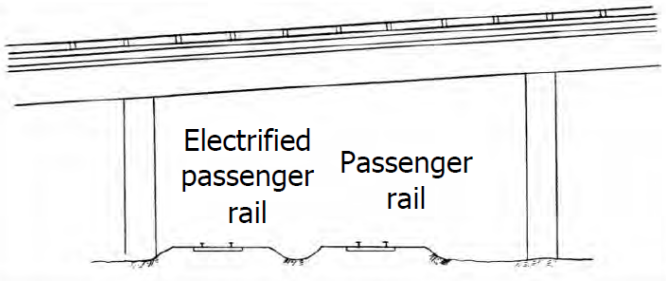



Figure 108. Bridge elevation view with an electrified passenger rail track and a non-electrified passenger rail track below the bridge.

## Railroad Crossing SID

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(15) | - | - | WRR04 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

### Specification

Code the railroad crossing sid associated with the railroad using the FRAGIS Map or Local Agency Routing Map.

If railroad does not have a corresponding crossing sid, leave blank.

## Railroad Milepost

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(7,3) | - | - | WRR06 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

Code the railroad milepost associated with the railroad using the FRAGIS Map or Local Agency Routing Map.

If railroad does not have a corresponding milepost, leave blank.

## Railroad Owner

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(30) | - | - | WRR05 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

Code the owner(s) associated with the railroad using the FRAGIS Map or Local Agency Routing Map.

If no owner determination can be made, leave blank.

## Railroad Operator

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WRR07 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Specification**

Code the operator associated with the railroad owner in Item WRR05 using the information in Table WRR07.

If no operator determination can be made, leave blank.

**Table WRR07 Railroad Operator Code**

| WSBIS Code | Description |
|---|---|
| 5 | Amtrak |
| 10 | Ballard Terminal Railroad Company |
| 15 | BNSF Railway Co. |
| 20 | Cascade and Columbia River Railroad |
| 25 | Central Washington Railroad Company |
| 30 | Chehalis-Centralia Railroad & Museum |
| 35 | Chelatchie Prairie Railroad Association |
| 40 | City of Arlington |
| 45 | Columbia And Cowlitz Railway Company |
| 50 | Columbia Basin Railroad Co., Inc. |
| 55 | Columbia Rail |
| 60 | Columbia Rail Group |
| 65 | CWW, LLC |
| 70 | DARIGOLD, INC. |
| 75 | Great Northwest Railroad, Inc. |
| 80 | Inland Northwest Rail Museum |
| 85 | KET LLC |
| 90 | Kettle Falls International Railway LLC |
| 95 | Lake Whatcom Railway |
| 100 | Longview Switching Company |
| 105 | Meeker Southern Railroad Company |
| 110 | Mount Vernon Terminal Railway |
| 115 | Mt. Rainier Scenic Railroad |
| 120 | Olympia & Belmore Railroad, Inc. |
| 125 | Palouse River & Coulee City Railroad |
| 130 | Pend Oreille Valley Railroad |
| 135 | Peninsular Railway and Lumbermen's Museum |
| 140 | Portland Vancouver Junction Railroad |
| 145 | Puget Sound & Pacific Railroad |
| 150 | Rainier Rail |
| 155 | RNIR |
| 160 | RYAL LLC |
| 165 | Simpson Lumber Company LLC |
| 170 | Snoqualmie Valley Railroad |
| 175 | Sound Transit - Sounder Commuter Rail |
| 180 | Sound Transit - Link Light Rail |
| 185 | Spokane, Spangle & Palouse Railway LLC (SSPR) |
| 190 | St. Paul & Pacific Northwest Railroad Co. LLC |
| 195 | Tacoma Rail |
| 200 | Tacoma Rail Mountain Division |

**Table WRR07 Railroad Operator Code**

| WSBIS Code | Description |
|---|---|
| 205 | Union Pacific Railroad Company |
| 210 | Washington Eastern Railroad, LLC |
| 215 | WATCO Switching Services |
| 220 | Yak Rail LLC |
| 225 | Other/Unknown |

## Railroad Minimum Vertical Clearance

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,1) | N(3,1) | EI | BRR02 | B.RR.02 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the minimum vertical clearance for the railroad feature reported in Item B.F.01 (Feature Type), rounded down to the nearest tenth of a foot.<br><br>Measure plumb from the top of rails to the lowest bridge restriction or appurtenance (signs, utilities, etc.) attached to the bridge. Appurtenances attached to the bridge that serve only a railroad purpose, such as catenary systems, are excluded from the measurement and do not reduce the vertical clearance measurement.<br><br>Code 99.9 when the clearance is 100 feet or greater.<br><br>**Submittal to SNBI** will report this item only when Item B.F.02 (Feature Location) is B. | Several measurements may need to be made to determine the minimum vertical clearance for each railroad feature when one or more railroad tracks pass below the bridge. However, only the minimum measurement is reported.<br><br>Update measurements when alterations are made to the bridge or railroad tracks that affect the previously measured clearance.<br><br>Clearances greater than 30 feet may be estimated. |

## Railroad Minimum Vertical Clearance continued...

### Examples

Two railroad tracks below the bridge that both carry freight and passenger service (i.e. one railroad feature). Report 31.2.

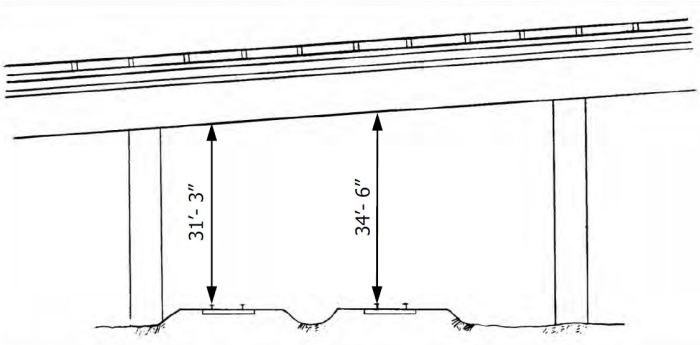



Figure 109. Bridge elevation view with two freight/passenger rail tracks below the bridge.

Two railroad tracks below the bridge. One carries passenger rail service, and one carries freight (i.e. two railroad features).

- Report 20.2 for the passenger rail feature.
- Report 21.2 for the freight rail feature.

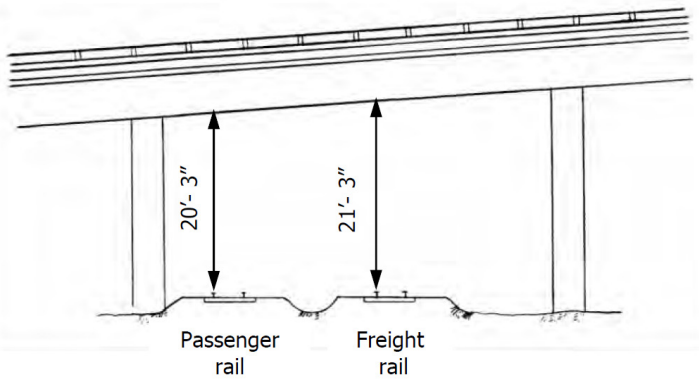



Figure 110. Bridge elevation view with one passenger rail and one freight rail track below the bridge.

# Railroad Minimum Horizontal Offset

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,1) | N(3,1) | EI | BRR03 | B.RR.03 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the minimum horizontal offset for the railroad feature reported in Item B.F.01 (Feature Type), rounded down to the nearest tenth of a foot.<br><br>Measure perpendicular from the centerline of the tracks to the nearest substructure unit or toe of slope that is steeper than 1 to 3 (vertical to horizontal).<br><br>For multiple tracks with the same railroad service type, report the minimum distance after measuring the offsets in both directions from all tracks.<br><br>Code 99.9 when the minimum horizontal offset is 100 feet or greater.<br><br>**Submittal to SNBI** will report this item only when Item B.F.02 (Feature Location) is B. | The intent of this item is to collect the minimum distance from the centerline of the railroad track to a bridge related obstruction.<br><br>Offsets greater than 30 feet may be estimated. |

## Railroad Minimum Horizontal Offset continued...

### Examples

One railroad track below the bridge. Report 20.3.

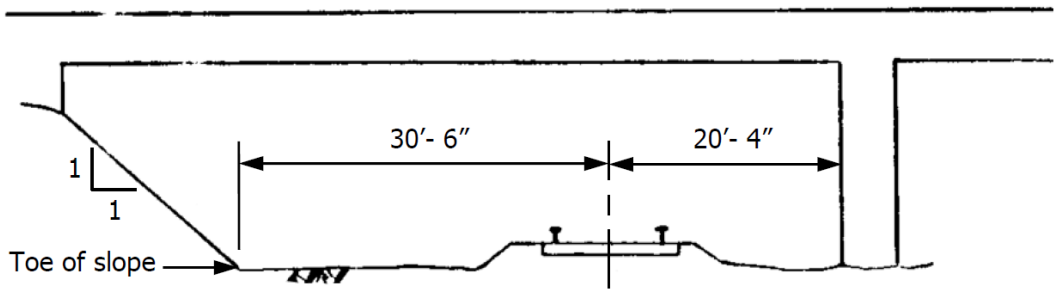



Figure 111. Bridge elevation view indicating horizontal offset for one railroad track below the bridge.

Two railroad tracks that both carry freight (i.e. one railroad feature). Report 18.5.

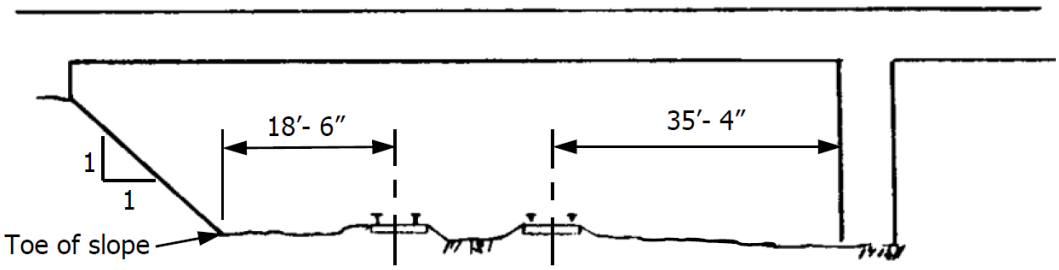



Figure 112. Bridge elevation view indicating horizontal offset for two railroad tracks below the bridge.

## *Features - Navigable Waterways*

| Navigable Waterway | | | | | |
|---|---|---|---|---|---|
| **Format** | **SNBI Format** | **Frequency** | **WSBIS Item ID** | **SNBI Item ID** | **SNTI Item ID** |
| AN(1) | AN(1) | I | BN01 | B.N.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code whether the waterway feature reported in Item B.F.01 (Feature Type) is considered navigable waters of the United States using one of the following codes in conjunction with Table 30 U.S. Coast Guard Navigable Waters and LA Map.<br><br>**Code** — **Description**<br>N — Not navigable waters<br>Y — Navigable waters<br>U — Navigable waters designation is undetermined | This item identifies bridges over navigable waters where the United States Coast Guard may exercise jurisdiction, as defined in 33 CFR, Part 2. This information helps identify bridges at risk from vessel collision and bridges where a Coast Guard permit may be required for modifications to the structure.<br><br>Information helpful in coding this item may be found in design and construction documentation or prior correspondence with the Coast Guard.<br><br>Navigable waterways are determined by the Commandant of the United States Coast Guard per Title 33 of the Code of Federal Regulations, Section 2.36. |

# Navigable Minimum Vertical Clearance

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,1) | N(4,1) | I | BN02 | B.N.02 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

## Specification

Code the minimum vertical clearance over the waterway feature reported in Item B.F.01 (Feature Type), rounded down to the nearest tenth of a foot.

The recorded clearance is from the highest datum plane referenced in the approved permit plans to the lowest superstructure restriction or other appurtenances attached to the bridge over the designated navigation channel.

For all movable bridges, the vertical clearance reported for this item is for the bridge in the closed position (i.e., open to vehicular traffic).

Record the most restrictive clearance when there are multiple designated navigation channels.

**Submittal to SNBI** will report this item only when Item B.N.01 (Navigable Waterway) is Y.

## Commentary

Reference datum, designated navigation channels, and vertical clearances can be found on permit plans approved by the United States Coast Guard.

When permit plans are not available, values can be established from field measurements obtained for known navigation channels and the most restrictive clearance recorded. Reference field measurements to the following datum:

| Crossing Type | Datum |
|---|---|
| Tidal waters | Mean High Water |
| Non-tidal waters | Extreme High Water |
| River | Q50 Surface Elevation |

## Navigable Minimum Vertical Clearance continued...

### Examples

Permit plans for a bridge over tidal waters with the navigation channel designated by cross-hatched area. Permit plans set the datum at mean higher-high water (M.H.H.W.) instead of mean high water. Report 50.0.

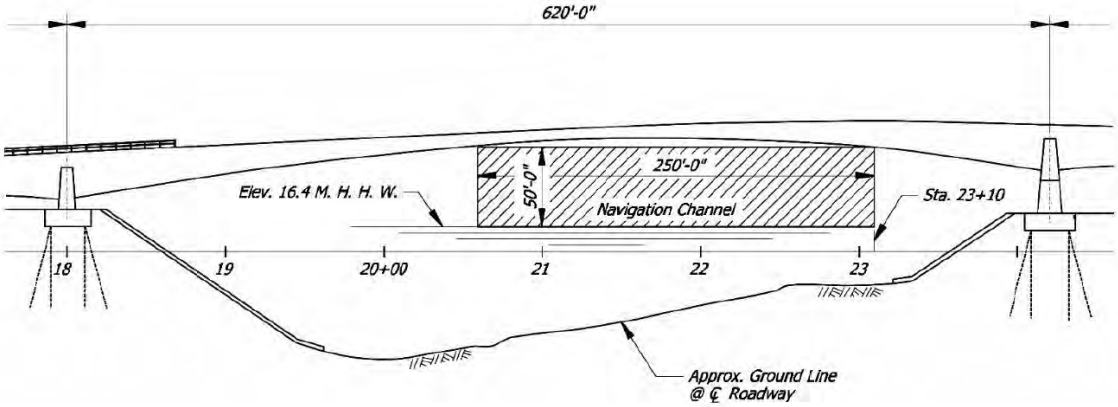



Figure 115. Bridge elevation view indicating navigation channel and vertical clearance. (Source: Alaska DOT)

Permit plans for a bridge over tidal waters with multiple designated navigation channels. Permit plans set the datum at mean higher-high water (M.H.H.W.) instead of mean high water. Report 23.1.

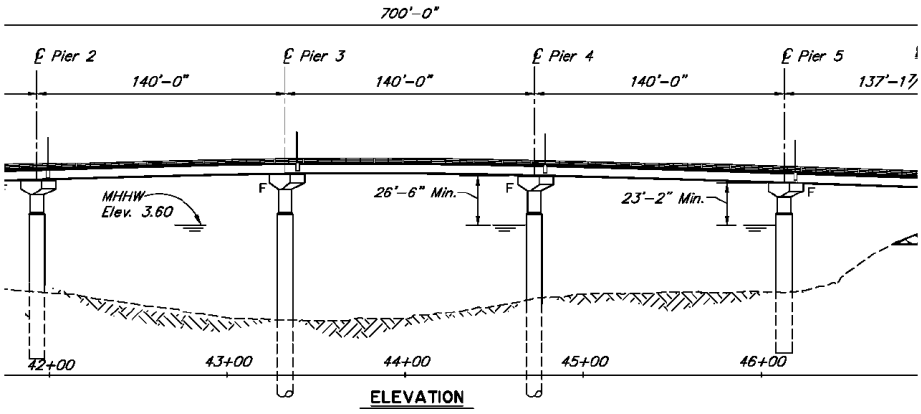



Figure 116. Bridge elevation view indicating multiple navigation channels and vertical clearances. (Source: Alaska DOT)

## Navigable Minimum Vertical Clearance continued...

### Examples

Vertical lift bridge. Information taken from "As-Built" plans as no permit plans are available. Mean High Water elevation is 3.2 ft. Minimum vertical underclearance is 12 ft – 3.2 ft = 8.8 ft. Report 8.8.

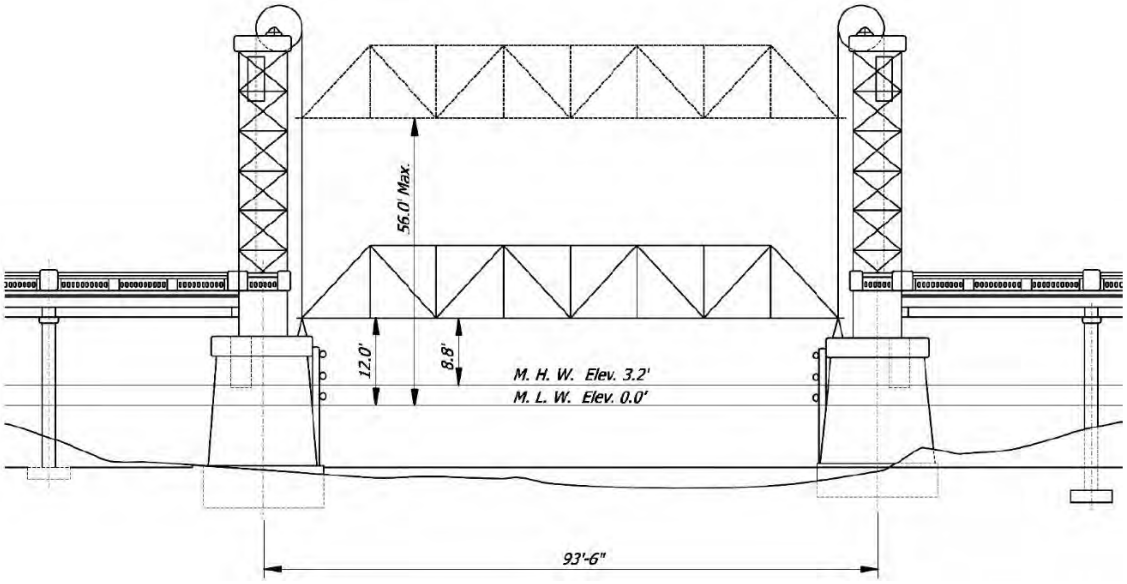



Figure 117. Bridge elevation view for a vertical lift bridge indicating vertical clearances. (Source: Florida DOT)

**Table 30 U.S. Coast Guard Navigable Waters**

| Body of Water | Navigable CG | Non-Nav CG | Remarks |
|---|---|---|---|
| Bachelor Island Slough, WA | X | | Side channel of Columbia River. Mouth 14 miles S of Vancouver, WA (tidal). |
| Baker Bay, WA | X | | Part of Columbia Estuary. Chinook to Ilwaco, WA (including West Channel). |
| Bear Creek, WA | | X | At mile 0.8. |
| Bear River, WA | X | | Flows into Willapa Bay. Navigable to head of tidewater, approximately 4 mi. above mouth. |
| Big Beef Harbor, WA | X | | (Hood Canal) Navigable to mouth of Big Beef Creek (tidal). |
| Bingen Channel, WA | X | | Columbia River, Bonneville Pool Backwater. |
| Birnie Slough, WA | X | | Side channel of Columbia River. 1 mile S of Cathlamet, WA on Puget Island (tidal). |
| Black Jack Creek, WA | X | | Tributary to Puget Sound. |
| Bogachiel River, WA | | X | Tributary of Quillayute River. |
| Bone River, Pacific County, WA | | X | At and upstream of the SR-101 Bridge |

**Table 30 U.S. Coast Guard Navigable Waters**

| Body of Water | Navigable CG | Non-Nav CG | Remarks |
|---|---|---|---|
| Brooks Slough, WA | | X | Tributary of Skamokawa Creek. Mouth at Skamokawa, WA. |
| Budd Inlet, WA | X | | Puget Sound. Near Olympia, WA. |
| Burke Slough, WA | X | | Side channel of Columbia River. Mouth 5 miles upstream from Kalama, WA (tidal). |
| Burnt Bridge Creek, WA | | X | Southwestern Clark County; originates Mill Plains area, 7.0 miles to Vancouver Lake. |
| Capitol Lake, WA | X | | Near Olympia, WA. Formed by dam at mouth of Deschutes River. |
| Carol's Channel, WA | X | | Side channel of Columbia River near Longview, WA (tidal). |
| Carr Inlet, WA | X | | Puget Sound. Pierce County, WA. |
| Case Inlet, WA | X | | Puget Sound. Mason County, WA. |
| Cathlamet Channel,WA. | X | | Side channel of Columbia River at Cathlamet, WA (tidal). |
| Cedar River, WA | X | | Flows into Lake Washington at Renton, WA. Navigable to mile 1.3 (Wells Ave Bridge). |
| Chambers Creek, WA | | X | Flows into Puget Sound near Steilacoom, WA. See Steliacoom Waterway. |
| Charlton Channel, WA | X | | Navigable to mile 4.0. |
| Chehalis River, WA | X | | Flows into Grays Harbor. Navigable to mile 68.0. AA at and upstream of County Bridge at Centralia (Galvin Road Bridge). Also AA from County Bridge at South Elma to County Bridge at Centralia. |
| Chelan River, WA | | X | Tributary of Columbia River. Navigable at mile 0.05 (Columbia River backwater). |
| Chelan, Lake, WA | | X | Only outlet is Chelan River. |
| Chinook River, WA | X | | Flows into Baker Bay. Mouth 3 miles E of liwaco, WA (tidal). Navigable to mile 0.6. |
| Clallam River, Clallam County, WA | X | | |
| Coalcreek Slough, WA | X | | Tributary of Columbia River, mouth 10 miles downstream from Longview, WA. |
| Columbia River Reservoir, WA | X | | From Grand Coulee Dam to Canadian border (see Lake Roosevelt). |
| Columbia River, WA/OR | X | | Navigable for entire distance in the United States. |

**Table 30 U.S. Coast Guard Navigable Waters**

| Body of Water | Navigable CG | Non-Nav CG | Remarks |
|---|---|---|---|
| Coweeman River, WA | X | | Tributary of Cowlitz River. Mouth at Longview, WA. Navigable at mile 4.0. |
| Cowlitz River, WA | X | | Tributary of Columbia River. Mouth at Longview, WA. Navigable to mile 34.0. |
| Dead Water Slough, Snohomish River, WA | X | | |
| Deep River, WA | X | | Tributary of Columbia River. Mouth 7 ml. NE of Astoria, OR (tidal). Navigable to mile 5.0. |
| Dell Creek, WA | | X | Tributary of Naselle River near Naselle, WA. |
| Deschutes Basin, WA | | | See Capitol Lake. |
| Deschutes River, WA | | X | Flows into Capitol Lake at Olympia, WA. CG considers non-navigable at mile 11.0. |
| Diablo Lake, WA | | X | Skagit River. |
| Dickey River, WA | X | | Flows into Quillayute River near La Push, WA. Navigable to head of tidewater 1 mile above mouth. |
| Dosewallips River, Jefferson County, WA | X | | STAA at and upstream of SR-101 Bridge |
| Drano Lake | X ACOE | | "Navigable to Little White Salmon River mile 1.0. In Bonneville þool - 3 miles from Hood .River, Oregon, across Columbia River. Moutheof Little White Salmon River" |
| Duck Creek, WA | | X | Tributary of Elochman River. |
| Dungeness River, WA | | X | Flows into Strait of Juan de Fuca at Dungeness. |
| Duwamish River, WA | X | | River mouth is considered the head of West Waterway, Seattle Harbor, about 0.3 miles downstream of the Spokane Street Bridge. The head of navigation is the mouth of Black River, former outlet of Lake Washington. This is also the approximate head of the tide, and the point of which the Duwamish becomes the Green. See also Green River. |
| Ebey Slough, WA | X | | Side channel of Snohomish River North of Everett, WA. AA at and upstream of SR-2 Bridge. |
| Edison Slough, WA | X | | Flows into Samish Bay (tidal). |

**Table 30 U.S. Coast Guard Navigable Waters**

| Body of Water | Navigable CG | Non-Nav CG | Remarks |
|---|---|---|---|
| Elliott Slough | | | Tributary to Chehalis River |
| Elochoman River, WA | X | | Tributary of Columbia River. Flows into Elochoman Slough (tidal at mile 3.0). |
| Elochoman Slough,WA | X | | Side channel of Columbia River at Cathlamet, WA (tidal). |
| Elwell Creek, WA | | X | Tributary of Skykomish River. |
| Entiat River, WA | | X | Tributary of Columbia River. |
| Falk Creek, WA | | X | Tributary of Skamokawa Creek. |
| Femdale Slough, WA | X | | Side channel of Nooksack River (tidal). Also known as Portage Slough. |
| Fifth Street Waterway, WA | X | | Navigable at bridge over 5th Street Waterway at Steilacoom, WA (tidal). |
| Fisher Island Slough (Fisher), WA | X | | "Side channel of Columbia River at Island Channel, WA. Downstream end 6 miles downstream from Longview, WA (tidal). Navigable to mile 2.0." |
| Franklin D. Roosevelt, Lake, WA | X | | See Columbia River. |
| Germany Creek, WA | X | | Tidal at SR-4 bridge. |
| Governors Lake, WA | X | | See Capitol Lake. |
| Grays Harbor, WA | X | | "At Aberdeen, WA (tidal) from U.P.P.R. Bridge at Aberdeen to seaward end of bar channel, including all bays and sloughs to the elevation of mean high water." |
| Grays River, WA | X | | "Tributary of Lower Columbia River. Mouth 7 miles NE of Astoria, OR (tidal at town of Grays River, mile 8.0)." |
| Green Lake, WA | | X | Seattle, WA. |
| Green River, WA | X | | "Becomes Duwamish River at mouth of Black River (head of tidewater), mile 11.0. Navigable to mile 23.0 at Kent, WA. Non- navigable upstream of State Highway 516 Bridge in existence on October 26, 1981. Act of Congress, 33 U.S.C. 59s." |
| Hama Hama River, WA | X | | Flows into Hood Canal near Eldon, WA (tidal to mile 1.0). |
| Hamilton Creek, WA | X | | "Tributary of Columbia River. Navigable to limit of Columbia River backwater elevation of 28.5 MSL." |

**Table 30 U.S. Coast Guard Navigable Waters**

| Body of Water | Navigable CG | Non-Nav CG | Remarks |
|---|---|---|---|
| Hat Slough, WA | X | | "Flows out of Stillaguamish River near mile 8.0. Mileage shown is from head to mouth in Port Susan (tidal). AA at County Bridge on Marine Drive." |
| Hoh River, WA | X | | "Flows into Pacific Ocean near Oil City, WA, and the Hoh Indian Nation (tidal and navigable to about mile 1.0)." |
| Hoko River, WA | X | | Flows into Strait of Juan de Fuca near Sekiu, WA (tidal to about mile 1.0). |
| Hood Canal, WA | X | | Near Port Gamble, WA. |
| Hoquiam River (East Fork), WA | X | | Flows into Hoquiam River at Hoquiam, WA (tidal to about mile 6.5). |
| Hoquiam River, WA | X | | Flows into Grays Harbor at Hoquiam, WA (tidal to about mile 7.0). Navigable to mile 8.0. |
| Horse Shoe Lake, WA | | X | Old channel of Lewis River at Woodland, WA. |
| Horse Thief Lake, WA | | X | Klickitat County. |
| Humptulips River,WA | X | | Flows into Grays Harbor near Hoquiam, WA (tidal at mile 1.0). |
| Jessie Slough, Grays Harbor County, WA | X | | AA at and upstream of County Bridge near Edison. |
| Joe Creek, Grays Harbor County, WA | X | | STAA at and upstream of the Joe Creek Bridge |
| Johns River, WA | X | | Flows into Grays Harbor near Markham, WA (tidal). Navigable to mile 4.0. |
| Johnson Creek, WA | | X | Flows into Sequim Bay at Pitship Point. |
| Jump Off Joe Lake, WA | | X | Near Chewelah, WA. |
| Kalama River, WA | X | | "Tributary of Columbia River. Mouth 2 miles downstream from Kalama, WA. Navigable at mile 3.4" |
| Klickitat River, WA | X | | Tributary to Columbia River. Bonneville Pool Backwater extends upstram to about mile 1.0. |
| Lagoon Point, Whidbey Is., WA | X | | Man made inlet created for residential. Tributary to Puget Sound. |
| Lake Crescent, WA | | X | "Located entirely within Olympic National Park. While not navigable, entire lake is “water subject to the jurisdiction of the U.S.”" |

**Table 30 U.S. Coast Guard Navigable Waters**

| Body of Water | Navigable CG | Non-Nav CG | Remarks |
|---|---|---|---|
| Lake River, WA | X | | Tributary of Columbia River (tidal at mile 3.3). |
| Lake Roosevelt, WA | X | | Formed by Grand Coulee Dam. See Columbia River. |
| Lake Union, WA | X | | Between Lake Washington and Puget Sound. |
| Lake Washington Ship Canal, WA | X | | "At Seattle, WA. Joins Lake Washington with Puget Sound at Shilshole Bay. Includes Lake Union." |
| Lake Washington, WA | X | | At Seattle, WA. |
| Latah Creek, WA | X | | Tributary of Spokane River. |
| Lewis River (East Fork), WA | X | | Tributary of Lewis River. Navigable to La Center, WA, mile 3.0. |
| Lewis River, WA | X | | "Tributary of Columbia River. Across Columbia River from St. Helens, OR. Navigable to mile 7.7." |
| Little Hoquiam River, WA | X | | Flows into Hoquiam River near Hoquiam, WA (tidal to mile 2.0). |
| Little Pend Oreille River, WA | | X | Tributary to Colville River. Flows from Little Pend Oreille Lakes SW to Colville River. |
| Martin Island Slough, WA | X | | Side channel of Columbia River. 4 miles upstream from Kalama, WA. |
| McAllister Creek, WA | X | | Flows into Nisqually Reach of Puget Sound (tidal at mile 3.0). |
| McNary Reservoir, WA | X | | See Columbia River. |
| Mercer Slough | X | | Tributary to Lake Washington |
| Methow River, WA | | X | Near Winthrop, WA. |
| Methow River, WA | | X | Tributary of Columbia River at Pateros, WA. |
| Mill Creek, WA | X | | Flows into Hamrnersley Inlet of Puget Sound (tidal at mile 0.5). |
| Mill Creek, WA | X | | Tributary of Columbia River near Stella, WA (tidal to mile 0.8). |
| Moses Lake, WA | | X | Formed by O'Sullivan Darn on Crab Creek. |
| Mullen Slough, WA | | X | Tributary of Green River at Kent, WA. |
| Naselle River, WA | X | | Flows into Willapa Bay near Naselle, WA. Navigable at mile 15.3. |
| Nemah River (Middle Fork), WA | X | | Flows into Willapa Bay near Nemah, WA (tidal at confluence of South Nemah). |

**Table 30 U.S. Coast Guard Navigable Waters**

| Body of Water | Navigable CG | Non-Nav CG | Remarks |
|---|---|---|---|
| Nemah River (North Fork), WA | X | | Flows into Willapa Bay near Nemah, WA (tidal at mile 1.5). |
| Nemah River (South Fork), WA | X | | Tributary of Middle Nemah (tidal at bridge above confluence with Middle Nemah). |
| Niawiakum River Pacific County, WA | X | | STAA at and upstream of SR-101 Bridge |
| Nisqually River, WA | X | | Flows into Nisqually Reach of Puget Sound (tidal at 1-5 Freeway Bridge; mile 2.4). |
| Nookachamps Creek, WA | | X | Tributary to Skagit River. |
| Nooksack River, WA | X | | "Flows into Bellingham Bay near Bellingham, WA. Navigable to mile 26.0. AA at mile 23.2 SR-544 Bridge to mile 26.0." |
| North Creek, WA | | X | Tributary to Sammamish River. |
| North River, WA | X | | Flows into Willapa Bay near South Bend, WA. Navigable to falls 5 miles above mouth. |
| Okanogan River, WA | X | | "Tributary to Columbia River near Brewster, WA. Navigable from mouth to McLaughlin Falls, approximately 50 miles above mouth near Riverside, WA." |
| Ollala Bay, WA | X | | Puget Sound. |
| Palix River (Middle Fork), WA | X | | Tributary of Palix River (tidal to mile 2.0). |
| Palix River (North Fork), WA | X | | Tributary of Palix River (tidal to mile 1.5). |
| Palix River (South Fork), WA | X | | Tributary of Palix River (tidal to mile 3.5). |
| Palix, River, WA | X | | Flows into Willapa Bay near Bay Center, WA (tidal). |
| Palouse River (South Fork), WA | | X | At North Grand Avenue bridge, Pullman, WA. |
| Palouse River, WA | | X | Mouth halfway between Lower Monumental Dam, and Little Goose Dam. |
| Pend Oreille River, WA/ID | X | | Navigable from the Canadian boundary at mile 16 to Lake Pend Oreille. |
| Percival Creek, WA | | X | From Black Lake near Olympia to Capitol Lake at Olympia. |
| Pickering Passage, WA | X | | Puget Sound. |
| Portage Slough, WA | | | See Ferndale Slough. |

**Table 30 U.S. Coast Guard Navigable Waters**

| Body of Water | Navigable CG | Non-Nav CG | Remarks |
|---|---|---|---|
| Purdy Creek, WA | | X | Tributary of Skokomish River at mile 3.9. |
| Puyallup River, WA | X | | "Flows into Commencement Bay of Puget Sound at Tacoma, WA (tidal at mile 3.0).<br>Navigable to Mile 3.0 near 30th Ave E." |
| Pysht River, WA | X | | Flows into Strait of Juan de Fuca near Sekiu, WA (tidal to mile 2.5). |
| Queets River, WA | X | | Flows into Pacific Ocean near Queets, WA (tidal to mile 1.0). |
| Quilceda Creek, WA | X | | Tributary of Snohomish River (tidal at mile 2.3). |
| Quillayute River, WA | X | | Flows into Pacific Ocean at La Push, WA (tidal to mile 2.5). |
| Rock Cove, WA | X | | Backwater of Bonneville Pool. |
| Rock Creek, WA | X | | Backwater of Lake Umatilla to mile 1.0. |
| Roosevelt, Lake, WA | X | | See Columbia River. |
| "Rosedale Bay, Pierce County (Puget Sound), WA" | X | | STAA at and landward of the Rosedale Bay Bridge |
| Ross Lake (Upper Skagit River), WA | X | | Navigable to Canadian Border. |
| Salmon Creek, WA | | X | Tributary to Naselle River, Pacific County. |
| Salmon Creek, WA | X | | Flows into Lake River at mile 9.5, Clark County. NW 36 Ave Bridge. |
| Samish River, Skagit County, WA | X | X | "Flows into Samish Bay near Edison, WA (tidal to about mile 7.0). Non-navigable at mile 8.0<br>and upstream. The I-5 twin bridges are in non-navigable water." |
| Sammamish River, WA | X | | "Flows from Lake Sammamish to Lake Washington near Seattle, WA. CGAA for entire<br>waterway. (in 2017 BRG said CGAA are no longer valid)," |
| Sammamish, Lake, WA | X | | Source of Sammamish River. |
| Sekiu River, WA | X | | Flows into Strait of Juan de Fuca near Sekiu, WA (tidal at mile 0.1). |

**Table 30 U.S. Coast Guard Navigable Waters**

| Body of Water | Navigable CG | Non-Nav CG | Remarks |
|---|---|---|---|
| Skagit River (incl. South Fork), WA | X | | "Flows into Skagit Bay near Stanwood, WA. Department of Agriculture now has jurisdiction over parts of the Skagit River pursuant to the Wild and Scenic Rivers Act. Navigable to mile 80.0. AA from junction with North Fork to junction with Freshwater Slough." |
| Skagit River (North Fork), WA | X | | "Flows out of Skagit River at mile 9.5 near Mount Vernon, WA into Skagit Bay. Navigable to mile 7.0." |
| Skamokawa Creek, WA | X | | Tributary of Columbia River. Mouth at Skamokawa, WA. |
| Skarnokawa Creek (Left Fork), WA | | X | Tributary of Columbia River. Mouth at Skamokawa, WA. |
| Skidmore Slough, WA | X | | Flows into Willapa River near South Bend, WA (tidal at mile 0.2). |
| Skokomish River, WA | X | | Flows into Hood Canal near Union, WA (tidal to mile 3.0). |
| Snohomish River (Ebey Slough), WA | X | | "Flows out of Snohomish River near mile 10.0 at Everett into Port Gardner. Mileage shown is from head to Burlington Northern Railway bridge near mouth (tidal)." |
| Snohomish River (Steamboat Slough), WA | X | | "Flows out of Snohomish River near mile 6 at Everett into Port Gardner. Mileage shown from head to Burlington Northern Railway bridge near mouth (tidal)." |
| Snohomish River (Union Slough), WA | X | | "Flows out of Snohomish River near mile 6.0 at Everett into Port Gardner. Mileage shown is from head to Burlington Northern Railway bridge near mouth (tidal)." |
| Snohomish River, WA | X | | "Navigable throughout. Formed by confluence of Skykomish and Snoqualmie Rivers near Monroe, WA. AA at and upstream of SR-522 Bridge near Monroe." |
| Snoqualmie River, WA | X | | "At point of confluence with Skykomish River, forms the Snohomish River near Monroe, WA. Navigable to at least mile 24.9." |
| South Slough, OR | X | | Estuary of Lower Coos Bay. Mouth 1.0 mile N of Charleston, OR (tidal). |
| Spokane River, WA | X | | Considered navigable above mile 80.2 N Argonne Road Bridge (May be the Spokane Upriver Dam) to Lake Coeur d' Alene and below mile 29.1 to confluence with the Columbia River. |

**Table 30 U.S. Coast Guard Navigable Waters**

| Body of Water | Navigable CG | Non-Nav CG | Remarks |
|---|---|---|---|
| Steamboat Slough, WA | X | | Side channel of Columbia River. Mouth at Skamokawa, WA (tidal). |
| Stillaguamish River (Hat Slough), WA | X | | Flows out of Stillaguamish River near mile 8.0 from road to mouth in Port Susan (tidal). |
| Stillaguamish River, WA | X | | "Flows into Port Susan near Stanwood, WA (tidal to mile 11.5). STAA at and upstream of SR-9 Bridge. AA at and upstream of County Bridge at mile 7.35" |
| Stuart Slough, WA | X | | Tributary of Willapa River |
| Stuck River, WA | | X | Tributary of Puyallup River. |
| Sumas River, WA | | X | Flows through northern Whatcom County. |
| Swinomish Slough (Channel), WA | X | | Connects Skagit Bay with Padilla Bay (tidal). |
| Tacoma Harbor, WA | X | | Puget Sound. Tacoma, WA. |
| Tapps, Lake, WA | | X | Pierce County. |
| Tolt River, WA | | X | Tributary of Snoqualmie River. Not navigable at mile 0.6. |
| Union River, WA | | X | Flows into Hood Canal at Belfair, WA. |
| "Unnamed inlet tributary to Nisqually Reach at Tolmie State Park, WA" | X | | Tidal. |
| "Unnamed inlet tributary to Pickering Passage, approx. 14 miles NE of Shelton, WA" | X | | Tidal. |
| "Unnamed slough running in NW direction off its intersection with Johnson Slough near Raymond, WA" | X | | Tidal. |
| "Von Geldern Cove Pierce County (Puget Sound), WA" | X | | STAA at and landward of the Western Home Bridge |
| Walla Walla River, WA | X | | Tributary of Columbia River McNary Pool backwater extends to mile 15.8. |
| Wallacut River, WA | X | | "Flows into Baker Bay. Mouth 1 .0 mile NE of llwaco, WA (tidal at mile 0.5). AA at and upstream of tidegate at about mile 0.5" |

**Table 30 U.S. Coast Guard Navigable Waters**

| Body of Water | Navigable CG | Non-Nav CG | Remarks |
|---|---|---|---|
| Wanapum Reservoir, WA | X | | Columbia River |
| Welcome Slough, WA | X | | Tributary of Columbia River. 2 miles S of Cathlamet, WA. |
| Wenatchee River, WA | | X | Tributary to Columbia River. |
| Whatcom (Creek) Waterway, WA | X | | Near Bellingham, WA (tidal). |
| Whatcom, Lake, WA | | X | Near Bellingham, WA. |
| White Salmon River, WA | X | | "Tributary of Columbia River. Mouth 2 miles downstream from White Salmon, WA. Navigable to 1.0 mile. Navigable to head of Bonneville Pool Backwater (See Drano Lake Little White Salmon )." |
| Willapa Bay, WA | X | | Estuary of Pacific Ocean |
| Willapa River (North Fork), WA | X | | At confluence with South Fork, forms Willapa River at Raymond, WA (tidal at mile 14.6). |
| Willapa River (South Fork), WA | X | | At confluence with North Fork, forms Willapa River at Raymond, WA (tidal at mile 0.9). |
| Willapa River, WA | X | | "Formed by confluence of North and South Forks at Raymond, WA. Flows into Willapa Bay near South Bend, WA. (tidal)" |
| Wind River, WA | X | | "Tributary of Columbia River. Mouth 4 miles upstream from Stevenson, WA. Navigable to head of Bonneville Pool Backwater." |
| Wishkah River, WA | X | | Flows into Chehalis River at Aberdeen, WA (tidal to approximately 11 miles above mouth). |
| Woodard Creek, WA | | X | Tributary of Columbia River near North Bonneville, WA. |
| "Woodward Bay, Henderson Inlet, Puget Sound, WA" | X | | AA at and landward of bridge at mile 0.65 |
| Yakima River, WA | X | | Tributary of Columbia River. McNary Pool backwater extends upstream to mile 8.4. |

# Moveable Bridge Maximum Navigation Vertical Clearance

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,1) | N(4,1) | I | BN03 | B.N.03 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

## Specification

Code the maximum vertical clearance over the waterway feature reported in Item B.F.01 (Feature Type), rounded down to the nearest tenth of a foot.

The recorded clearance is from the highest datum plane referenced in the approved permit plans to the lowest superstructure restriction or other appurtenances attached to the bridge over the designated navigation channel, when the movable bridge is in the open position.

Code 999.9 when the bridge provides unlimited vertical clearance over the navigation channel in the open position.

**Submittal to SNBI** will report this item only when Item B.N.01 (Navigable Waterway) is Y and Item B.SP.06 (Span Type) begins with M, indicating that the span type is movable.

## Commentary

The value recorded for this item is particularly useful for vertical lift bridges and for bascule bridges where the leaf (or leaves) does not provide unlimited vertical clearance over the designated navigation channel in the open position.

When permit plans are not available, values can be obtained from field measurements. Reference field measurements to the following datum:

| Crossing Type | Datum |
|---|---|
| Tidal waters | Mean High Water |
| Non-tidal waters | Extreme High Water |
| Rive | Q50 Surface Elevation |

## Moveable Bridge Maximum Navigation Vertical Clearance cont...

### Example

Vertical lift bridge. Information taken from "As-Built" plans as no permit plans are available. Mean High Water elevation is 3.2 ft. Maximum vertical underclearance is 56 ft – 3.2 ft = 52.8 ft. Report 52.8.

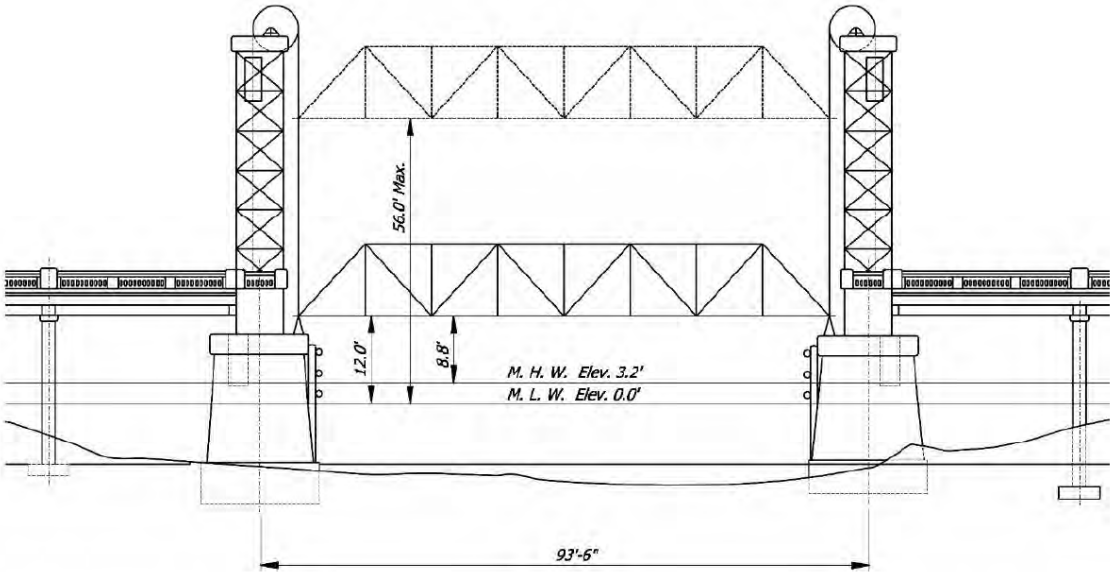



Figure 118. Bridge elevation view for a vertical lift bridge indicating vertical clearances. (Source: Florida DOT)

## Navigation Channel Width

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(5,1) | N(5,1) | I | BN04 | B.N.04 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the navigation channel width for the waterway feature reported in Item B.F.01 (Feature Type), rounded down to the nearest tenth of a foot.<br><br>The width is as shown on the approved permit plans, or field measured when the navigation channel changes or is unmarked.<br><br>For field measurements, measure the horizontal distance perpendicular to the centerline of the navigation channel. For marked channels measure between the markers designating the limits of the channel at the bridge. For unmarked channels, measure the minimum clear distance between fenders or piers.<br><br>If multiple channels exist, report the most restrictive.<br><br>**Submittal to SNBI** will report this item only when Item B.N.01 (Navigable Waterway) is Y. | The width provided here should be consistent with the navigation channel used in the navigation vertical clearance items. The designated navigation channel width may be less than the distance between substructure units. |

## Navigation Channel Width continued...

### Examples

Permit plans for a bridge over tidal waters with the navigation channel designated by cross-hatched area. Report 250.0.

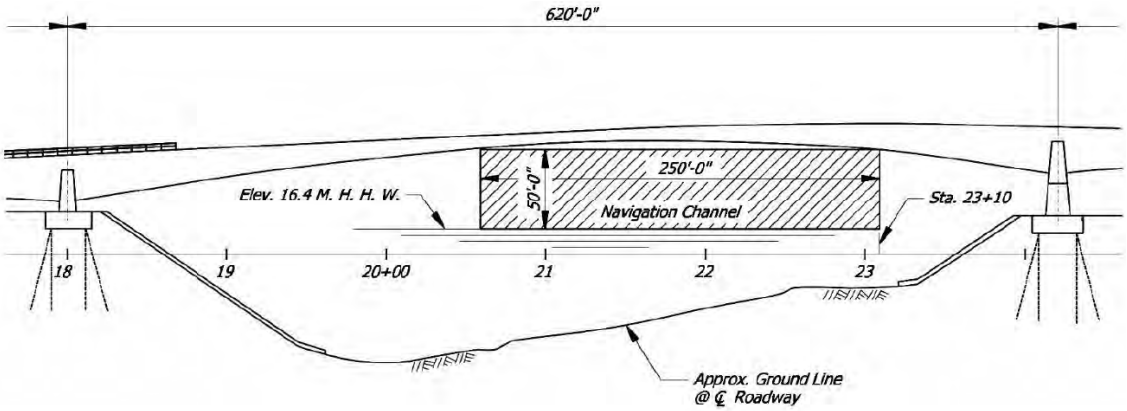



Figure 119. Bridge elevation view indicating navigation channel width dimensions. (Source: Alaska DOT)

Bridge with multiple designated navigation channels bounded by piers. Report 126.5.

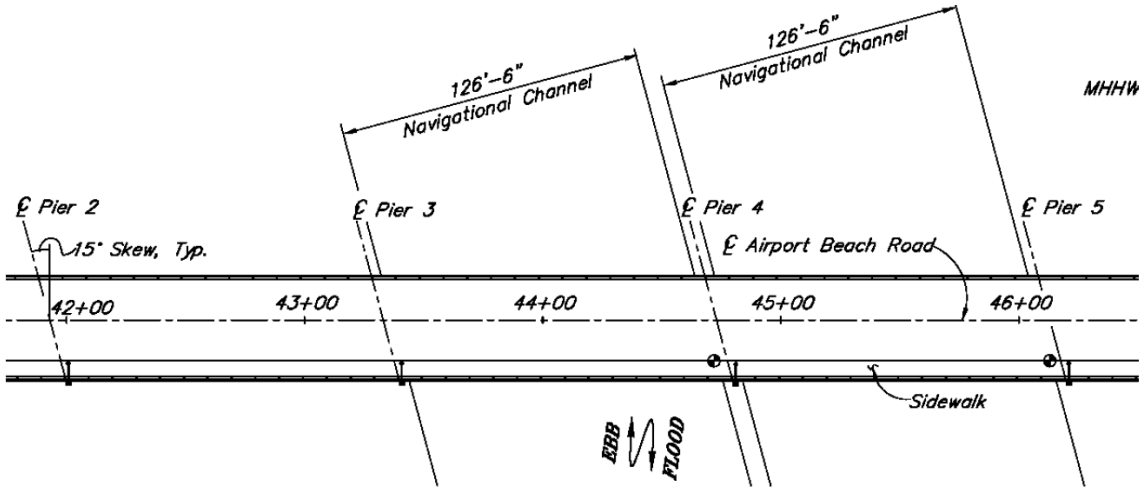



Figure 120. Bridge plan view indicating navigation channel width dimensions. (Source: Alaska DOT)

# Navigation Channel Minimum Horizontal Clearance

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(5,1) | N(5,1) | I | BN05 | B.N.05 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

| Specification | Commentary |
|---|---|
| Code the minimum horizontal clearance for the waterway feature reported in Item B.F.01 (Feature Type), rounded down to the nearest tenth of a foot.<br><br>The clearance is the minimum distance from either edge of the navigation channel shown on the approved permit plans, to the face of the nearest bridge substructure unit located within the waterway.<br><br>The clearance may be field measured when the placement of navigation markers at the bridge is inconsistent with the permit plans, or if the presence of navigation markers indicates a navigation channel and no permit plans are available.<br><br>For field measurements, measure the horizontal distance perpendicular to the centerline of the navigation channel from the markers designating the limits of the channel at the bridge, to the face of the nearest bridge substructure unit located within the waterway.<br><br>Code 0 when substructure units in the waterway are the boundaries for the navigation channel.<br><br>Code 9999.9 when no substructure unit is within the waterway.<br><br>**Submittal to SNBI** will report this item only when Item B.N.01 (Navigable Waterway) is Y. | The intent of this item is to collect the most restrictive distance from the edge of the navigational channel to a bridge substructure to assess risk for vessel collision.<br><br>The clearance provided here should be consistent with the navigation channel used in Item B.N.04 (Navigation Channel Width). |

## Navigation Channel Minimum Horizontal Clearance continued...

### Examples

Permit plans for a bridge over tidal waters with the navigation channel designated by cross-hatched area. No substructure units within the waterway. Report 9999.9.

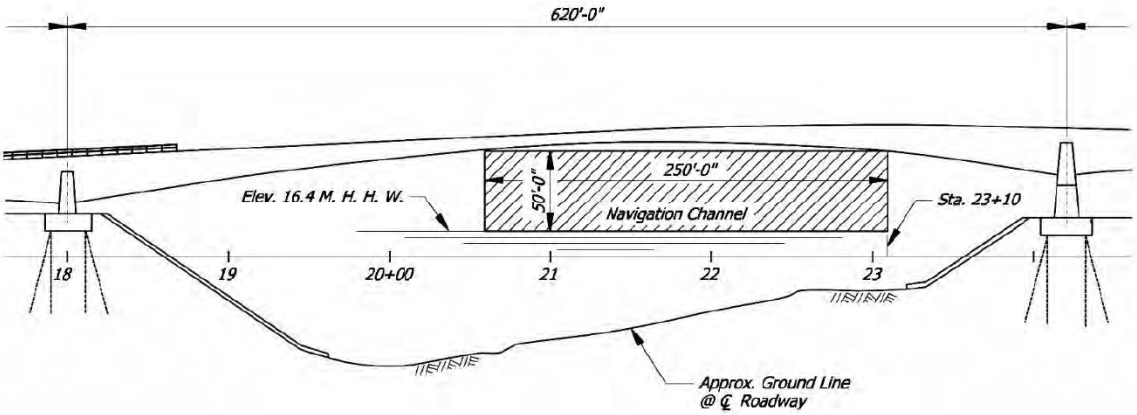



Figure 121. Bridge elevation view with no substructure units in the waterway. (Source: Alaska DOT)

Bridge with multiple designated navigation channels bounded by piers. Report 0.

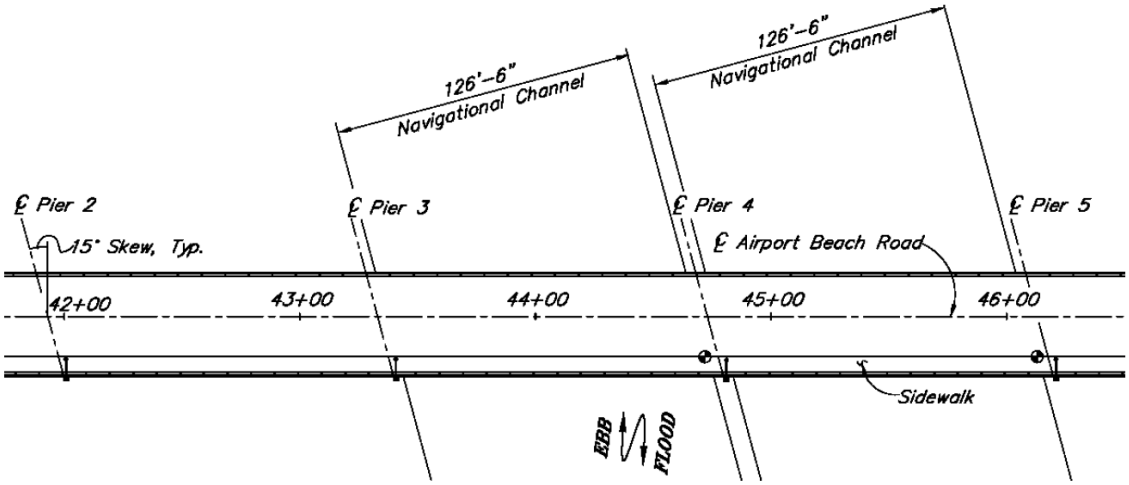



Figure 122. Bridge plan view indicating multiple navigation channel width dimensions to substructure units in the waterway. (Source: Alaska DOT)

Bridge with navigation channel designated by cross-hatched area. Substructure units within the waterway. Report 135.6.

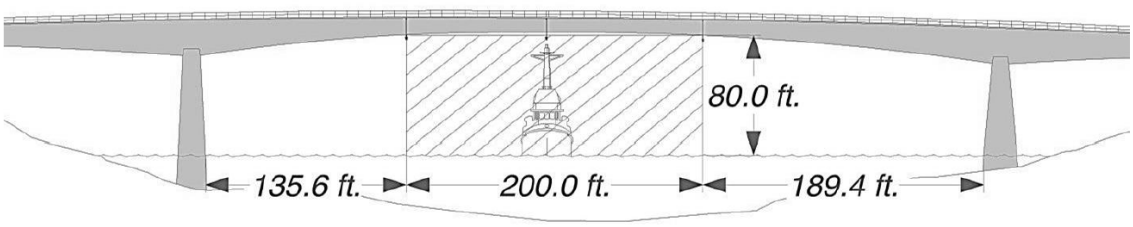



Figure 123. Bridge elevation view indicating navigation channel clearances to substructure units in the waterway.

## Substructure Navigation Protection

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | AN(1) | EI | BN06 | B.N.06 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

### Specification

Code the presence and adequacy of substructure navigation protection for the waterway feature reported in Item B.F.01 (Feature Type), using one of the following codes.

| Code | Description |
|---|---|
| 0 | Navigation protection not required; bridge has been designed or assessed to have adequate capacity to resist anticipated impact loads without collapse. |
| 1 | Navigation protection not required; assessment of navigation opening and vessel traffic has determined that there is a low probability that an errant vessel could impact the bridge. |
| 2 | Protective system in place and functioning. |
| 3 | Protective system in place, but damage or deterioration impacts ability to protect. |
| 4 | Protective system in place, but reevaluation of design suggested. |
| 5 | No protective system in place, but reevaluation of the need for a protective system is recommended. |

**Submittal to SNBI** will report this item only when Item B.N.01 (Navigable Waterway) is Y.

### Commentary

Substructure navigation protection systems can be fender systems, dolphins, or other systems that either prevent the substructure from being impacted or adequately reduce the impact load that is transferred into the substructure.

Use codes 0 and 1 to indicate that an assessment of vessel traffic characteristics and/or bridge capacity has determined that navigation protection is not required. AASHTO's Guide Specifications and Commentary for Vessel Collision Design of Highway Bridges provides a method for assessing an existing bridge's vulnerability to vessel collision. Codes 0 and 1 should not be assigned based on field observation.

Use codes 4 and 5 to indicate that observed conditions necessitate a review of vessel traffic characteristics, bridge capacity, and protective system capability to determine whether the bridge is adequately protected from vessel collision.

# Materials & Types Tab

| Superstructure Configuration Designation | | | | | |
|---|---|---|---|---|---|
| **Format** | **SNBI Format** | **Frequency** | **WSBIS Item ID** | **SNBI Item ID** | **SNTI Item ID** |
| AN(3) | AN(3) | I | BSP01 | B.SP.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

**Specification / Commentary**

This item is populated automatically from the WSP01 field.

| Superstructure Configuration Code | | | | | |
|---|---|---|---|---|---|
| **Format** | **SNBI Format** | **Frequency** | **WSBIS Item ID** | **SNBI Item ID** | **SNTI Item ID** |
| Calculated | AN(3) | I | WSP01 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the assigned span configuration designation using one of the following codes.<br><br>**Code** **Description**<br>M## Main<br>A## Approach<br>C## Culvert<br>V## Culvert extension<br>W## Widening<br><br>The ## characters in the above codes are auto-generated with sequential numbers, with leading zeros, assigned to each span configuration. | This item captures how spans of the reported bridge configuration are classified and designated.<br><br>Except for culverts, each bridge has at least one main span. Main spans include all spans of most bridges or the major span(s) of a sizable bridge.<br><br>The "##" characters in the codes with a sequential number (e.g., M01, A01, A02, etc.) identifies each unique span configuration present on the bridge.<br><br>A bridge may or may not have approach spans. Approach spans are typically those of a different material, type, or design than the main span and are typically at one or both ends of the main span.<br><br>Consider the span(s) of vaulted abutments as an approach span.<br><br>Use code C for spans that convey water through or under a roadway embankment and are designed hydraulically to take advantage of submergence to increase water carrying capacity.<br><br>Use code V when a culvert is extended using dissimilar construction.<br><br>Use code W for widened portions of main or approach spans with dissimilar construction. Widening data sets do not contribute to the calculation of the total number of spans for the bridge. |

## Superstructure Configuration Code continued...

### Examples

Four-span steel plate girder bridge. This bridge has one span data set. Report M01.

Double-leaf bascule bridge with four steel box girder approach spans. This bridge has two span data sets.

- Report M01 for the bascule data set.
- Report A01 for the steel box girder data set.

Six-span bridge with two continuous steel plate girder main spans and four simply supported steel plate girder approach spans. This bridge has two span data sets.

- Report M01 for the continuous steel plate girder data set.
- Report code A01 for the simply supported steel plate girder data set.

Four-barrel corrugated steel pipe culvert, modified by adding four additional HDPE round pipes along the roadway centerline to increase hydraulic capacity. This bridge has two span data sets.

- Report C01 for the steel pipes data set.
- Report C02 for the HDPE pipes data set.

Steel truss main span bridge with three prestressed concrete multi-beam approach spans at the north end, and two steel multi-beam approach spans at the south end. This bridge has three span data sets.

- Report M01 for the steel truss data set.
- Report A01 for the north approach data set.
- Report A02 for the south approach data set.

Single span reinforced concrete tee-beam bridge widened with prestressed concrete box beams. This bridge has two span data sets.

- Report M01 for the reinforced concrete tee-beam data set.
- Report W01 for the prestressed concrete box beams data set.

Three-sided frame culvert, lengthened by adding a four-sided box culvert to the end of the barrel. This bridge has two span data sets.

- Report C01 for the three-sided frame culvert data set.
- Report V01 for the four-sided box culvert data set.

Single span steel beam bridge widened using the same superstructure/deck construction. This bridge has one span data set. Report M01.

## Span Description

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | I | WSP02 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

**Specification / Commentary**

Briefly identify the span numbers associated with the Span Configuration identified in WSP01.

**Examples**

- Main Spans 2, 3 and 4
- Approach Spans 1-3

## Number of Spans

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,0) | N(4,0) | I | BSP02 | B.SP.02 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Record the number of spans. | This item captures the number of spans of the configuration(s) designated in item B.SP.01 (Span Configuration Designation).<br><br>If the number of barrels or spans varies, report the maximum number. |

## Number of Spans continued...

### Examples

Four-span steel plate girder bridge. This bridge has one span data set. Report 4.

Double-leaf bascule bridge with four steel box girder approach spans. This bridge has two span data sets.

- Report 1 for the bascule main span data set.
- Report 4 for the box girder approach span data set.

Six-span bridge with two continuous steel plate girder main spans and four simply supported steel plate girder approach spans. This bridge has two span data sets.

- Report 2 for the main span data set.
- Report 4 for the approach span data set.

Four-barrel corrugated steel pipe culvert, modified by adding four additional HDPE round pipes along the roadway centerline to increase hydraulic capacity. This bridge has two span data sets.

- Report 4 for the steel pipes data set.
- Report 4 for the HDPE pipes data set.

Three steel girder spans with concrete vaulted/cellular abutments that enclose a reinforced concrete slab span at each end of the bridge. This bridge has two span data sets.

- Report 3 for the steel girder main span data set.
- Report 2 for the reinforced concrete approach span data set.

Four-sided concrete box culvert that collects runoff at a single-barrel inlet at the northeast corner of an intersection, and at a three-barrel inlet at the northwest corner. The barrels merge beneath the intersection, and all four barrels outlet to the southeast corner. This bridge has one span data set. Report 4.

Three-sided frame culvert, lengthened by adding a four-sided box culvert to the end of the barrel. This bridge has two span data sets.

- Report 1 for the three-sided frame culvert data set.
- Report 1 for the four-sided box culvert data set.

Twin concrete box girder bridge that has eastbound and westbound lanes separated by a 1” median gap. Eastbound portion of superstructure is supported by two piers, and westbound portion is supported by three piers due to unusual terrain restrictions. This bridge has one span data set. Report 4.

## Number of Beam Lines

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,0) | N(3,0) | I | BSP03 | B.SP.03 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Record the number of principal beam lines.<br><br>Code 1 for bridges where Item B.SP.06 (Span Type) is F01, F02, S01, or S02.<br><br>Code 0 for bridges where Item B.SP.06 (Span Type) is P01 or P02. | Principal beam lines include the main longitudinal load-carrying members of the superstructure such as beams, girders, trusses, and arches or arch ribs, but do not include stringers of a floor beam system or spandrel walls of an arch.<br><br>Use the average number of beam lines for bridges with variable number of beam lines within a span configuration, rounded down. |

**Examples**

Timber multi-beam bridge with 12 beams. Report 12.

Steel through truss bridge with two trusses and ten stringers. Report 2.

Flared three-span tee-beam bridge with 12 beams at the south end and 17 beams at the north end. Report 14.

Steel arch bridge with three arch ribs. Report 3.

Concrete arch bridge with masonry spandrel walls. Report 1.

Four-barrel corrugated steel pipe culvert, modified by adding four additional HDPE round pipes along the roadway centerline to increase hydraulic capacity. This bridge has two span data sets.

- Report 0 for the steel pipes data set.
- Report 0 for the HDPE pipes data set.

Three-sided frame culvert, lengthened by adding a four-sided box culvert to the end of the barrel. This bridge has two span data sets.

- Report 1 for the three-sided frame data set.
- Report 1 for the four-sided frame data set.

# Span Material

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSP04 | B.SP.04 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

## Specification

Record the principal span material type using one of the following codes.

| Code | Description |
|---|---|
| A01 | Aluminum |
| C01 | Reinforced concrete - cast-in-place |
| C02 | Reinforced concrete - precast |
| C03 | Prestressed concrete - pre-tensioned |
| C04 | Prestressed concrete - cast in place post-tensioned |
| C05 | Prestressed concrete - precast post-tensioned |
| CX | Concrete - other |
| F01 | FRP composite - aramid fiber |
| F02 | FRP composite - carbon fiber |
| F03 | FRP composite - glass fiber |
| FX | FRP composite - other |
| I01 | Iron - cast |
| I02 | Iron - wrought |
| M01 | Masonry - block |
| M02 | Masonry - stone |
| P01 | Plastic - Polyethylene |
| PX | Plastic - other |
| S01 | Steel - rolled shapes |
| S02 | Steel - welded shapes |
| S03 | Steel - bolted shapes |
| S04 | Steel - riveted shapes |
| S05 | Steel - bolted and riveted shapes |
| SX | Steel - other |

## Specification Continued

continued...

| Code | Description |
|---|---|
| T01 | Timber - glue laminated |
| T01 | Timber - nail laminated |
| T01 | Timber - solid sawn |
| T01 | Timber - stress laminated |
| T01 | Timber - other |
| X | Other |

## Span Material continued...

### Commentary

A principal span member includes the main longitudinal load-carrying members of the span such as beams, girders, trusses, arches, or pipes, but does not include the floor system.

Use code C04 or C05, as applicable, for prestressed concrete superstructures that utilize both pre-tensioning and post- tensioning.

Use code M01 for masonry made from bricks or concrete blocks. Use code M02 for natural stone.

Use code P01 for plastics that include HDPE and PE materials typically used for pipes.

### Examples

Spliced concrete girder: post-tensioned, precast, pre-tensioned bulb-T. Report C05. Stress laminated timber slab. Report T04.

Concrete encased steel rolled beam. Report S01. Bolted steel truss with timber stringers. Report S03.

Cast-in-place reinforced concrete tee-beams strengthened with carbon fiber FRP. Report C01. Corrugated steel pipes with bolted seams. Report S03.

Corrugated steel pipe culvert with welded seams, modified by adding additional HDPE round pipes to lengthen the culvert along the roadway centerline. This bridge has two span data sets.

- Report S02 for the steel pipes data set.
- Report P01 for the HDPE pipes data set.

Three-sided, cast-in-place reinforced concrete frame culvert, lengthened by adding a four- sided precast reinforced concrete frame culvert to the end of the barrel. This bridge has two span data sets.

- Report C01 for the three-sided frame data set.
- Report C02 for the four-sided frame data set.

Terra cotta pipes. Report X.

## Span Continuity

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(1) | AN(1) | I | BSP05 | B.SP.05 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Record the span continuity using one of the following codes.<br><br>**Code** — **Description**<br>1 — Simple or single span<br>2 — Continuous<br>3 — Continuous for live loads only<br>4 — Cantilever<br>5 — Cantilever with pin and hanger<br>6 — Frame<br>7 — Buried | This item captures the continuity of the span(s) in the configuration.<br><br>Use code 2 for bridges designed continuous for permanent (dead) loads and live loads. Also, use code 2 for cable stayed and suspension bridges, and for multi-span arches.<br><br>Use code 3 for bridges designed as simple spans for permanent (dead) loads and continuous for live loads. When it is unknown if the superstructure was designed as continuous for live loads, code this item consistent with the assumption used in the load rating calculations.<br><br>Use code 6 for three-sided and four-sided frames that are not buried.<br><br>Use code 7 for pipe culverts and other structures that rely on soil-structure interaction to support vertical loads. |

**Examples**

Two prestressed concrete girder simple spans that have one span data set. Report 1.

Three-span bridge with cantilevered end spans that are unsupported at the extreme ends. There are two span data sets, one for the center span and one for the end spans. Report 2 for the center span. Report 4 for the end spans.

Steel rigid K-frame that has one span data set. Report 6.

Two prestressed concrete girder simple spans with continuous deck designed to provide continuity for live load over the pier and have one span data set. Report 3.

Three-span concrete girder bridge with cantilever and suspended center span. There are two span data sets, one for the center span and one for the end spans. Report 4 for the center span. Report 2 for the end spans.

Three-span steel girder bridge with cantilever and suspended pin and hanger center span. There are two span data sets, one for the center span and one for the end spans. Report 5 for the center span. Report 2 for the end spans.

Three-barrel monolithic concrete frame bridge that is not buried and has one span data set. Report 6.

Four-barrel corrugated steel pipe culvert. Report 7.

w/errata#1 03/24

## Span Type

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSP06 | B.SP.06 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

### Specification

Record the span type using one of the following codes.

| Code | Description |
|---|---|
| A01 | Arch - under fill without spandrel |
| A02 | Arch - open spandrel |
| A03 | Arch - closed spandrel |
| A04 | Arch - through |
| A05 | Arch - tied |
| B01 | Box girder/beam - single |
| B02 | Box girder/beam - multiple adjacent |
| B03 | Box girder/beam - multiple spread |
| B04 | Box girder/beam - segmental |
| F01 | Frame - three-sided |
| F02 | Frame - four-sided |
| F03 | Frame - K-shaped |
| F04 | Frame - delta-shaped |
| G01 | Girder/beam - I-shaped adjacent |
| G02 | Girder/beam - I-shaped spread |
| G03 | Girder/beam - tee-beam |
| G04 | Girder/beam - inverted tee-beam |
| G05 | Girder/beam - double-tee adjacent |
| G06 | Girder/beam - double-tee spread |
| G07 | Girder/beam - channel adjacent |
| G08 | Girder/beam - channel spread |
| G09 | Girder/beam - girder & floor beam |
| G10 | Girder/beam - through girder |
| GX | Girder/beam - other |

### Specification Continued

continued...

| Code | Description |
|---|---|
| L01 | Cable - suspension |
| L02 | Cable - suspension |
| L03 | Cable - suspension |
| L04 | Cable - other |
| M05 | Moveable - vertical lift |
| M01 | Moveable - vertical lift |
| M02 | Moveable - vertical lift |
| M03 | Moveable - other |
| P04 | Pipe - rigid |
| P01 | Pipe - flexible |
| S01 | Slab - solid |
| S02 | Slab - voided |
| T01 | Truss - deck |
| T02 | Truss - through |
| T03 | Truss - pony |
| X04 | Other - railroad flat car |
| X05 | Other - ferry transfer |
| X06 | Other - floating |
| X | Other |

## Span Type continued...

### Commentary

Adjacent girders/beams are those sections that are placed directly next to each other and are touching or nearly touching.

Spread girders/beams are those sections that are spaced so that the deck spans the space between the sections.

Box girder/beams include boxes, tubs, and cellular structures where interior surfaces may or may not be accessible. Use code B04 for segmental construction and irrespective if the span type meets the description for B01, B02 or B03.

Use code F01 for three-sided rigid frames.

Use code F02 for rigid four-sided concrete box bridges.

Use code G01 or G02, as applicable, for bulb-tee and deck bulb-tee girders/beams.

Use code G09 for superstructures with girder and floor beam systems regardless of the girder shape.

Use code G10 for through girder type superstructures regardless of the girder shape.

Use code P02 for pipes that rely on the stability of surrounding soils to maintain their structural shape.

w/errata#1 03/24

# Span Protective System

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSP07 | B.SP.07 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

## Specification

Record the span protective system using one of the following codes.

| Code | Description |
|---|---|
| 0 | None |
| A01 | Admixture – internally sealed |
| A02 | Admixture – low permeability |
| A03 | Admixture – polymer impregnated |
| A04 | Admixture – ASR inhibitor |
| AX | Admixture – other |
| C01 | Coating – paint |
| C02 | Coating – sealer |
| C03 | Coating – methacrylate |
| C04 | Coating – hot dip galvanizing |
| C05 | Coating - metalizing/thermal spray |
| CX | Coating - other |
| E01 | Encasement - concrete |
| EX | Encasement - other |
| M01 | Membrane - built-up |
| M01 | Membrane - sheet |
| M01 | Membrane - liquid applied |
| M01 | Membrane - unknown |
| MX | Membrane - other |
| P01 | Patina - uncoated weathering steel |
| S01 | Sacrificial - cathodic, passive |
| S02 | Sacrificial - cathodic, active |
| SX | Sacrificial - other |
| T01 | Treated - timber preservative |
| U | Unknown |
| X | Other |

w/errata#1 03/24

## Commentary

Code this item consistent with the material reported for Item B.SP.04 (Span Material).

In cases where the span configuration may have a combination of protective systems, use the code for the predominant protective system based on protected area. In cases where multiple systems protect the same area, use the code for the outermost protective layer.

Use code 0 when the span is unprotected.

Use code 0 when unprotected steels either never were coated or currently have no signs of coating systems, and have no protective systems such as cathodic protection or weathering chemistry.

Non-protective anti-graffiti and aesthetic coatings are not considered when coding this item.

Use code C01 for weathering steel that has been painted.

Use code C02 for sealers such as silanes, siloxanes, linseed oils, etc.

Use code P01 only for weathering grades of steel.

For timber, use code T01 for oil-based or water-borne timber preservatives. Use code C01 for paints and stains.

Use the appropriate code for span members under fill that have a protective system.

## Span Protective System

**Examples**

Low permeability concrete slab bridge with waterproofing sheet membrane. Report M02.
Weathering steel multi-beam bridge that has the beam ends painted to protect from leakage through the joints. Report P01.

## Deck Interaction

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(2) | AN(2) | I | BSP08 | B.SP.08 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

**Specification**

Record the type of interaction between the superstructure and deck for the span configuration using one of the following codes.

| Code | Description |
|---|---|
| CS | Composite - shored construction |
| CU | Composite - unshored constructions |
| IM | Integral or monolithic |
| NC | Non-composite |

**Submittal to SNBI** will not report this item when Item B.SP.09 (Deck Material and Type) is 0.

**Commentary**

This item captures the type of structural interaction that occurs between the bridge deck and superstructure, which may indicate the importance of the deck to the overall stability and capacity of the bridge.

Use code NC to indicate that the deck and the superstructure act independently.

Use code CU to indicate that the deck acts composite with the superstructure, and that the superstructure can carry its own self-weight, plus that of the deck concrete prior to curing.

Use code CS to indicate that the deck acts composite with the superstructure, but without the deck the superstructure requires shoring to carry its own self weight, the weight of the deck concrete prior to curing, or both.

Use code IM to indicate that the deck was cast or fabricated of the same material and at the same time as the superstructure and the two can be expected to act as a unit. Use code IM for slabs and orthotropic steel decks.

When the type of interaction is unknown, code this item consistent with the assumption used in the load rating calculations.

## Deck Interaction continued...

**Examples**

Steel rolled shape beams with cast-in-place deck. No shear connectors. Report NC.

Precast concrete bulb-tee with cast-in-place deck. Shear connectors extend into the deck. Deck was cast without shoring. Report CU.

Precast concrete double-tee beam bridge with an additional structural deck cast on top. Report CU.

Steel plate girder with cast-in-place deck. Shear connectors extend into the deck. Girders were shored during deck construction to maintain stability. Report CS.

Cast-in-place tee-beam bridge. Report IM. Adjacent box beam bridge. Traffic rides on the top flange of the box. Report IM.

Steel box girder with orthotropic deck. Deck plate acts as top flange of the box section. Report IM.

# Deck Material & Type

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSP09 | B.SP.09 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

## Specification

Record the deck material and type for the span configuration using one of the following codes.

| Code | Description |
|---|---|
| 0 | None |
| A01 | Aluminum |
| C01 | Reinforced concrete – cast-in-place |
| C02 | Reinforced concrete – precast |
| C03 | Prestressed concrete – pre-tensioned |
| C04 | Prestressed concrete – cast-in-place post-tensioned |
| C05 | Prestressed concrete – precast post-tensioned |
| CX | Concrete – other |
| F01 | FRP composite - aramid fiber |
| F02 | FRP composite - carbon fiber |
| F03 | FRP composite - glass fiber |
| FX | FRP composite - other |
| S01 | Steel - open grid |
| S02 | Steel - filled or partially filled grid |
| S03 | Steel - plate |
| S04 | Steel - orthotropic |
| S05 | Steel - corrugated |
| SX | Steel - other |
| T01 | Timber - glue laminated |
| T02 | Timber - nail laminated |
| T03 | Timber - solid sawn |
| T04 | Timer - stress laminated |
| T05 | Timber - other |
| X | Other |

## Commentary

In cases where the superstructure configuration may have a combination of deck materials and/or types, code the predominant deck material and type based on the deck area.

Use the applicable code for superstructure types with integral top flanges that serve as the deck, such as concrete tee-beams and box beams/girders.

For slabs, and for the slab portion of three-sided and four-sided concrete rigid frame bridges and culverts not under fill, use the same applicable material code as used in Item B.SP.04 (Span Material).

Use code 0 for the following bridge and culvert types when under fill, as these do not have a deck component: slabs, arches without spandrels, closed spandrel arches, pipes, and three-sided or four-sided rigid frames.

Use code C02, C03, or C05, as applicable, for full depth precast panels only. Use code C01 or C04, as applicable, for cast-in-place concrete on partial depth structural panels that are not just considered stay-in-place forms.

## Examples – Span Protective System

Low permeability concrete slab bridge with waterproofing sheet membrane. Report M02.
Weathering steel multi-beam bridge that has the beam ends painted to protect from leakage through the joints. Report P01.

# Wearing Surface

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSP10 | B.SP.10 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

## Specification

Record the predominant wearing surface material type protecting the deck or slab for the span configuration using one of the following codes.

| Code | Description |
|---|---|
| 0 | None |
| B01 | Bituminous (asphalt) |
| C01 | Concrete – monolithic |
| C02 | Concrete – unmodified |
| C03 | Concrete – latex modified |
| C04 | Concrete – low slump |
| C05 | Concrete – fiber reinforced |
| C06 | Concrete – microsilica |
| C07 | Concrete – polyester |
| CX | Concrete – other |
| CU | Concrete – unknown |
| E01 | Earth – gravel or soil |
| P01 | Polymer – epoxy |
| P02 | Polymer – polyester |
| PX | Polymer – other |
| S01 | Steel |
| T01 | Timber - running planks |
| X | Other |

**Submittal to SNBI** will not report this item when Item B.SP.09 (Deck Material and Type) is 0.

## Commentary

When a span configuration has a combination of wearing surface types, code the predominant wearing surface type based on the deck or slab area.

Do not consider patching materials when coding this item.

Use code 0 when no additional sacrificial concrete thickness or wearing surface is included on the deck or slab.

Use codes C01 through CU for overlays that contain portland cement.

Use code C01 when there is an additional sacrificial thickness cast concurrently with the structural deck or slab.

Use code C02 when an additional placement of concrete of the same concrete material as the deck or slab is placed after the deck or slab has cured.

Use code CU when a concrete wearing surface exists, but the specific material composition is unknown.

Use code S01 when a steel grid deck is fabricated with an additional sacrificial thickness. Code S01 is not intended for temporary steel plates.

Use code T01 where running planks are added on timber decks or slabs.

## Examples

Bridge with 2” asphalt wearing surface over a sheet waterproofing membrane. Report B01.
Bridge with latex modified concrete overlay topped with an epoxy polymer overlay. Report P01.

# Deck Protective System

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSP11 | B.SP.11 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

## Specification

Record the deck protective system for the span configuration using one of the following codes.

| Code | Description |
|---|---|
| 0 | None |
| A01 | Admixture – internally sealed |
| A02 | Admixture – low permeability |
| A03 | Admixture – polymer impregnated |
| A04 | Admixture – corrosion inhibitor |
| A05 | Admixture – ASR inhibitor |
| AX | Admixture – other |
| C01 | Coating – paint |
| C02 | Coating – sealer |
| C03 | Coating – methacrylate |
| C04 | Coating - hot dip galvanizing |
| C05 | Coating - metalizing/thermal spray |
| CX | Coating - other |
| M01 | Membrane – built up |
| M02 | Membrane – sheet |
| M03 | Membrane – liquid applied |
| MU | Membrane – unknown |
| MX | Membrane – other |
| P01 | Patina – uncoated weathering steel |
| T01 | Treated - timber preservative |
| U | Unknown |
| X | Other |

**Submittal to SNBI** will not report this item when Item B.SP.09 (Deck Material and Type) is 0.

w/errata#1 03/24

## Commentary

Code this item consistent with the predominant material reported in Item B.SP.09 (Deck Material and Type).

In cases where the deck may have a combination of protective systems, use the code for the predominant protective system based on protected area. In cases where multiple systems protect the same area, use the code for the outermost protective layer.

Use code 0 when the deck is unprotected.

Use code A01 for internally sealed concrete systems that use wax beads in the concrete. After the concrete cures, it is heated to melt the wax and seal the concrete.

Use code A02 when low permeability concrete is used with admixtures such as flyash, microsilica, or slag.

Use code A05 when admixtures are used to inhibit alkali-silica reactivity (ASR).

Use code C02 for sealers such as silanes, siloxanes, linseed oils, etc.

Do not use codes C02 and C03 when the material is applied for localized crack repair.

Use code M01 when the membrane is built up using combined layers of liquid and preformed/ sheet membranes.

Use code MU when a membrane exists, but the type is unknown.

Use code MX when a membrane type is known, but does not match the types specified for codes M01, M02, or M03.

## Examples

Bridge with 2” asphalt wearing surface over a sheet waterproofing membrane. Report M02.
Bridge deck constructed with polymer impregnated concrete and sealed with a flood coat of methacrylate. Report C03.

# Deck Reinforcing Protective System

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSP12 | B.SP.12 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

## Specification

Record the type of deck reinforcing protective system for the span configuration using one of the following codes for concrete decks and slabs.

| Code | Description |
|---|---|
| 0 | None |
| C01 | Coating – epoxy coated |
| C02 | Coating – galvanized |
| C03 | Coating – metalized |
| CX | Coating – other |
| R01 | Reinforcing – stainless, clad |
| R02 | Reinforcing – stainless, solid |
| R03 | Reinforcing – high chromium |
| R04 | Reinforcing – FRP, aramid fiber |
| R05 | Reinforcing – FRP, carbon fiber |
| R06 | Reinforcing – FRP, glass fiber |
| R07 | Reinforcing – FRP, other |
| RX | Reinforcing – other |
| S01 | Sacrificial – cathodic, passive |
| S02 | Sacrificial – cathodic, active |
| SX | Sacrificial – other |
| U | Unknown |
| X | Other |

**Submittal to SNBI** will report this item only if Item B.SP.09 (Deck Material and Type) is concrete (i.e. codes C01 to CX). w/errata#1 03/24

## Commentary

In cases where the span(s) may have a combination of protective systems, use the code for the predominant protective system based on protected area. In cases where multiple systems protect the same area, use the code for the outermost protective layer. If the top and bottom mat have different protective systems, report the protective system for the top mat.

Do not consider bar chairs or other reinforcing steel supports when coding this item.

Use code 0 when steel reinforcement is unprotected, such as with black steel.

Use codes C01 to CX and R01 to RX when any (e.g., top mat only) or all the reinforcing steel in the deck is protected by the selected steel type.

Use code S02 when impressed currents are used as the cathodic protection system.

## Examples

Bridge deck constructed with black reinforcing bars, later widened with a top mat of epoxy coated bars and bottom mat of black bars. This bridge has two span data sets.

- Report 0 for the original deck data set.
- Report C01 for the widened deck data set.

# Deck Stay-In-Place Forms

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSP13 | B.SP.13 | - |

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**

## Specification

Record the type of deck stay-in-place form for the span configuration using one of the following codes.

| Code | Description |
|---|---|
| 0 | None |
| C01 | Concrete – reinforced |
| C02 | Concrete – prestressed |
| F01 | FRP composite |
| M01 | Metal |
| T01 | Timber |
| X | Other |

**Submittal to SNBI** will not report this item when Item B.SP.09 (Deck Material and Type) is 0.

## Commentary

Use this item to identify forms used in construction that remain in place by design or owner preference.

When a span configuration has a combination of stay-in-place form types, code the predominant type based on the deck area.

Use code C01 when a precast reinforced concrete panel (partial depth) is used with a cast-in-place reinforced concrete placement on top.

Use code C02 when a precast prestressed concrete panel (partial depth) is used with a cast-in-place reinforced concrete placement on top.

This item is not intended to be used for materials installed only for debris shielding, or when Item B.SP.09 (Deck Material and Type) is S05 (Steel – corrugated).

## Examples

Bridge constructed using 3” thick prestressed concrete form panels. Completed deck is 8” thick. Report C02.

Bridge with reinforced concrete deck placed originally with removable forms, subsequently widened with reinforced concrete deck placed on metal stay-in-place forms. This bridge has two span data sets.

- Report 0 for the original data set.
- Report M01 for the widened data set.

## Substructure Configuration Designation

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSB01 | B.SB.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification / Commentary**

This item is automatically populated from WSB01.

## Substructure Configuration Code

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Calculated | - | I | WSB01 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

Record the substructure set designation using one of the following codes.

| Code | Description |
|---|---|
| A## | Abutment |
| P## | Pier or Bent |
| W## | Widening |

The ## characters in the above codes are auto-generated with sequential numbers, with leading zeros, assigned to each substructure configuration.

Submittal to SNBI will not report this item when B.SP.06 (Span Type) is a pipe (i.e. code P01 or P02).

w/errata#1 03/24

**Commentary**

This item captures how the reported substructure configuration is designated.

The substructure is the portion of a bridge below the bearings or below the springline of an arch, which transfers loads to the foundation. This includes the walls and footings, caps, or floor slabs of three-sided and four-sided rigid frame bridges and culverts.

The "##" characters in the codes with a sequential number (e.g., A01, A02, P01, etc.) identifies each unique substructure configuration present on the bridge.

An abutment is a substructure unit located at the end of a bridge that transfers loads from the superstructure to the foundation while providing lateral support for the approach roadway embankment. Typically, a bridge has two abutments, but there may be cases (such as bifurcated structures assigned two bridge numbers) where one end of the bridge does not mate up with the approach roadway. (continued...)

## Substructure Configuration Code continued...

### Commentary Continued

A multiple span bridge with cantilevered end spans that are unsupported at the extreme ends does not have abutments.

Piers and bents are substructure units that support the spans of a multi-span superstructure at intermediate location(s) between abutments.

Use code W for widened portions of abutments or piers/bents with dissimilar substructure construction.

### Examples

Single-span concrete rigid frame bridge. This bridge has one designated substructure data set. Report A01.

Two-span concrete, three-sided, rigid frame culvert. This bridge has two designated substructure data sets.

- Report A01 for the end support frame legs data set.
- Report P01 for the intermediate support frame leg data set.

Four-span multi-beam bridge with integral concrete abutments and concrete column piers. This bridge has two designated substructure data sets.

- Report A01 for the abutment data set.
- Report P01 for the pier data set.

Three-span bridge with intermediate concrete pier walls and cantilevered end spans that are unsupported at the extreme ends. This bridge has one designated substructure data set. Report P01.

Three-span suspension bridge with concrete tower piers, concrete pier walls supporting the ends of the suspension spans, eight timber bents supporting the approach spans, and concrete stub abutments at each end of the bridge. The north abutment has a spread footing on rock foundation and the south abutment has a steel H-pile foundation. This bridge has five designated substructure data sets.

- Report A01 for the north abutment data set.
- Report A02 for the south abutment data set.
- Report P01 for the towers data set.
- Report P02 for the concrete pier walls data set.
- Report P03 for the timber bents data set.

Five-span girder bridge with concrete stub abutments and concrete wall piers. Bridge is widened with concrete stub abutments and concrete column piers. This bridge has three designated substructure data sets.

- Report A01 for the stub abutments (including the widening) data set.
- Report P01 for the concrete wall piers data set.
- Report W01 for the concrete columns data set.

## Pier Description

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | I | WSB02 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification / Commentary**

Briefly identify the substructure numbers associated with the Substructure Configuration identified in WSB01.

**Examples**

Abutments 1 and 5

Piers 2-4

## Number of Substructure Units

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(3,0) | N(3,0) | I | BSB02 | B.SB.02 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Record the number of substructure units. | This item captures the number of substructure units of similar material, design, and foundation type that are being reported. |

**Examples**

Four-span multi-beam bridge with integral concrete abutments and concrete column piers. This bridge has two substructure data sets.

- Report 2 for the abutment data set.
- Report 3 for the pier data set.

Three-span bridge with intermediate concrete pier walls and cantilevered end spans that are unsupported at the extreme ends. This bridge has one substructure data set. Report 2.

Three-span suspension bridge with concrete tower piers, concrete pier walls supporting the ends of the suspension spans, eight timber bents supporting the approach spans, and concrete stub abutments at each end of the bridge. The north abutment has a spread footing on rock foundation and the south abutment has a steel H-pile foundation. This bridge has five substructure data sets.

- Report 1 for the north abutment data set.
- Report 1 for the south abutment data set.
- Report 2 for the towers data set.
- Report 2 for the concrete pier walls data set.
- Report 8 for the timber bents data set.

Five-span girder bridge with concrete stub abutments and concrete wall piers. Bridge is widened with concrete stub abutments and concrete column piers. This bridge has three substructure data sets.

- Report 2 for the stub abutments (including the widening) data set.
- Report 4 for the concrete wall piers data set.
- Report 4 for the concrete columns data set.

# Substructure Material

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSB03 | B.SB.03 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

## Specification

Record the principal substructure material type using one of the following codes.

| Code | Description |
|---|---|
| 0 | None |
| A01 | Aluminum |
| C01 | Reinforced concrete – cast-in-place |
| C02 | Reinforced concrete – precast |
| C03 | Prestressed concrete – pre-tensioned |
| C04 | Prestressed concrete – cast-in-place post-tensioned |
| C05 | Prestressed concrete – precast post-tensioned |
| CX | Concrete – other |
| E01 | Earth – reinforced soil mass |
| F01 | FRP composite – aramid fiber |
| F02 | FRP composite – carbon fiber |
| F03 | FRP composite – glass fiber |
| FX | FRP composite – other |
| I01 | Iron – cast |
| I02 | Iron – wrought |
| M01 | Masonry – block |
| M02 | Masonry – stone |
| P01 | Plastic - polyethylene |
| PX | Plastic - other |

## Specification Continued

continued...

| Code | Description |
|---|---|
| S01 | Steel - rolled shapes |
| S02 | Steel - welded shapes |
| S03 | Steel - bolted shapes |
| S04 | Steel - riveted shapes |
| S05 | Steel - bolted and riveted shapes |
| S06 | Steel - pipes |
| SX | Steel - other |
| T01 | Timber - glue laminated |
| T02 | Timber - nail laminated |
| T03 | Timber - solid sawn |
| T04 | Timber - stress laminated |
| TX | Timber - other |
| X | Other |

Submittal to SNBI will not report this item when B.SP.06 (Span Type) is a pipe (i.e. code P01 or P02).

w/errata#1 03/24

## Examples

Closed spandrel arch founded on cast-in-place concrete spread footings on rock. Report C01. Reinforced concrete full height cantilever abutment. Report C01.

Pile bent abutment with timber piles, timber lagging, and concrete cap. Report C01. Pile bent abutment with steel H-piles, timber lagging, and rolled steel cap. Report S01. Reinforced concrete stub abutment on steel piles with a MSE wall. Report C01.

GRS abutment with precast, prestressed concrete box beams placed directly on the reinforced soil mass. Report E01.

# Substructure Type

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSB04 | B.SB.04 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

## Specification

Record the abutment, pier, or bent design type using one of the following codes.

| Code | Description |
|---|---|
| 0 | None |
| A01 | Abutment – cantilever/wall |
| A02 | Abutment – stub |
| A03 | Abutment – open/spill through |
| A04 | Abutment – integral |
| A05 | Abutment – semi-integral |
| A06 | Abutment – gravity |
| A07 | Abutment – counterfort or buttressed |
| A08 | Abutment – pile bent with lagging |
| A09 | Abutment – crib |
| A10 | Abutment – cellular/vaulted |
| A11 | Abutment – reinforced soil mass |
| A12 | Abutment – footing or cap only |
| AX | Abutment – other |
| B01 | Bent – column or open |
| B02 | Bent – column with web wall |
| B03 | Bent – pile |
| B04 | Bent – straddle or c-shaped |
| BX | Bent - other |

Submittal to SNBI will not report this item when B.SP.06 (Span Type) is a pipe (i.e. code P01 or P02).

w/errata#1 03/24

## Specification Continued

continued...

| Code | Description |
|---|---|
| P01 | Pier – wall |
| P02 | Pier – single column |
| P03 | Pier – multiple column |
| P04 | Pier – multiple column with web wall |
| P05 | Pier – straddle or c-shaped |
| P06 | Pier – movable bridge |
| P07 | Pier – tower |
| P08 | Pier – footing only |
| PX | Pier – other |
| U | Unknown |
| X | Other |

## Substructure Type continued...

### Commentary

In cases where the substructure may have a combination of designs due to retrofitting actions, use the code for the predominant design.

Both piers and bents provide the same function; however, a pier has only one footing at each substructure unit (the footing may serve as a pile cap) while a bent has several footings or no footing, as is the case with a pile bent.

Use code 0 when the superstructure rests directly on the foundation (i.e. on unreinforced soil or bedding material, reinforced soil or bedding material, or rock).

Use codes A01 to A10, as appropriate, if the superstructure load is supported by a substructure unit, which is in turn supported by piles or the reinforced soil mass. Use code A11 when the superstructure rests directly on the reinforced soil mass.

Use code A02 for partial height abutments that do not extend to near the bottom of the embankment fill. Use code A02 for abutments that are larger height than a pile cap or have features such as a backwall that exceed the purpose of a pile cap.

Use code A10 when the space between wingwalls, abutment stem, approach slab, and footings is hollow.

Use code A12 or P08 when the superstructure rests only on a footing, grade beam, thrust block, or pile or shaft cap with embedded piles or shafts that are not part of a bent.

Use code B04 when a highway or railroad passes directly beneath or through the bent.

Use code P06 for piers that support movable bridges and the equipment needed to open and close the bridge.

Use code P07 for towers of complex bridges such as cable-stayed and suspension bridges.

### Examples

Reinforced concrete full-height cantilever abutment. Report A01.

Reinforced concrete stub abutment on steel piles with a MSE wall. Report A02.

Pile bent type abutment with painted steel piles, timber lagging, and steel cap. Report A08.

Single-span closed spandrel arch that bears directly on a thrust block founded on rock. Report A12.

Single-span timber beams resting on concrete grade beam. Report A12. Single-span railroad flat car with ends resting on unreinforced soil. Report 0.

Intermediate bent supported on concrete-filled steel pipe piles connected with a concrete cap beam. Report B03.

Reinforced concrete pier wall widened with a single reinforced concrete column. This bridge has two substructure data sets.

- Report P01 for the pier data set.
- Report P02 for the widening data set.

Reinforced concrete pier with three concrete columns on concrete footing/pile cap. Report P03.

# Substructure Protective System

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSB05 | B.SB.05 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

## Specification

Record the substructure protective system using one of the following codes.

| Code | Description |
|---|---|
| 0 | None |
| A01 | Admixture – internally sealed |
| A02 | Admixture – low permeability |
| A03 | Admixture – polymer impregnated |
| A04 | Admixture – corrosion inhibitor |
| A05 | Admixture – ASR inhibitor |
| AX | Admixture – other |
| C01 | Coating – paint |
| C02 | Coating – sealer |
| C03 | Coating – methacrylate |
| C04 | Coating - hot dip galvanizing |
| C05 | Coating - metalizing/thermal spray |
| CX | Coating – other |
| E01 | Encasement - concrete |
| EX | Encasement - other |
| P01 | Patina – weathering steel |
| S01 | Sacrificial – cathodic, passive |
| S02 | Sacrificial – cathodic, active |
| SX | Sacrificial – other |
| T01 | Treated – Timber preservative |
| U | Unknown |
| X | Other |

**Submittal to SNBI** will not report this item when Item B.SB.04 (Substructure Type) is 0. Submittal to SNBI will not report this item when B.SP.06 (Span Type) is a pipe (i.e. code P01 or P02).

## Commentary

Code this item consistent with the predominant material reported in Item

B.SB.03 (Substructure Material).

In cases where the substructure may have a combination of protective systems, use the code for the predominant protective system based on protected area. In cases where multiple systems protect the same area, use the code for the outermost protective layer.

Use code 0 when the substructure is unprotected.

Use code 0 when unprotected steels either never were coated or currently have no signs of coating systems and have no protective systems, such as, cathodic protection or weathering chemistry.

Anti-graffiti coatings are not considered when coding this item.

Use code C01 for weathering steel that has been painted.

Use code C02 for sealers such as silanes, siloxanes, linseed oils, etc.

Use code E01 for steel piles of pile bents that are encased in concrete.

Use code P01 only for weathering grades of steel.

For timber, use code T01 for oil-based or water-borne timber preservatives. Use code C01 for paints and stains.

w/errata#1 03/24

## Examples

Painted weathering steel pier cap. Report C01.
Pile bent with preservative treated timber piles and concrete cap sealed with siloxane. Report C02.
Pile bent type abutment with painted steel H-pile foundation, timber lagging, and reinforced concrete cap with active cathodic protection. Report S02.

# Foundation Type

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSB06 | B.SB.06 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

## Specification

Record the substructure protective system using one of the following codes.

| Code | Description |
|---|---|
| 0 | None |
| E01 | Earth – reinforced soil |
| E02 | Earth – unreinforced soil |
| E03 | Rock |
| F01 | Footing – not on rock |
| F02 | Footing – on rock |
| F03 | Footing – on reinforced soil |
| P01 | Pile – steel H-shape |
| P02 | Pile – steel pipe |
| P03 | Pile – concrete, cast-in-place |
| P04 | Pile – prestressed concrete |
| P05 | Pile – timber |
| P06 | Coating – other |
| P07 | Pile – micropile |
| P08 | Pile – composite |
| P09 | Pile – FRP composite |
| PX | Pile – other |
| S01 | Drilled shaft – single |
| S02 | Drilled shafts – multiple |
| S03 | Caisson |
| U | Unknown |
| X | Other |

**Submittal to SNBI** will not report this item when Item B.SB.04 (Substructure Type) is 0. Submittal to SNBI will not report this item when B.SP.06 (Span Type) is a pipe (i.e. code P01 or P02).

w/errata#1 03/24

## Commentary

In cases where the substructure has a combination of foundations due to retrofitting actions, use the code for the predominant foundation.

Do not consider localized repairs to original foundation types when reporting this item.

Use code E01 when the superstructure bears directly on reinforced soil, reinforced bedding material, or the reinforced soil mass. Use code E02 when the superstructure bears directly on unreinforced soil or unreinforced bedding material. Use code E03 when the superstructure bears entirely on rock.

Use codes F01 to F03, for footings or when the substructure bears directly on ground at grade or below grade, e.g. grade beams, floor slabs, gravity walls, crib walls, etc.

Use code F02 only if the design plans, or subsequent subsurface investigation, indicate that the entire foundation is supported by rock.

Use code F03 if the superstructure load is supported by a substructure unit, which is in turn supported by the reinforced soil mass.

Use code P02 for filled or unfilled steel pipe piles.

Use code P03 for cased and uncased cast-in-place concrete piles, and for driven corrugated, fluted, or spiral-welded shell-cased concrete piles.

Use code P04 for solid or hollow-core square, octagonal, or cylindrical piles.

Use code P06 for piles that have concrete or grout placed by pumping through the stem of the auger pipe as the auger is withdrawn. (continued..)

## Foundation Type continued...

### Commentary Continued

Use code P07 for small diameter piles, typically less than 12 inches, that are drilled, then grouted.

Use code P08 for piles in which the length is composed of two or more pile types or materials, excluding pile tips.

Use code P09 when FRP composite piles are used for construction but not as repairs to existing piles of a different type.

Use codes S01 and S02 for cased or uncased drilled shafts.

Use code S03 for footings sunk into position by excavation through or beneath the caisson structure.

### Examples

Three-sided concrete frame culvert with a spread footing keyed into bedrock, modified by adding a four-sided box culvert placed on crushed stone bedding to the end of the barrel to widen the culvert. This culvert has two substructure data sets.

- Report F02 for the three-sided concrete frame culvert data set.
- Report F01 for the four-sided box culvert data set.

Three-sided concrete frame culvert with steel H-pile foundation, modified by adding a four-sided box culvert with steel H-pile foundation to the end of the barrel to widen the culvert. This culvert has two substructure data sets.

- Report P01 for the three-sided concrete frame culvert data set. (B.SB.01=A01).
- Report P01 for the four-sided box culvert data set. (B.SB.01=W01).

Closed spandrel arch founded on spread footings on bedrock. Report F02.

Pile bent abutment with steel H-piles, timber lagging, and rolled steel cap. Report P01. Reinforced concrete stub abutment on steel H-piles with an MSE wall. Report P01.

Precast, reinforced concrete arch structure constructed on cast-in-place concrete footing with steel H-pile foundation. Report P01.

Pile bent abutment with timber piles, timber lagging, and concrete cap. Report P05.

GRS abutment with precast, prestressed concrete box beams placed directly on the reinforced soil mass. Report E01.

Four corrugated steel circular pipes placed on crushed stone bedding. Do not report this item.

w/errata#1 03/24

# Foundation Protection System

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(3) | AN(3) | I | BSB07 | B.SB.07 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

## Specification

Report the foundation protective system using one of the following codes.

| Code | Description |
|---|---|
| 0 | None |
| A01 | Admixture – internally sealed |
| A02 | Admixture – low permeability |
| A03 | Admixture – polymer impregnated |
| A04 | Admixture – corrosion inhibitor |
| A05 | Admixture – ASR inhibitor |
| AX | Admixture - other |
| C01 | Coating – paint |
| C02 | Coating – sealer |
| C03 | Coating – methacrylate |
| C04 | Coating - hot dip galvanizing |
| C05 | Coating - metalizing/thermal spray |
| CX | Coating – other |
| E01 | Encasement - concrete |
| EX | Encasement – other |
| P01 | Patina - uncoated weathering steel |
| S01 | Sacrificial – cathodic, passive |
| S02 | Sacrificial – cathodic, active |
| SX | Sacrificial – other |
| T01 | Treated - timber preservative |
| U | Unknown |
| X | Other |

**Submittal to SNBI** will not report this item when Item B.SB.04 (Substructure Type) is 0. Submittal to SNBI will not report this item when B.SP.06 (Span Type) is a pipe (i.e. code P01 or P02).

w/errata#1 03/24

## Commentary

Code this item consistent with the predominant material reported in Item B.SB.06 (Foundation Type).

In cases where the foundation may have a combination of protective systems, use the code for the predominant protective system based on protected area. In cases where multiple systems protect the same area, use the code for the outermost protective layer.

Use code 0 when the foundation is unprotected.

Use code 0 when unprotected steels either never were coated or currently have no signs of coating systems and have no protective systems, such as cathodic protection or weathering chemistry.

Anti-graffiti coatings are not considered when coding this item.

Use code C02 for sealers such as silanes, siloxanes, linseed oils, etc.

Use code E01 for steel piles of pile bents that are encased in concrete.

Use code P01 only for weathering grades of steel.

For timber, use code T01 for oil-based or water-borne timber preservatives. Use code C01 for paints and stains.

| Foundation Protection System continued... |
|---|
| **Examples** |
| Closed spandrel arch founded on spread footings on bedrock. Report 0. |
| Pile bent abutment with timber piles treated with creosote, timber lagging, and concrete cap. Report T01. |
| Pile bent with painted steel H-piles and rolled steel cap. Report C01. |
| GRS abutment with precast, prestressed concrete box beams placed directly on the reinforced soil mass. Report 0. |
| Three-sided concrete frame culvert with a spread footing keyed into bedrock, modified by adding a four-sided box culvert placed on crushed stone bedding to the end of the barrel to widen the bridge. The four-sided box was constructed with high performance concrete that provides for low permeability. |
| Report 0 for the three-sided concrete frame culvert data set. |
| Report A02 for the four-sided box culvert data set. |
| Precast, reinforced concrete arch bridge constructed on cast-in-place concrete footing with unpainted steel H-pile foundation. Report 0. |

## *Roadside Hardware*

The data items in this subsection identify crash tested roadside hardware on the bridge. These data items are considered part of the Primary Data Set and have a one-to-one relationship with a bridge.

The data for these items typically remain static once a bridge has been inventoried. The following data items are included in this subsection.

| Item ID | Data Item |
|---|---|
| B.RH.01 | Bridge Railings (Crash Test) |
| B.RH.02 | Bridge Railings Transitions (Crash Test) |

Roadside hardware is commonly associated with bridges and serves as a traffic safety feature to redirect errant vehicles and reduce crash severity. The items in this subsection are inventoried to indicate if hardware at the bridge is required, present, or has been crash tested. Do not consider the condition of the hardware when reporting these items.

Table 6 contains the applicable crash testing codes used for all the roadside hardware items in this subsection. The applicable code may be based on an approved analytical equivalency evaluation.

Refer to the FHWA Office of Highway Safety website for policy and guidance on roadside hardware (https://highways.dot.gov/safety/rwd/reduce-crash-severity). Also, refer to the Task Force 13 – Hardware Guide website for roadside hardware, systems specifications, and individual component details.

The AASHTO LRFD Bridge Design Specifications are currently used to design bridge railings. The AASHTO Manual for Assessing Safety Hardware (MASH), which replaces NCHRP Report 350, is currently used for testing and evaluating the safety performance of roadside hardware.

The AASHTO Roadside Design Guide addresses appropriate bridge railings, roadside barriers, barrier end treatments, and crash cushions

| Year Built Range | Table 6 Roadside Hardware Codes | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Code | Test Level Code | | | | | | Description |
| | | 1 | 2 | 3 | 4 | 5 | 6 | |
| Any | N | - | - | - | - | - | - | Not applicable – roadside hardware is not required. |
| 2010 - Present | - | MYY1 | MYY2 | MYY3 | MYY4 | MYY5 | MYY6 | Roadside hardware successfully crash-tested for AASHTO MASH. |
| 1993-2009 | - | 3501 | 3502 | 3503 | 3504 | 3505 | 3506 | Roadside hardware successfully crash-tested for NCHRP Report 350. |
| Do Not Use | - | 2301 | 2302 | 2303 | - | - | - | Roadside hardware successfully crash-tested for NCHRP Report 230. |
| Do Not Use | - | 2391 | 2392 | 2393 | - | - | - | Roadside hardware successfully crash-tested for NCHRP Report 239. |
| Do Not Use | - | 891 | 892 | 893 | - | - | - | Roadside hardware successfully crash-tested for 1989 AASHTO Guide Specifications for Bridge Railings. |
| Do Not Use | X | - | - | - | - | - | - | Roadside hardware successfully crash-tested for other criteria. |
| 1931-1992 | AYY | - | - | - | - | - | - | Roadside hardware has not been crash-tested but meets AASHTO Standard Specifications for Highway Bridges. |
| Before 1931 | SYY | - | - | - | - | - | - | Roadside hardware has not been crash-tested but meets approved agency standards. |
| Any | I | - | - | - | - | - | - | Roadside hardware has not been crash-tested and does not meet approved agency standards. |
| Any | 0 (zero) | - | - | - | - | - | - | None - roadside hardware is required, but required roadside hardware is not present. |

Note that YY, for codes in Table 6, represents the last two digits of the year for the crash testing publication, AASHTO Specifications, or agency approved standards.

## Bridge Railings (Crash Test)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(4) | AN(4) | I | BRH01 | B.RH.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Code the crash-test level for the bridge railings using one of the codes in Table 6.<br><br>The following flowcharts and associated tables apply to WSDOT owned infrastructure.<br><br>These flowcharts and associated tables may be used by local agencies to manage their infrastructure if they choose. | This roadside hardware includes all types and shapes of bridge railings (parapets, median barriers, or structure mounted) located on the bridge or that cross over culverts.<br><br>Use the code that first applies going from the bottom (Code 0) of Table 6 to the top (MYY), if there are more than one type of bridge railing on the bridge. (continued..) |

**Commentary Continued**

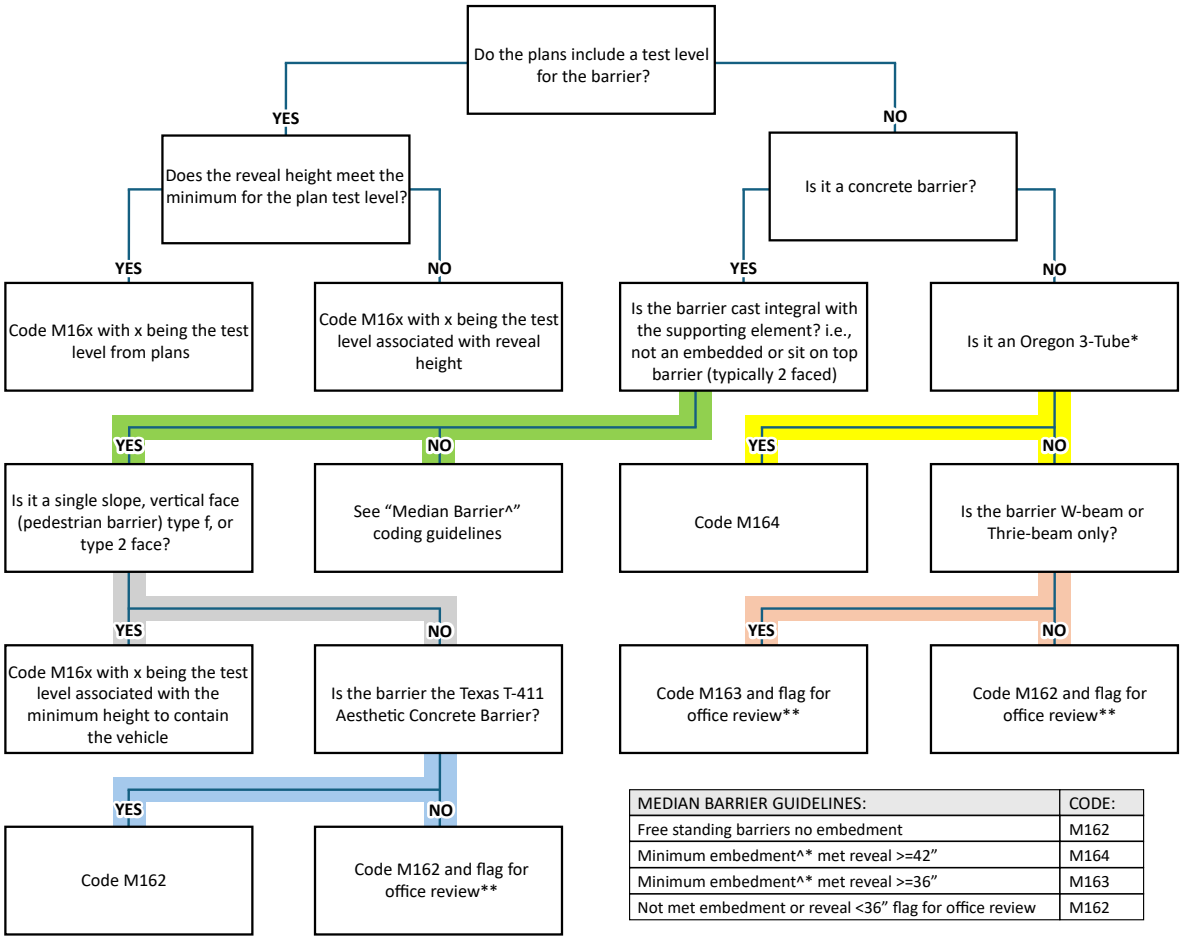
Unless other information is available, code as the test level in the plans with potential reduction based on reveal height not meeting minimum.

Barriers will be downgraded to a test level which meets the minimum height to contain the test level vehicle.

Notes: The minimum heights for each test level is defined by BDM section 10.2.1 and AASHTO BDS Table A13.2-1 with the BDM governing when in conflict.

Median barriers^ not cast integral with the structure should follow the Median Barrier guidelines on each page. The test level in the notes may not apply.

## Table BRH01a Structures Built 2010 to Current




| MEDIAN BARRIER GUIDELINES: | CODE: |
|---|---|
| Free standing barriers no embedment | M162 |
| Minimum embedment^* met reveal >=42" | M164 |
| Minimum embedment^* met reveal >=36" | M163 |
| Not met embedment or reveal <36" flag for office review | M162 |

Codes "N", "I" and "0 (zero)" should be used when appropriate (see Table 8)

## Table BRH01aa Minimum Rail Height To Contain Vehicle Built 2010 to Current

| Test Level | Min Height | Source |
|---|---|---|
| 1 | 27 | AASHTO BDS A13.2-1 |
| 2 | 27 | AASHTO BDS A13.2-1 |
| 3 * | 32 | WSDOT BDM |
| 4 | 36 | WSDOT BDM |
| 5 | 42 | WSDOT BDM |
| 6 | 90 | AASHTO BDS A13.2-1 |
| * 29" for vertical faced barrier | | |

All "YY" codes should be "16" unless a cable barrier system is employed

**CODE = MYYX:**
X = Test Levels 1-6 and YY = 2016*
(**cable barriers may be 2009, but all others will be 2016*)

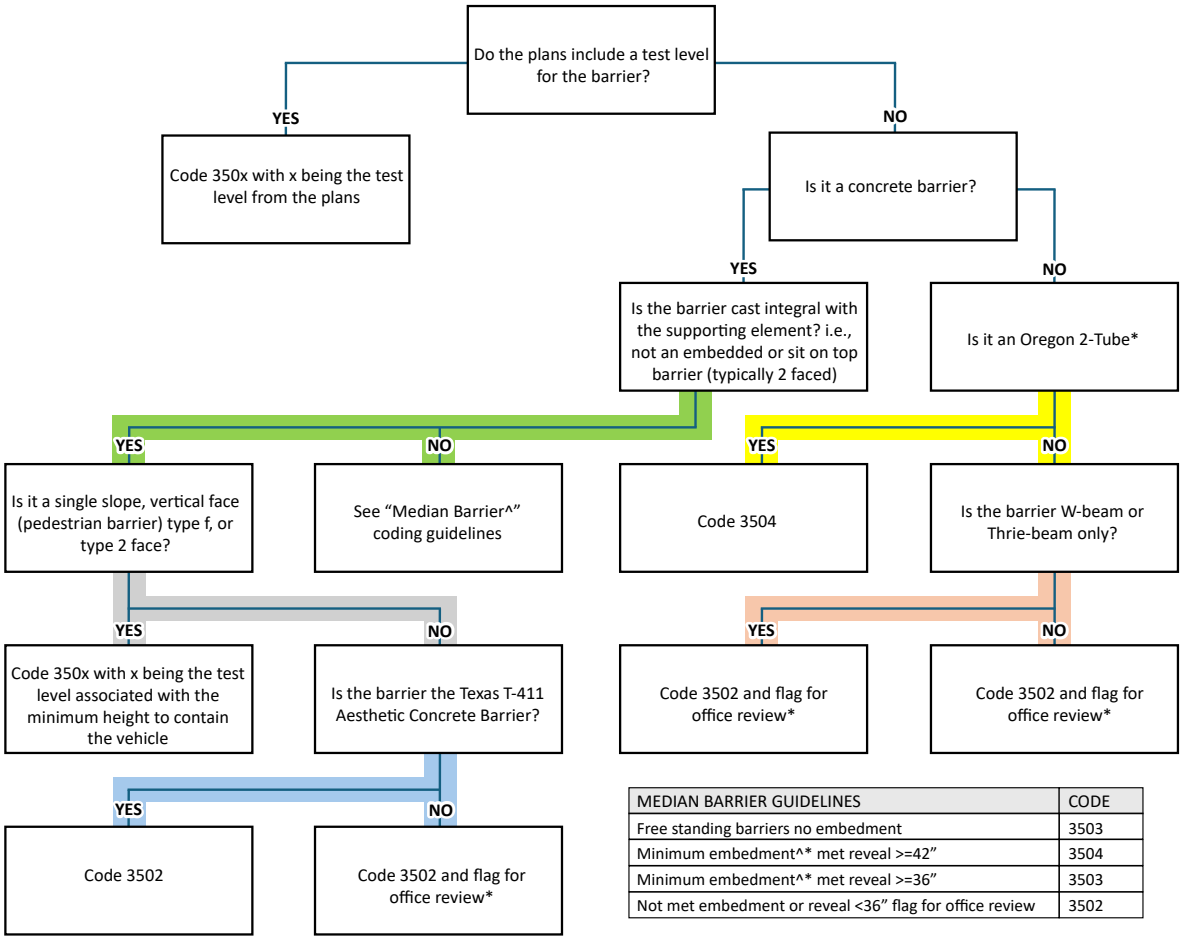
* modified Oregon 3 tube with a 4th tube code the same

** If there is a known barrier system or resolution, code accordingly and the skip office review

^ "Median Barriers" are at times used at edges of roadways

^* Minimum embedment is defined as 3" of concrete or HMA or 10" of roadway base course or compacted soil. If embedment is present minimum may be assumed as met.

## Table BRH01b Structures Built 1993 to 2009




| MEDIAN BARRIER GUIDELINES | CODE |
|---|---|
| Free standing barriers no embedment | 3503 |
| Minimum embedment^* met reveal >=42" | 3504 |
| Minimum embedment^* met reveal >=36" | 3503 |
| Not met embedment or reveal <36" flag for office review | 3502 |

Codes "N", "I" and "0 (zero)" should be used when appropriate (see Table 8)

## Table BRH01bb Minimum Rail Height To Contain Vehicle Built 1993 to 2009

| Test Level | Min Height | Source |
|---|---|---|
| 3501 | 27 | AASHTO BDS A13.2-1 |
| 3502 | 27 | AASHTO BDS A13.2-1 |
| 3503 | 27 | AASHTO BDS A13.2-1 |
| 3504 | 32 | AASHTO BDS A13.2-1 |
| 3505 | 42 | AASHTO BDS A13.2-1 |
| 3506 | 90 | AASHTO BDS A13.2-1 |

* If there is a known barrier system or resolution, code accordingly and skip the office review

^ "Median Barriers" are at times used at edges of roadways

^* Minimum embedment is defined as 3" of concrete or HMA or 10" of roadway base course or compacted soil. If embedment is present minimum may be assumed as met.

**Table BRH01c Structures Built 1992 to 1931**

Unless other information is available, code as the year of AASHTO SSHB which is applicable.

**CODE - AYY**

YY=Year of bridge built or other applicable year information if available

Test level and reveal height are not required for the coding of barriers in this age range. Record reveal height for inspection records.

Based upon the understanding of WSDOT and it's precursor organizations policy, all barrier systems are assumed to have been designed to AASHTO SSHB or equivalent WSDOT or precursor agency standards of the time. Use the AASHTO SSHB for this period unless other information is available. While some barriers built in this era have the potential to be compliant with crash tests to NCHRP this guide codes them per AASHTO SSHB.

Codes "N", "I" and "0 (zero)" should be used when appropriate (see Table 8)

**Table BRH01d Structures Built Prior to 1931**

Unless other information is available, code as not crash tested but meets approved agency standards with the year built as YY.

For this iteration of the coding guide use the year built of the structure, not the year built of a retrofit.

**CODE - SYY**

YY=Year of bridge built or other applicable year information if available

Test level and reveal height are not required for the coding of barriers in this age range. Record reveal height for inspection records.

Based upon the understanding of WSDOT and it's precursor organizations policy, all barrier systems are assumed to have been designed to agency standards from the time of construction.

Codes "N", "I" and "0 (zero)" should be used when appropriate (see Table 8)

**Table 8 Roadside Hardware Codes N, I and 0 (zero)**

| WSBIS Code | Description |
|---|---|
| N | Not applicable - Roadside safety hardware is not required |
| I | Roadside hardware has not been crash-tested and does not meet approved agency standards. |
| 0 (zero) | None - roadside hardware is required, but required roadside hardware is not present. |

## BRTC - Document Year (YYYY)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,0) | N(4,0) | I | WRH01 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

If crash code field BRH01 has YY then code the 4 digit year for the applicable specification shown in Table 6, otherwise leave blank

## Bridge Railings Transitions (Crash Test)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(4) | AN(4) | I | BRH02 | B.RH.02 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

| Specification | Commentary |
|---|---|
| Record the crash-test level for transition railings using one of the codes following tables:<br><br>For structures built between 2010 to Present, use Table BRH02a.<br><br>For structures built between 1993 to 2009, use Table BRH02b.<br><br>For structures built between 1992 to 1931, use Table BRH02c.<br><br>For structures built prior to 1931, use Table BRH02d.<br><br>Use code I when no information is known about the crash test level or an agency approved standard. Also, use code I when an overlay is applied to the deck/slab and the height no longer meets the original geometry requirements of the crash-tested transition.<br><br>Codes "N", "I" and "0 (zero)" should be used when appropriate (see Table 8).<br><br>For bridges with one-way traffic, and which a transition on the departure end of the bridge is not warranted (i.e. only a connection to develop the departure rail strength is warranted), the crash-test level of the departure end does not need to be reported when it is lower crash test level than the approach end.<br><br>w/FHWA errata#1 03/24 | This roadside hardware serves as the transition from the roadside approach railing to the bridge railing and is firmly attached and anchored to the bridge railing to provide sufficient tension in the transition rail upon impact.<br><br>Use the code that first applies going from the bottom (Code 0) of Table 6 to the top (MYY), if there are more than one type of transition.<br><br>A list of crash-tested transitions may be obtained from the FHWA Office of Highway Safety website at: https://highways.dot.gov/safety/rwd/reduce-crash-severity. |

# Bridge Railings Transitions (Crash Test)

## Examples

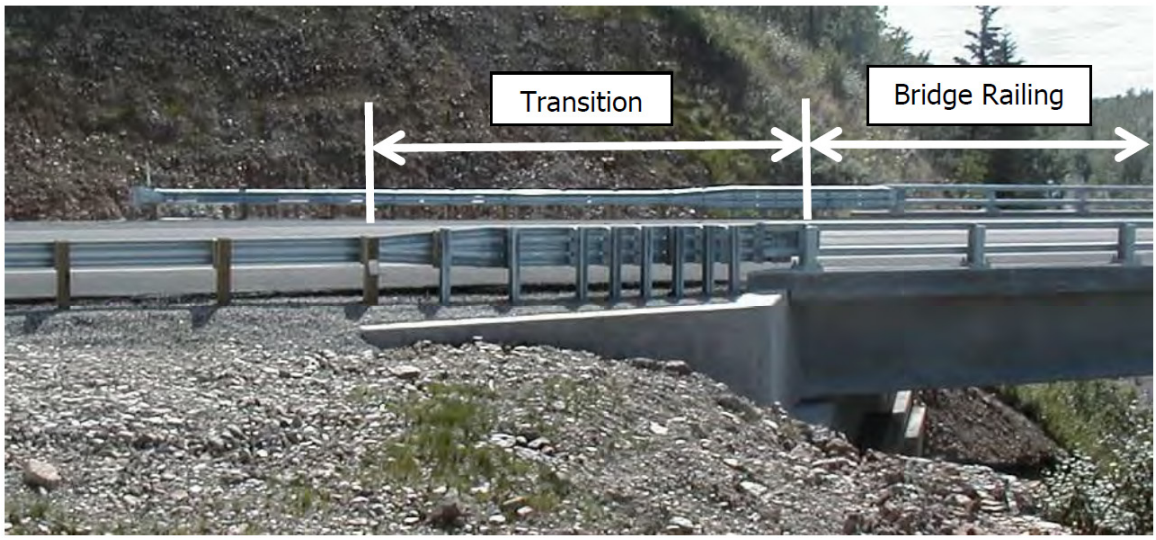



Figure 11. Metal bridge railing and transition. (Image Source: Alaska DOT)

Bridge built in 2009.

Bridge Rail successfully crash-tested for NCHRP 350 Test Level 4.

- Report 3504 for Item B.RH.01 (Bridge Rail Crash Test).

Bridge Rail reported as 3504.

- Report 3503 for Item B.RH.02 (Bridge Rail Transition Crash Test).

## Bridge Railings Transitions (Crash Test)

### Examples Continued

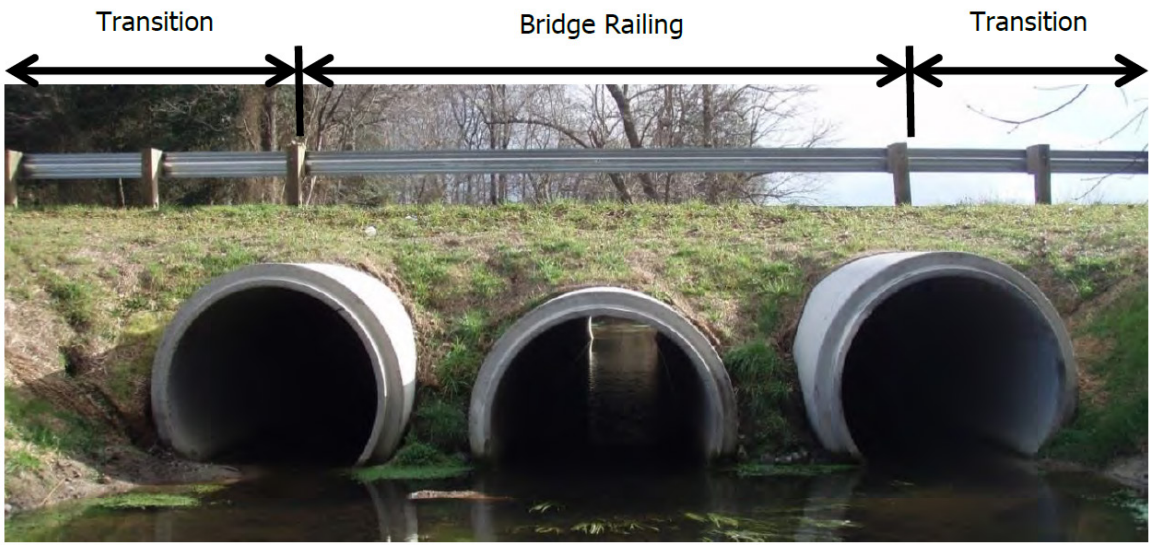



Figure 12. Metal bridge railing and transition for long-span application. (Image Source: Delaware DOT)

Bridge built in 2012.

Steel W-beam bridge rail with wood posts (long-span application):

- Report M162 for Item B.RH.01 (Bridge Railings (Crash Test) and flag for review

Steel W-beam transition with wood posts (long-span application). Rail reported in Item BRH01 as M162.

- Report M162 for Item B.RH.02 (Bridge Rail Transitions (Crash Test).

**Table BRH02a Bridge Railings Transitions (Crash Test) Built 2010 to Current**

| Test Level of Barrier | Test Level of Transition |
|---|---|
| 6 | 3 |
| 5 | 3 |
| 4 | 3 |
| 3 | 2 |
| 2 | 2 |
| 1 | 1 |
| If Bridge Railings (Crash Test) is coded M165, Code Bridge Railing Transition (Crash Test) M163 | |

**Table BRH02b Bridge Railings Transitions (Crash Test) Built 1993 to 2009**

| Test Level of Barrier | Test Level of Transition |
|---|---|
| 3506 | 3503 |
| 3505 | 3503 |
| 3504 | 3503 |
| 3503 | 3502 |
| 3502 | 3502 |
| 3501 | 3501 |
| If Bridge Railings (Crash Test) is coded M3505, Code Bridge Railing Transition (Crash Test) M3503 | |

**Table BRH02c Bridge Railings Transitions (Crash Test) Built 1992-1931**

| |
|---|
| When transitions are present and lacking other guidance - code the same as the barrier BRH01. |

**Table BRH02d Bridge Railings Transitions (Crash Test) Built prior to 1931**

| |
|---|
| When transitions are present and lacking other guidance - code the same as the barrier BRH01. |

## BRTCT - Document Year (YYYY)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,0) | N(4,0) | I | WRH02 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

If crash code field BRH02 has YY then code the 4 digit year for the applicable specification shown in Table 6, otherwise leave blank

# Load Rating Tab

## Design Load

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(8) | AN(8) | I | BLR01 | B.LR.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

### Specification

Code the live load for which the bridge was designed using one of the following codes.

| Code | Description |
|---|---|
| H10 | H-10 |
| H15 | H-15 |
| H20 | H-20 |
| HS15 | HS-15 |
| HS20 | HS-20 |
| HS20M | HS-20 and Military |
| HS20Plus | Greater than HS-20 |
| HL93 | HL-93 |
| HL93Plus | Greater than HL-93 |
| RR | Railroad |
| U | Unknown |
| X | Other |

### Commentary

For widened or rehabilitated bridges, code the most restrictive design load governing any portion of the bridge.

Use code HS20M when the bridge is designed to accommodate both the HS-20 and the alternate military load.

Use codes HS20Plus and HL93Plus when the HS-20 or HL-93 design load configuration is increased proportionally above that specified in the AASHTO design specifications.

Use code U when the design plans are not available and the likely design load cannot be inferred from design characteristics of the bridge or agency policy at the time the bridge was built.

A code other than U can be reported when design plans are not available, but the design load can be inferred from design characteristics of the bridge or agency policy at the time the bridge was built.

Use code X when the design load is known but is not based on AASHTO or railroad design load configurations.

w/FHWA errata#1 03/24

### Example - Design Load

A bridge designed for an HS-20 load is later widened. The widening is designed for the HL-93 load. Report HS20.

Per State design policy, a bridge is designed using LRFD, in which the truck load portion of the HL-93 load is increased by 25%. Report HL93Plus.

Per State design policy, a bridge is designed for the HL-93 design load, with further consideration of a State-defined permit vehicle. The permit vehicle controls the design of the superstructure. Report X.

# Design Method

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(4) | AN(4) | I | BLR02 | B.LR.02 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

## Specification

Code the method by which the bridge was designed using one of the following codes.

| Code | Description |
|---|---|
| ASD | Allowable Stress Design |
| LFD | Load Factor Design |
| LRFD | Load and Resistance Factor Design |
| U | Unknown |
| X | Other |

## Commentary

The codes describe the design methods used in accordance with AASHTO design specifications.

For widened or rehabilitated bridges, code the design method associated with the code in Item B.LR.01 (Design Load).

Use code U when the design plans are not available and the likely design method cannot be inferred from design characteristics of the bridge or agency policy at the time the bridge was built.

A code other than U can be reported when design plans are not available, but the design method can be inferred from design characteristics of the bridge or agency policy at the time the bridge was built.

## Example - Design Method

A bridge designed for an HS-20 load using Load Factor design is later widened. The widened portion is designed for the HL-93 load using Load and Resistance Factor design. Item B.LR.01 (Design Load) has code HS20 reported. Report LFD.

## Load Rating Date *(LR Date)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| YYYYMMDD | YYYYMMDD | I | BLR03 | B.LR.03 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Record the date of the most recent load rating.<br><br>Do not report this item if no rating analysis or evaluation has been performed.<br><br>**WSDOT Commentary:**<br><br>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. | This item reflects the date of the most recent calculation or reevaluation of the load rating.<br><br>The load rating may be performed independently and at a different date than the inspection.<br><br>Defects discovered during inspections that may impact the strength or serviceability of the bridge typically require reevaluation of the load rating. When reevaluation of the load rating is completed, report the date of the reevaluation for this item.<br><br>Refer to the following items when a new or updated load rating is completed:<br>• B.LR.04 (Load Rating Method)<br>• B.LR.05 (Inventory Load Rating Factor)<br>• B.LR.06 (Operating Load Rating Factor)<br>• B.LR.07 (Controlling Legal Load Rating Factor)<br>• B.LR.08 (Routine Permit Loads) |

**Examples - Load Rating Date**

Load rating calculations found in the bridge record are dated September 5, 1999. Report 19990905.

A bridge rated for an HS-20 load using Load Factor rating is later widened. The entire bridge is re-rated using Load and Resistance Factor rating on July 23, 2012. Report 20120723.

## Load Rating Method *(LR Method)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(4) | AN(4) | I | BLR04 | B.LR.04 | L.1 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the method used to calculate the load rating using one of the following codes in Table BLR04. | When different portions of a bridge are load rated using different methods, report the rating method associated with the controlling rating factor.<br><br>For information on applicable load rating methods, refer to the October 30, 2006 FHWA memorandum at: https://www.fhwa.dot.gov/bridge/nbis/10300 6.cfm.<br><br>For information on using code AR, refer to the September 29, 2011 FHWA memorandum at: https://www.fhwa.dot.gov/bridge/110929.cfm<br><br>For information on using code EJ, refer to the February 2, 2011 FHWA memorandum at: https://www.fhwa.dot.gov/bridge/110202.cfm |

**Example**

A bridge rated for an HS-20 load using Load Factor rating is later widened. The entire bridge is re-rated using Load and Resistance Factor rating. Report LRFR.

A steel truss bridge with steel beam approach spans originally rated using Allowable Stress Rating. The approach spans are re-rated using Load Factor Rating due to deterioration. The rating of the approach spans controls. Report LFR.

A bridge designed and checked using Load Factor Design and an HS-20 live load. The bridge meets the criteria stated in the September 29, 2011 FHWA memo and has an assigned load rating. Report AR.

A concrete bridge constructed in 1910 has no design plans. Load rating determined by a qualified engineer after field condition and live load history evaluation. Report EJ.

**Table BLR04 Load Rating Method Code**

| WSBIS/SNBI Code | SNTI Code | Description |
|---|---|---|
| LFR | 1 | Load Factor |
| ASR | 2 | Allowable Stress |
| LRFR | 3 | Load and Resistance Factor |
| LT | 4 | Load Testing |
| AR | A | Assigned Rating |
| EJ | 0 | Field Evaluation/Engineering Judgement |
| N | 5 | No Rating Performed |
| NA | N | Rating Not Applicable |

## Inventory Load Rating Factor

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,2) | N(4,2) | I | BLR05 | B.LR.05 | L.2 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the inventory load rating factor, truncated to the hundredth, for the standard AASHTO HS-20 or HL-93 loadings, whichever is applicable based on the method reported in Item B.LR.04 (Load Rating Method).<br><br>When temporary or supported conditions exist, as indicated in Item B.PS.01 (Load Posting Status), report the rating factor for the bridge including the temporary or supported conditions.<br><br>**Submittal to SNBI** will not report this item when no rating analysis or evaluation has been performed. | For LRFR, this is the rating factor for the design load rating at the inventory level of reliability using the HL-93 loading considering all applicable strength and serviceability limit states.<br><br>Refer to the AASHTO Manual for Bridge Evaluation for details of HS-20 and HL-93 loadings and limit states. |

**Example - Inventory Load Rating Factor**

A bridge has a calculated inventory load rating factor of 1.486. Report 1.48.

## Operating Load Rating Factor

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,2) | N(4,2) | I | BLR06 | B.LR.06 | L.3 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the operating load rating factor, truncated to the hundredth, for the standard AASHTO HS-20 or HL-93 loadings, whichever is applicable based on the method reported in Item B.LR.04 (Load Rating Method).<br><br>When temporary or supported conditions exist, as indicated in Item B.PS.01 (Load Posting Status), report the rating factor for the bridge including the temporary or supported conditions.<br><br>**Submittal to SNBI** will not report this item when no rating analysis or evaluation has been performed. | For LRFR, this is the rating factor for the design load rating at the operating level of reliability using the HL-93 loading considering all applicable strength and serviceability limit states.<br><br>Refer to the AASHTO Manual for Bridge Evaluation for details of HS-20 and HL-93 loadings and limit states. |

**Example - Operating Load Rating Factor**

A bridge has a calculated operating load rating factor of 1.679. Report 1.67.

## Controlling Legal Load Rating Factor

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,2) | N(4,2) | I | BLR07 | B.LR.07 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification**

This item is auto-calculated from the lowest value reported for B.EP.02, Legal Load Rating factors.

If Item WEP02 EV Included is coded Y, the values for EV2 and EV3 reported in B.EP.02 are included here.

## Routine Permit Loads

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(1) | AN(1) | I | BLR08 | B.LR.08 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

### Specification

Code the inspection type or scour monitoring performed using one of the following codes.

| Code | Description |
|---|---|
| A | Bridge carries routine permit loads. Load capacity is adequate for all routine permit loads approved for the route segment; no routine permit loads are restricted. |
| B | Bridge carries routine permit loads. Load capacity is adequate for some routine permit loads approved for the route segment, but some routine permit loads are restricted. |
| C | Bridge does not carry routine permit loads. Load capacity is inadeqate for all routine permit loads approved for the route segment. Routine permit loads are restricted from the bridge. |
| N | Bridge does not carry routine permit loads. Routine permit loads are not approved for the route segment. |

w/FHWA errata#1 03/24

### Commentary

This item is used to identify bridges where State routine permit loads must be considered in load rating and posting evaluations and to identify bridges where routine permit loads are restricted due to bridge load capacity limitations.

Agencies have varying policies for issuing routine permits, from not issuing routine permits to issuing various routine permits when these loads exceed State legal loads. Some agencies may utilize maps that indicate highways and bridges that are restricted to routine permit loads or that allow routine permit loads.

Use code A when all routine permit loads allowed to travel the route segment are also allowed to travel on the bridge.

Use code B when not all routine permit loads allowed to travel the route segment are allowed to travel on the bridge.

Use code C when all routine permit loads allowed to travel the route segment are restricted from the bridge.

Use code N when the agency does not issue routine permits or routine permit loads are not approved for the route segment that is carried by the bridge. (continued..)

## Routine Permit Loads continued...

### Examples

A State issues a routine permit for eleven vehicle configurations to travel segments of interstate routes throughout the State. A bridge is on an interstate route segment which all eleven configurations are allowed to cross the bridge. Report A.

A bridge is on a route segment that is included in a routine permit. The routine permit allows vehicles that do not exceed 55 tons and the limits of the Federal Bridge Formula B to travel the route segment, but the permit also restricts single unit vehicles exceeding State legal load from crossing the bridge. Report B.

A bridge is on State Route 10 and is posted for legal loads. Route 10 is included in a routine permit. The permit restricts the routine permit vehicles from crossing bridges that are posted for legal loads. Report C.

A State issues a routine permit for eleven vehicle configurations to travel segments of interstate routes throughout the State. A bridge is on an interstate route segment which is excuded from the permit and the route segment is not included in any other routine permit. Report N.

w/FHWA errata#1 03/24

## Reference Inspection Completion Date *(Old Item 2580)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WLR01 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

### Specification

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.

## Rated By *(Old Item 2582)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(16) | - | - | WLR02 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification**

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.

## Overloads

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Numeric | - | - | WLR09 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification**

Code the rating factor for the overload configurations truncated to the nearest hundredth.

OL-1 Single and OL-2 Single are reported when the load rating considered the overload configurations in a single lane only with no other trucks on the bridge.

| Load Posting Status | | | | | |
|---|---|---|---|---|---|
| **Format** | **SNBI Format** | **Frequency** | **WSBIS Item ID** | **SNBI Item ID** | **SNTI Item ID** |
| AN(2) | AN(2) | I | BPS01 | B.PS.01 | L.4 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the load posting status of the bridge using one of the codes in Table BPS01. | When temporary or supported conditions exist ensure that data items related to physical characteristics of the bridge (e.g. geometry, clearances, condition, and load rating) represent those characteristics of the temporary or supported bridge.<br><br>When both a weight and other load restriction exist at the bridge, use the code for the weight restriction (code PP, TP, or SP). |

**Table BPS01 Load Posting Status Code**

| WSBIS/SNBI Code | SNTI Code | Description |
|---|---|---|
| PO | A | **P**ermanent bridge/tunnel **O**pen, no restriction |
| PA | B | **P**ermanent, **T**emporary, or **S**hored bridge/tunnel with posting recommended but not implemented - **A**ction needed |
| TA | | |
| SA | | |
| PM | B | **P**ermanent, **T**emporary, or **S**hored bridge/tunnel with posting sign - **M**issing |
| TM | | |
| SM | | |
| PD | B | **P**ermanent, **T**emporary, or **S**hored bridge/tunnel with posting sign in place, but - re**D**uced posting recommended |
| TD | | |
| SD | | |
| SO | D | **S**hored bridge/tunnel (permanent or temporary) - **O**pen, no restriction, with shoring in place to prevent load posting. |
| TO | E | **T**emporary bridge/tunnel - **O**pen, no restriction, while permanent bridge/tunnel awaiting replacement or rehabilitation. |
| N | G | New bridge/tunnel - **N**ot opened to traffic |
| C | K | Permanent, Temporary, or Shored Bridge/tunnel - **C**losed to all traffic |
| PP | P | **P**ermanent, **T**emporary, or **S**hored bridge/tunnel - **P**osted with weight limit signs |
| TP | | |
| SP | | |
| PR | R | Permanent, Temporary, or Shored bridge/tunnel posted for other Restriction (speed, lane, one truck) to control loads. |
| TR | | |
| SR | | |

## Posting Status Change Date

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| YYYYMMDD | YYYYMMDD | I | BPS02 | B.PS.02 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Record the date the bridge entered the status reported in Item B.PS.01 (Load Posting Status). | For bridges entering posted status, it is preferable that the reported date represent the date on which signs were properly installed at the bridge. The date the load posting became legally enforceable can also be used for this item when the installation date is unknown. When neither the installation nor legal enforcement date are known, the date the posting was first documented to be in place can be used for this item. |

## Legal Load Configuration *(Configuration)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(15) | AN(15) | I | BEP01 | B.EP.01 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification**

Configurations included here represent the AASHTO, FHWA, State transportation department, Federal agency, or Tribal government defined legal load codes.

| Code | Description |
|---|---|
| 3 | AASHTO Type 3 |
| 3S2 | AASHTO Type 3S2 |
| 3-3 | AASHTO Type 3-3 |
| SU4 | AASHTO SU4 truck |
| SU5 | AASHTO SU5 truck |
| SU6 | AASHTO SU6 truck |
| SU7 | AASHTO SU7 truck |
| NRL | AASHTO Notional Rating Load |
| EV2 | FHWA Type EV2 emergency vehicle |
| EV3 | FHWA Type EV3 emergency vehicle |
| S01 | State-defined legal load WA-105 |
| F# | Federal-defined legal load (WSDOT does not use) |
| T# | Tribal-defined legal load (WSDOT does not use) |

## Legal Load Rating Factor

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N(4,2) | N(4,2) | I | BEP02 | B.EP.02 | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | |
|---|---|
| Record the rating factor for the legal load configuration truncated to the hundredth.<br><br>Record the rating factor for the legal load configuration without consideration of reduced force effects from postings or restrictions that affect traffic operation, e.g. that limit speed, number of lanes, number of trucks, or do not allow commercial vehicles.<br><br>Do not report this item when a bridge posting includes the legal load configuration, but there is not a calculated legal load rating factor for the configuration.<br><br>When temporary or supported conditions exist, as indicated in Item B.PS.01 (Load Posting Status), report the rating factor for the bridge including the temporary or supported conditions. | For LRFR method this would be the rating factor of "Legal Load Rating".<br><br>For Allowable Stress and Load Factor rating methods this would be the operating rating factor.<br><br>When the legal load configuration does not have a load rating evaluation because it is enveloped by a design load type and corresponding calculated design load rating factor, a value is not reported for the legal load configuration.<br><br>Enveloped as used here means that the legal load rating factor or the operating rating factor for the legal load configuration will be greater than or equal to 1.0 when the design load has a legal load rating factor or operating rating factor that exceeds a threshold value established by an engineering study.<br><br>When the legal load configuration does not have a load rating evaluation because it is enveloped by a screening level legal load model, e.g. AASHTO Notional Rating Load, and corresponding calculated screening load rating factor, a value is not reported for the legal load configuration. A value is reported for the screening load.<br><br>A bridge has a calcuated legal load rating factor of 1.429 for State defined legal load S-NRLSHV which is the unique idenitifier code for the State's screening level legal load configuration for special hauling vehicles that are different than the AASHTO special hauling vehicles. Report 1.42 for the S-NRLSHV. (continued..) |

## Legal Load Rating Factor

**Commentary Continued**

Enveloped as used here means that the legal load rating factor or the operating rating factor for the legal load configuration will be greater than or equal to 1.0 when the screening level legal load has a legal load rating factor or operating rating factor that exceeds a threshold value established by an engineering study.

A bridge has a calculated legal load rating factor of 0.926 for the AASHTO Type 3S2 load. Report 0.92.

A bridge does not have a calculated legal load rating factor for the AASHTO SU4 truck because the AASHTO Notional Rating Load has a legal load rating factor of 1.21 which is greater than 1.0. Report 1.21 for the AASHTO Notional Rating Load. Do not report a value for the AASHTO SU4 truck.

## Posting Type *(Actual Posting Type)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(17) | AN(17) | I | BEP03 | B.EP.03 | L.5,L.6 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Record the type of posting at the bridge restricting the vehicle reported in Item B.EP.01 (Legal Load Configuration) using one or more of the following codes in Table BEP03.<br><br>Report multiple codes in the order shown separated by pipe ( \| ) delimiters.<br><br>**Submittal to SNBI** will not report this item if no posting sign is used for the legal load configuration. | This item is reported when a bridge is posted for the legal load configuration. Roadway postings are excluded. |

**Table BEP03 Posting Type Code**

| WSBIS/SNBI Code | SNTI Code | Description |
|---|---|---|
| G | L5 | Gross Load |
| A | L6 | Single Axle Load |
| D | L6 | Tandem Axle Load |
| T | L5 | Truck Load |
| C | - | No commercial vehicles |
| S | - | Speed reduction |
| L | - | Number of lanes restricted |
| V | - | Number of vehicles restricted |
| X | - | Other |

## Posting Value *(Actual Posting Value)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| AN(15) | AN(15) | I | BEP04 | B.EP.04 | L.7,L.8,L.9 |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the weight limit value(s) shown on the load posting sign for the vehicle reported in Item B.EP.02 (Legal Load Rating Factor) rounded down to the nearest U.S. ton.<br><br>Report multiple weight limit values in the order shown in Item B.EP.01 (Posting Type) separated by pipe ( \| ) delimiters.<br><br>Do not report this item if no posting sign is used for the legal load configuration.<br><br>Do not report this item if Item B.EP.03 (Posting Type) only has codes C, S, L, or V reported.<br><br>w/FHWA errata#1 03/24 | This item is reported when a bridge is posted. Roadway postings are excluded.<br><br>Multiple weight limit values are reported when a posting sign has more than one weight limit that restricts the legal load configuration, e.g. a single axle and tandem axle weight limit. |

**Table BEP04 Posting Value Code**

| WSBIS/SNBI Code | SNTI Code | Description |
|---|---|---|
| 3 | L7 | AASHTO Type 3 |
| 3S2 | L8 | AASHTO Type 3S2 |
| 3-3 | L9 | AASHTO Type 3-3 |
| SU4 | - | AASHTO SU4 truck |
| SU5 | - | AASHTO SU5 truck |
| SU6 | - | AASHTO SU6 truck |
| SU7 | - | AASHTO SU7 truck |
| NRL | - | AASHTO Notional Rating Load |
| EV2 | - | FHWA Type EV2 emergency vehicle |
| EV3 | - | FHWA Type EV3 emergency vehicle |
| S01 | - | State-defined legal load WA-105 |
| F# | - | Federal-defined legal load (WSDOT does not use) |
| T# | - | Tribal-defined legal load (WSDOT does not use) |

## EV Included

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WEP02 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

| Specification | Commentary |
|---|---|
| Code the EV Included using the following criteria:<br><br>**Code** — **Description**<br>Y — Yes, bridge is on an Interstate or within 1 access mile<br>* — Delete (bridge is not on an Interstate or within 1 access mile) | Emergency Vehicles are considered legal vehicles if the bridge is location on an Interstate or with 1 access mile of an interstate.<br><br>If this field is coded Y, rating factors are reported to the SNBI and emergency vehicles are considered in the coding of Item B.EP.02 - Legal Load Rating Factor and Item B.PS.01 - Posting Status. |

## Recommended Posting Type

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | WEP03 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification**

This field is populated by the Load Rating Engineer or based on the recommendation provided with a load rating.

See Posting Type Item B.EP.03 for specification/commentary.

## Recommended Posting Value (ton)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Numeric | - | - | WEP04 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 3 - Tunnels carrying roadways within**

**Specification**

This field is populated by the Load Rating Engineer or based on the recommendation provided with a load rating.

See Posting Value Item B.EP.04 for specification/commentary.

## Load Rating - Posting Examples

The following are weight limit signs and coding examples using common MUTCD and WSDOT Load Posting Signs.

1. If Item WEP02 EV Included is coded Y, then code the values as indicated in each table.

**Table PE01 MUTCD R12-1**

| Configuration | 3 | 3S2 | 3-3 | SU4 | SU5 | SU6 | SU7 | WA-105 | EV2[1] | EV3[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| BEP03 | G | G | G | G | G | G | G | G | G | G |
| BEP04 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |




**Table PE02 MUTCD R12-2**

| Configuration | 3 | 3S2 | 3-3 | SU4 | SU5 | SU6 | SU7 | WA-105 | EV2[1] | EV3[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| BEP03 | A | A | A | A | A | A | A | A | A | A |
| BEP04 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |




**Table PE04 MUTCD R12-4**

| Configuration | 3 | 3S2 | 3-3 | SU4 | SU5 | SU6 | SU7 | WA-105 | EV2[1] | EV3[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| BEP03 | G \| A | G \| A | G \| A | G \| A | G \| A | G \| A | G \| A | G \| A | G \| A | G \| A |
| BEP04 | 10 \| 1 | 10 \| 1 | 10 \| 1 | 10 \| 1 | 10 \| 1 | 10 \| 1 | 10 \| 1 | 10 \| 1 | 10 \| 1 | 10 \| 1 |



**Table PE05 MUTCD R12-5**

| Configuration | 3 | 3S2 | 3-3 | SU4 | SU5 | SU6 | SU7 | WA-105 | EV2[1] | EV3[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| BEP03 | T | T | T | - | - | - | - | - | T | T |
| BEP04 | 8 | 12 | 16 | - | - | - | - | - | 8 | 8 |

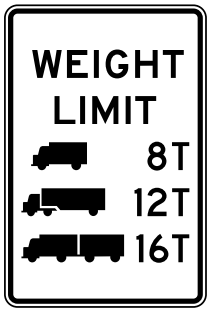



**Table PE06 MUTCD R12-6**

| Configuration | 3 | 3S2 | 3-3 | SU4 | SU5 | SU6 | SU7 | WA-105 | EV2[1] | EV3[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| BEP03 | T | T | T | T | T | T | T | - | T | T |
| BEP04 | 12 | 20 | 24 | 15 | 15 | 18 | 18 | - | 12 | 12 |

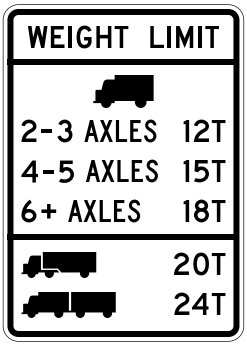



**Table PE07 MUTCD R12-7 & R12-7aP**

| Configuration | 3 | 3S2 | 3-3 | SU4 | SU5 | SU6 | SU7 | WA-105 | EV2[1] | EV3[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| BEP03 | - | - | - | - | - | - | - | | G\|A | G\|A\|D |
| BEP04 | - | - | - | - | - | - | - | | 43\|12 | 43\|12\|26 |

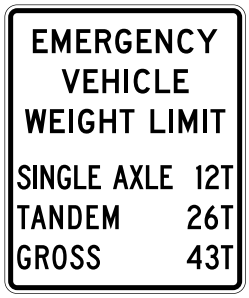





**Table PE701 MUTCD R12-701**

| Configuration | 3 | 3S2 | 3-3 | SU4 | SU5 | SU6 | SU7 | WA-105 | EV2[1] | EV3[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| BEP03 | - | - | - | - | - | - | - | - | A\|D | A\|D |
| BEP04 | - | - | - | - | - | - | - | - | 13\|17 | 13\|17 |

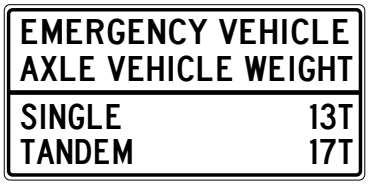



**Table PE702 MUTCD R12-702**

| Configuration | 3 | 3S2 | 3-3 | SU4 | SU5 | SU6 | SU7 | WA-105 | EV2[1] | EV3[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| BEP03 | - | - | - | - | - | - | - | - | - | D |
| BEP04 | - | - | - | - | - | - | - | - | - | 17 |




**Table PESuvS Single Unit Vehicles (SUV) - Single Configuration**

| Configuration | 3 | 3S2 | 3-3 | SU4 | SU5 | SU6 | SU7 | WA-105 | EV2[1] | EV3[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| BEP03 | T | - | - | - | - | - | - | - | T | T |
| BEP04 | 7 | - | - | - | - | - | - | - | 7 | 7 |




**Table PESuvL Single Unit Vehicles (SUV) - Limited Configuration**

| Configuration | 3 | 3S2 | 3-3 | SU4 | SU5 | SU6 | SU7 | WA-105 | EV2[1] | EV3[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| BEP03 | T | - | - | T | T | T | T | - | T | T |
| BEP04 | 7 | - | - | 12 | 12 | 12 | 12 | - | 7 | 7 |

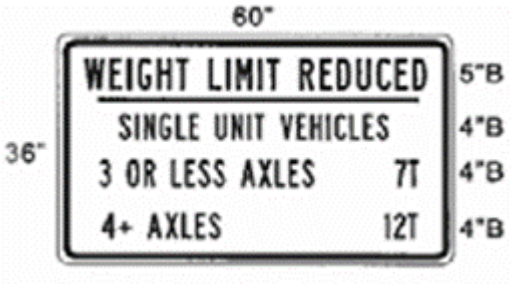
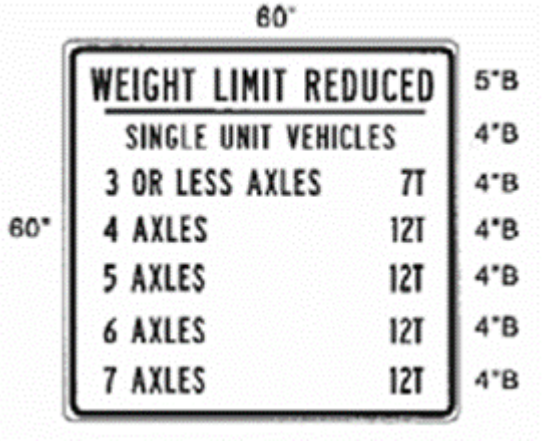


**Table PESuvA Single Unit Vehicles (SUV) - All Configuration**

| Configuration | 3 | 3S2 | 3-3 | SU4 | SU5 | SU6 | SU7 | WA-105 | EV2[1] | EV3[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| BEP03 | T | - | - | T | T | T | T | - | T | T |
| BEP04 | 7 | - | - | 12 | 12 | 12 | 12 | - | 7 | 7 |



# Waterway Tab

## WSBIS Item 7832 – Water Type — Pulldown

**Applicable Structure Types**

- **Type 1 - Local Agency Bridges & culverts carrying public roadways**

This field describes the type of water the bridge crosses over.

B Brackish (a mixture of fresh and salt water).
F Fresh water.
S Salt water.
T Tidal.

Leave blank if not over water.

## WSBIS Item 7833 – Flood Plain Intrusion — Pulldown

**Applicable Structure Types**

- **Type 1 - Local Agency Bridges & culverts carrying public roadways**

This code indicates whether or not the structure's approach roadway or abutment intrude into the flood plain of the waterway (i.e., whether or not previous or possible flooding could cause or has caused water to rise so it touches the structure's approach roadway embankment or abutment).

A No intrusion into the flood plain.
B Bridge or approaches intrude into the waterway causing minor backwater.
C Overtopping of approach roadway has occurred.
D A portion of the superstructure has been under water.
U Flood plain intrusion is unknown.

Leave blank if not over water.

## WSBIS Item 7834 – Flood Control — Pulldown

**Applicable Structure Types**

- **Type 1 - Local Agency Bridges & culverts carrying public roadways**

This field indicates if there is any existing type of flood control on the waterway under the bridge. To be considered, this flood control must be in place either upstream or downstream from the bridge and must be near enough to have an effect on the bridge. Flood control may be provided by dams, dikes, fill, or other means.

B Both upstream and downstream.
U Upstream.
D Downstream.
N No flood control.

Leave blank if not over water.

## WSBIS Item 7835 – Scour History — Pulldown

**Applicable Structure Types**

- **Type 1 - Local Agency Bridges & culverts carrying public roadways**

This code describes scour conditions at the bridge site.

C Current scour problems.
H History of scour problems but scour conditions are now stable.
N No history of scour.
U Scour history is unknown.

Leave blank if not over water.

## WSBIS Item 7836 – Streambed Material Type — Pulldown

**Applicable Structure Types**

- **Type 1 - Local Agency Bridges & culverts carrying public roadways**

This code describes the composition of the streambed at the bridge site.

Enter one of the following codes to indicate the predominant type of material that is evident.

1 Bedrock
2 Sediment
3 Gravel
4 Sand
5 Cobbles
6 Lined Canal
7 Vegetation
8 Alluvial Fan
9 Unknown

Leave blank if not over water.

## WSBIS Item 7837 – Substructure Stability — Pulldown

**Applicable Structure Types**

- **Type 1 - Local Agency Bridges & culverts carrying public roadways**

This code describes the type of material upon which the bridge's substructure rests. This code is used to determine the degree of stability that can be expected in the bridge substructure.

Code the lower number value If different sections of a continuous span bridge are supported by different materials.

1 Spread footing, simple spans.
2 Spread footing, continuous spans.
3 Pile foundation, simple spans.
4 Pile foundation, continuous spans.
5 Bedrock, simple spans.
6 Bedrock, continuous spans.
7 Unknown, simple spans.
8 Unknown, continuous spans

Leave blank if not over water.

## WSBIS Item 7838 – Waterway Obstruction — Pulldown

**Applicable Structure Types**

- **Type 1 - Local Agency Bridges & culverts carrying public roadways**

This code indicates any conditions in the waterway which affect the flow of water beneath the bridge.

| | |
|---|---|
| A | Debris accumulates at the bridge. |
| B | Ice accumulates at the bridge. |
| C | The waterway is overgrown with vegetation. |
| D | A and C above. |
| E | A and B above. |
| F | B and C above. |
| G | A, B, and C above. |
| N | No obstruction to the flow of water beneath the bridge. |

Leave blank if not over water.

## WSBIS Item 7839 – Streambed Stability — Pulldown

**Applicable Structure Types**

- **Type 1 - Local Agency Bridges & culverts carrying public roadways**

This code describes any existing stream conditions which may influence scour at the bridge site.

| | |
|---|---|
| A | Sharp bends. |
| B | Significant lateral shifts. |
| C | Steep slopes. |
| D | High water velocity. |
| E | Degradation. |
| F | Aggredation. |
| G | No conditions influencing scour exist. |
| H | Streambed conditions are unknown. |

Leave blank if not over water.

## WSBIS Item 7840 – Streambed Anabranch — Pulldown

**Applicable Structure Types**

- **Type 1 - Local Agency Bridges & culverts carrying public roadways**

This field indicates whether or not confluences or shifting anabranches are present in the waterway. A confluence is a flowing together of two or more streams. An anabranch is a river branch that re-enters the main stream, creating an island in the waterway.

Code only those conditions which exist near the bridge site.

| | |
|---|---|
| A | Anabranches are present. |
| B | Both anabranches and confluences are present. |
| C | Confluences are present. |
| N | Neither anabranches nor confluences are present. |
| U | Waterway configuration is unknown. |

Leave blank if not over water.

## WSBIS Item 7841 – Piers in Water — Pulldown

**Applicable Structure Types**

- **Type 1 - Local Agency Bridges & culverts carrying public roadways**

This field contains the number of the structure's piers in the water at normal yearly high water.

If the bridge is inspected at low water, look for evidence that the piers or pile bents have been in the water.

| | |
|---|---|
| 0 | No piers in the water. |
| 1-9 | Number of piers in the water. |
| M | More than nine piers in the water. |

Leave blank if not over water.

# Auto-Generated Fields Section

This section is auto-generated for the SNBI and SNTI Items not maintained in Bridgeworks (WSBIS) but are reported to FHWA during submittal.

### SNBI Item BL01 - State Code / SNTI Item I.3

The Washington State Code is 530, and is created automatically for insertion in SNBI, SNTI reports. This data field is not maintained in the Washington State Bridge Inventory.

### SNTI 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 SNTI.

### SNTI Items N.1 through N.3 – Navigable Waterway Data

Washington State has no tunnels under navigable waters. These 3 fields are automatically reported as 0 to the SNTI.

### SNBI Items B.IR.01 – NSTM Inspection Required

This field is auto-generated based on field B.IE.01.

### SNBI Items B.IR.03 – Underwater Inspection Required

This field is auto-generated based on field B.IE.01.

### SNBI Items B.IR.04 – Complex Feature

This field is auto-generated based on field B.IE.01.

### SNBI Items B.C.13 – Lowest Condition Rating Code

This item is calculated by FHWA and is not required to be reported. The code for this item is the lowest condition rating code from the following items:

B.C.01 (Deck Condition Rating),B.C.02 (Superstructure Condition Rating), B.C.03 (Substructure Condition Rating), and B.C.04 (Culvert Condition Rating).

### SNBI Items B.IE.10 – Inspection Data Update Date

This field is automatically generated.when the updated data is released into the permanent record by the data steward.

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# *Appendix 2-D 1995 NBI Coding Guide Items Retained for Reference*

All the items in this appendix are Discontinued NBI Items from Bridgeworks (WSBIS) that are no longer reportable and have been retained for reference until all the SNBI fields have been coded. These items are still visible within the Bridgeworks application, but are no longer editable.

Items in this appendix will be removed from Bridgeworks (WSBIS) by January 2028.

## *SNBI Tab - Discontinued Items*

**WSBIS Item 1677 – Channel Protection Condition - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 61

**Applicable Structure Types**

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

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

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

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

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

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

**Table 1677 Channel Protection Condition Rating - NBI** *This item has been discontinued.*

| 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 1679 – Pier/Abutment Protection - NBI — Pulldown

*This item has been discontinued.*

NBI Item 111

### Applicable Structure Types

- **Bridges & culverts carrying public roadways**

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

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

**Table 1679 Pier/Abutment Protection Rating - NBI** *This item has been discontinued.*

| 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.

## *Appraisals*

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

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

**Table 4 Adequacy Appraisal Ratings - NBI** *This item has been discontinued.*

| 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, and 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 1680 – Scour Critical - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 113

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

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

**Table 1680 Scour Critical Rating - NBI** *This item has been discontinued.*

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

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

*This item has been discontinued.*

NBI Item 71

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

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

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

Remote – greater than 100 years
Occasional – 3 to 10 years
Slight – 11 to 100 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 - NBI** *This item has been discontinued.*

| WSBIS Item 1487 – Functional Class | | | Description |
|---|---|---|---|
| 01, 11, 12 | 02, 06, 07, 14, 16, 17 | 08, 09, 18, 19 | |
| Waterway Adequacy Appraisal Rating | | | |
| 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:

Bridges with scour records maintained by BPO must code this field as directed by the BPO Scour Engineer.

NBI Commentary:

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

**WSBIS Item 1661 – Alignment - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 72

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

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

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

This field should be blank for tunnels and pedestrian, RR and other non-vehicular structures over public roadways.

**Table 1661 - Appr. Roadway Alignment Appr. Rating - NBI** *This item has been discontinued.*

| WSBIS Code | Description |
|---|---|
| 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. |

## *Local Agency Appraisals*

**Drain Status** **DISCONTINUED** *(LP View Only)*

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | 7665 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

This code has been discontinued, please move any notes associated with this field to the appropriate note.

## Deck Scaling *DISCONTINUED* (LP View Only)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | 7666 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

This code has been discontinued, please move any notes associated with this field to the appropriate BMS Deck Element note.

## Deck Scaling Percent *DISCONTINUED* (LP View Only)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| N (2,0) | - | - | 7667 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

This code has been discontinued, please move any notes associated with this field to the appropriate BMS Deck Element note.

## Deck Rutting *DISCONTINUED* (LP View Only)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | 7669 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

This code has been discontinued, please move any notes associated with this field to the appropriate BMS Deck Element note.

## Deck Exposed Rebar *DISCONTINUED* (LP View Only)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | 7670 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

This code has been discontinued, please move any notes associated with this field to the appropriate BMS Deck Element note.

## Curb Condition *DISCONTINUED* (LP View Only)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | 7672 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

This code has been discontinued, please move any notes associated with this field to the appropriate BMS Rail or Sidewalk Element note.

## Sidewalk Condition *DISCONTINUED* (LP View Only)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | 7673 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

This code has been discontinued, please move any notes associated with this field to the appropriate BMS Sidewalk Element note.

## Paint Condition *DISCONTINUED* (LP View Only)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | 7674 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

This code has been discontinued, please move any notes associated with this field to the appropriate BMS Protective Coating Element note.

## Approach Condition *DISCONTINUED* (LP View Only)

| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
|---|---|---|---|---|---|
| Pulldown | - | - | 7681 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

This code has been discontinued, please move any notes associated with this field to the appropriate BMS Approach Roadway Impact Smart Flag note.

| Pier Protection Condition *DISCONTINUED* (LP View Only) | | | | | |
|---|---|---|---|---|---|
| Format | SNBI Format | Frequency | WSBIS Item ID | SNBI Item ID | SNTI Item ID |
| Pulldown | - | - | 7683 | - | - |

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**

**Specification**

This code has been discontinued, please move any notes associated with this field to the appropriate BMS Pier Protection Element (BMSE 707) note.

## *Bridge ID Tab - Discontinued Items*

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

*This item has been discontinued.*

NBI Item 6

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not cross over or under a public roadway**

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 - NBI** **AN(18)**

*This item has been discontinued.*

**NBI Item 7**

**NTI Item I.10**

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not cross over or under a public roadway**

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

Examples:

US 12
RAILROAD
MAIN STREET
PEDESTRIANS
ISRAEL RD

**WSBIS Item 1286 – Custodian - NBI**
*These items has been discontinued.* **AN(18)**
**NBI Item 21**
**NTI Item C.2**
**WSBIS Item 1019 - Owner - NBI**
*These items has been discontinued.*
**NBI Item 22**
**NTI Item C.1**

## Applicable Structure Types

- **All structure records**

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

### Table 1286 Custodian and Owner Coes - NBI

| 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 |

**WSBIS Item 1285 – Toll Code - NBI** **Pulldown**
*This item has been discontinued.*
**FHWA Item 20 – Toll**
**NTI Item C.4 - Toll**

**Applicable Structure Types**

- **Type 1 - Bridges & culverts carrying public roadways**
- **Type 2 - Pedestrian, RR and other non-vehicular structures over public roadways**
- **Type 3 - Tunnels carrying public roadways within**

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

**Table 1285 Toll Code - NBI** *This item has been discontinued.*

| 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 toll free and carries a toll free 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 1289 – Temporary Structure - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 103

**Applicable Structure Types**

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

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

**Table 1289 Temporary Structure Code - NBI** *This item has been discontinued.*

| 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 – Historical Significance (NRHP) - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 37

**Applicable Structure Types**

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

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

Use one of the following codes:

**Table 1292 Historical Significance (NRHP) - NBI** *This item has been discontinued.*

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

**WSBIS Item 1588 – Border Bridge Percent - NBI** **N(2,0)**

*This item has been discontinued.*

NBI Item 98B

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

Code a 2-digit number specifying the percentage of total deck area of the existing bridge that the neighboring State is responsible for funding.

Leave blank if the structure does not cross a state border.

**WSBIS Item 7296 – Historical Significance – Local Agency (LP view only)** **Pulldown**
*This item has been discontinued.*

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**Table 7296 Historical Significance - Local Agency** *This item has been discontinued.*

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

**WSBIS Item 7281 – Legislative District 1 (LP view only)** **N(2,0)**
*This item has been discontinued.*

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

**WSBIS Item 7283 – Legislative District 2 (LP view only)** **N(2,0)**
*This item has been discontinued.*

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not carry or cross over/under a public roadway**

## Geometry Tab - Discontinued Items

**WSBIS Item 1356 - Curb-to-Curb Width (feet) - NBI** **N(4,1)**

*This item has been discontinued.*

NBI Item 51

**Applicable Structure Types**

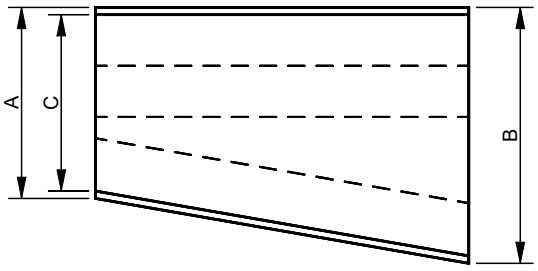
- **Bridges & culverts carrying public roadways**

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.

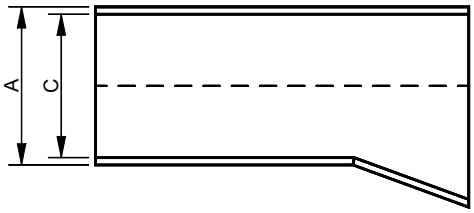
SNBI measurements for Curb_to_Curb Widths are enough different from this field that a separate field was created. This field can be used to populate the SNBI field in many cases, but thru trusses, thru arches, culverts, and cantilevered sidewalks are measured differently.

## Figure WSBIS 1356a



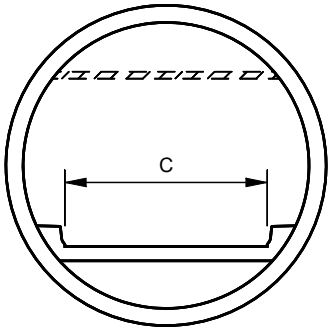

**OUT TO OUT = (A + B) / 2**
**CURB TO CURB = C**

**EXAMPLE 1**




**OUT TO OUT = A**
**CURB TO CURB = C**

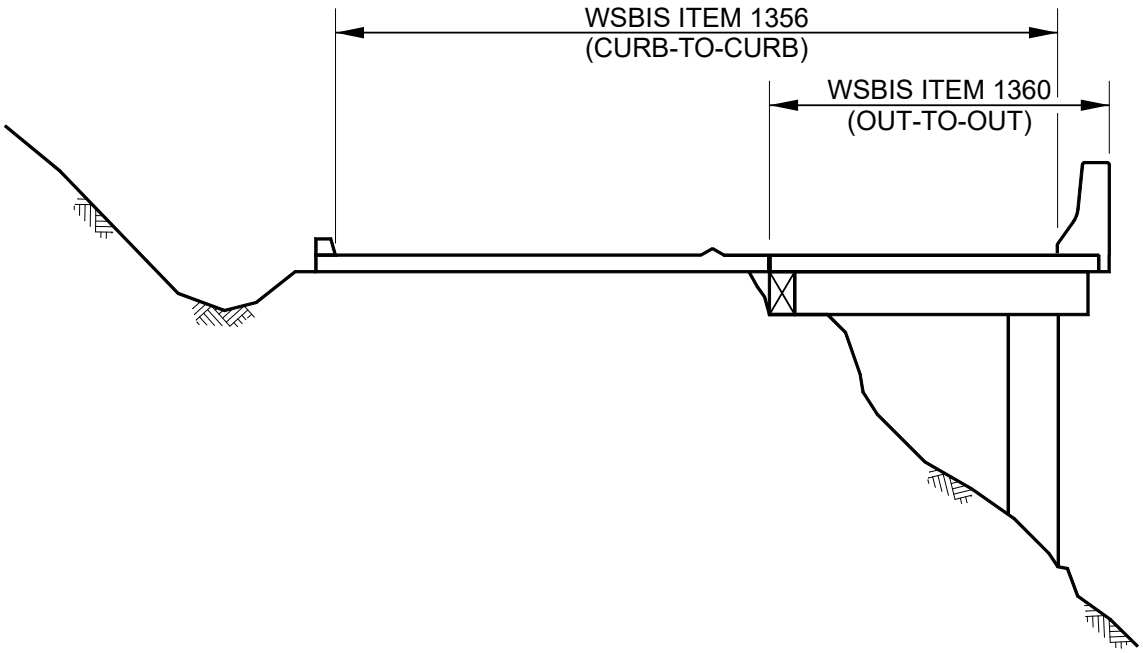
**EXAMPLE 2**




**CURB TO CURB = C**
**OUT TO OUT DOES NOT APPLY**

**EXAMPLE 3 (TUNNEL)**

## Figure WSBIS 1356b



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

*This item has been discontinued.*

NBI Item 52

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

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

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

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

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

SNBI measurements for Out_to_Out Deck Widths are enough different from this field that a separate field was created. This field can be used to populate the SNBI field in many cases, but thru trusses, thru arches, culverts, and cantilevered sidewalks are measured differently.

## WSBIS Item 1291 - Median Code - NBI N(4,1)

*This item has been discontinued.*

NBI Item 51

### Applicable Structure Types

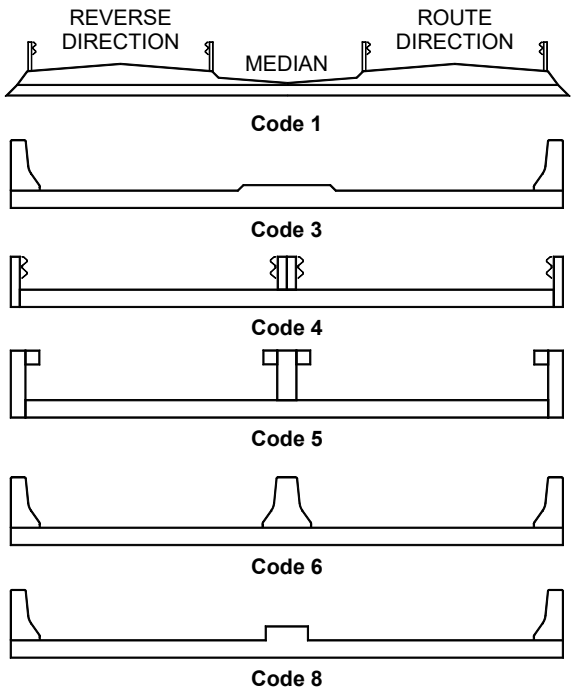
- **Bridges & culverts carrying public roadways**

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

### Table 1291 Median Code - NBI

| 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 Median Code - NBI**




NBI Commentary:

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

**WSBIS Item 1310 - Skew Angle (degrees) - NBI** **N(2,0)**

*This item has been discontinued.*

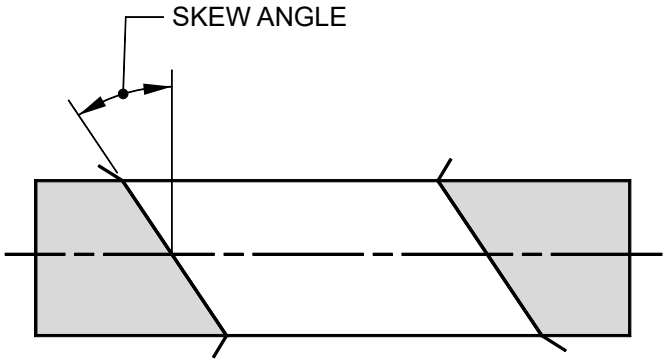
NBI Item 34

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

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

**Figure WSBIS 1310**



## *Feature (Crossing) Tab - Discontinued Items*

**WSBIS Item 1435 – Route Number - NBI** **AN(5)**

*This item has been discontinued.*

NBI Item 5D

NTI Item I.7

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not cross over or under a public roadway**

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.

Local agency bridge owners are encouraged to use one of the following methods to develop a route number where one has not already been assigned:

1. Federal Aid road will have a Federal Aid route number that can be used and padded with zeroes as needed.
2. City streets are often identified by the city number and padded with zeroes as needed.
3. The number of the route used to access the path to the structure can be used.
4. A unique (to the agency) number can be assigned.

Note for local agency users: While this item is identified as alpha-numeric, the use of alphabetic characters in a route number will cause the record to not import into Mobility for the bridge item comparison module.

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

*This item has been discontinued.*

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not cross over or under a public roadway**

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 or other permanent feature. The use of a zero milepost is undesirable and should be avoided when possible.

**WSBIS Item 1433 – Highway Class - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 5B

NTI Item I.9

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not cross over or under a public roadway**

Identify the highway class for the LRS inventory route identified in Item 1467 using one of the following codes:

**Table 1433 Highway Class - NBI** *This item has been discontinued.*

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

Code 8 when there is no inventory route.

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

**WSBIS Item 1434 – Service Level - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 5C

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**
- **Type 4 - Structures that do not cross over or under a public roadway**

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

**Table 1434 Service Level - NBI** *This item has been discontinued.*

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

**WSBIS Item 1490 – Lane Use Direction - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 102

NTI Item C.3

**Applicable Structure Types**

- **All structure records**

Code the direction of traffic of the inventory route identified in LRS Route WSBIS Item 1467 as a 1-digit number using one of the codes below. This item must be compatible with other traffic-related items such as WSBIS Item 1352 – Lanes on the Structure, WSBIS Item 1445 – Average Daily Traffic, WSBIS Item 1491 – Total Horizontal Clearance and WSBIS Item 1356 – Curb-to-Curb.

**Table 1490 Lane Use Direction Code**

| WSBIS Code | NBI Code | NTI Code | Description |
|---|---|---|---|
| 0 | 0 | 0 | No public roadway on or under structure. |
| 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 1483 – National Highway System (NHS) - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 104

NTI Item C.5

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

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

**Table 1483 National Highway System Code (NHS) - NBI** *This item has been discontinued.*

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

Maps identifying NHS routes are available at: https://hepgis.fhwa.dot.gov/fhwagis.

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 1485 – STRAHNET Highway - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 100

NTI Item C.6

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

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

**Table 1485 STRAHNET Highway Code - NBI** *This item has been discontinued.*

| 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 |

Maps identifying NHS routes are available at: https://hepgis.fhwa.dot.gov/fhwagis/#

NTI Commentary:

Codes translated for the NTI as shown in the table above.

**WSBIS Item 1487 – Functional Classification - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 26

NTI Item C.7

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

For the inventory route, code the functional classification using one of the following codes:

**Table 1487 Functional Classification Code - NBI** *This item has been discontinued.*

| 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 https://www.wsdot.wa.gov/data/tools/geoportal/?config=functionalclass

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 (NTN) - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 110

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

The national network for trucks includes most of the Interstate System and those portions of Federal-aid highways identified in the Code of Federal Regulations (23 CFR 658). The national network for trucks is available for use by commercial motor vehicles of the dimensions and configurations described in these regulations. For the inventory route identified in WSBIS Item 1435, indicate conditions using one of the following codes:

**Table 1489 National Truck Network Code (NTN) - NBI** *This item has been discontinued.*

| WSBIS Code | NTI 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 WH24 – NBI Reportable Flag** **Pulldown**

*This item has been discontinued.*

**Applicable Structure Types**

- **Type 1 - Bridges and culverts carrying public roadways**
- **Type 2 - Pedestrian, railroad and other non-vehicular bridges over public roadways**
- **Type 3 - Tunnels carrying roadways within**

Indicate if the crossing record is to be included in the National Bridge Inventory data submittal or not. Records required to be reported include all structures subject to the NBIS and all undercrossings identified as a Federal Aid Route. Other undercrossings can be reported at the owner's discretion.

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

**WSBIS Item 1354 – Lanes Under** **N(2,0)**

*This item has been discontinued.*

NBI Item 28B

NTI Item A.3

**Applicable Structure Types**

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

Code the number of lanes under the structure.

For On records, code WSBIS Item 1354 for all lanes under the bridge for all routes that are functionally classified (see WSBIS Item 1487).

For Under records, code WSBIS Item 1354 for only the lanes associated with the inventory route under.

For Tunnels, code all the lanes in the tunnel.

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

*This item has been discontinued.*

NBI Item 114

**Applicable Structure Types**

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

For On records, code WSBIS Item 1354 for all lanes under the bridge for all routes that are functionally classified (see WSBIS Item 1487).

Code the forecasted average daily traffic (ADT) for the inventory route. This shall be projected at least 17 years but no more than 22 years from the last year of routine inspection. If planning data is not available, use the best estimate based on site familiarity. The future ADT must be compatible with the other items coded for the structure. For example, parallel bridges with an open median are coded as follows: if WSBIS Item 1352 – Lanes On the Structure and WSBIS Item 1356 – Curb-to-Curb are coded for each bridge separately, then the future ADT must be coded for each bridge separately (not the total for the route).

**WSBIS Item 1463 – Future ADT Year** **N(6,0)**
*This item has been discontinued.*
**NBI Item 115**

**Applicable Structure Types**

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

Code the 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 1477 – Linear Sub Route** **N(2,0)**
*This item has been discontinued.*
**NBI Item 13B**

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

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 1484 - Base Highway Network** **Pulldown**
*This item has been discontinued.*
NBI Item 12

**Applicable Structure Types**

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

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

Table 1484 Base Highway Network Code

**Table 1484 Base Highway Network Code** *This item has been discontinued.*

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

**WSBIS Item 1486 – Federal Lands Highways - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 105

**Applicable Structure Types**

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

This code identifies bridges on roads which lead to and traverse federal lands. These bridges may be eligible to receive funding from the Federal Lands Highway Program.

Washington State Forest Highways can be found in the Emergency Relief chapter of the Local Agency Guidelines (LAG) manual.

As of January 1, 2000, there are three Land Management Highway Systems (LMHS). There are two in Douglas County and one in Lincoln County.

| | | | |
|---|---|---|---|
| 0 | Not applicable | 4 | Both IRR and FH |
| 1 | Indian Reservation Road (IRR) | 5 | Both IRR and LMHS |
| 2 | Forest Highway (FH) | 6 | Both FH and LMHS |
| 3 | Land Management Highway System (LMHS) | 9 | Combined IRR, FH and LMHS |

For existing data in WSBIS, do not alter codes. For new records, code zero unless a data source is available.

NBI Commentary:

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

**WSBIS Item 1495 – Horiz. Clrnc., Reverse Dir. (ft & in)** **N(4,0)**

*This item has been discontinued.*

NBI Item 47

**Applicable Structure Types**

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

The horizontal clearance for the inventory route should be measured and recorded for each opening between restrictive features – curbs, rails, guardrails, walls, piers, slopes, or other structural features limiting the roadway (surface and shoulders).

The purpose of this item is to give the largest available clearance for the movement of wide loads. Flush and mountable medians are not considered to be restrictions. This clearance is defined in two ways:

1. Clear distance between restrictions of the inventory route either on or under the structure.
2. Edges of roadway surface including shoulders when there are no other restrictions.

When the entire undivided inventory route passes on or under a structure, code WSBIS Item 1491 as measured and WSBIS Item 1495 is blank.

When the divided inventory route passes on or under a structure, code WSBIS Item 1491 and WSBIS Item 1495 as measured in each direction. Note that when a bridge pier separates a single route, it is always considered divided.

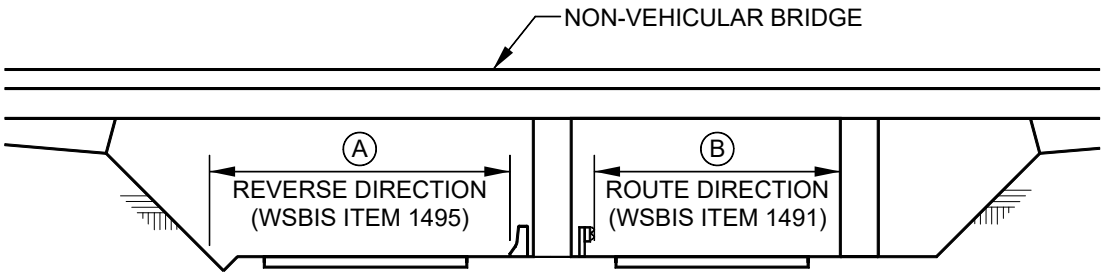
When the inventory route consists of two parallel bridges carrying a divided route, for the bridge carrying the increasing route direction code WSBIS Item 1491 as measured and WSBIS Item 1495 is blank. For the bridge carrying the decreasing route direction, WSBIS Item 1491 is blank and code WSBIS Item 1495 as measured.

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

**NBI Commentary:**

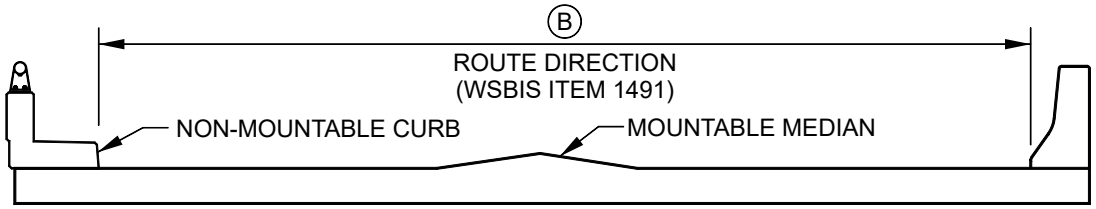
The minimum horizontal clearance for each route is reported to the NBI, regardless of route direction.

**Figure 1495 Horiz. Clrnc., Reverse Dir. (ft & in)** *This item has been discontinued.*



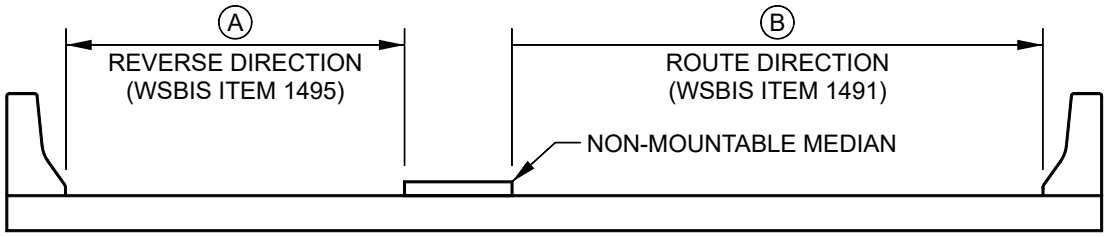

**IF CLEARANCE (A) > (B), CODE WSBIS ITEM 1495 = (A) & WSBIS ITEM 1491 = Blank**

**Figure 1**




**NO MEDIAN OR FLUSH OR MOUNTABLE MEDIAN**

**Figure 2**




**RAISED MEDIAN OR NON-MOUNTABLE MEDIAN**

**IF CLEARANCE (B) > (A), CODE WSBIS ITEM 1491 = (B) & WSBIS ITEM 1495 = Blank**

**Figure 3**

**WSBIS Item 2368 – Min. Vert. Clrnc. Over Deck Override (ft & in.)** **N(4,0)**

*This item has been discontinued.*

**Applicable Structure Types**

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

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

**WSBIS Item 2436 – Route Sequencer** **Integer**

*This item has been discontinued.*

**Applicable Structure Types**

- **All structure records maintained by WSDOT Bridge Preservation**

The route sequencer is a two digit number used for placement of crossing records in the *Bridge List* M 23-09.

If the inventory route is not included in the bridge list, code 0.

For state owned structures, or structures with crossings managed by the Statewide Program Manager, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

**WSBIS Item 2437 – Bridge List Override (miles)** **N(5,2)**

*This item has been discontinued.*

**Applicable Structure Types**

- **All structure records maintained by WSDOT Bridge Preservation**

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

For state owned structures, or structures with crossings managed by the Statewide Program Manager, this item is coded by the BPO Information Group and is visible in the BridgeWorks Inventory Management mode.

**WSBIS Item 2438 – Milepost Sequencer** **Integer**

*This item has been discontinued.*

**Applicable Structure Types**

- **All structure records maintained by WSDOT Bridge Preservation**

The milepost sequencer is a two digit number used for placement of crossing records in the *Bridge List* M 23-09.

If the inventory route is not included in the bridge list, code 0.

For state owned structures, or structures with crossings managed by the Statewide Program Manager, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

**WSBIS Item 7479 – Federal Aid Route Number** **AN(4)**
*This item has been discontinued.*

**Applicable Structure Types**

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

If the route being inventoried is a federal aid highway, enter its federal aid route number in this field. If the bridge is not on a federal aid highway, the field should be filled with zeros.

Federal Aid Route Numbers are located at local agency planning departments or at WSDOT Service Center Planning and at: https://hepgis-usdot.hub.arcgis.com/datasets/3b1de850d0704cd2b5a7effb8c777fee_0/explore?location=47.282135%2C-122.176328%2C9.11

## *Materials & Types Tab - Discontinued Items*

**WSBIS Item 1532 – Main Span Material - NBI** **Pulldown**
*This item has been discontinued.*
NBI Item 43A

**Applicable Structure Types**

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

Indicate the kind of material and/or design for the main span.

**Table 1532 Main Span Material Code - NBI** *This item has been discontinued.*

| 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 - NBI Pulldown

*This item has been discontinued.*

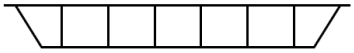
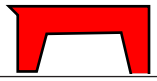
NBI Item 43B

### Applicable Structure Types

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

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

**Table 1533 - Main Span Design Code - NBI** *This item has been discontinued.*

| 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 1538 – Number of Main Spans - NBI** **N(3,0)**

*This item has been discontinued.*

NBI Item 45

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

Record the number of spans in the main or major unit. This item will include all spans of most bridges, the major unit only of a sizable structure, or a unit of material or design different from that of the approach spans.

A span that contains a drop-in span with cantilevers, or two cantilever spans with a hinge, is counted as one span (from pier to pier). Cantilever end spans are counted separately.

**WSBIS Item 1535 – Approach Span Material - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 44A

**Applicable Structure Types**

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

Indicate the type of structure for the approach spans to a major bridge or for the spans where the structural material is different. The codes are the same as for WSBIS Item 1532. If the kind of material is varied, code the most predominant.

Code 0 if this item is not applicable.

**WSBIS Item 1536 – Approach Span Design - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 44B

**Applicable Structure Types**

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

Indicate the type of structure for the approach spans to a major bridge or for the spans where the structural material is different using Table 1533. Use code 20 when no one type of design and/or construction is predominant for the approach units.

Code 00 if this item is not applicable.

**WSBIS Item 1541 – Number of Approach Spans - NBI** **N(3,0)**

*This item has been discontinued.*

NBI Item 46

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

Record the number of approach spans to the major bridge, or the number of spans of material different from that of the major bridge.

Code 0 if this item is not applicable.

NBI Commentary:

This coding guide requires coding zeroes when there are no approach spans. The NBI coding guide assumes a zero entry.

**WSBIS Item 1546 – Deck Type - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 107

**Applicable Structure Types**

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

Record the type of deck system on the bridge. If more than one type of deck system is on the bridge, code the most predominant. Code A for a filled culvert or arch with the approach roadway section carried across the structure.

*Main Listing Under records (e.g., railroad bridges and pedestrian bridges) are to be coded N, with the following exception: WSDOT owned pedestrian bridges are to be coded with the appropriate Deck Type.

Use one of the following codes:

**Table 1546 Deck Type Code - NBI** *This item has been discontinued.*

| WSBIS Code | NBI Code | Description |
|---|---|---|
| 1 | 1 | Concrete Cast-in-Place |
| 2 | 2 | Concrete Precast Panels |
| 3 | 3 | Steel Grating – Open |
| 4 | 4 | Steel Grating – Filled with Concrete |
| 5 | 5 | Steel plate (includes orthotropic) |
| 6 | 6 | Corrugated Steel |
| 7 | 7 | Aluminum |
| 8 | 8 | Treated timber |
| 9 | 8 | Untreated timber |
| 0 | 9 | Other |
| A | N | Filled arches / Culverts |
| B | 9 | Precast integral with beam |
| N | N | Bridges with no deck |

NBI Commentary:

WSDOT provides additional codes which are translated to NBI codes as shown above.

**WSBIS Item 1547 – Wearing Surface - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 108A

**Applicable Structure Types**

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

*Main Listing Under records (e.g., railroad bridges and pedestrian bridges) are to be coded N, with the following exception: WSDOT owned pedestrian bridges are to be coded with the appropriate Wearing Surface.

**Table 1547 Wearing Surface Code** *This item has been discontinued.*

| 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 - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 108B

**Applicable Structure Types**

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

*Main Listing Under records (e.g., railroad bridges and pedestrian bridges) are to be coded N, with the following exception: WSDOT owned pedestrian bridges are to be coded with the appropriate Membrane.

**Table 1548 Membrane Code - NBI** *This item has been discontinued.*

| 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 - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 108C

**Applicable Structure Types**

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

*Main Listing Under records (e.g., railroad bridges and pedestrian bridges) are to be coded N, with the following exception: WSDOT owned pedestrian bridges are to be coded with the appropriate Membrane.

**Table 1549 Deck Protection Code - NBI** *This item has been discontinued.*

| 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 |

## *Load Rating Tab - Discontinued Items*

**WSBIS Item 1550 – Design Load - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 31

**Applicable Structure Types**

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

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 - NBI** *This item has been discontinued.*

| 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 https://www.fhwa.dot.gov/bridge/110202.cfm.

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

*This item has been discontinued.*

NBI Item 41

NTI Item L.4

**Applicable Structure Types**

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

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

**Table 1293 - Open, Closed, Posted Code - NBI** *This item has been discontinued.*

| WSBIS Code | Description |
|---|---|
| A | Open, no restriction to legal loads (see Table 1660a) and no physical posting sign at the bridge |
| 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). Requires a physical posted sign at the bridge. |
| R | Posted for other load-capacity restriction (speed, number of vehicles on structure, etc.). Requires a physical posted sign at the bridge. |

**WSBIS Item 1660 – Operating Level - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 70

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

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

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

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

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

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

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

**Table 1660a Legal Loads** *This item has been discontinued.*

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

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

**WSBIS Item 1551 – Operating Rating Method** **Pulldown**

*This item has been discontinued.*

NBI Item 63

**WSBIS Item 1554 – Inventory Rating Method** **Pulldown**

*This item has been discontinued.*

NBI Item 65

NTI Item L.1

**Applicable Structure Types**

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

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

**Table 1551 Operating and Inventory Rating Method Code** *This item has been discontinued.*

| WSBIS Codes | | NTI Codes | Description |
|---|---|---|---|
| Used by WSDOT | Used by Local Agencies | | |
| N | N | N | No load rating required (only applicable to some tunnels) |
| 0 | 0 | 0 | Field evaluation and documented engineering judgment reported in tons using HS20 loading |
| 1 | 1 | - | Load Factor (LF) reported in tons using HS20 loading |
| 2 | 2 | - | Allowable Stress (AS) reported in tons using HS20 loading |
| - | 3 | - | Load and Resistance Factor (LRFR) reported in tons |
| 4 | 4 | - | Load Testing reported in tons using HS20 loading |
| 5 | 5 | 5 | No rating analysis or evaluation performed |
| - | 6 | 1 | Load Factor (LF) rating reported by rating factor using HS20 loading |
| - | 7 | 2 | Allowable Stress (AS) rating reported by rating factor using HS20 loading |
| 8 | 8 | 3 | Load and Resistance Factor Rating (LRFR) reported by rating factor using HL93 loading |
| F | - | A | Assigned rating method based on Load and Resistance Factor Design (LRFD) reported by rating factor using HL93 loading |

Note: WSDOT uses codes 0, 1, 2, 4, 5, 8 and F for bridges and culverts carrying public roadways. Local Agencies uses codes 0 through 8 for bridges and culverts carrying public roadways. For tunnels carrying public roadways within, all agencies use WSBIS codes 0, 1, 2, 3, 5, A and N.

Code 0 is to be used when the load rating is determined by field evaluation and documented engineering judgment, typically done when plans are not available for concrete structures or in cases of severe deterioration. Field evaluation and engineering judgment ratings must be documented. See Chapter 5 for additional guidance.

Code 5 is to be used when the structure has not been load rated or load rating documentation does not exist.

NBI and NTI Commentary:

WSBIS Item 1551 has been modified based on a November 15, 2011 FHWA Memo available at www.fhwa.dot.gov/bridge/nbi/111115.cfm.

The NTI does not report load ratings in tons, only rating factors. This restricts load rating methods to only those that report in rating factors. Also, the NTI has only one field to assign the load rating method for both inventory and operating methods. WSBIS has chosen to use the NBI Inventory rating method for reporting to the NTI.

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

**WSBIS Item 1552 – Operating Rating Tons** **N(3,0)**
*This item has been discontinued.*
NBI Item 64

**WSBIS Item 1555 – Inventory Rating Tons** **N(3,0)**
*This item has been discontinued.*
NBI Item 66

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

WSDOT enters rating data into the database as English tonnage for all cases noted in WSBIS Items 1551 and 1554 which have methods coded 0 through 4. For methods coded 5* through 8 or F, use WSBIS Items 1553 and 1556 to enter the rating factor.

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.

*Rating Tons (Items 1552/1555) or Rating Factors (Items 1553/1556) can be entered when Items 1551/1554 are coded 5.

NBI Commentary:

WSBIS Items 1552 and 1555 have been modified based on a March 22, 2004, FHWA Memo available at www.fhwa.dot.gov/bridge/nbi/111115.cfm.

***Note:*** This field is no longer restricted to reporting HS20 loads only – by WSBIS Item 1551 definition, in some cases HL93 load cases are reported here. Additional clarification on how to code these fields was also added.

When this 3-digit number is reported in the NBI submittal, the FHWA multiplies it by 32.4 and rounds it to tenths. This number represents metric tons. Due to the fact the FHWA cannot currently process metric tons greater than 99.9, any rating factor greater than 3.08 is truncated to 99.9 metric tons upon conversion.

**WSBIS Item 1553 – Operating Rating Factor** **N(4,2)**
*This item has been discontinued.*
NBI Item 64
NTI Item L.3

**WSBIS Item 1556 – Inventory Rating Factor** **N(4,2)**
*This item has been discontinued.*
NBI Item 66
NTI Item L.2

**Applicable Structure Types**

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

WSDOT enters rating data as factors for all cases noted in WSBIS Items 1551 and 1554 which have methods coded 5 through 8 or F. For methods coded 0 through 4, use WSBIS Items 1552 and 1555 to enter rating tonnage.

If WSBIS Item 1551 – Operating Rating Method has been coded 5, for new structures, the operating rating shall be coded with a rating factor of 1.30.

If WSBIS Item 1554 – Inventory Rating Method has been coded 5, for new structures, the inventory rating shall be coded with a rating factor of 1.00.

NBI Commentary:

When this number is reported in the NBI submittal, rating factors in excess of 9.99 will be reported to FHWA as 9.99.

## *Discontinued Tab - Discontinued Items*

NBI items in the Discontinued tab will be kept visible, but not editable within the Bridgeworks (WSBIS) application as of January 2025, to be used as reference until all data items have been correctly coded/translated into the new SNBI fields.

**WSBIS Item 2883 – Prop. Improvement Calculation** **Check Box**
*This item has been discontinued.*

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.

For local agency bridge owners, the Proposed Improvement entries are required for NBIS bridges when the Sufficiency Rating (Item 2710) is 80 or less and Status (Item 2711) is SD or FO.

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 = $950 (as of 2022)
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 = $475 (as of 2022)
Structure Cost = 0.50 x Total Cost
Roadway Cost = 0.10 x Total Cost
Engineering & Misc Cost = 0.40 x Total Cost
Total Cost = (Structure Imp Length x Prop Roadway Width) x Cost Per SF of Prop Deck
Estimate Year = (current year)

**WSBIS Item 1844 – Prop. Improvement Work Type** **Pulldown**

*This item has been discontinued.*

NBI Item 75A

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

Use one of the following codes to represent the proposed work type:

**Table 1844 Work Type Code** *This item has been discontinued.*

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

**WSBIS Item 1846 – Prop. Improvement Work Method** **Pulldown**

*This item has been discontinued.*

NBI Item 75B

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

Use one of the following codes to indicate whether the proposed work is to be done by contract or by force account:

**Table 1846 Proposed Improvement Work Method Code** *This item has been discontinued.*

| WSBIS Code | Description |
|---|---|
| 2 | Work to be done by owner's forces |
| 1 | Work to be done by contract |

**WSBIS Item 1847 – Prop. Improvement Structure Length (ft)** **N(6,0)**

*This item has been discontinued.*

NBI Item 76

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

Code the length of the proposed bridge improvement to the nearest foot. For replacement or rehabilitation of the entire bridge, the length should be back to back of backwalls of abutments or from pavement notch to pavement notch. For replacement or rehabilitation of only part of the structure, use the length of the portion to be improved.

For culvert improvements, use the proposed length measured along the centerline of the barrel regardless of the depth below grade. The measurement should be made between the inside faces of the top parapet or edge-stiffening beam of the top slab.

**WSBIS Item 2853 – Prop. Improvement Roadway Width (ft)** **N(6,0)**

*This item has been discontinued.*

Code the curb-to-curb width of the roadway on the proposed bridge. This measurement is coded to the nearest foot.

**WSBIS Item 2860 – Prop. Imp. Cost per S.F. of Deck (dollars)** **N6,0)**

*This item has been discontinued.*

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 – Prop. Imp. Structure Cost (thous. dollars)** **N(7,0)**

*This item has been discontinued.*

NBI Item 94

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

Code a number to represent the estimated cost of the proposed bridge improvements (including replacement) in thousands of dollars. This cost does not include roadway, right of way, detour, demolition, or preliminary engineering costs.

NBI Commentary:

WSBIS allows up to seven digits each for Structure, Roadway and Total Costs (in thousands of dollars). Amounts coded greater than six digits will be converted to 999999 for the NBI data submittal.

**WSBIS Item 1873 – Prop. Imp. Roadway Cost (thous. dollars)** **N(7,0)**

*This item has been discontinued.*

NBI Item 95

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

Code a number to represent the cost of the proposed roadway improvement in thousands of dollars. This shall include only roadway construction costs, excluding bridge, right-of-way, detour, extensive roadway realignment costs, preliminary engineering, etc. Do not use this item for estimating maintenance costs.

NBI Commentary:

WSBIS allows up to seven digits each for Structure, Roadway and Total Costs (in thousands of dollars). Amounts coded greater than six digits will be converted to 999999 for the NBI data submittal.

**WSBIS Item 2870 – Prop. Imp. Eng. and Misc. Cost (thous. dollars)** **N(7,0)**

*This item has been discontinued.*

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 – Prop. Imp. Total Cost (thous. dollars)** **N(7,0)**

*This item has been discontinued.*

NBI Item 96

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

Code a number to represent the total project cost in thousands of dollars, including incidental costs not included in Structure Cost and Roadway Cost. This item should include all costs normally associated with the proposed bridge improvement project. The Total Project Cost will therefore usually be greater than the sum of Structure and Roadway Costs.

NBI Commentary:

WSBIS allows up to seven digits each for Structure, Roadway and Total Costs (in thousands of dollars). Amounts coded greater than six digits will be converted to 999999 for the NBI data submittal.

**WSBIS Item 1879 – Prop. Improvement Estimate Year** **N(4,0)**

*This item has been discontinued.*

NBI Item 97

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

Code the year that the costs of proposed work were estimated. The data provided for these items must be current; that is, the estimate year shall be no more than 8 years before the current year.

**WSBIS Item 1022 – Urban Code - SNTI** **Pulldown**
*This item has been discontinued.*

**Applicable Structure Types**

- **Tunnels carrying public roadways within**

Record the urbanized area code.

**WSBIS Item 1188 – Latitude - NBI** **(XX degrees XX minutes XX.XX seconds)**
*This item has been discontinued.*
NBI Item 16
NTI Item I.13

**WSBIS Item 1196 – Longitude - NBI** **(XXX degrees XX minutes XX.XX seconds)**
*This item has been discontinued.*
NBI Item 17
NTI Item I.14

**Applicable Structure Types**

- **All structure records**

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

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

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

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

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

SNBI Latitude and Longitude fields added in 2023 into the Crossing Tab in BridgeWorks and have a different format. See WSBIS Items 1470 and 1471 in Appendix D.

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

*This item has been discontinued.*

**NBI Item 101**

**Applicable Structure Types**

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

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

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

One of the following codes shall be used:

**Table 1288 Parallel Structure Code** *This item has been discontinued.*

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

**WSBIS Item 1312 - Flared Flag - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 35

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

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

**Table 1312 Flared Flag** *This item has been discontinued.*

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

**WSBIS Item 1332 – Year Built - NBI** **N(4,0)**

*This item has been discontinued.*

NBI Item 27

NTI Item A.1

**Applicable Structure Types**

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

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

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

*This item has been discontinued.*

NBI Item 28A

**Applicable Structure Types**

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

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

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

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

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

**WSBIS Item 1378 – Vertical Underclearance Code.** **Pulldown**
*This item has been discontinued*
**NBI Item 54A**

**Applicable Structure Types**

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

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

***Note:*** For waterways beneath structure, code the navigation control code 1386 as appropriate, but always code 1378 = N

**Table 1378 - Vertical Underclearance Code** *This item has been discontinued.*

| WSBIS Code | Description |
|---|---|
| H | Functionally classified public highway beneath structure |
| R | Railroad beneath structure |
| N | No ground based transportation feature (terrain, waterway, etc) |
| P | Other ground based transportation feature (parking lot, pedestrian/bike path, private road, etc. |
| * | Delete |

**WSBIS Item 1379 – Min. Lat. Underclearance Right (ft)** **N(3,1)**
*This item has been discontinued.*
NBI Item 55B

**Applicable Structure Types**

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

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

Code the minimum lateral underclearance on the right to the nearest tenth of a foot. When both a railroad and highway are under the structure, code the lateral clearance for the reference feature coded in Item 1384.

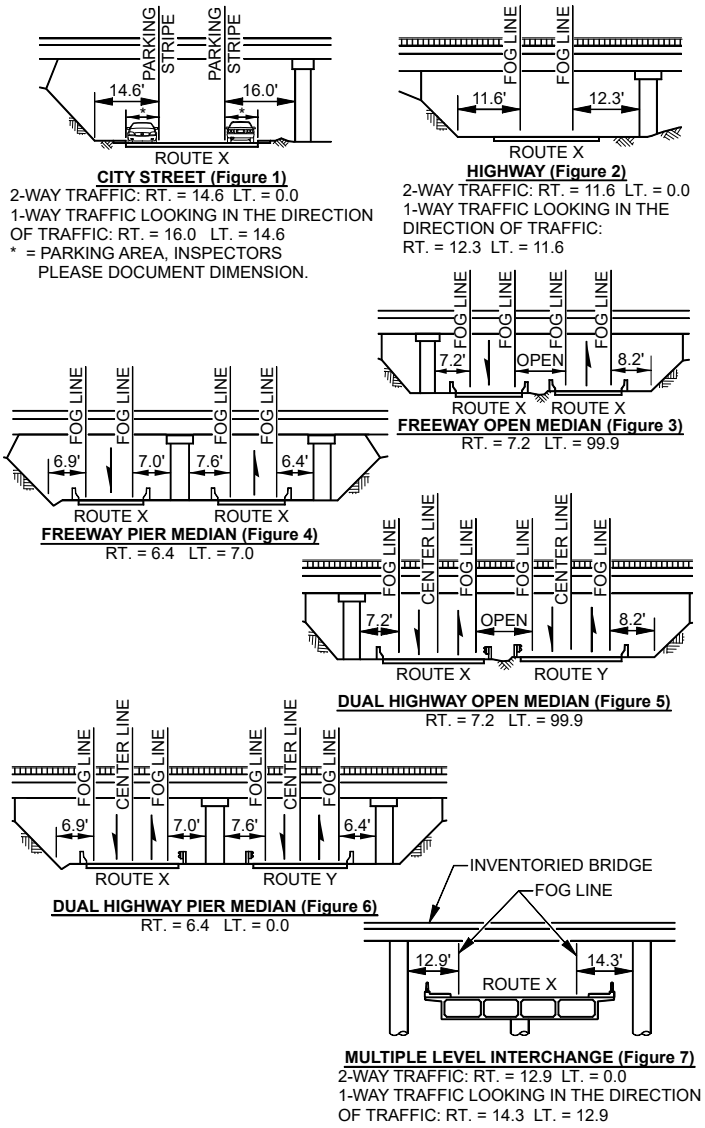
The lateral clearance should be measured from the right edge of the travelled way (outer edge of fog line) or from the centerline (between rails) of the right-hand track of a railroad to the nearest substructure unit (pier, abutment, etc.), a retaining wall or to a slope. If no fog line exists on the 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.

**WSBIS** **Figure 1379a**




NBI Commentary:

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

**WSBIS Item 1382 – Lateral Underclearance Code** **Pulldown**

*This item has been discontinued.*

NBI Item 55A

**Applicable Structure Types**

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

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

**Note:** For waterways beneath structure, code the navigation control code 1386 as appropriate, but always code 1382 = N

**Table 1382 - Lateral Underclearance Code** *This item has been discontinued.*

| WSBIS Code | Description |
|---|---|
| H | Functionally classified public highway beneath structure |
| R | Railroad beneath structure |
| N | No ground based transportation feature (terrain, waterway, etc) |
| P | Other ground based transportation feature (parking lot, pedestrian/bike path, private road, etc. |
| * | Delete |

**WSBIS Item 1383 – Min. Lat. Underclearance Left (ft)** **N(3,1)**

*This item has been discontinued.*

NBI Item 56

**Applicable Structure Types**

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

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

Code the minimum lateral underclearance on the left (median side for divided highways) to the nearest tenth of a foot. The lateral clearance should be measured from the left edge of travelled way (outer edge of fog line) 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.

NBI Commentary:

See WSBIS Item 1379 NBI Commentary.

**WSBIS Item 1386 – Navigation Control Code - NBI** **Pulldown**

*This item has been discontinued.*

NBI Item 38

**Applicable Structure Types**

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

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

**Table 1386 Navigation Control Code - NBI** *This item has been discontinued.*

| 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. Local agencies need to contact USCG to determine the correct coding for this field:

Commander, Thirteenth Coast Guard District

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

NBI Commentary:

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

**WSBIS Item 1387 – Navigation Vertical Clearance (ft) - NBI** **N(3,0)**

*This item has been discontinued.*

NBI Item 39

**Applicable Structure Types**

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

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

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

**WSBIS Item 1390 – Navigation Horizontal Clearance (ft) - NBI** **N(4,0)**

*This item has been discontinued.*

NBI Item 40

**Applicable Structure Types**

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

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

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

**WSBIS Item 1394 – Vertical Lift Min. Navigation Clrnc (ft) - NBI** **N(3,0)**

*This item has been discontinued.*

NBI Item 116

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

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

Leave this item blank if the structure is not a vertical lift bridge (Item 1533 = 15).

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

NBI Commentary:

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

**WSBIS Item 1436 – Route Direction - TUNNEL** **Pulldown**

*This item has been discontinued.*

NTI Item I.8

**Applicable Structure Types**

- **Tunnels carrying public roadways within**

Record the route direction for the route in the tunnel using one of the following codes:

**Table 1436 Route Direction Code** *This item has been discontinued.*

| WSBIS Code | Description |
|---|---|
| 4 | West |
| 3 | South |
| 2 | East |
| 1 | North |
| 0 | Two route directions |

Use code 0 when the tunnel carries both directions of a divided highway, and when the roadway is undivided. Route direction is considered the designated direction of the route, not geographic orientation.

## WSBIS Item 1544 – Service On — Pulldown

*This item has been discontinued.*

NBI Item 42A

**Applicable Structure Types**

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

**Table 1544 - Service On Code** *This item has been discontinued.*

| WSBIS Code | Description |
|---|---|
| 1 | Highway |
| 2 | Railroad |
| 3 | Pedestrian-bicycle |
| 4 | Highway-railroad |
| 5 | Highway-pedestrian |
| 6 | Overpass structure at an interchange or second level of a multilevel interchange |
| 7 | Third level (Interchange) |
| 8 | Fourth level (Interchange) |
| 9 | Building or plaza |
| 0 | Other |

## WSBIS Item 1545 – Service Under — Pulldown

*This item has been discontinued.*

NBI Item 42B

**Applicable Structure Types**

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

**Table 1545 - Service Under Code** *This item has been discontinued.*

| 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 (non-waterway) |

**WSBIS Item 1657 - Structural Evaluation** **Calculated**

*This item has been discontinued.*

NBI Item 67

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

This item is calculated automatically and cannot be edited.

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

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

**Table 1657 Structural Evaluation** *This item has been discontinued.*

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

NBI Commentary:

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

## WSBIS Item 1658 - Deck Geometry — Calculated

*This item has been discontinued.*

NBI Item 68

### Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This item is calculated automatically and cannot be edited.

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

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

Use this guide to determine which table to use.

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

**Table 1658a Deck Geometry** *This item has been discontinued.*

| 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** *This item has been discontinued.*

| 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 *This item has been discontinued.*

| 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 *This item has been discontinued.*

| 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 *This item has been discontinued.*

| 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** *This item has been discontinued.*

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

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

## WSBIS Item 1659 - Underclearances — Calculated

*This item has been discontinued.*

NBI Item 69

### Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This item is calculated automatically and cannot be edited.

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

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

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

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

## Table 1659a Underclearances *This item has been discontinued.*

| 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 Underclearances *This item has been discontinued.*

| Functional Class | | | | | | | Underclearance Adequacy Appraisal Rating Code |
|---|---|---|---|---|---|---|---|
| 1-Way Traffic | | | | 2-Way Traffic | | | |
| Principal Arterials (Interstate, etc.) | | | | Other Principal & Minor Arterials | Major & 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 the Right Ramp column to determine the rating code when acceleration or deceleration lanes or ramps are provided under 2-way traffic.

## WSBIS Items 1684, 1685, 1686, 1687

*This item has been discontinued.*

NBI Item 36A - 36D

### Applicable Structure Types

- **Bridges & culverts carrying public roadways**

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

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

**Table 6 Traffic Safety Feature Codes** *This item has been discontinued.*

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

NBI Commentary:

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

## WSBIS Item 1684 – Bridge Rails Pulldown

*This item has been discontinued.*

NBI Item 36A

### Applicable Structure Types

- **Bridges & culverts carrying public roadways**

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

Acceptable crash tested bridge rails fall into two general categories.

**Thrie-beam Retrofit**

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

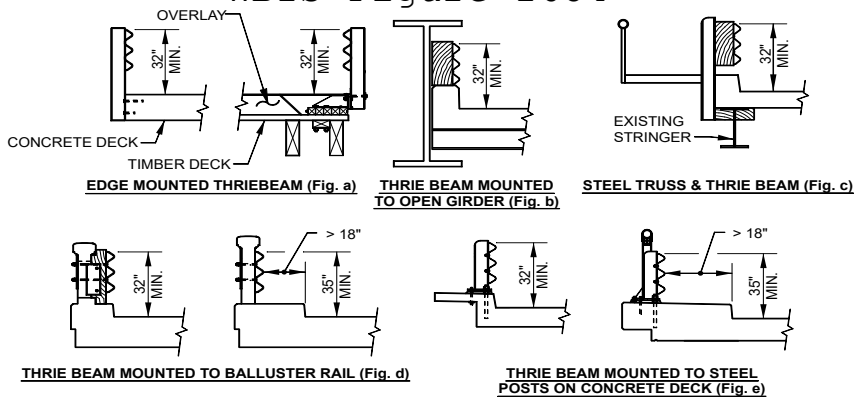
**Concrete Rail**

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

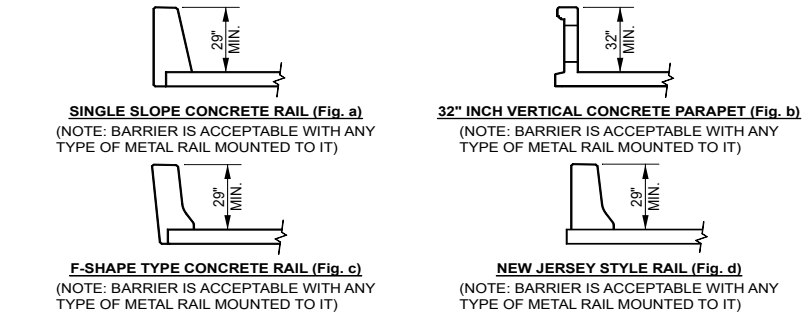
Bridge rails are coded as N when there is sufficient roadway fill that there is no attachment to the structure.

## Table 1684 Bridge Rails *This item has been discontinued.*

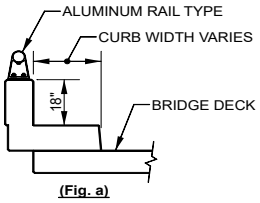
WBIS Figure 1684

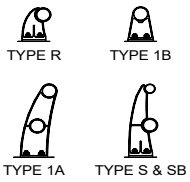



### THRIE BEAM RETROFIT




### CONCRETE RAIL




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

### TYPE 7 BRIDGE RAIL

**WSBIS Item 1685 – Transitions** **Pulldown**

*This item has been discontinued.*

Item 36B

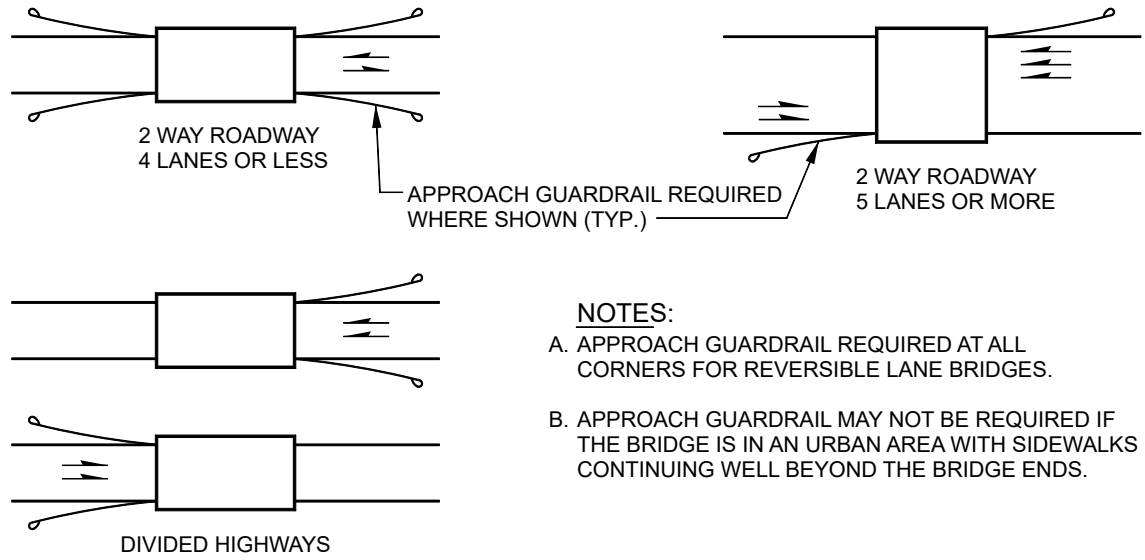
**Applicable Structure Types**

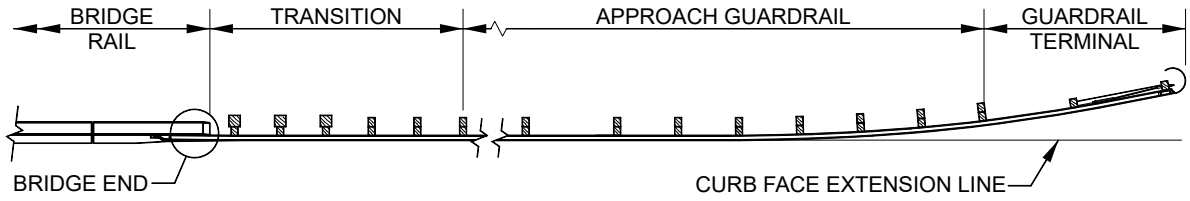
- **Bridges & culverts carrying public roadways**

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

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

**Table 1685 Transitions** *This item has been discontinued.*




## WSBIS Item 1686 - Guardrails Pulldown

*This item has been discontinued.*

### Applicable Structure Types

- **Bridges & culverts carrying public roadways**

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

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

**WSBIS Item 1687 - Terminals** **Pulldown**

*This item has been discontinued.*

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

Terminals are to be coded as 1 or 0 if they are within a reasonable distance of the bridge. On a fill embankment, this would be near the bottom of the fill slope (*Design Manual* M 22-01). Otherwise they will be coded as an N.

If guardrails are not required, the absence of terminals is automatically acceptable and coded as 1.

Acceptable guardrail terminals are shown in the Washington State Standard Plans Section C or *Design Manual* M 22-01.

**WSBIS Item 2537 – Alpha Span Type (INV MO only)** **AN(20)**

*This item has been discontinued.*

**Applicable Structure Types**

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

Use Table 2537 to identify each group of span types that make up the entire bridge.

- List the main span Alpha type first, followed by the approach spans.
- Approach span Alpha types should be listed longest to shortest if there are different/ variable approach span types.
- The Alpha types must be compatible with WSBIS Items 1532, 1533, 1535, and 1536 respectively.
- Separate each span group by a space.

Example:

Steel through truss main span has a 140 foot timber approach (treated with creosote) at one end of the truss, and a 30 foot concrete T-beam span at the other.

WSBIS Item 1532 = 3 – steel

WSBIS Item 1533 = 10 – through truss

WSBIS Item 1535 = 7 – wood or timber

WSBIS Item 1536 = 02 – girder

The Alpha Span Type would be enteres as follows: STrus TTC CTB

**Table 2537 Alpha Span Type Codes** *This item has been discontinued.*

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

**WSBIS Item 2710 - Sufficiency Rating** **Calculated**

*This item has been discontinued.*

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

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-G for the Sufficiency Rating formula.

**WSBIS Item 2711 - Struct. Deficient/Func. Obs. (SD/FO)** **Calculated**
*This item has been discontinued.*

**Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

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 Struct. Deficient/Func. Obs. (SD/FO)** *This item has been discontinued.*

| 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 Struct. Deficient/Func. Obs. (SD/FO)** *This item has been discontinued.*

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

# *Appendix 2-E Border Bridge Information*

## Oregon

Send all reports and any requests for their reports to

Erick Cain, OPMA, Erick.j.cain@odot.state.or.us
Bridge Inventory Coordinator
4040 Fairview Industrial Dr. SE MS #4
Salem, OR 97302
Phone: 503 986 3384 Fax: 503 986 3407

**Region 1 - (Longview to Hood River) –**
Joel Boothe, Joel.E.BOOTHE@odot.state.or.us
Office 503-652-5691, Cell 503-969-1091, Fax 503-653-3085

Inspected by Oregon:
5/1E – 000000PR – Columbia R Interstate (Oregon #01377A)
5/1W – 0005216A – Columbia R Interstate (Oregon #07333)
205/1 – 0010833A – Glen Jackson Bridge (Oregon #09555)
0259228300 – 08712700 – Br of the Gods (Oregon # 02592)

Inspected by Washington:
433/1 – 0003760A – Lewis & Clark (Oregon #02046)

**Region** 2 -
Bill Burns, 503-986-2659, Robert.W.BURNS@odot.state.or.us

Inspected by Oregon:
101/1 – 0007666A - Megler (Oregon #07949D) – Spans 1-4
101/1(A) – 0007666B - Megler(A) (Oregon #07949A) – Spans 5-19
101/1(B) – 0007666C - Megler(B) (Oregon #07949B) – Spans 20-159
101/1(C) – 0007666D - Megler(C) (Oregon #07949C) – Span 160

**Region 4 - (Hood River to Biggs Jct.) –**
Mike Pulzone, James.M.PULZONE@odot.state.or.us
Office 541-388-6188, Cell 541-419-1688, Fax 541-388-6108

Inspected by Oregon:
197/1 – 000000PC – The Dalles (Oregon #06635Q)

Inspected by Washington:
97/1 – 0006539A – Biggs Rapids-Sam Hill (Oregon #00849A)

Inspected by Consultants
06645 – 000000PH – Hood River (Oregon #06645)

**Region 5 -**
Kelley McAlister, Kelley.T.MCALISTER@odot.state.or.us
541-963-1371

Inspected by Washington:
82/280N – 0012819A – Umatilla (Oregon #16424)
82/280S – 000000PD – Umatilla (Oregon #02230A)

**Oregon Underwater Reports –**
Rick Shorb, Rick.L.SHORB@odot.state.or.us

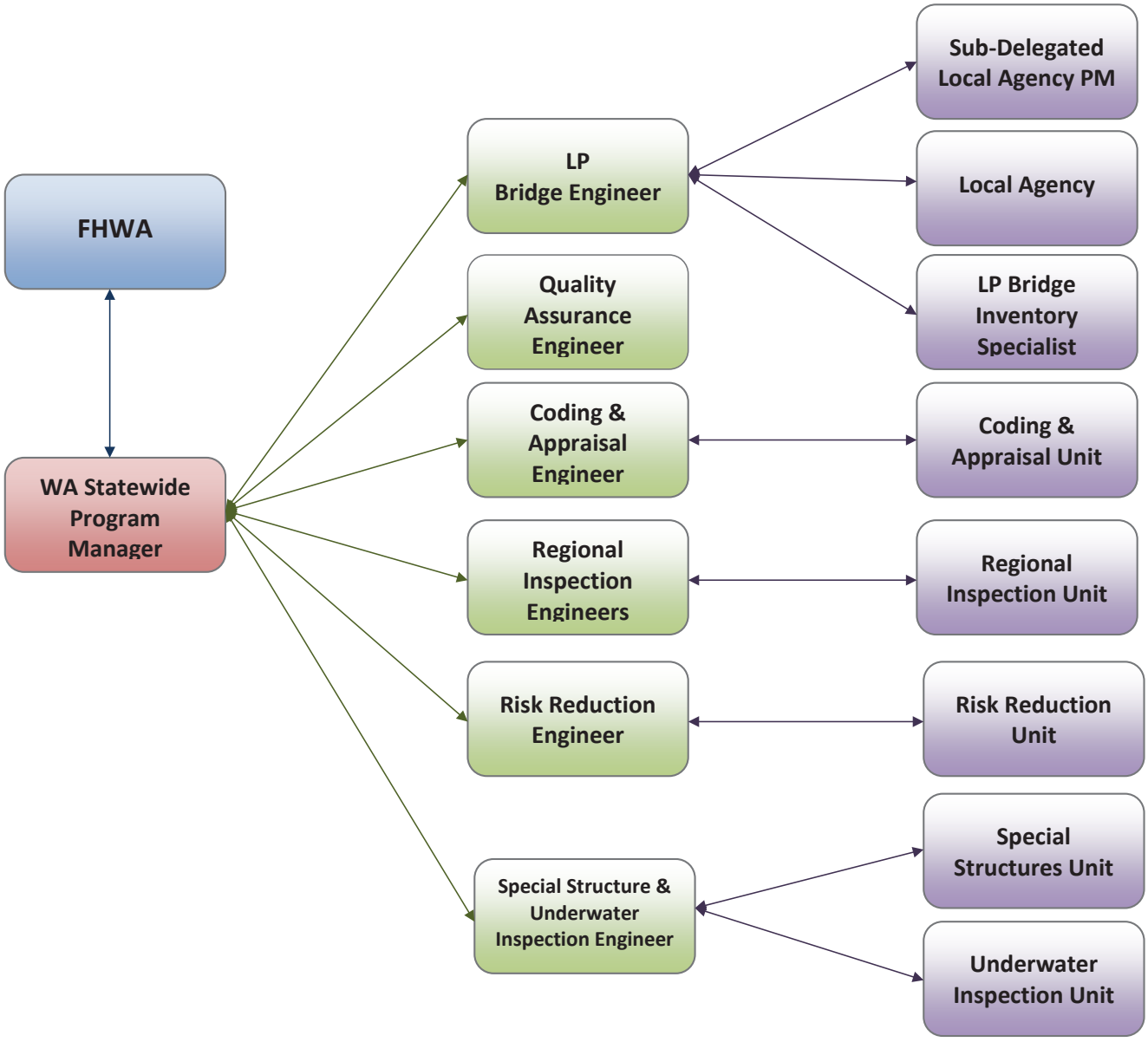
## Idaho

Patty Fish, patty.fish@itd.idaho.gov, 208-334-8847
cc to Kathleen Slinger, Kathleen.Slinger@itd,idaho.gov

Inspected by Washington
12/915 – 0002348A – Snake R Clarkston (ID SID 000000000010360)

Inspected by Idaho
41/10 – 00000LLV – BNRR OC (ID SID 000000000014255)
90/594N – 00200520 – Spokane River (ID SID 000000000016735)
90/594S – 00200519 – Spokane River (ID SID 000000000016740)
5700-1 – 08374400 – Southway Bridge (ID SID 000000000021495) – Local Agency owned (Asotin County) – Idaho works directly with Asotin County

# *Appendix 2-F WSDOT/FHWA Communication Protocol Flowchart*



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# Chapter 3 Inspections and Reports

## 3-1 General

This chapter provides guidelines to inspect bridges, culverts and tunnels, 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 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. Examples of unusual circumstances include severe weather, concern for inspector safety, concern for inspection quality, the need to optimize scheduling with other bridges, or other unique situations. Bridges with late inspections will be scheduled for the original inspection month during subsequent inspection cycles.

## 3-2 Inspection Types and Reporting

This section identifies and describes several inspection types, used by both the state and local agencies, that have been developed to address specific needs. Below is a list of those inspection types followed by a description of each inspection/report type.

- Initial
- Routine Bridge
- Routine Tunnel
- Nonredundant Steel Tension Member (NSTM)
- Underwater
- Complex Feature
- Interim
- Underwater Interim
- Damage
- Condition Safety
- WSDOT Safety
- Local Agency
- Short Span
- Two-Man UBIT Discontinued
- Informational
- Inventory
- In-Depth
- Geometric
- Feature Discontinued
- Scour Monitoring

## 3-2.1 *Bridge Inspection Reports*

All bridge field inspection reports (BIR) must be prepared at the completion of each inspection type 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 specified type of inspection into BridgeWorks. A Routine Inspection will be included with all NSTM and Special Feature inspection types. A bridge inspection report must be completed and released in the BridgeWorks program within 90 days from the end of the associated inspections.

### 3-2.1.A Opening and Completing Bridge Inspection Reports

(1) Select the appropriate report type to be included in the record and enter/select the: 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.

(2) Confirm the condition and adequacy coding for the various bridge elements and make any changes as necessary. Review the Adequacy Appraisal codes, NBI/SNBI condition codes, BMS and SNTI elements and their respective condition states. Provide notes and narratives from field observations describing the existing conditions and supporting condition codes. Verify that the correct Program Manager is listed on the inspection report.

(3) Update photos representing current or monitored conditions or defects. Photo narratives must include location and direction photo was taken, including photos representing typical conditions. Photos for Deck and Elevations should be updated approximately every 10 years or as conditions, at or around bridge, change significantly. Ensure that photos are identified in the element and note narratives.

(4) Prepare recommendations for repair of any bridge elements in need of repair and provide photos and descriptions of locations to be repaired. Update repair photos as conditions change. Verify out any repairs that have been completed and take a photo of the existing condition of repair. Repair and verification photos should be attached to the associated repair. Ensure all repair numbers and relevant repair or verification photos are identified in the element and note narratives. See Section 6-4 for additional repair instructions and procedures.

(5) Update the Files Tab with all newly gathered or updated file information, such as Scour Field Evaluations, Ground Lines, Element Condition Spreadsheets, Relevant Supporting Documentation, or Information for Inspection Coordination or Planning. Once the files are attached, PDF versions of the files, (if they are not already PDF) need to be created. Prior to locking the report, select all the appropriated PDF files for inclusion in the intended report.

(6) 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, open a Damage Inspection report type to flag and identify the finding. This will be in addition to the report being conducted (if applicable). Open a Critical Finding and complete the known information under the Critical Findings Tab. See Damage Report and Chapter 6 for additional information.

(7) Complete the report resources information on any soundings, inspection resources, support, or third-party requirements to include date completed, interval if applicable and date of next resource requirement.

## 3-2.2 *Initial Inspection (Triggered Inspection-No Interval, Next Routine Insp. at 24 months)*

An Initial Inspection is essentially the first Routine Inspection performed on any reportable new, replaced, rehabilitated, or temporary bridge. This inspection requires a Lead Inspector with a current Certification Number. It is conducted the same as a Routine Inspection outlined below and verifies any data already entered in BridgeWorks via the "Inventory" Report type. An Initial Inspection may also be performed when there is a change in bridge ownership. The initial inspection, used only for reportable structures, is reported to the NBI and NTI. When the Initial Inspection is conducted, the necessary information to schedule the Routine Inspection report type will also be entered.

The purpose of this inspection is to add bridges to the inventory, or document significant structural changes due to widening or rehabilitation and establish certain baseline information.

1. **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, in addition to entering the Routine Inspection information:

   - An NSTM Inspection if the bridge contains nonredundant steel tension members. See Nonredundant Steel Tension Member (NSTM) Inspection.
   - An Underwater Inspection is needed to inspect underwater portions of the bridge. See Underwater Inspection.
   - A Complex Features inspection if the bridge contains unique design or construction elements. See Complex Feature Inspection.

   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.

2. **Site Inspection** – The Initial Inspection site visit must be conducted after the bridge has been constructed, preferably before it is placed into service, but within 90 days after it is open to traffic. As part of the site inspection, the Team Leader will verify, complete and correct, if necessary, any inventory information that had been initially coded into BridgeWorks. At the bridge site, the Team Leader should review and confirm all geometric information such as actual bridge dimensions, and measurements, and verify the list of bridge elements including the quantity and condition of each. As part of the initial site visit, at least 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.

   Additional information to collect may include initial soundings (channel profile), vertical clearance for the carried route or vertical clearances for all routes below.

   The Scour Field Evaluation Form and Vertical Clearance forms were developed for collecting this information and supplement the BIR. Examples of the forms are shown in Section 3-5.

3. **Check Coding** – The BIR form should note any inconsistencies found between the plans and the as-built bridge and should provide an explanation of any coding changes.

4. **Establish Routine Inspection Schedule and Resources** – Before releasing the report in BridgeWorks, the inspection interval and next inspection date for Routine or any other required inspections needs to be entered. In the review process and prior to release, the next inspection date, program scheduling requirements, and resources for future inspections need to be evaluated. For the State, these will be coordinated with Supervisors, and the Scour engineer, and then entered accordingly with correct interval and any force date to properly coincide with future scheduled inspections

### 3-2.3 *Routine Bridge Inspection (Scheduled 12, 24 or 48-Month Interval)*

Routine Inspections are the regularly scheduled inspections of an entire structure to ensure that the structure continues to satisfy present service requirements. Inspections consist of observations, measurements, or both, as needed to determine the physical and functional condition of the bridge, to identify any changes from “Initial” or previously recorded conditions. This inspection requires a Lead Inspector with a current Certification Number. Generally, Routine Inspection intervals are not to exceed 24 months throughout the life of the bridge. The acceptable tolerance for intervals of 24 months or greater for the next Routine inspection is up to three (3) months after the month in which the inspection was due. The acceptable tolerance for intervals less than 24 months for the next Routine inspection is up to two (2) months after the month in which the inspection was due. For any inspection conducted outside the month in which the inspection was due, regardless of interval, the subsequent Routine inspection will be reset to the original target month. Changes to the target month will require PM approval within BridgeWorks. Routine Inspections are reported to the NBI and NTI.

1. **Inspecting Bridge Components –** The BIRM describes the general inspection procedures to be followed for inspecting any concrete, steel, or timber bridges, and the specific procedures to follow for inspecting given bridge elements (i.e., the bridge abutments). These steps can be used by the Team Leader as a checklist to help accomplish the inspection and identify 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.

2. **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 field inspection is used in conjunction with the scour appraisal (see Section 5-3), to identify and verify the potential of harmful effects of scour to the bridge.

   **Field inspection documentation for scour should include the specific location and extent of any deterioration, damage, or undermining in the following:**

   - The stream channel and stream banks.
   - Substructure elements (abutments, pier walls, web walls, columns, or shafts).
   - Foundations (footings and seals). Measure and record the extent of foundation exposure and undermining.
   - Channel protection devices (i.e., dams and levees).
   - Scour countermeasures (riprap or shielding).
   - Recommendations for any repairs, replacement, or maintenance required.
   - Perform soundings on bridges as identified by the Scour Engineer using the Scour Field Evaluation form.

   The Scour Field Evaluation form was developed to supplement the BIR for water crossings by measuring the streambed cross-section (soundings) at a bridge to document observations related to scour. A copy of this form is shown in Section 3-5.

   Soundings of streambed elevations should be taken during the Initial Routine Inspection and during subsequent inspections as required. The form should note the location and depth of the streambed at each point where a sounding was taken. This information should then be plotted to identify long term changes in the channel cross section over time.

   Further discussion of inspection procedures for bridges over water can be found in the BIRM *Bridge Inspectors Reference Manual* and *HEC 18 Evaluating Scour at Bridges*.

3. **Routine Inspections with Extended Intervals** – Routine Inspections with extended inspection intervals greater than 24 months but not exceeding 48 months, must meet the criteria of CFR 23 650.311(a)(1)(iii) and as outlined in the WSDOT Extended Interval Policy sent to FHWA dated September 18th, 2023.

   - Reported bridges shall be re-evaluated against the policy criteria sent to FHWA after every inspection. Refer to the WSDOT Extended Interval Policy sent to FHWA, dated September 18th, 2023, under Appendix 3-C for further details.

- The Coding and Appraisal Unit will run data checks on each BIR to determine the reported structure's eligibility prior to release into the database.
- 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 and that no major rehabilitation, or structural modification such as widening has occurred in the last two years."

4. **Routine Inspections with Inspection Intervals Less than 24 Months** – Bridges or culverts should be considered for more frequent inspections if structure or site conditions warrant more frequent inspection of the entire structure. Under CFR 23 (a)(1)(ii)(B) bridges included in the NBI that meet any of the following criteria must be inspected at intervals not to exceed 12 months.

   a. One or more of the NBI Deck, Superstructure, Substructure or Culvert code is rated equal to 3 or less.

   b. Observed scour condition is rated equal to a 3 or less.

   Where condition ratings are coded 3 or less due to localized deficiencies, a special or limited inspection (WSDOT Interim Inspection), limited to just those noted deficiencies can be used in conjunction with the regular interval Routine Inspection. In such cases there will be no more than 12 months between the two. See the description of Interim Inspection.

## 3-2.4 *Nonredundant Steel Tension Member (NSTM) (Scheduled 12- or 24-Month Interval)*

The National Bridge Inspection Standards (NBIS) require that an NSTM Inspection be performed, in addition to the required Routine Inspection, on regular intervals not to exceed 24 months on bridge members identified as NSTMs. This inspection requires a Lead Inspector with a current Certification Number and NSTM Endorsement. The acceptable tolerance for intervals of 24 months for the next NSTM inspection is up to three (3) months after the month in which the inspection was due. The acceptable tolerance for intervals of less than 24 months for the next NSTM inspection is up to two (2) months after the month in which the inspection was due. For any NSTM inspection conducted outside the month in which the inspection was due, regardless of interval, the subsequent NSTM inspection will be reset to the original target month. Changes to the target month will require PM approval within BridgeWorks.

According to the MBE, a nonredundant steel tension member 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 nonredundant steel tension bridge members, preparing written procedures, planning and performing effective NSTM Inspections and completing the required inspection report. The information presented here is meant as a summary of the main points of the NSTM Inspection. NSTMs were previously referred to as fracture critical members and a complete description can be found in the BIRM. NSTM Inspections are reported to the NBI.

1. **General** – Each agency shall identify the bridges within its jurisdiction which contain NSTMs. The agency can then identify, through documentation, the particular NSTMs within each bridge. For the member to be considered an NSTM, 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 load path, system, or internal 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 four types of redundancy: load path, structural, system, and internal. Bridge owners in the past have mainly identified structures with only load path redundancy to determine whether a member is an NSTM. 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 an NSTM. 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 considered as NSTMs.

2. **Identify the Bridge Types** – The following is a list of the types of bridges in which NSTMs will be found. Figures are also shown which illustrate these bridge types and note the location of the NSTM areas.

   a. **Steel Two-Beam or Two-Girder Systems (Exhibit 3-1)**

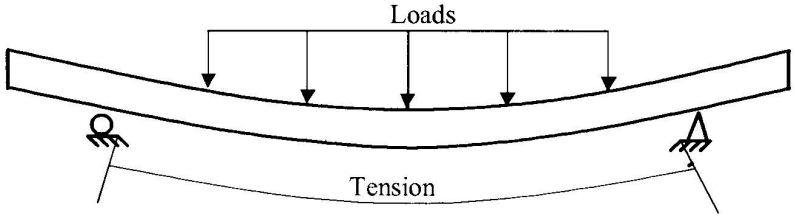
      (i) **Simple Spans** – Each beam or girder should be considered an NSTM as failure of either one could cause the bridge to collapse (Example A).

      (ii) **Continuous Spans** – In general, at the midpoint of the span, the bottom of the girder should be considered as an NSTM and over the pier, the top of the girder should be considered as an NSTM. A structural engineer may need to assess the bridge to determine the actual redundancy and presence of NSTMs (Example B).

      (iii) **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 as an NSTM (Example C).

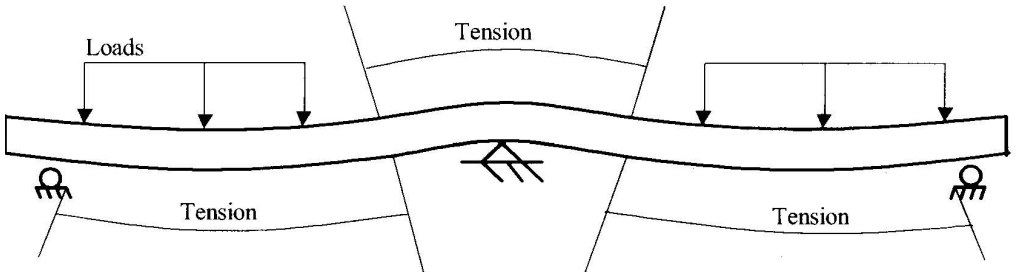
**Exhibit 3-1 Steel Two-Beam or Two-Girder Systems**

Example A: Simple Beam

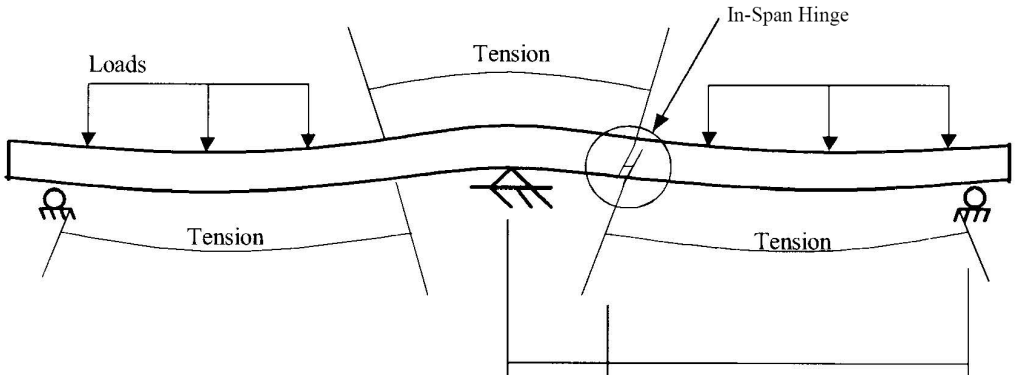



Example B: Continuous Spans

**Exhibit 3-1 Steel Two-Beam or Two-Girder Systems**




Example C: Cantilever - Suspended Spans



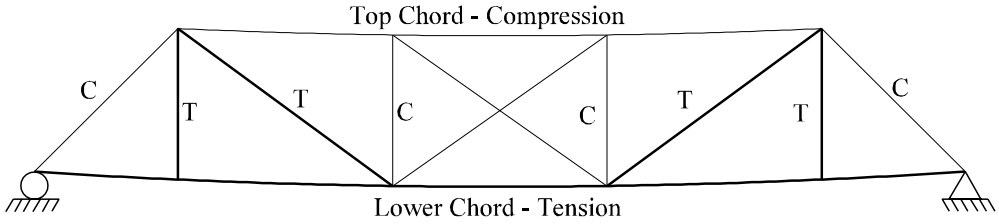

b. Steel Truss Systems (Exhibit 3-2) – Most truss bridges employ only two trusses and are thus considered as having NSTMs. All truss members in tension should be regarded as NSTMs. The exception is, when a detailed analysis by an experienced structural engineer, verifies loss of a member would not result in collapse of the bridge or major component.

The following elements within any truss bridge should also warrant special attention:

(i) **Pin-Connections** – Any load bearing pin connection in an NSTM or steel three girder system is considered as an NSTM.

(ii) **Category D and E Welds –** On a truss bridge, any tension member containing a Category D or E weld.

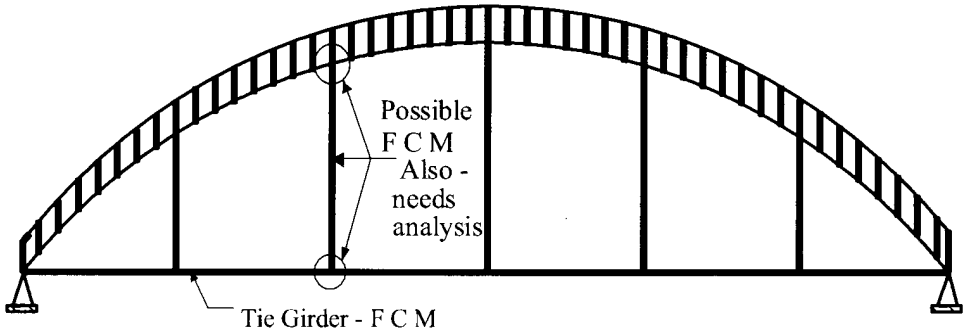
**Exhibit 3-2 Steel Truss Systems**




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

c. **Tied Arches (Exhibit 3-3) –** The tie girder which keeps the supports from spreading apart is in tension and should be considered as an NSTM.

**Exhibit 3-3 Tied Arches**



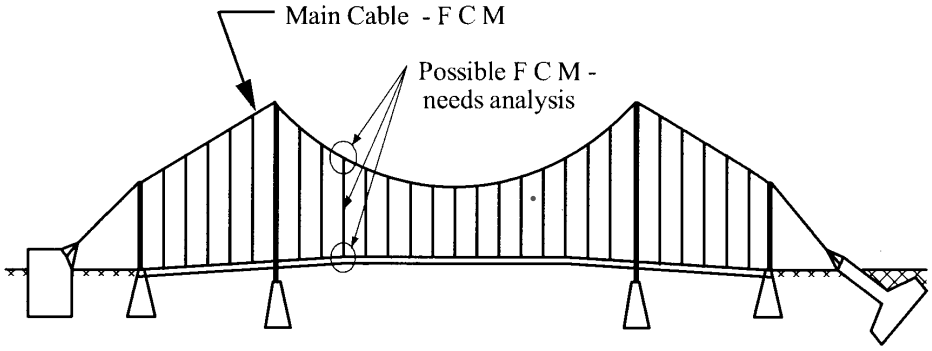

d. **Suspension Spans (Exhibit 3-4)**

(i) **Cables** – If the main suspension member is a cable, the cable should be considered as an NSTM (Example A).

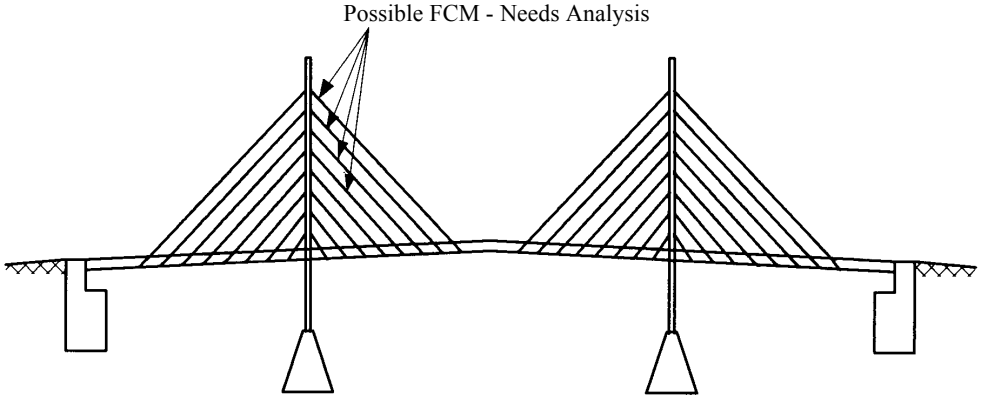
(ii) **Cable Stayed Bridge** – The bridge is of such complexity that it should be reviewed by a structural engineer to determine the criticality of the various stays to fracture (Example B).

**Exhibit 3-4 Suspension Spans**

Example A: Cable Suspension Bridge



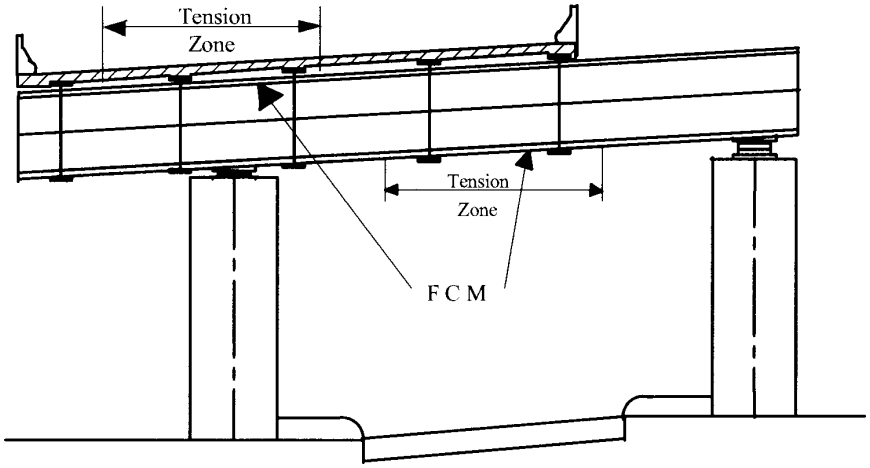

Example B: Cable Suspension Bridge



e. **Other NSTM Bridge Details**

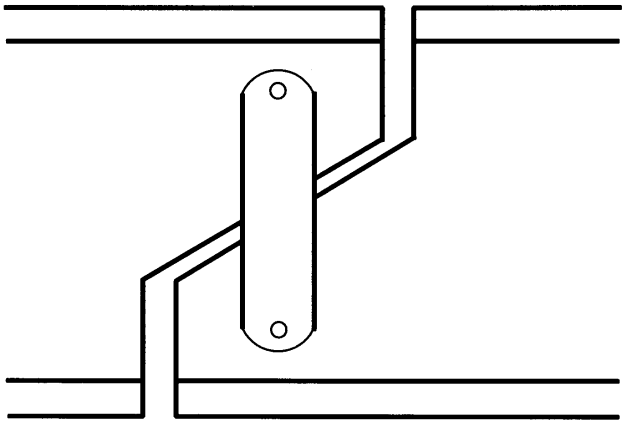
(i) **Steel Cross Beams and Caps** – Tension zones of the member or box beam should be considered as an NSTM (Exhibit 3-5).

**Exhibit 3-5 Steel Cross Beams and Caps**




(ii) **Pin and Hanger Supports** – The pin and hanger connection used to support a suspended span from a cantilever span should be considered as an NSTM if the member is non-redundant. The pin connection and hanger support in a two-girder or three-girder system are considered as NSTMs as the bridge has no built in redundancy. The same connections in a multi-beam system (more than 3 beams) are not NSTMs as the bridge has a high degree of redundancy. Pin connections in such bridges should be inspected with the same techniques and methods as NSTM pins (Exhibit 3-6).

**Exhibit 3-6 Pin and Hanger Supports**



3. **Prepare Written Procedures** – Once the NSTMs within a bridge have been identified, the agency must prepare a detailed plan as to how it will accomplish the NSTM Inspection. This written procedure may be developed by others being hired to perform the NSTM 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.

   NSTM 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 an NSTM Inspection during cold weather (as cracks will be more visible), at low water (if the NSTM 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 NSTM; 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 NSTM 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 NSTM inspection plan should identify the inspection interval 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 more than one type of inspection method is employed, identify when, where and how they are to be used. For example, a pinned truss bridge may require each of the pins to be examined visually during each inspection, supplemented by ultrasonic testing of ⅓ of the pins during each inspection. Therefore, all of the pins would be inspected ultrasonically in a 72-month period, if the inspection interval was 24 months.

4. **Perform the NSTM Inspection** – The purpose of the NSTM Inspection is to assess the structural condition of each bridge member identified as an NSTM. 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 an NSTM 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 ensures 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 NSTMs will be located. The following pages describe the particular features to note.

   First, the Team Leader must gain access to the area with NSTMs. 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.
   - Eye bars.
   - 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 Nonredundant Steel Tension Member Inspection Report.

5. **Prepare the Visual NSTM Inspection Report** – At the conclusion of the NSTM Inspection, a Visual NSTM Inspection Report should be prepared to provide detailed verification of the inspection findings. The report should provide qualitative and quantitative information concerning the NSTMs. This information is important for a number of reasons: it can offer insight about the condition of the member, it can provide a history of the bridge, and it can be used to substantiate the thoroughness of the inspection effort in the event of litigation arising from a bridge failure. See Section 3-5 for a copy of the Visual NSTM Inspection Report form.

   **The inspection report should:**

   - Identify what parts of the bridge were inspected and the location of each NSTM. (This can be shown on a photograph or sketch of the bridge.)
   - Describe the procedures followed to inspect the NSTM.
   - Describe the condition of the NSTM.
   - 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 NSTM, recalculate load ratings, close the bridge).

6. **Finalizing the report** – Once completed the NSTM report along with any supporting documentation should be uploaded to the files tab and all resources updated accordingly as described in the beginning of this chapter under 'Opening and Completing Bridge Inspection Reports'.

7. **NSTM Inspections with Inspection Intervals Less than 24 Months** – NSTM Bridges with an NSTM Inspection Condition Code rated 4 (Poor) or less must be inspected at intervals not to exceed 12 months. NSTM Bridges may be considered for more frequent inspection based on load posting, susceptibility to impact damage or other known deficiencies.

8. This report should be entered in conjunction with the scheduled Routine Inspection and will be signed as a part of that entry. It is eligible for Electronic Signature.

## 3-2.5 *Underwater Inspection (Scheduled Interval Not to Exceed 60 Months)*

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, with an FHWA Underwater Bridge Inspection endorsement must conduct an Underwater Inspection. An evaluation of the bridge's susceptibility to scour also needs to be conducted, see Section 5-3. Many bridge failures are due to underwater or scour problems; therefore, the importance of these types of inspection cannot be overemphasized. There may be environmental restrictions that need to be taken into consideration prior to conducting an Underwater Inspection.

An Underwater Inspection of submerged bridge elements is required on an interval not to exceed 60 months. The acceptable tolerance for intervals of 60 months for the next

Underwater inspection is up to three (3) months after the month in which the inspection was due. The subsequent Underwater inspection will be reset to the original target month. Changes to the target month will require PM approval within BridgeWorks.

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 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 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 interval of required inspection.
   - Location of members to be inspected.
   - Type(s) of foundation.
   - Bottom of foundation elevation or pile tip elevation.
   - Identification of scour critical substructure units.
   - Special equipment requirements.
   - Follow-up actions taken on findings of last inspection.
2. **Document the Underwater Inspection** – Prepare a Daily Site Dive Log for each dive and prepare an Underwater Inspection Report when inspection of the entire underwater portion of the bridge is concluded.
   a. **Daily Site Dive Log** – The Daily Site Dive Log must be completed by the inspection Team Leader (in concert with the diver). Section 3-5, provides a sample of the Daily Site Dive Log form. The form should summarize what equipment was used in the dive, what procedures were employed, what problems were encountered (such as strong currents or underwater obstructions or accumulations of debris) and should provide any information which may be helpful for planning future dives. At the conclusion of every dive, the diver must go over the inspection findings with the Team Leader 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.

(i) 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 interval, or an in-depth inspection.

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. **Finalizing the report** – Once completed the Underwater Report along with any supporting documentation should be uploaded to the files tab and all resources updated accordingly as described in the beginning of this chapter under 'Opening and Completing Bridge Inspection Reports'.

4. **Underwater Inspections with Inspection Intervals Less than 60 Months –** Bridges that require an Underwater Inspection meeting any of the following criteria must be inspected at intervals not to exceed 24 Months.

- Underwater Inspection Condition coded as serious (3) or less.
- Channel or Channel Protection Condition coded as serious (3) or less.
- Observed Scour Condition is coded as serious (3) or less.

Where condition ratings are coded 3 or less due to localized deficiencies, a special or limited inspection (WSDOT Interim Dive Inspection), limited to just those noted deficiencies can be used in conjunction with the regular interval Dive Inspection. In such cases there will be no more than 24 months of interval between the two. See the description of Interim Inspection.

5. **Underwater Inspection Intervals Less than 24 Months** – The acceptable tolerance for intervals of less than 24 months between dive inspection is up to two (2) months after the month in which the inspection was due.

## 3-2.6 *Complex Feature Inspection (Scheduled 12- or 24-Month Interval) (SNBI In-Depth Inspection)*

The Special Feature Inspection Type is being discontinued and replaced with the Complex Feature Inspection. Certain bridges will receive Complex Feature Inspections due to their design, material or function and are performed, in addition to the required Routine Inspection and requires a Lead Inspector with a current Certification Number. Complex Inspections are performed on regular intervals not to exceed 24 months. The acceptable tolerance for intervals of 24 months is up to three (3) months after the month in which the inspection was due. The acceptable tolerance for intervals less than 24 months is up to two (2) months after the month in which the inspection was due. For any inspection conducted outside the month in which the inspection was due, regardless of interval, the subsequent inspection will be reset to the original target month. Changes to the target month will require PM approval within Bridgeworks.

1. Bridges with complex features include but are not limited to:

   - *Moveable Bridges
   - *Floating Bridges
   - *Suspension Bridges
   - *Cable Stay Bridges
   - Ferry Terminals
   - Bridges with Pin and Hanger Details
   - Bridges built with High Strength Steel
   - Segmental Post Tension Concrete Boxes

   *Movable Bridges, Floating Bridges, Suspension and Cable-Stayed Bridges considered to be bridges with complex features in accordance with the NBIS.

2. Written procedures must be developed and included in the bridge file for all Complex Feature Inspections. Procedures should include:

   - Type, detail, and interval of required inspection.
   - The location of members to be inspected.
   - Special equipment required.

   a. **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.

   b. **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.

c. **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.

d. **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.

e. **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.

f. **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 "Complex 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 www.wsdot.wa.gov/publications/manuals/M3105.

g. **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 considered as an NSTM. Even when used in a multi-beam system where the bridge has a high degree of redundancy, the connection should still be inspected similar to an NSTM. 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.

h. **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.

3. This report should be entered in conjunction with the scheduled Routine Inspection and will be signed as a part of that entry. It is eligible for Electronic Signature.

## 3-2.7 *Interim Inspection (Scheduled 3, 6, 12- or 24-Month Interval) (SNBI Special Inspection)*

Interim Inspections for the State of Washington are considered Special Inspections under the NBIS. As a minimum, this inspection type is scheduled when condition ratings for Deck, Superstructure, Substructure or Culvert are coded 3 or less due to localized deficiencies, that need to be monitored between regular interval Routine Inspections. An Interim inspection may also be scheduled regardless of condition ratings, when a particular known or suspected deficiency, is identified as needing to be monitored. Interim Inspections are reported in the NBI.

The procedure for performing and documenting an Interim Inspection is the same as for a regular-interval Inspection, except that the focus is limited primarily to elements or areas identified with localized deficiencies or conditions that are being monitored.

**Examples of conditions that may indicate Interim Inspection:**

- Specifically identified bridge element or members show signs of advanced or rapid deterioration.
- Specific areas of damage needing to be monitored pending repair or replacement.
- Concerns over ongoing settlement that may adversely impact the supported structure.
- Foundation deterioration or damage may also warrant a visual inspection at an interval less than the mandatory 60 months.

1. **Determining the Interval** – The inspection interval will vary depending on the type of deficiency being monitored, and how rapidly the deterioration may be progressing. For Routine Inspections on 24-month intervals, Interim Inspections are typically done in 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.
2. **Preparing for the Inspection –** 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. Notes in the report should instructed the inspector 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 will be prepared by the individual who performed the inspection and will have specific language pertaining to the portions of the bridge needing the Interim Inspection, and what measurements need to be made.
4. **Documentation** – The Interim Inspection notes should detail the following:
   - The specific areas inspected.
   - Any measurements taken.
   - The procedures utilized to analyze and assess the given bridge element(s).
   - Testing results and/or findings.
   - Any recommendations for maintenance or repair.
   - Photos to document where and how to take repeatable measurements.

   In addition to the written information provided in the Interim Inspection Report, problem areas in the bridge should be carefully identified and documented with drawings/ sketches, and photographs, to facilitate accurate comparison of changes in condition and to provide repeatable measurements.
5. **Finalizing the report** – Once the Interim Report is completed, any supporting documentation should be uploaded to the files tab and all resources updated accordingly as described in the beginning of this chapter under 'Opening and Completing Bridge Inspection Reports'.
6. **Interim Inspection Intervals Less than 24 Months** – The acceptable tolerance for intervals of less than 24 months between inspections is up to two (2) months after the month in which the inspection was due.

## 3-2.8 *Underwater Interim (Scheduled 3, 6, 12, 24, 36 or 48-Month Interval) (SNBI Special Inspection)*

Underwater Interim Inspections for the State of Washington are considered Special Inspections under the NBIS. As a minimum, this inspection type is scheduled when condition ratings are coded 3 or less due to localized deficiencies, that need to be monitored between regular interval Underwater Inspections. An Underwater Interim inspection may also be scheduled regardless of condition ratings, when a particular known or suspected deficiency, is identified as needing to be monitored. Underwater Interim Inspections are reported in the NBI.

The procedure for performing and documenting an Interim Underwater Inspection is the same as for a regular-interval Underwater Inspection, except that the focus is limited primarily to elements or areas identified with localized deficiencies or conditions that are being monitored.

**Examples of conditions that may indicate Interim Inspection:**

- Extensive localized scour or rapidly progressing deterioration of the stream bed in which normally buried footings become exposed or pile supported footings become undermined. of the stream bed.
- Foundation deterioration or damage may also warrant a visual inspection at an interval less than the mandatory 60 months.

1. **Determining the Interval** – The inspection interval will vary depending on the type of deficiency being monitored, and how rapidly the deterioration may be progressing.

   a. 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 interval.

      During subsequent Interim Inspections, the interval may be adjusted upwards if the scour is determined to be stable and non-threatening to the structure. Adjusting a scour related Interim Inspection interval upwards is done slowly over time, i.e., 12, 24, 36, or 48 months, until the maximum 60-month inspection interval is reached.

   b. For non- scour related Underwater Inspection findings (i.e., foundation damage or deterioration) the Underwater Interim Inspection interval will usually be set at 24 months.

   c. There may be cases where Interim Inspections should occur several times during a calendar year on 3- or 6-month intervals. The inspecting agency along with the Team Leader will determine the appropriate inspection interval. The Underwater Inspection Note should detail the follow.

   d. 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. **Preparing for the Inspection –** 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 Underwater Interim Inspection.

3. **Reporting** – A BIR documenting the inspection findings will be prepared by the individual who performed the inspection and will have specific language pertaining to the portions of the bridge needing the Underwater Interim Inspection, and what measurements need to be made.

4. **Documentation** – The Underwater Inspection Note should detail the following:

   - The specific areas inspected for the Interim Inspection.
   - Any measurements taken.
   - The procedures utilized to analyze and assess the given bridge element(s).
   - Testing results and/or findings.
   - Any recommendations for maintenance or repair.
   - Recommendations for additional inspections and frequencies.

   In addition to the written information provided in the Underwater Interim 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.

5. **Finalizing the report** – Once completed the Interim Underwater Report along with any supporting documentation should be uploaded to the files tab and all resources updated accordingly as described in the beginning of this chapter under 'Opening and Completing Bridge Inspection Reports'.
6. **Underwater Interim Inspection Intervals Less than 24 Months** – The acceptable tolerance for intervals of less than 24 months between dive inspections is up to two (2) months after the month in which the inspection was due.

## 3-2.9 *Damage Inspection (Unscheduled-No Interval by WSDOT)*

A Damage Inspection is an unscheduled inspection with no assigned interval 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, the need for an In-Depth or more frequent Routine or Interim Inspections may be indicated. This determination should be made by the Team Leader in conjunction with their supervisor. Damage Inspections are reported to the NBI or NTI.

Damage Inspections are categorized by type based on the damage received or how it was found or is being reported. Team Leaders should create a Damage Inspection Report in BridgeWorks and choose one of the following events:

- A – Scour
- B – Flood
- C – Collision (Bridge Impact/Hit)
- D – Overload
- E – Fire
- G –Earthquake
- H – Fatigue
- I – Deterioration
- M - Erosion
- N – Unknown/Other
- P – Bridge Rail
- S – Reported by Others - Collision (Bridge Impact/Hit)
- T – Reported by Others – Fire
- V – Reported by Others – Other

1. **Preparing for the Inspection –** If called upon to perform a Damage Inspection, Team Leaders should familiarize themselves 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.
2. **Conducting the inspection –** When conducting a Damage Inspection for any reason, 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. For flood events, post event follow-up inspections may be necessary after the water fully subsides. When completed, the Team Leader should be able to provide the necessary information and assist in assessing the structure's safety and condition. Observations by the Team Leader for recommending or determining appropriate measures to protect the bridge from failure or further damage.

Assessments that need to be made during the inspection:

- Identify any damaged, fractured, and impacted members and elements.
- Measure/Calculate and record any section loss of materials and note location.
- Identify number, position/location and extent of any damaged reinforcement or tensioning strands.
- Measure any noted misalignment or movement.
- Determine any loss of foundation support.
- Compute the amount of any section loss.
- Measure the amount any member is out of alignment.
- Check connection locations adjacent to and around areas of damage.

For bridges impacted by flooding events:

- Observe for water over the bridge deck. Also note the overtopping in BAP02.
- Observe for missing approach roadway or deck sections and/or collapsed spans.
- Site down the bridge rail for sags or discontinuities that may indicate settlement.
- Observe the deck joints for steps, asymmetry, excessive gaps, or impaction that may indicate settlement, tilting, or rotation of the piers.
- From a safe location on the channel banks, observe for tilting, rotation, settlement, or loss of foundation at each pier.
- Identify scour around underwater bridge elements.
- Document channel bank erosion.
- Identify damage to designed channel protection such as riprap.
- Document any indication of lateral migrations in the channel.
- Document sediment transport or accumulation.
- Document debris transport or accumulation (especially around piers).
- Take soundings if possible.
- Assess if the bridge should be open, closed, or posted before leaving the bridge.
  - All bridges that are overtopped should be closed until water recedes below the deck.
  - Scour Critical (BAP03 codes of C or D) and Unknown Foundation (BAP03 code of U) bridges that are in pressure flow (flow up to the bottom of the superstructure) should be closed until in-water inspection of the foundations can be made.

3. **Reporting** – A BIR documenting the inspection findings will be prepared by the individual who performed the inspection and will have specific language identifying the cause and areas of damage, as well as individual elements and locations impacted.
4. **Documentation** – The Damage Inspection, date, time, and a short description should be documented in the "0" Note. Details of actual damage to members/elements, or areas around the bridge should be described and quantified within the affected element notes. Documentation should be detailed regarding specific members, location, quantities, or extent, and include measurements of section loss, deformity, or misalignment.

Supporting materials and notes should include:

- Drawings or sketches indicating location and extent of damage. See Section 3-5 for Girder Damage Templates.
- Photographs providing overall, up close, and detailed depictions of damage elements that support evaluation and conclusions.
- Records of measurements that may need to be verified or repeated.
- Soundings and Ground Line representation of channel profiles.
- Physical check for verification of clearances at damage locations.

In addition to the documentation, of the damage and collection of supporting information, resulting conditions states of elements need to be quantified. Condition Codes for

Deck, Superstructure, Substructure, Culvert, Underwater Inspection, Channel, Channel Protection and Observed Scour, all need to be evaluated and adjusted appropriately.

Team Leaders writing the report should work with their supervisor, the BPO Repair Section, and the BPO Risk Reduction Engineer throughout the writing and review process to assess the following:

- Overall bridge condition and status.
- Required repairs, and priorities.
- Need for any required posting or restrictions.
- Scheduling or inspection interval adjustment of future inspections.
- Requirements for CFDR documentation and FHWA notification.

5. **Finalizing the report** – Once the Damage Report is completed, to include any recommended repairs, postings or restrictions, any supporting documentation should be uploaded to the files tab and all resources updated accordingly as described in the beginning of this chapter under 'Opening and Completing Bridge Inspection Reports'.

   **Prior to release, ensure that any additional required inspection types are scheduled or adjustments to other inspection frequencies are made. If required, initiate and enter required CFDR information.**

## 3-2.10 *CFDR (Critical Finding Damage Report) (Dedicated Tab in BridgeWorks)*

A Critical Finding Damage Report (CFDR) is not an actual report, but rather a tab entry into BridgeWorks of specific information to track information on open Critical Findings and facilitate reporting to FHWA on the status. When an incident or discovered condition results in the need for reporting of a Critical Finding, usually the temporary closure or restriction of a structure, an authorized BridgeWorks user for an agency is responsible for opening a CFDR using the "Critical Findings" tab. The CFDR should be opened at the time of the incident or discovery as part of a Routine or Damage Inspection but may be entered using an Informational Report. After the release of any associated report, the CFDR may be managed and updated for status using an open Informational Report.

Descriptions entered on the Critical Finding tab should only be a brief summary to accompany the dated entries reporting the Identification of a Critical Finding, Actions Taken, Updates and any Resolution. BridgeWorks uses these entries along with other structure inventory information and condition reporting already existing for the structure to generate a report for Program Managers. Historical and open Critical Findings will remain associated with the structure.

Inspectors should work with Supervisors, Organizational Engineers, and Program Managers for determining when a CFDR is required, how it should be reported and any necessary updates. For specific information on entry descriptions, see Chapter 6, "Completing the CFDR" and "CFDR Tracking and Reporting".

## 3-2.11 *Local Agency Safety (Interval set by agency, Not Reportable)*

A Local Agency Safety Inspection is used by agencies other than WSDOT to inspect structures owned by WSDOT or other agencies. Some examples include:

- a railroad bridge over local agency route.
- a state-owned pedestrian bridge over a local agency route.
- a state-owned bridge carrying traffic over a local agency route.

Local Agency Safety Inspections are performed at the discretion of agencies that do not own but have an interest in the structure. The inspection scope and inspection interval are also entirely determined by that agency. These inspections are not reported to the NBI or NTI and are not subject to the NBIS or NTIS. These inspections are intended to assess the safety of the structure for any immediate hazard to the route crossing under it, and the inspection is directed to only those portions of the structure that could affect that undercrossing route.

The agency performing a Local Agency Safety Inspection should limit inspection notes to BMS element 379 – Local Agency Safety. Repair recommendations should be limited to only those findings that directly affect the safety for users of the route under the bridge. In cases where the bridge owner also maintains an inspection record in WSBIS, the repair can be added to the repair report. In cases where the bridge owner doesn't use WSBIS (most railroads for example), entering repairs into the repair report will need to be supplemented with direct contact with the structure owner.

Agencies that own a non-reportable structure and maintain a record in WSBIS typically use the Condition report type for that structure.

## 3-2.12 *WSDOT Safety (Interval set by agency, Not Reportable)*

A WSDOT Safety Inspection is used by WSDOT to inspect structures owned by other agencies. For this report WSDOT will maintain the WSDOT Safety report type.

WSDOT Safety Inspections are performed at the discretion of WSDOT when it does not own but has an interest in the structure. The inspection scope and inspection interval are also entirely determined by WSDOT. These inspections are not reported to the NBI or NTI and are not subject to the NBIS or NTIS. These inspections are intended to assess the safety of the structure for any immediate hazard to the route crossing under it, and the inspection is directed to only those portions of the structure that could affect that undercrossing route.

WSDOT Safety Inspections should limit inspection notes to BMS element 378 – WSDOT Safety. Repair recommendations should be limited to only those findings that directly affect the safety for users of the route under the bridge. In cases where the bridge owner also maintains an inspection record in WSBIS, the repair can be added to the repair report. In cases where the bridge owner doesn't use WSBIS (most railroads for example), entering repairs into the repair report will need to be communicated through the region or rail office to the owner of the structure. Typically addressed by the region office.

For WSDOT owned non-reportable structures with a record in WSBIS, inspectors will typically use the Condition report type for that structure.

## 3-2.13 *Condition Inspection (Interval set by agency, Not Reportable)*

A Condition Inspection is used in cases where an agency owns a structure that is not reportable to the NBI or NTI but is using WSBIS to maintain a comprehensive record of the structure for both public safety and long-term maintenance. These inspections are separate from Short Spans and are conducted on structures that typically do not carry live traffic open to the public and are therefore not reportable. Examples include:

- A state or local agency pedestrian bridge, regardless of whether it crosses over a state or local agency route.
- A transit structure where the owner chooses to maintain a record in WSBIS, regardless of whether it crosses over a state or local agency route.

This inspection is performed at the discretion of the agency which owns the structure, and the inspection scope and inspection interval is also entirely determined by that agency. Condition Inspections are similar to Routine Inspections, but without specific federally mandated requirements for inspection interval, level of detail, or appraisal coding. These inspections are not reported to the NBI or NTI and are not subject to the NBIS or NTIS.

## 3-2.14 *Short Span Inspections (Interval set by agency, Not Reportable)*

This inspection type is used for bridges/culverts that have an opening of 20 feet or less as measured along the center of the roadway between under copings of abutments, spring lines of arches, or extreme end openings of 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, in the interest of public safety and long-term maintenance, it is recommended that agencies inspect short span bridges consistent with a full NBI inspection. If possible, assigned structure numbers should be unique to separate them from reportable structures. The interval 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 with spans between 4 and 20 feet.
    - Single span concrete or metal structures, other than metal corrugated pipes with spans between 6 and 20 feet.

- Multiple span concrete structures with total openings between 8 and 20 feet.
- Metal corrugated pipes with openings between 8 and 20 feet.
- Multiple concrete or steel pipe structures with total openings from 10 and 20 feet.

See Appendix 3-A1 through 3-A3 for clarification. These guidelines are not intended to replace sound engineering judgment. When in doubt, a conservative approach should be taken.

2. **Determine the Interval –** Recommended intervals 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 structures, with BMS elements in Condition States 3 or 4.
   - **48 Months** – Metal structures in good condition or concrete with only minor problems.
   - **72 Months** – Concrete structures in good condition.
3. **Performing the inspection** – Conduct Short Span Inspections consistent with Routine Inspections and fill in all the applicable fields listed on the WSBIS coding form.
   - Provide all the same information and supporting documentation to include Deck and Elevation Photos, and Scour Field Evaluations.

   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.
4. **Short Span Bridges Not Inspected** – If the short span bridge is not inspected, the following are some guidelines to follow:
   a. 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.
   b. 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.
5. **Finalizing the report** – Once the Short Span Report is completed, any supporting documentation should be uploaded to the files tab and all resources updated accordingly as described in the beginning of this chapter under 'Opening and Completing Bridge Inspection Reports'. Submit the data through normal bridge inspection reporting procedures. First or initial inspections on short spans will still be entered into Bridge Works as a Short Span type. However, a comment will be entered under the "0" Note to indicate that the inspection on that date was the initial inspection.

## 3-2.15 *2-Man and 3-Man Agreement Inspections (2-Man Inspection Type Discontinued)*

Local agencies can enter into signed agreements with the State allowing WSDOT to assist those agencies with inspections requiring the use of specialized equipment such as UBITS. WSDOT can provide all the resources and perform the inspection (3-Man) or provide the UBIT with driver and bucket operator to assist the Agency in conducting their own inspection (2-Man).

The 2-Man inspection type in BridgeWorks was originally used to identify and schedule State UBIT resources used by Local Agencies but is being discontinued. The 2- Man Inspection resource is still available but will not be entered into BridgeWorks as an inspection type. WSDOT still provides the UBIT with driver and operator/assistant inspector at cost, and the Team Leader representing the Local Agency will still perform the inspection. Inspection intervals 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. Going forward, agencies using the WSDOT UBIT resource either as a 2-Man Inspection or a 3-Man Inspection should do the following:

1. **Enter the Appropriate Report Type –** The agency or lead inspector for the agency will need to identify the reportable type of inspection being performed. This will normally be either a Routine or an NSTM.
2. **Enter the UBIT Resource** – The UBIT and Two Man Resources should be entered as a resource under the Routine or NSTM Inspection type (not both) for the bridges that require the resource.
    a. Under the Resource Box at the bottom of the Routine or NSTM Inspection type tabs in BridgeWorks, select the UBIT resource in the drop down.
    b. Under the column “Used” select the type of UBIT used for the current or last inspection. Under the “Min”, “Max”, and ‘Pref” columns enter the appropriately desired size of UBIT.
    c. Under the “Hours” and “OTHrs” (Over Time Hours) columns, enter the number of hours used for the current or last inspection.
    d. Under the “Freq” and “Date”, columns enter the Interval and Date of the current or last inspection. The “Need” date will automatically populate. If it does not or there is already a “Date” entered, use the “Ovr Need” to enter the date and it will override. Enter the “Interval” and “Need Date” information to coincide with the inspection interval and due date month above. This will ensure that the equipment will be scheduled to coincide with the month the desired inspection is due.
    e. To indicate that the UBIT will be needed with only the driver and operator, and the Lead Inspector will be agency provided (Two Man), under the “Resource” column select an additional resource as 2-Man. With out that, the UBIT resource will be scheduled as a full inspection team.

        **Examples**

        - Routine or NSTM Inspection conducted every two years with a UBIT in May, with next inspection required 5/8/2030. Agency desires WSDOT to do the complete inspection and write the report.
            i. Enter …. UBIT Resource……Freq = 24……Need Date 5/8/2030

- Routine or NSTM Inspection conducted every two years with a UBIT in May, with next inspection required 5/8/2030. Agency conducts inspection.
  i. Enter …. UBIT Resource……Freq = 24……Need Date 5/8/2030
  ii. Enter …. 2-Man Resource
- Routine Inspection conducted every two years in August, but only requires a UBIT every four years. Agency conducts inspection. Last Two Man Inspection 8/10/23, Next Routine 8/10/25. Next Routine Inspection with UBIT 8/10/27.
  i. Enter …. UBIT Resource……Freq = 48……Need Date 8/10/2027
  ii. Enter …. 2-Man Resource

f. WSDOT compiles inspection schedules and resource by month, up to 1-year in advance each year. If the Resources and Resource Need Dates are filled out and updated each inspection to coincide future Inspection Need Dates, resources under agreements will automatically get scheduled for the month those inspections are due. WSDOT should contact the agencies at least the month prior to the actual scheduled date.

3. **Performing the Inspection** – WSDOT should contact the agencies at least one month prior to the actual scheduled inspection need dates. If that does not happen or the agency is scheduling further out, the agency may contact WSDOT Bridge Preservation. In both cases of either 2-Man or 3-Man Inspections, WSDOT and the agency under agreement will coordinate the days and times of inspections. For agencies using private consultants to conduct the inspection, it is the agency under agreement that WSDOT will coordinate with. Local Agencies are responsible for providing traffic control, arranging for RR flagging or any other required coordination.

   a. For 2-Man Inspections, WSDOT will provide the UBIT with driver and a bucket operator to also act as assistant inspector. The representative for the Local Agency must meet all the necessary qualifications to act as a Team Leader for the inspection being performed. The representative Team Leader needs to have the proper PPE for fall protection and have received all the required fall protection training necessary to utilize the UBIT. If there are any questions do not hesitate to contact WSDOT Bridge Preservation in advance for assistance.

   b. For 3-Man Inspections, WSDOT will coordinate with the agency under agreement for the days and times of the inspections to be performed. Local Agencies are responsible for providing traffic control, arranging for RR flagging or any other required coordination. WSDOT will provide the UBIT with driver, bucket operator/assistant inspector and the qualified Team Leader to conduct the inspection and prepare the report.

   c. Assigned Team Leaders from either WSDOT or the agency under agreement should perform the necessary required inspection, such as a Routine and/or NSTM, and enter them into BridgeWorks following the procedures for opening and completing those specific reports.

4. **Finalizing the report** – Once the associated report is completed, any supporting documentation should be uploaded to the files tab and all resources updated accordingly as described in the beginning of this chapter under 'Opening and Completing Bridge Inspection Reports'. Before releasing the report be sure to complete the following:

   a. Update the resources for the report as described above and insure that need dates for the resources coincide with required next inspection dates. If there are any questions, the agency or team leader may contact WSDOT Bridge Preservation Supervisors for assistance.

   b. For WSDOT UBIT drivers and bucket operators/co-inspectors performing 2-Man Inspection support, ensure the correct RO Number are used for each structure inspected and notify your supervisor when the inspections have been completed.

## 3-2.16 *Informational Report*

This report type is used to add notes, data, files or photos to a report between scheduled inspections. Additionally, the Informational Report can be used to change the inspection interval if necessary or to just assign a next scheduled inspection date without having to change the normal inspection interval. 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, it may be necessary to print out and sign the report for scanning into BEISt (see "Signed Informational Report" type). This will be determined by the Team Leader and their supervisor. 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 Informational Report.

## 3-2.17 *Signed Informational Report*

This report type is similar to the Informational Report type regarding the entry and updating of administrative information, photos, files, notes, or adjusting inspection dates and intervals. However, any time an Informational Report includes the changing of NBI condition codes that may directly affect and change the overall rating of a structure, possibly affecting the inspection interval and reporting requirements, the report must be signed. This type of report must be entered by a certified Team Leader, reviewed through the QC process, signed, and then uploaded into BEISt. An example of Informational Reports that may require a signature may include changes to the below listed NBI or SNTI condition codes.

- Deck Condition
- Superstructure Condition
- Substructure Condition
- Culvert Condition
- Observed Scour Condition
- Underwater Inspection Condition
- Channel Condition
- Channel Protection Condition
- NSTM Inspection Condition

## 3-2.18 *Inventory*

This report type is used to administratively enter or update new or altered bridge records. The data entered is based off plan reviews and information derived from project documents or real-estate agreements. Once entered, this report generates information within the bridge record that will require field verification by inspectors when conducting Initial and Routine Inspections. This report type may also provide detailed information on a new or altered structure to assist the inspection team in field verification and is intended to stay in the bridge record until an Initial or follow up Routine Inspection is completed.

For Local Agency structures, the Inventory Report type is created and removed by the Local Programs Bridge Inventory Engineer (LPBIE) for new structures. When agencies need an inventory report, they will contact the LPBIE for assistance.

For WSDOT structures, the Inventory report type is always created and removed by the BPO Information Group and is closely coordinated with the Contract History 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.

## 3-2.19 *In-Depth (SNBI Special Inspection)*

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, targeted evaluation prior to a contract, or conducting specific analyses of given bridge elements. The need for an In-Depth Inspection generally arises resulting from a Routine or Interim Inspection; or just a need for additional information to support contract work or requests for information.

In-Depth Inspections are performed as needed and do not have inspection interval. They are treated as one-time only inspections typically to gather additional information. If the inspecting agency feels that subsequent inspections are needed on regular intervals, Interim Inspections should be utilized instead. They are not reported in the NBI or NTI.

1. **Performing the Inspection** – The In-Depth Inspection should include as detailed analysis as necessary to determine the condition of the given bridge element or elements. 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. Prior to scheduling the inspection, Team Leaders should ensure they fully understand the purpose of the inspection and the information type and detail required.
2. **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.

   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.

## 3-2.20 *Geometric (Anticipated Discontinuance in 2025)*

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. Vertical and horizontal roadway clearances are collected at an 8-year interval for minimum vertical clearances of 16.5 feet and less, and at a 16-year interval for minimum vertical clearances greater than 16.5 feet. 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.

## 3-2.21 *Scour Monitoring*

This inspection type is used when scour monitoring is performed as required by a Scour Plan of Action (POA) for a triggering storm event. See Sections 5-3.2 and 5-3.3.1. This typically involves during event and post- event inspections by regional maintenance crews who then report the findings to the BPO Scour Engineer. If multiple site visits occur for a triggering storm event, this report type only needs to be recorded for that storm event with a start date and an end date. The start date is the first day the structure is observed for a triggered event. The end date is the day the inspection or monitoring closes out for the event in accordance with the scour plan of action (POA).

## 3-3 Bridge Inspection Orientation

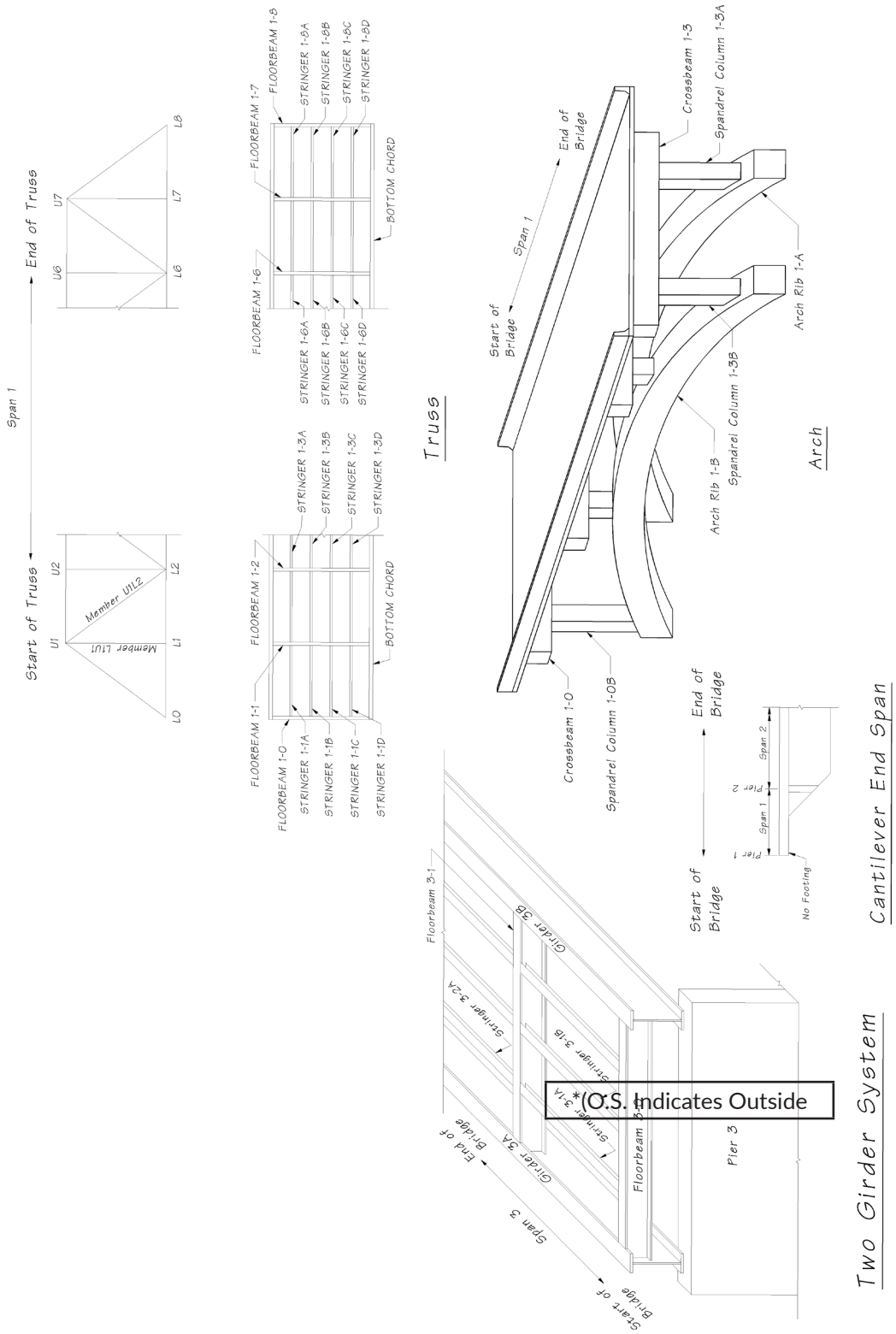
Designation of bridge orientation and a component numbering system for the bridge elements is needed for consistency within the inspection reports. Orientation and component numbering systems typically follow the conventions of the bridge owner and inspecting agency. To ensure consistency between inspections, the designated orientation will be identified at the beginning of each bridge inspection report.

**State Owned Structures**

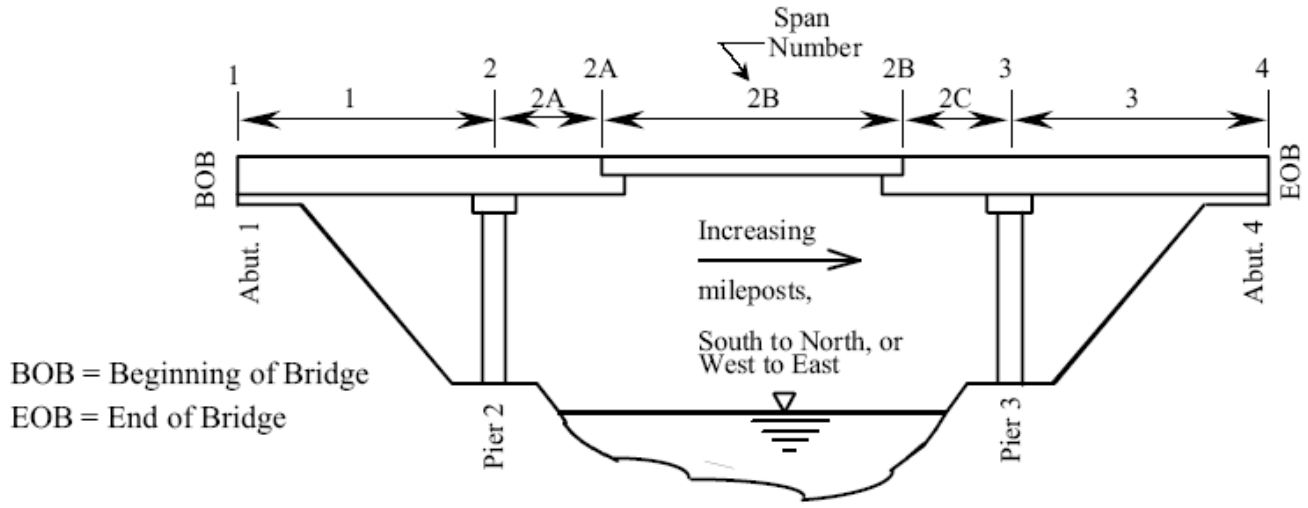
- For east to west routes (typically even numbered routes) the designated beginning of a structure is at the west end moving to the east in the direction of increasing milepost. For south to north routes (typically odd numbered routes) the designated beginning of a structure is at the south end moving to the north. There are a few exceptions regarding route orientation and numbering within the state, as well as a few that are confusing regarding geographic orientation. In any case, the orientation should default to the direction of increasing milepost.
- For directional traffic ramp structures, such as on-ramps and off-ramps, orientation will normally be in the direction of traffic. This allows for inspections to start where the bridge is first accessed while traveling the associated route.
- For overcrossing structures, orientation will normally be crosswise to the orientation of the associated route and start at the west or south for consistency. For a south to north route, an overcrossing structure will be oriented west to east (left to right). Over a west to east route, an overcrossing structure will be oriented south to north (right to left).

Once the designated orientation of a structure is identified, subcomponents will typically be numbered from the left to the right looking ahead on stationing in the direction of orientation. If the State inspects bridges for another agency, unless the agency already has a clearly designated orientation within the report, designated orientation will typically follow State convention (See Exhibit 3-7 through Exhibit 3-10)

## Exhibit 3-7 Bridge Nomenclature



## Exhibit 3-8 Component Location




**Orientation**:

B.O.B. normally south or west ends following route orientation.

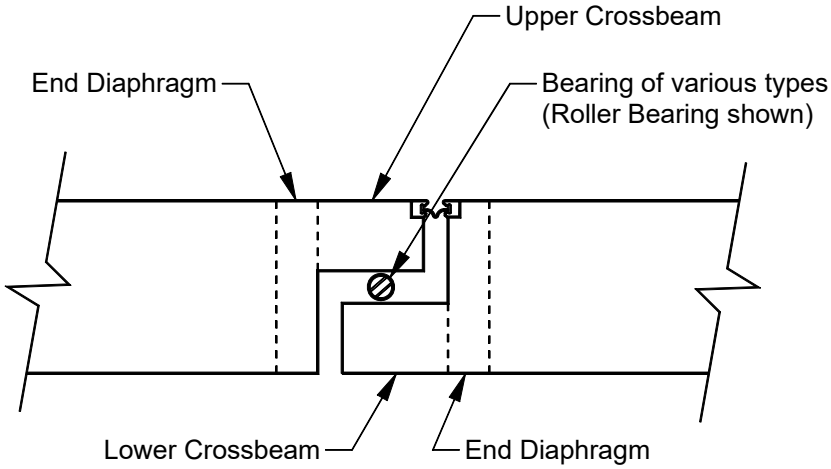
**Exceptions Include:**

One way ramps – B.O.B. = First end to receive traffic.

Selected bridges that follow plan orientation.

There is no golden rule about orientation except that B.O.B. Must always be identified in the '0' note along with basis for this assumption. It is helpful to refer to geographical markers (streets, rivers, etc) when describing the B.O.B.

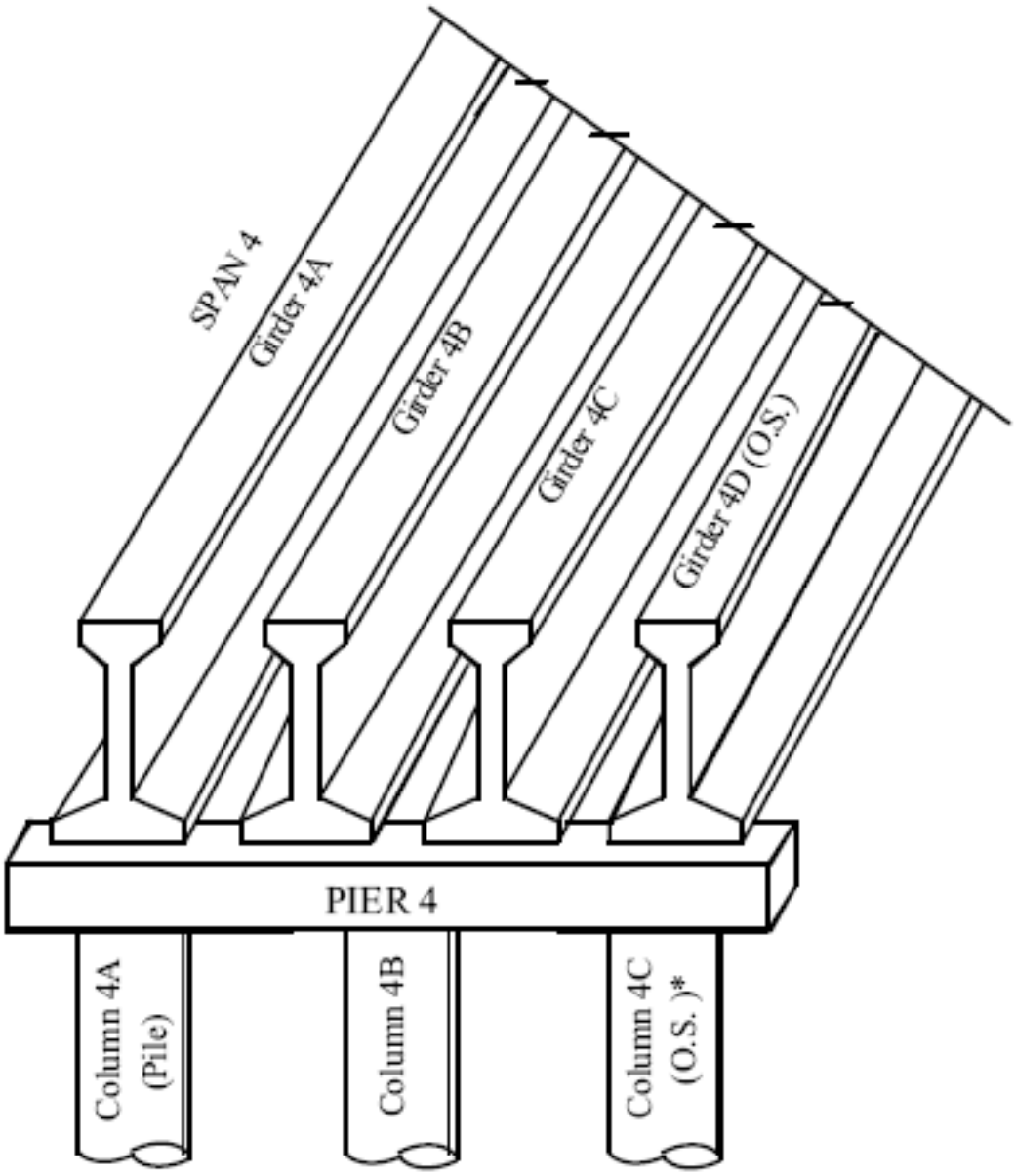
## Exhibit 3-9 In-Span Hinge Callout




**IN-SPAN HINGE CALLOUT**

(Do not Quantify Crossbeams in BMS for Box Girder)

**Exhibit 3-10 Component Identification**




Section 3-4 provides guidelines for inspection processes and procedures specific to the State and the Office of Local Programs. These guidelines can be used as a reference or can be implemented.

# 3-4 Policy and Procedures

This section discusses the specific policies and procedures that are utilized in BPO or LP that are supplementary guidelines for field work and inspection report writing. These best management practices are utilized by inspection teams and are specific to each program.

## 3-4.1 *BPO Policy and Procedures*

### 3-4.1.A General Inspection and Report Writing

1. 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 corresponding to FHWA and/or agency specific items. Over the next several years, new SNBI coding requirements are being incorporated, phasing out older ones. Many of the items will start to show the new SNBI numbers in place or in addition to the existing numbers.
2. When circumstances (including obstruction of bridge elements) prevent any required work from being completed at the time of inspection, report the situation to your supervisor so a determination can be made whether or not the bridge needs to be rescheduled in the current inspection year. It is the responsibility of the Team Leader to ensure that the bridge inspection is completed unless the supervisor delegates the responsibility. Bridges that cannot be inspected due to high water will be rescheduled in the current inspection year during lower flows. Bridges that need cleaning or vegetation removed will require coordination with maintenance for dirt and/or vegetation removal prior to re-inspection. If the supervisor determines that the bridge does not need to be rescheduled in the current inspection year, clearly identify why the work wasn't completed and what is required of the next team leader to achieve the task.
3. 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.
4. Whenever an in-span hinge separates two bridges, the bearings, restrainers, and joint are to be coded with the "dependent" structure. Identify how these elements are associated in the report. Explain any exceptions to this rule in the 0 note.
5. 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.
6. 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.
7. Investigate fully and report any and all joint noises and their origination.

8. Compare Curb to Curb Width (B.G.06) with Horizontal Clearance (1491 and 1495). Typically, they should be the same, except for non-mountable medians.
9. 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.
10. Inspection report summary comments are required for any BMS element in Condition State (CS) 2, 3 or 4. Comments need to be detailed in accurately describing and supporting the assigned condition states. The comments can be supported with photos but should, on their own, contain the necessary details to document the location and extent of conditions.
11. Avoid using phrases for significant defects such as “open crack” without a further description such as width, and any repetitive nature. Mark the specific defect location on the bridge with any measurement and the date. Consider taking a photo of the marked defect to include in the inspection report. For concrete crack size guidelines, see the table in Section 4-4.
12. 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 (NSTM, soundings, etc.). The WSBIS sheet is required to reflect all current changes associated with the inspection.
13. 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 NSTM inspection Report.
14. Ensure that photographs are accurately titled and up to date in depicting the current condition as is described in the report notes. Report notes should contain the detailed information and be accurately supported by the photos.
15. 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.
16. Deck and Elevation Photos should be assessed at each inspection. Update photos if there are new conditions or changes to the structure.

## 3-4.1.B Bridge Inspection Notes Standard Practice

1. Cardinal directions (north, south, east, and west) are not to be abbreviated and are never capitalized, except at the beginning of a sentence. The directions northeast, southeast, northwest, and southwest may be abbreviated NE, SE, NW, and SW.
2. For acronyms, follow the standard practice of spelling out the first time use with the acronym in parenthesis following (e.g., Local Programs (LP)).
3. 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)<br>‘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. |

4. Limit the use of symbols to ° for degrees and % for percent.
5. Use of the “Tilde” (~) symbol is not allowed.

Dimensions are noted with a space or hyphen between feet and inches, and a hyphen between whole inches and fractions of an inch. When combined with other dimensions, a ‘0’ should precede bare fractions of an inch. Measurements greater than 12″ may be listed in inches, if appropriate. Decimal inches may also be used. For example:

1′ 1-1/16″ × 6′ 0-7/8″ 6″ × 14″ timber stringers

8″ × 14″ × 1/2″ deep spall

3 ft. wide × 14 ft. long × 2.5 ft. tall bridge corbel

12 ft. (L) × 15′ 6″ (W) × 3″ (D) popout in south face of Pier 2 1′ 0-3/4″(l) × 0.125″(w) crack in east face of Girder 2F

42.2″ long anchor bolts

## 3-4.1.C Report Notes Within BridgeWorks

**0 Note – Orientation**

- Bridge orientation and identification of the pier/span numbering system is always required, stating the basis of orientation such as "increasing mileposts," "ramp direction," or per plans. Any potentially confusing orientation issues or deviations from standards (west to east or south to north) must be clearly identified. Identifiable physical features at beginning or end of bridge may also be used.
- Place any special instructions and information that doesn't fit anywhere else under the 0 note.
- For bridges receiving Routine Inspections that are still open to traffic while under construction, enter the standard note provided under 3-4.1. L, "Inspection of Structures Under Contract"
- For bridges receiving Extended Interval Routine Inspections at 48-months, enter the standard note provided under "Routine Inspection" for "Routine Inspections with Extended Intervals".
- Flood Monitoring information for triggered Scour POA events will be entered in the zero note with the Start Date, Flow rates or other descriptions of the triggering event, Subsequent inspections/monitoring, and the End Date. Other elements in the report will be used to report defects noted during the event. If there are no defects noted during the monitoring event, the zero note will be the only record of this report type. This information will be retained until the next inspection type is entered. The next inspection should delete the scour monitoring information to avoid cluttering the zero note with outdated information.

**1 Note** – This note is maintained by the Team Leader and is used for explanatory information. regarding bridges that contain NSTMs and/or Complex Features. Use this note to explain any complex features, procedures, areas to be inspected or complicated scheduling. Do not redundantly repeat resource information or dates that an inspection occurred.

**5 Note** – Bridge Management Engineer maintains this note. It contains information regarding scheduled rehabilitation or replacement, and other upcoming program management items.

**6 Note** – **Agreements:** This note is maintained by WSDOT supervisors for use in documenting information, clarification and directions for inspections associated with other agency agreements, memorandums of understanding or larger umbrella agreements. This note would record and clarify the existence of any agreement or MOU obligation and may provide direction to inspectors for inspection work required, and any subsequent processing or dissemination of completed reports. Examples may include.

- Agreement with other State Agency requiring inspectors to perform a condition inspection on structures overcrossing a state route in conjunction with a State Safety Inspection.
- Memorandum with Federal Agency on shared structure requiring state to inspect the route above and report the structure on the NBIS as a Routine and provide a courtesy copy of the report.
- Umbrella agreement with Local or Other State Agency outlining shared responsibilities related to the inspection.

**9 Note** – The 9 note is used to create the executive summary for an Underwater Inspection Report.

**11 Note** – For state-owned structures, the Load Rating Engineer maintains this field. For Local Agency owned structures, the bridge owner can designate others, such as a load rating engineer, other personnel, or consultant, to maintain this field. This note is used to explain any load posting placed on a bridge. This note is closely associated with the Revise Rating flag (2688), see Section 3-4.1.E.

### 3-4.1.D Operating Level Code (1660)

Verify that load posting signs are in place at the bridge and in advance of the bridge. Advance load postings should 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 or Recommended Posting Type (WEP03) and Recommended Posting Value (WEP04). Note within BridgeWorks under Operating Level Code (1660) any findings. Take a photo of any existing posting signs and advance posting signs. Code Actual Posting Type (BEP03) and Actual Posting Value (BEP04) based on the posting signs. Ensure that Item 1293) (open or closed) and the Posting Status (BPS01) is coded appropriately.

If required posting signs are missing or inaccurate, inspectors shall notify the Risk Reduction Engineer for state-owned bridges and the Local Agency Bridge Engineer for locally owned bridges on the date of the inspection. The federally mandated timeframe for remediation is 30 days from the inspection date.

### 3-4.1.E Revise Rating Flag (2688)

Load rating issues should be addressed within the body of the BIR in the (2688) note. Delete any notes that don't have relevance to the existing condition of the bridge.

### 3-4.1.F Scour Code (1680) and SNBI B.AP.03

For State owned bridges, the Scour Engineer maintains the Scour code (1680) and SNBI B.AP.03 field and notes. For Local Agency owned structures, the bridge owner can designate others, such as a hydraulic or scour engineer, other personnel, or consultant, to maintain this field. Any scour comments by the Team Leader should be placed in BMS Element (#361) Scour Flag, Channel Condition (BC09), Channel Protection Condition (BC10), Scour Condition (BC11), or Channel Protection (1677), depending upon which is most appropriate. Inspector codes for SNBI B.C.09, B.C.10, and B.C.11 are supported by the notes in BMS Element 361 and NBI 1677 fields.

### 3-4.1.G Soundings Resource

When preparing for an inspection that requires soundings, print any existing stream cross section file to include in your inspection field packet. The inspector should take notice of the soundings resource 'Need' or 'Ovr Need' dates and whether the resource is for underwater inspectors or regional inspectors, to determine if soundings are due during their inspection. The Scour Engineer determines which State bridges need stream cross sections (soundings) by placing a "Y" in the Soundings Flag (2693). When this is required as part of the inspection, perform the following:

1. Enter data into the Scour Field Evaluation Form, see Section 3-5.
    a. If you could not take soundings on the initial inspection trip, plan on getting them on another trip, either by coordinating with another Team Leader or by doing it yourself.
    b. If there is a reason soundings should be taken at a different time of the year (i.e., low water, low tide, or fish windows), add a resource with an explanation under the Report Types Tab.
    c. If soundings are unattainable, contact the scour section for guidance.
2. Attach the completed form to the appropriate bridge inspection report File Tab, replacing any already existing form and remove the old one.
3. Change the Soundings Flag (2693) from "Y" to "*" for State bridges only.
4. When you return to the office
    a. For WSDOT owned bridges, submit an email to the scour section (to: Scour Assistant cc: Scour Engineer) with the Scour Field Evaluation attached. The email shall include any significant findings and/or repair need that need to be brought to the Scour Engineer's immediate attention.
    b. For local agency structures, submit the Scour Field Evaluation to the local bridge owner as part of your submittal. BPO scour section does not process channel cross sections for the local agencies. Feel free to contact the BPO scour section if you have questions or concerns.
5. The Scour Engineer will email an electronic stream cross section file that you will attach to the report Files tab.
    a. Replace any existing stream cross section file with the updated one and remove the old one.
    b. Print the new stream cross section file and include it with your inspection review packet.

### 3-4.1.H Timber Structures

- Yellow Tagged (YT) members have rot and a shell greater than or equal to 1-½". A YT member requires a Priority 2 repair. The need for Interim Inspections is determined by the lead and the Regional Supervisors.
- Red Tagged (RT) members have rot and a shell less than 1-½". An RT member requires a Priority 1 repair. Schedule an Interim Inspection. Determine the extent, location, and significance of decay. Provide details for the Load Rating Engineer.

### 3-4.1.I Culverts

- Culverts are defined as identified in Chapter 1 and Appendix 3-A.
- NBIS Length (B.G.01), Total Length (B.G.02), Maximum Span (B.G.03), Minimum Span (B.G.04), Out-Out (B.G.05), and Curb-Curb (B.G.06), are determined in accordance with the associated SNBI listings.
- The BMS element quantity is determined by measuring from inlet to outlet of one barrel/pipe and is not dependent upon the number of barrels or pipes. This will typically be equal to the SNBI Out-Out measurement for structures not located on a skew.
- When inspecting culverts as either a reportable structure or as a short span, record the maximum and minimum fill depths over the culverts at the outer edges of the traveled roadway.

### 3-4.1.J Vertical Clearances (1370, 1374, and 2694,)

**Minimum Vertical Clearances**

Every Routine, Short Span, Safety or Condition inspection shall include a verification statement of the vertical clearance (VC) card comparing it with the current condition and any significant changes (new asphalt, additional lanes, new curb/gutter, etc.). Verification will also include at least one vertical clearance measurement if traffic allows, and ideally at the low point if possible. If changes in conditions or conflicts with the VC card are identified, note discrepancies, and collect all new clearances if possible. If no changes or discrepancies are identified, no further action is required.

For structures with clearances greater than 16’-6”, and with no other noted changes or discrepancies, the verification of a vertical clearance measurement is optional.

**Each Inspection**

- Check for all postings on bridge, and in advance, are in place.
- Check that Posted clearances are consistent with existing conditions and documentation.
- Update 2694 as applicable.
- Update the WSBIS as applicable.

**When to Collect or Verify Vertical Clearances**

- Whenever a clearance card is missing, incomplete or inaccurate. High traffic volumes may prevent the ability to acquire this information without traffic control.
- When changes in alignments, geometry or conditions affecting current measurements are identified.
- At bridges where the clearances box has been populated with a “V”.
- When Team Leader feels that over height hit damage is occurring significantly enough to check the existing clearance information.
- As a part of over height load damage inspections.

**Where to Collect or Verify Vertical Clearances**

- Minimum clearances along all lane stripes, edges of pavement/curb or controlling grade breaks between these points.
- Appurtenances (lights, signs, utilities) that control minimum vertical clearances should be documented as well, but in most circumstances will be used only to create a repair recommendation to relocate appurtenance. Provide vertical clearance information to the Sign Bridge Engineer.
- For existing postings verify lowest accessible clearance location first and verify other locations as required.
- For over height impact Damage Inspections, measure all accessible lane stripe locations below and around the points of impact.

**Documenting Vertical Clearances**

- Document all measured clearances. Drawings should be neatly transcribed and turned in to the Bridge Geometry Engineer. Photos are to be placed in the Photos/2694 Clearance folder in BridgeWorks and the Bridge Geometry Engineer notified of this action.
- 2694 Note should reference: Vertical clearances taken or checked on (date). Minimum clearance below the bridge measured to be (measured minimum clearance) below (exact location). See photo #. REPAIR #00000. In situations where multiple structures are controlled by one structure that requires posting, the recommended posting locations and the presence or omission of signage shall be appropriately documented in the 2694 notes of each of the involved structures.
- Update WSBIS fields (1370), (1374) and (1499). Appurtenances are not coded. Consult with the Bridge Geometry Engineer for questions.

**Posting Requirements and Recommendations**

- Bridges with field measured minimum clearances over the traveled lanes equal to 14’ 3” up to and including 15’ 3” require posting on the structure at the controlling location and advance warning signs at one or both shoulders.
- All bridges with field measured minimum clearances less than 14’ 3” require additional advance posting signs in advance of nearest intersecting roads, ramps, or a wide point in the road where a driver can detour or turn around.
- All posted clearances shall be 3” less than the actual lowest measured clearance, except as follows:

  a. In some cases, WSDOT intentionally posts clearances with more than a 3” buffer. This decision will be documented in the 2694 note, identifying the posting clearance required.

  b. A tolerance to the 3” buffer for existing bridge posting signs is allowed. See criteria listed below.

     - If the actual measured opening for a bridge or tunnel increases by 2” or less the existing signing may remain. *(i.e., a bridge clearance changes from 15’-0” to 15’-2”, the existing warning sign of 14’-9” may remain.)*
     - If the actual measure opening for a bridge or tunnel increases by more than 2” the signs shall be replaced. *(i.e., a bridge clearance changes from 14’-9” to 15’-0”, the existing warning sign of 14’-6” shall be corrected.)*

- If the actual measured opening for a bridge or tunnel decreases by 1” or less the existing signs may remain. *(i.e., a bridge clearance changes from 15’-0” to 14’-11”, the existing warning sign of 14’-9” may remain.)*
- If the actual measured opening for a bridge or tunnel decreases by more than 1” the existing signs shall be replaced. *(i.e., a bridge clearance changes from 14’-10” to 14’-8”, the existing warning sign of 14’-7” shall be corrected.)*

There are situations where bridges should be posted for minimum vertical clearances in the shoulders (outside traveled way). Check with the Bridge Geometry Engineer for details. Appurtenances such as lights or signs that suspend below those bridge elements are to be noted. Those that are 15’3” or less within a traveled path or have evidence of traffic impact damage are to be written up as a repair to be removed or relocated.

**Vertical Clearance (V) Repair**

- A Priority 1 or 2 Vertical Clearance (V) Repair is warranted as follows:
- Priority 1: When vertical clearance posting is found deficient (for example less than 2” buffer), missing, or where the signage on and in advance of the bridge do not match.
- Priority 2: When a vertical clearance posting on and in advance of the bridge is found conservative (more than 5” buffer) without prior documentation from the Region or other authorized authority.
- Each repair written should identify and include the following language:
- (Minimum clearance measured to be (measured clearance) located at (controlling location) on (date measured). Post for (3” less than measured clearance) in accordance with the most current WSDOT Low Vertical Clearance Signing Policy. Contact Bridge Geometry Engineer at Bridge Preservation 360-570-2544 with any questions.

## 3-4.1.K Horizontal Clearances

- Collect minimum shoulder widths on both sides of roadway and edge of traveled way (fog line) to permanent obstruction (columns, abutments, retaining walls, toe of slopes). See Item 1379 for ramps, gores, and other more complex configuration examples.
- Collect horizontal clearances where the clearance flag has been populated with an “H”.
- Update WSBIS fields (1379) and (1383) (Minimum Lateral under Clearance Right & Left).

## 3-4.1.L Inspection of Structures Under Contract

New bridges and bridges reopening from major retrofits, widening, or rehabilitation are required to have an Initial Inspection conducted on them within 90 days of opening to traffic. Bridges under rehabilitation or retrofit while still open to traffic are required to receive their scheduled Routine Inspections within the acceptable tolerance period.

**New structures and structures closed under contract.**

1. Information organized and provided under Inventory or Informational Report Types by the Bridge Inventory Technician will include the Project Office contact and contract numbers.
2. BPO inspector MUST contact the Project Office (Project Engineer if possible) prior to performing inspection. Do not directly talk to contractor without first contacting the region.

3. Perform the Initial Inspection within 90 days of opening or re-opening to traffic. If significant safety issues, or defects are identified, report the findings to the Inspection Supervisors first and then the Region Project Office.
4. Complete the Initial Inspection Report Type.

**Structures under contract construction while still open to traffic.**

1. If the inspectors identify that the structure is under contract prior to arriving on site, they should contact the Project Office (Project Engineer if possible) and let them know that the structure requires a Routine Inspection. If not and the inspectors arrive on site and can safely access the structure, proceed with the inspection without interfering with any ongoing construction activities.
2. Conduct the most complete Routine Inspection possible.
3. Do not change or alter element quantities in the bridge report based on any construction activities or expected final configuration.
4. Under each element that is impacted or not accessible, provide a comment stating the limitations of the inspection.
    - Example: South rail not accessible due to construction, temporary traffic rail in place to protect work zone.
    - Example: West abutment not accessible due to construction.
    - Example: Bearings at west abutment not accessible.
    - New girder line north of Girder Line A not inventoried as construction is not complete.
5. Leave previously noted defects and any associated condition states, or repairs for areas under construction in the report.
6. Attempt to identify when the contract is expected to be complete.
7. Notify regional supervisor of inspection completion, and anticipated contract completion date, but DO NOT force date inspections or resources without coordinating with supervisors.
8. Complete the Routine Report Type.
9. Under the “0 Note” provide the following statement:
    - “At the time of this inspection, the bridge is currently under contract construction for rehabilitation, retrofit or widening and is at least partially open to traffic. The scheduled Routine Inspection was performed in accordance with FHWA and Agency standards and guidelines. However, the scope of the inspection in inherently defined and limited to accessible areas and elements not directly impacted by construction and where activities will not interfere with the contract. Impacted areas and elements that were not fully accessible are described in the inspection notes. Previously identified element quantities, defects and condition states for elements or areas under construction are considered to remain the same and will not be changed until the contract is complete, and a new Initial Inspection is performed”. See photos.
10. Provide 2 or 3 photos showing the general areas and extent of construction.

### 3-4.1.M Bridge Scour for Local Agency Bridge Inspections

- Bridges with Scour Code (1680) of 2 and 3, or SNBI Scour Vulnerability (B.AP.03) of C or D, are scour critical. For reports with a scour code of "6", "U"or "B.AP.03 code = 0" the bridge is assumed to be scour critical.
- Bridges with a scour code of "6", "U", or SNBI Scour Vulnerability (B.AP.03) of "0", "E", or "U" are assumed to be scour critical and 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", "6" or B.AP.03 code = 0] indicating that the bridge foundation is not known, is tidal, and/or has not been evaluated. Perform evaluation of scour potential and any required mitigation. Indicate determination and any requirements under the (1680) note."
- Scour critical bridges, and those that are assumed to be scour critical, that have exposed footings or have a history of exposed footings due to scour, REQUIRE a priority 1 scour repair documented in the BMS Element (#361) – Scour flag note in BridgeWorks. This repair should read as follows: "Scour mitigation needs to be evaluated."
- All scour critical bridges need soundings at every Routine Inspection. The (2693) note needs the following comment: "Take soundings every Routine Inspection on this scour critical bridge." Also ensure that the (2693) flag is set to "Y" at all times. This will help the process stay in place over time.
- Bridges that are not scour critical do not need cross sections unless there is some specific need that is documented in the report.

### 3-4.1.N Rental Equipment

The Enterprise and Risk Management Office has declared that equipment damage insurance must be purchased when renting access equipment. If the rental company does not offer insurance, insurance can be purchased through the Department of Enterprise Services (DES). The DES insurance option can take up to two weeks to process so plan accordingly.

For rented access equipment the following is required:

- Review the paperwork, when receiving the equipment, to ensure that it reflects insurance for the rented equipment.
- Review the invoice when you receive it from the BPO Accountant, making sure that the rate and time used are correct.
- Notify the rental office of any discrepancies found.
- Write the bridge number and dates used on the invoice.
- Return it to the BPO Accountant for processing.

### 3-4.1.O Bridge Inspection Safety

A Pre-Activity Safety Plan (PASP) is required prior to any field activity. A copy of the PASP form is located at W:\Data\Bridge\RegionalInsp\FORMS\SAFETY.

### 3-4.1.P Identifying the Purpose of Inspections in the Bridge Inspection Report

Within the Inspection Note (B.IE.11), under the specific inspection tab, indicate the purpose and schedule of any Interim or Special Inspections that are required. Statement should briefly describe what is to be accomplished during the Interim or Special Feature Inspection. An example note may read:

- "Interim Inspections of YT and RT timber members are done on a 48-month interval next due xx/xx/xx. UBIT is required to access RT members at Pier X."

An abbreviated note identifying the scope should be placed in the 0 note of the actual Interim Inspection report.

- "Interim Inspection conducted to monitor YT and RT timber members.

### 3-4.1.Q Agreements Inspections

Team Leader will provide the complete submittal package for each bridge inspected, which includes the signed inspection report, the SI&A sheet, the inventory sheet, all photos and files. The inspection report may be digitally signed. This package is given to the Bridge Resource Technician (BRT) who checks them against the scope of work. If there is anything missing, the BRT needs to check with the inspectors and follow up with the Bridge Preservation Accountant (BPA) if there are problems with providing a complete submittal package. The complete submittal package for each bridge is scanned and loaded onto BEISt, and a hardcopy filed in the unofficial letter file in the resource room. The complete submittal packages for each bridge are sent to the agency via USPS to the address in the agreement along with a transmittal letter listing all inspection reports provided. A copy of the transmittal letter is given to the BPA for filing with the invoices and agreements.

## 3-4.2 *LP Policy and Procedures*

Local Agency Policy and Procedures differing from those in the WSBIM are detailed in the *Local Agency Guidelines* (LAG) Chapter 34. 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 Bridge Engineer for guidance and advice on bridge program questions.

## 3-5 Forms

This section contains inspection forms typically used by the State. Local agencies have the option of developing their own forms with similar information or utilizing the forms in this section.

| | |
|---|---|
| Exhibit 3-11 | Bridge Inspection Report |
| Exhibit 3-12 | WSBIS Form |
| Exhibit 3-13 | Scour Field Evaluation |
| Exhibit 3-14 | Daily Site Dive Log |
| Exhibit 3-15 | Visual NSTM Inspection Report |
| Exhibit 3-16 | WSDOT Form 234-030 Prestressed Concrete Damage Drawing Template |
| Exhibit 3-17 | Girder Elevation Template |
| Exhibit 3-18 | Ultrasonic UT Inspection Report |
| Exhibit 3-19 | UT Inspection Schedule |
| Exhibit 3-20 | Pin and Hanger Visual Inspection Report |
| Exhibit 3-21 | Complex Features Inspection Report |
| Exhibit 3-22 | Vertical Clearance Card Generic |
| Exhibit 3-23 | Vertical Clearance Card Steel |
| Exhibit 3-24 | Vertical Clearance Card Tunnel |

## Exhibit 3-11 Bridge Inspection Report (Page 1 of 2)

WSDOT

**BRIDGE INSPECTION REPORT**

Page 1 of 2

Printed On: 12/18/202

CD Guid: 9470aae8-70e2-435f-9eb6-bb7ef18a4a5c

Agency: Washington State | Program Mgr: Roman G. Peralta | CD Status: Work | Release Date:

**Structure No.** SAMPLE **SID** XB116301 **Structure Name** SAMPLE

**Carrying** **Route On** 00000 **Mile Post** 0.00

**Intersecting** **Route Under** **Mile Post**

Inspector's Signature | Cert # | Cert Exp Date | Co-Inspector's Signature

### Current Inspections Performed

| Report Type | Subtype | Rsk Mthd | Begin Date | Comp Date | Interval | Due Date | Hours | Inspector | Cert No | Co-Insp |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |

### Component Condition Ratings

| | | | |
|---|---|---|---|
| | | Overall Condition Classification | (BC12) |
| | | FHWA Deck Overall | (BC01) |
| | | WSDOT Deck Overall | (WC01) |
| | | Bridge Railings | (BC05) |
| | | Bridge Railing Transitions | (BC06) |
| | | Bridge Joints | (BC08) |
| | | Superstructure Overall | (BC02) |
| | | NSTM Inspection | (BC14) |
| | | Bridge Bearings | (BC07) |
| | | Substructure Overall | (BC03) |
| | | UW Inspection | (BC15) |
| | | Culvert Overall | (BC04) |
| | | Scour Condition | (BC11) |
| | | Channel Condition | (BC09) |
| | | Channel Protection | (BC10) |
| | | Chan/Prot (NBI Disc) | (1677) |
| | | Pier/Abut/Prot (NBI Disc) | (1679) |

### Appraisal

| | | | |
|---|---|---|---|
| | | Scour Critical (NBI Disc) | (1680) |
| | | Scour Vulnerability | (BAP03) |
| | | Scour Plan of Action | (BAP04) |
| | | Waterway (NBI Disc) | (1662) |
| | | Overtopping Likelihood | (BAP02) |
| | | Appr Roadway Align | (BAP01) |
| | | Fatigue Details | (BIR02) |
| | | Seismic Vulnerability | (BAP05) |

### Miscellaneous Fields

| | | | |
|---|---|---|---|
| | | Year Built | (BW01) |
| | | Asphalt Depth | (WIE30) |
| | | Design Curb Height | (WIE31) |
| | | Bridge Rail Height | (WIE32) |
| | | Number of Utilities | (WIE33) |
| | | Subject to NBIS | (WIE34) |
| | | Inspn QA Date | (BIE09) |

### Inspection Flags

| | | | |
|---|---|---|---|
| | | Soundings | (WIE20) |
| | | Clearance | (WIE21) |
| | | Revise Rating | (WIE22) |
| | | PhotosFlag | (WIE23) |
| | | Roadside Hardware Flag | (WIE25) |
| | | QA Flag | (WIE24) |

### BMS Elements

| Element | Element Description | Total | Units | CS 1 | CS 2 | CS 3 | CS 4 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |

### Notes

### Repairs

| Repair No | Pr | R | Repair Descriptions | BMS | Noted | Maint | Verified |
|---|---|---|---|---|---|---|---|
| | | | (No repairs for this structure) | | | | |

## Exhibit 3-11 Bridge Inspection Report (Page 2 of 2)

WSDOT

**BRIDGE INSPECTION REPORT**

Page 2 of 2

Printed On: 12/18/202

CD Guid: 9470aae8-70e2-435f-9eb6-bb7ef18a4a5c

Agency: Washington State | Program Mgr: Roman G. Peralta | CD Status: Work | Release Date:

**Structure No.** SAMPLE **SID** XB116301 **Structure Name** SAMPLE

**Carrying** **Route On** 00000 **Mile Post** 0.00

**Intersecting** **Route Under** **Mile Post**

**All Inspections and Resources Required**

| Report Type | Subtype | Rsk Mthd | Begin Date | Comp Date | Interval | Due Date | Hours | Inspector | Cert No | Co-Insp |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |

| Inspection Note | Insp QC Date | Inspn Data Update Date | |
|---|---|---|---|
| | | | |

## Exhibit 3-12 WSBIS Form

WSDOT

**WSBIS Bridge Inventory Report**

Agency: Washington State
Program Manager: Roman G. Peralta
Printed On: 12/18/2024

CD Status: Work
CD Date: 12/18/2024
CD Guid: 9470aae8-70e2-435f-9eb6-bb7ef18a4a5c

| | | |
|---|---|---|
| Approved | | |
| Revised | | |
| RFC | | |
| AAN | | |
| Not Reviewed | | |

Carrying:
Route On: 00000 Milepost: 0.00
Intersecting:
Route Under Milepost:

Structure No: SAMPLE Soundings: Clearance: Revise Rating: Photos: Rdside Hdwr: QA:

**Inspections Performed**

| Report Type | Subtype | Risk Mth | Begin Date | Comp Date | Freq | Hours | Inspector | Cert No | Co-Insp |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

**Features**

| Feature Designation | Feature Type | Feature Location | Feature Name | Program Manager |
|---|---|---|---|---|
| H01 | H - Highway | C - Carried on bridge | | Roman G. Peralta |
| W01 | W - Waterway | B - Below bridge | | |

**Bridge ID and Location**

| | | Last Recorded | Updated |
|---|---|---|---|
| Structure ID | (BID01) | XB116301 | |
| Previous Structure ID | (BID02) | | |
| Structure Type | (WID01) | 1 - Bridges and culverts carrying public roadways | |
| Structure Number | (WID02) | SAMPLE | |
| Structure Sort Number | (WID03) | 99SAMPLE | |
| Structure Name | (BID02) | SAMPLE | |
| Owner | (BCL01) | | |
| Maintenance Responsibility | (BCL02) | | |
| County | (BL02) | 1 - 1 | |
| City | (WL05) | 0 - UNINCORPORATED | |
| Place Code | (BL03) | | |
| Highway Agency District | (BL04) | | |
| Metro Planning Org | (BL12) | | |
| Section | (WL06) | | |
| Township | (WL07) | | |
| Range | (WL08) | | |
| Obsolete Flag | (WID05) | | |
| Border Structure ID | (BL07) | | |

| | | |
|---|---|---|
| Toll | (BCL05) | |
| Hist. Significance (NRHP) | (BCL04) | |
| Hist. Significance (HAER) | (WCL04) | |
| Special Structures Flag | (WID04) | |

**Geometry**

| | | Last Rec. | Updated |
|---|---|---|---|
| NBIS Br Length | (BG01) | | |
| Total Structure Len | (BG02) | | |
| Max Span Length | (BG03) | | |
| Min Span Length | (BG04) | | |
| Out-to-Out (NBI Disc) | (1360) | | |
| Out-to-Out | (BG05) | | |
| Curb-to-Curb (NBI Disc) | (1356) | | |
| Curb-to-Curb | (BG06) | | |
| Sidewalk/Curb L | (BG07) | | |
| Sidewalk/Curb R | (BG08) | | |
| Min Vert Clrnc Over | (WH12) | | |
| Min Vert Under Br | (WH13) | | |

| | | |
|---|---|---|
| Aprch Rdwy Width | (BG09) | |
| Median Code | (BG10) | |
| Skew (NBI Disc) | (1310) | |
| Skew | (BG11) | |
| Curved Bridge | (BG12) | |
| Max Br Height | (BG13) | |
| Sidehill Bridge | (BG14) | |
| Irr. Deck Area | (BG15) | |
| Calc. Deck Area | (BG16) | 0.0 |

Exhibit 3-13 Scour Field Evaluation (Page 1 of 2)

Washington State Department of Transportation

# Scour Field Evaluation

| Date of Evaluation: | Lead Inspector: | Co-Inspector: | Bridge Number: | |
|---|---|---|---|---|
| | | | Bridge Name: | |
| | | | Structure ID: | |

| **Channel Condition:** | Location | Description of Condition | **Soundings:** | |
|---|---|---|---|---|
| Alignment/Angle of Attack: | | | Measurements Taken From: | |
| Thalweg/Meander: | | | Height from Deck (ft): | |
| Degradation: | | | Distance to Water Surface (ft): | |
| Aggradation: | | | Thalweg (ft): | |
| Debris Effecting Flow: | | | Distance to thalweg (ft): | |
| Bank Erosion/Instability: | | | Distance was measured from: | |
| **Countermeasures:** | Type[2] | Description of Condition | Ahead or Back on Station? | |
| Upstream Channel: | | | **Location:** | **Measurement (ft)** |
| Upstream Right Bank[1]: | | | | |
| Upstream Left Bank[1]: | | | | |
| Under Bridge Channel: | | | | |
| Under Bridge Right Bank[1]: | | | | |
| Under Bridge Left Bank[1]: | | | | |
| Piers: | | | | |
| Abutments/Wingwalls: | | | | |
| Downstream Channel: | | | | |
| Downstream Right Bank[1]: | | | | |
| Downstream Left Bank[1]: | | | | |
| [1] *Right and Left orientation when looking downstream.* | | | | |
| **Scour:** | Location | Description of Condition | | |
| | | | | |
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[2] ***LWM**, Large Woody Material; **MWM**, Mobile Woody Material; **MB**, Meander Bar; **CVW**, Cross Vein Weir (aka Drop Structure); **HLR**, Heavy Loose Riprap; **LLR**, Light Loose Riprap; **HPR**, Hand Placed Riprap; **FGR**, Fully Grouted Riprap; **PGR**, Partially Grouted Riprap; **QS**, Quarry Spalls; **BWW**, Bendway Weirs; **GB**, Guide Banks; **CD**, Check Dams; **BRR**, Buried Rock Revetment; **COW**, Cut-Off Wall; **CSP**, Concrete Slope Paving; **ACM**, Articulating Concrete Mattress; **GMB**, Gabion Mattresses/Baskets; **GFM**, Grout-Filled Mats.*

Washington State Department of Transportation

# Scour Field Evaluation
## Continuation

| Dates of Evaluation (Begin/Completion): | Lead Inspector: | Co-Inspector: | Bridge Number: | 0 |
|---|---|---|---|---|
| 1/0/1900 | 0 | 0 | Bridge Name: | 0 |
| | | | Structure ID: | 0 |

**APPENDIX C**

Table 54. Channel - defect severity guidance for component condition ratings.

| Defect | Minor | Moderate | Major |
|---|---|---|---|
| Alignment | Flow angle of attack 15-30 degrees with respect to the bridge substructure, or 5-15 degrees with respect to wall piers. | Flow angle of attack 30-45 degrees with respect to the bridge substructure, or 15-30 degrees with respect to wall piers. | Flow angle of attack more than 45 degrees with respect to the bridge substructure, or more than 30 degrees with respect to wall piers. |
| Migration | Thalweg has moved from its baseline location, but movement has arrested or does not threaten the bridge or approach roadway. | Thalweg movement has not arrested and impacts embankment stability. | Thalweg movement has begun to undermine approach roadway. |
| Degradation | Exists within tolerable limits or has arrested. | Sloughing of banks, resulting in vertical embankments on both sides of the channel. Bridge is not yet impacted. | Sloughing of banks, resulting in vertical embankments on both sides of the channel. Bridge is impacted. |
| Aggradation | Exists within tolerable limits or has arrested. | Exceeds tolerable limits. Hydraulic opening is significantly blocked, increasing potential for overtopping or channel restriction. | Hydraulic opening is mostly blocked. May cause frequent overtopping or channel restriction. |
| Debris | Restricts channel slightly, or is prone to build-up. | Large deposits exist and restrict the channel, causing increased water velocities, redirecting stream flow, or eroding banks. | Hydraulic opening mostly blocked, significantly redirecting stream flow or impacting waterway capacity. |
| Bank Erosion/ Instability | Erosion/instability that does not impact the bridge or approach roadway. | Significant erosion/instability that is progressing toward the bridge or approach roadway. | Stability of the approach roadway embankment is impacted. |

| Soundings Continued: | |
|---|---|
| Location: | Measurement (ft) |
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## Exhibit 3-14 Daily Site Dive Log (Page 1 of 3)

Washington State Department of Transportation

# Daily Site Dive Log

| Inspector | | Date |
|---|---|---|
| Bridge Number | Bridge Name | |
| Bridge Type | Waterway Name | |
| Dive Objective | | |

**Diving Operation**

Type of Operation ☐ SCUBA ☐ Snorkel ☐ SSA ☐ Other _____

Equipment
Suit _____
Air Supply _____
Site Access _____
Inspection Tools _____
Repair Tools _____
Repair Materials _____

**Conditions**

Water ☐ Salt ☐ Fresh ☐ Brackish Temperature _____ °F Visibility _____
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 Temperature _____ °F
Thermocline Temperature _____ °F Depth _____ ft.

**Diver Checks**

☐ First Aid Equipment on Site
☐ Comunication for EMS
☐ Dive Gear Inspection
☐ Air Source Checked
☐ PASP 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**

Page 1 of _____

## Exhibit 3-14 Daily Site Dive Log (Page 2 of 3)

| **Dive Schedule** | | | | | |
|---|---|---|---|---|---|
| Dive No. | Entry Time | Exit Time | Total Time in Water | Maximum Depth | Remarks |
| | | | | | |
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**Dive Narrative**

Dive Team Members

_____ (Print Name) Diver Stdby DPIC Notes Other (Role)

_____ (Print Name) Diver Stdby DPIC Notes Other (Role)

_____ (Print Name) Diver Stdby DPIC Notes Other (Role)

_____ (Print Name) Diver Stdby DPIC Notes Other (Role)

_____ (Print Name) Diver Stdby DPIC Notes Other (Role)

Page 2 of _____

## Exhibit 3-14 Daily Site Dive Log (Page 3 of 3)

**WSDOT Dive Team**
- Daily Rough Log

Date: _____ Bridge # / Site: _____

| Dive Number | Diver(s) | Air (psig) | | Time | | | Max Depth | Letter Group | Surface Interval | Rep. Dive Group | Roles (Initals) | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | In | Out | In | Out | Total | | | | | DPIC | Stdby | Other | |
| | | | | | | | | | | | | | | |
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## Exhibit 3-15 Visual NSTM Inspection Report (Page 1 of 2)

Washington State Department of Transportation

**NONREDUNDANT STEEL TENSION MEMBER INSPECTION REPORT**

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

**Date:**
**Hours:**
**Inspector ID #:**
**Lead Inspector Initials:**
**Co-Inspector Initials:**

**Procedures:**

**Riveted Floor Truss**

**1.** As required, use mirrors or other equipment to check inside surfaces of NSTM's.
**2.** Check for loose or unevenly loaded member sub-elements.
**3**. Check girder web at areas around floorbeam and lateral bracing.
**4**. For continuous spans with welded stud shear connectors, check top flange soffit for cracking in tension areas and document location in weld category C
**5.** Check all rivets at connection plates, with emphasis on the end row of cover plates and outside edges of splice plates.
**6**. Check for any welds, including plug, tack, or repair welds. Record location of welds, regardless of condition, and document weld type and category.
**7.** Check NSTM's 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.
**8.** Check all heat straightened or repaired areas. Record location of these areas, regardless of condition.
Steel Girder

**Riveted Steel Girder**

**1**. Check a sampling of rivets, with emphasis on the end row of cover plates and outside edges of splice plates.
**2.** Check girder web at areas around floorbeam and lateral bracing.
**3.** For continuous spans with welded stud shear connectors, check top flange soffit for cracking in tension areas and document location in weld category C.
**4.** Check for any welds, including plug, tack, or repair welds. Record location of welds and document weld type and category.
**5.** Check NSTM's 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.

**Main Suspension Cable**

**1.** Walk suspended line cables, inspecting the condition of paint protective system.

| NSTM Location | NSTM Type | NSTM Per Girder or Truss Line | Plan Sheets | | |
|---|---|---|---|---|---|
| | | | Sh. No. | Contr. | Sh. Name |
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Note: NSTM = Non-Redundant Steel Tension Member

Exhibit 3-15 Visual NSTM Inspection Report
(Page 2 of 2)

Washington State Department of Transportation

## NONREDUNDANT STEEL TENSION MEMBER 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 |
|---|---|---|---|---|---|
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NSTM Report and Cover.xlsx -Visual NSTM Findings

Printed 12/18/2024

## Exhibit 3-16 WSDOT Form 234-030 Prestressed Concrete Damage Drawing Template

Washington State Department of Transportation

### Prestressed Concrete Damage Drawing Template

Bridge Number: _____ Inspected By: _____

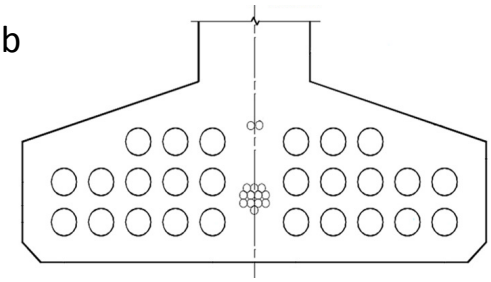
Bridge Name: _____ Notes: _____

Date: _____

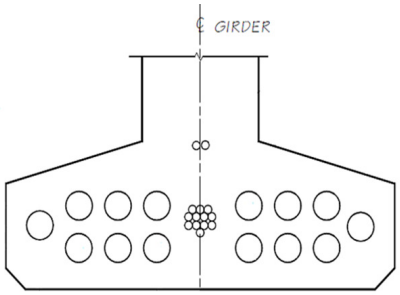
Looking: _____

Location: _____

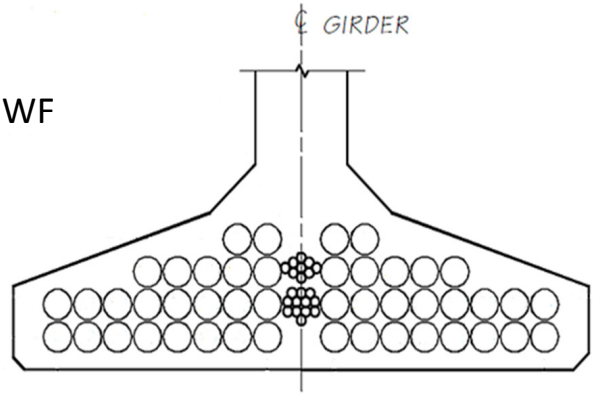
Bulb



W

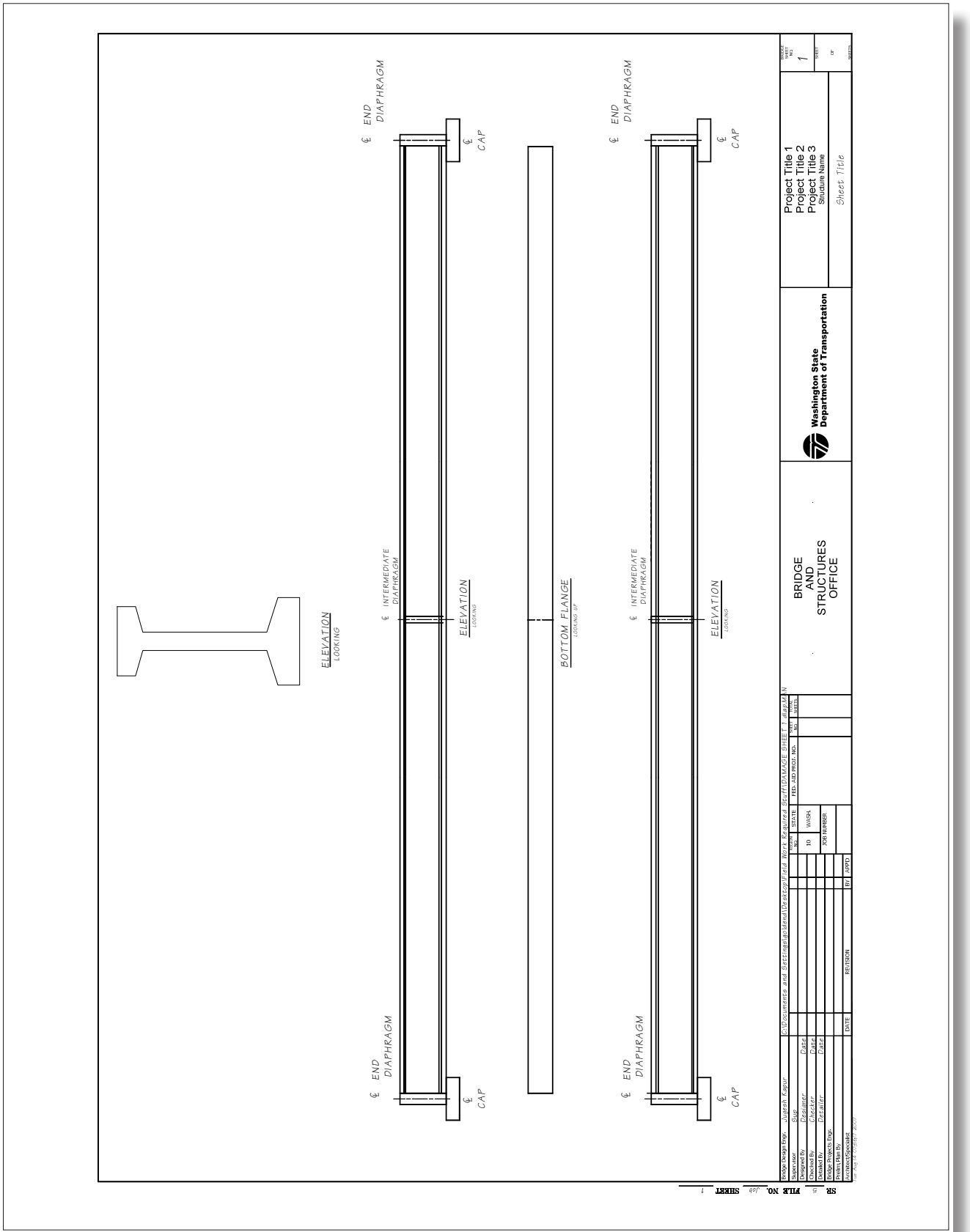



WF




DOT Form 234-030
Revised 10/2015

## Exhibit 3-17 Girder Elevation Template



## Exhibit 3-18 Ultrasonic UT Inspection Report (Page 1 of 2)

Washington State Department of Transportation

# UT INSPECTION REPORT

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

**Date:**
**Hours:**
**Inspector ID #:**
**Lead Inspector Initials:**
**Co-Inspector Initials:**

**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 | Plan Sheets | | |
|---|---|---|---|---|---|
| | | | Sh. No. | Contract | Sh. Name |
| | | | | | |
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Note: UTM = Ultrasonic Tested Member

1 of 3

## Exhibit 3-18 Ultrasonic UT Inspection Report (Page 2 of 2)

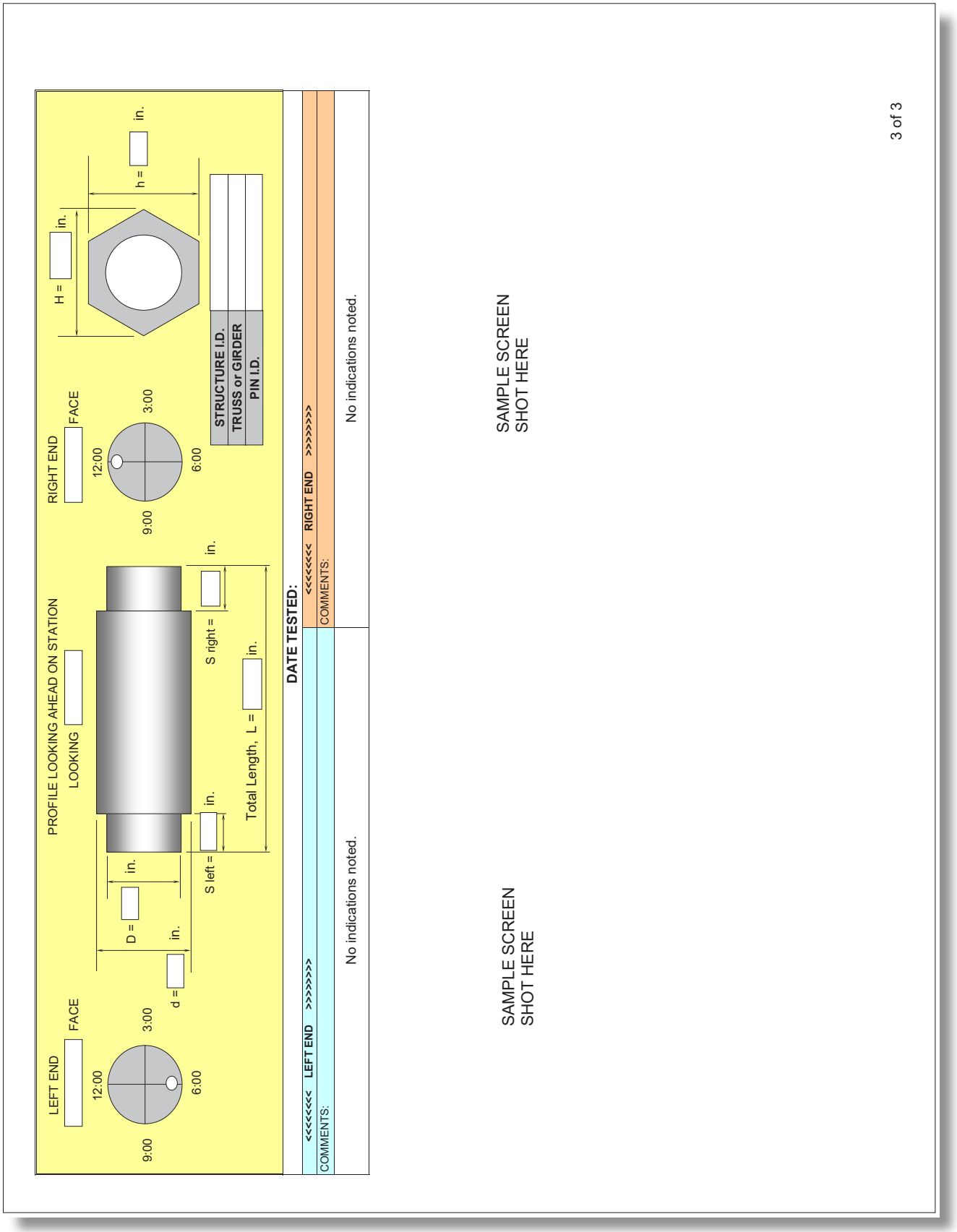


Exhibit 3-19 UT Inspection Schedule

Washington State Department of Transportation

## UT INSPECTION SCHEDULE

| Truss / Girder | Span | Location | Detail Description | Redundant | Condition State | | Freq. (Months) | UT Inspection Date | Next Inspection Date |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | VT | UT | | | |
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1 of 1

## Exhibit 3-20 Pin and Hanger Visual Inspection Report (Page 1 of 2)

Washington State Department of Transportation

# VISUAL PIN AND HANGER INSPECTION REPORT

| | | | |
|---|---|---|---|
| **Bridge Name:** | | **Date:** | |
| **Bridge No:** | | **Hours:** | |
| **Structure ID:** | | **Inspector ID #:** | |
| **Structure Type:** | | **Lead Inspector Initials:** | |
| **Agency:** | | **Co-Inspector Initials:** | |
| **Milepost:** | | | |

**Inspected Items:** Pins and Hangers

**Procedures:**

**Hangers**

**1.** Check for loose or unevenly loaded member sub-elements.
**2**. Check for any welds, including plug, tack, or repair welds. Record location of welds, regardless of condition, and document weld type and category.
**3.** Check members for areas of heavy or pitted corrosion, nicks, gouges, and sharp bends, and. Record location of all these conditions and estimated section loss, if applicable.
**4.** Check all heat straightened or repaired areas. Record location of these areas, regardless of condition.

**Pins**

**1.** 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.
**2.** 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.
**3.** Observe and record abnormalities like; alignment, pin wear, loose pin nuts, and amount of nut engagement. It is important to note that full nut engagement is when the nut is flush with the pin or the pin is extending past the nut.
**4.** Check for paint system failure on pin nuts, pin, and surrounding members.

| Location | Type | Member Per Girder or Truss Line | Plan Sheets | | |
|---|---|---|---|---|---|
| | | | Sh. No. | Contr. | Sh. Name |
| | | | | | |
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Visual Pin and Hanger Report.xls Printed 12/18/2024

Exhibit 3-20 Pin and Hanger Visual Inspection Report
(Page 2 of 2)

Washington State Department of Transportation

## VISUAL PIN and HANGER 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** | | | | | |
| | | | | | |
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| **HANGERS** | | | | | |
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Visual Pin and Hanger Report.xls

Printed 12/18/2024

## Exhibit 3-21 Complex Features Inspection Report (Page 1 of 2)

Washington State Department of Transportation

**COMPLEX FEATURES INSPECTION REPORT**

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

**Date:**
**Hours:**
**Inspector ID #:**
**Lead Inspector Initials:**
**Co-Inspector Initials:**

**Inspected items:**

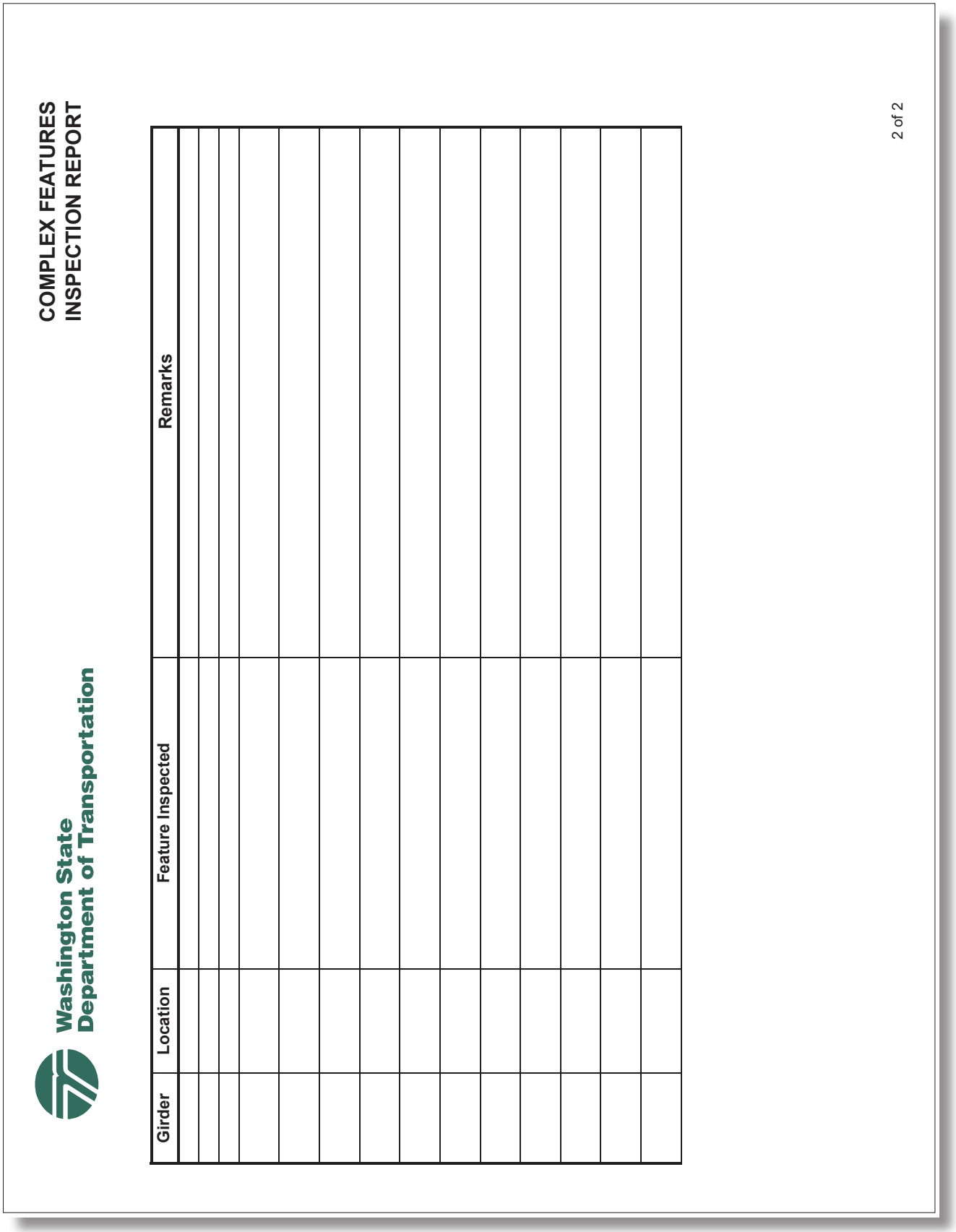
**Procedures:**

**High strength steel welded girder top and bottom flanges, webs, and stiffeners:**
1. Visually inspect for cracks in the welds in the areas of high strength steel.
2. Inspect areas where there is a change in the bridge cross section, where stress is concentrated, or which show out-of-plane bending.
3. Nondestructive testing, such as magnetic particle and liquid dye penetrant, will be used in suspect areas where visual inspection cannot confirm a defect.

| Complex Features | Complex Feature Type | Feat Per Girder or Truss Line | Plan Sheets | | |
|---|---|---|---|---|---|
| | | | Sh. No. | Contract | Sh. Name |
| | | | | | |
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1 of 2

## Exhibit 3-21 Complex Features Inspection Report (Page 2 of 2)



COMPLEX FEATURES
INSPECTION REPORT

Washington State
Department of Transportation

2 of 2

| Girder | Location | Feature Inspected | Remarks |
|---|---|---|---|
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## Exhibit 3-22 Vertical Clearance Card Generic

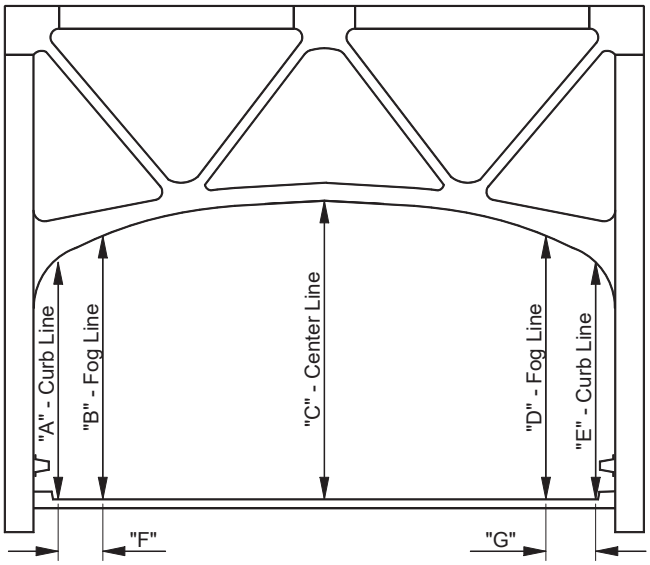
| | |
|---|---|
| Bridge Number: | |
| Structure ID: | |
| Looking: | |
| Measurement Date: | |
| Photo Date: | |
| Inspection/Co Initials: | |
| Minimum Vertical Clearance Posted For: | |
| Posting on Structure: | |
| Posting on Shoulder: | |
| Advance Detour Intersection Posting for Vertical Clearance 14'-0" or less: | |

Note:
Vertical measurements are actual measures rounded down to the nearest inch. Posted clearances are typically 3 inches less than the lowest clearance for a particular through movement.

## Exhibit 3-23 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.

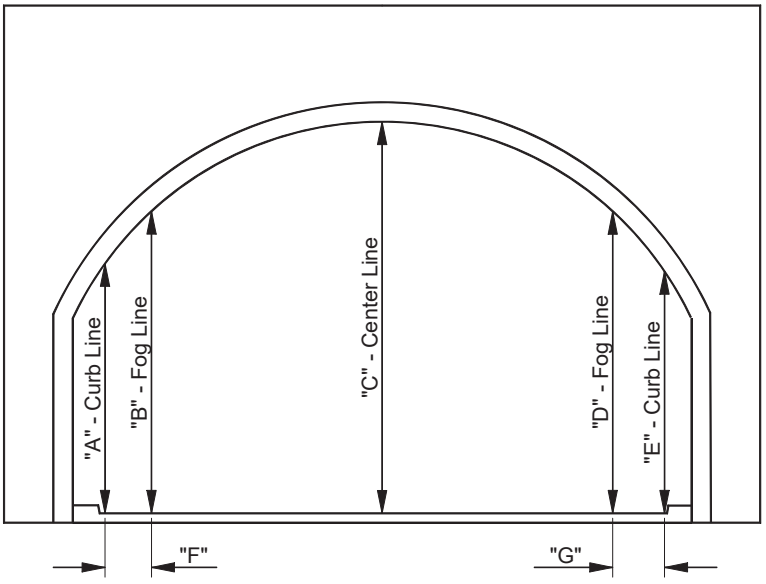



| Location | Field Measurement | | | | | | |
|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G |
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## Exhibit 3-24 Vertical Clearance Card Tunnel

| | |
|---|---|
| Bridge Number: | |
| Structure ID: | |
| Looking: | |
| Measurement Date: | |
| Photo Date: | |
| Inspection/Co Initials: | |
| Minimum Vertical Clearance Posted For: | |
| Posting on Structure: | |
| Posting on Shoulder: | |
| Advance Detour Intersection Posting for Vertical Clearance 14'-0" or less: | |

Note:
Vertical measurements are actual measures rounded down to the nearest inch. Posted clearances are typically 3 inches less than the lowest clearance for a particular through movement.




| Location | Field Measurement | | | | | | |
|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G |
| | | | | | | | |
| | | | | | | | |
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## 3-6 Appendices

Appendix 3-A Bridge/Culvert Coding Matrix

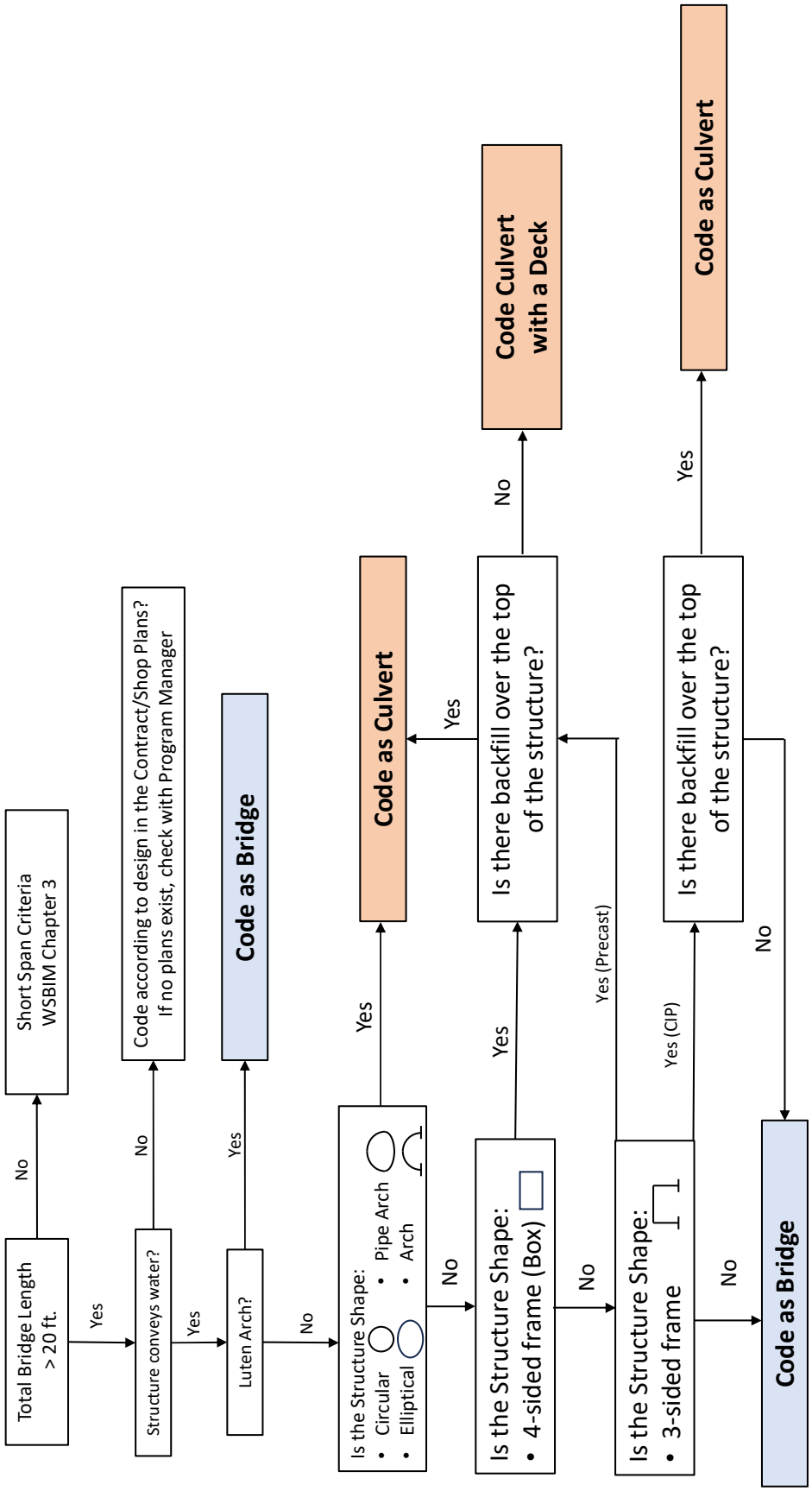
Appendix 3-B Short Span Bridge Criteria

Appendix 3-C UBIT Inspections and Procedures

Appendix 3-D FHWA Letter for Routine Extended Interval Inspections

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# *Appendix 3-A Bridge/Culvert Coding Matrix*



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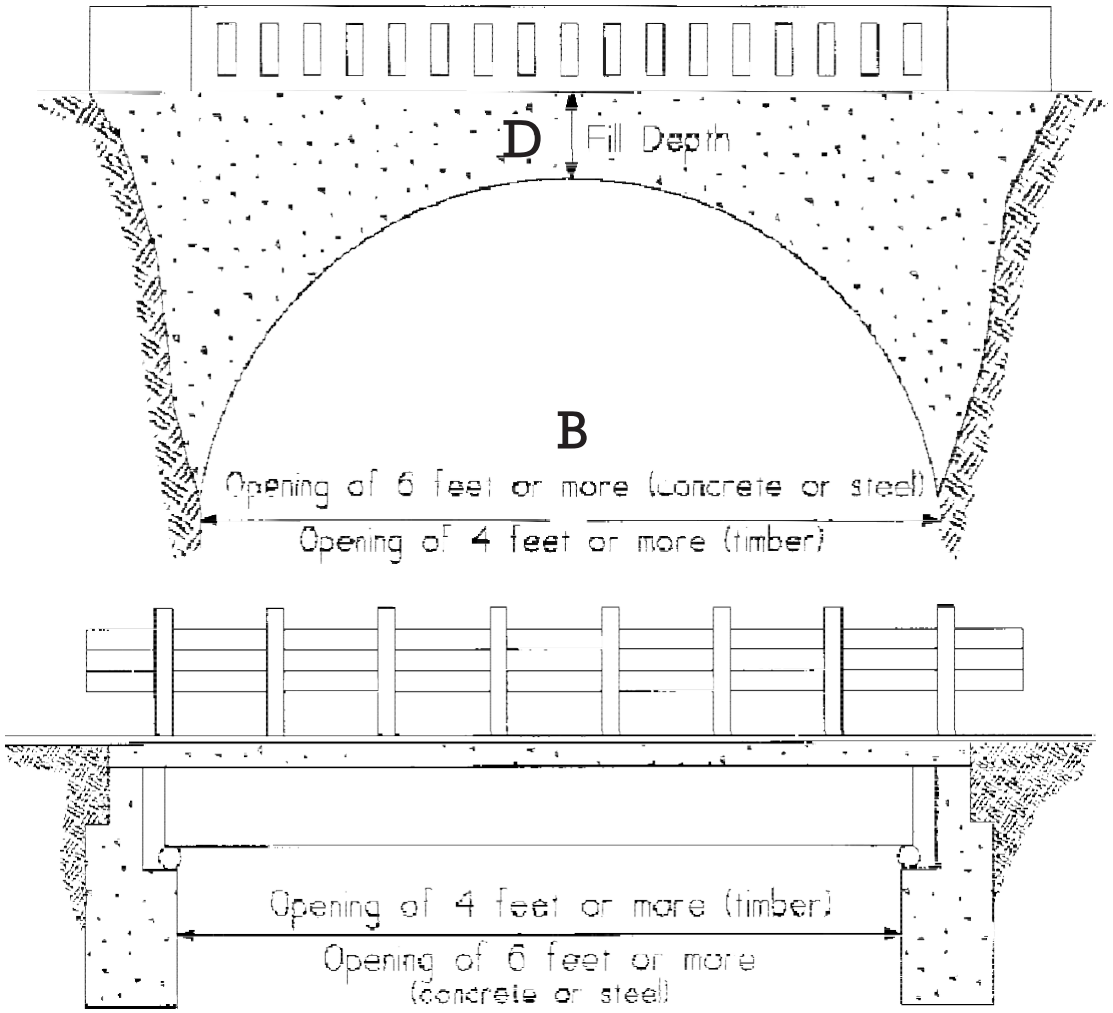
# *Appendix 3-B Short Span Bridge Criteria*

Short Span Inspections for bridges and culverts with a span of 20 feet or less, are recommended and performed by the Washington State Department of Transportation (WSDOT) Bridge Preservation Office when the outlined criteria are met. Structures not meeting one or more of the outlined criteria are turned over to region maintenance for responsibility of inspection and maintenance.

In the event that a structure is determined not to be inspected as a short span, the Team Leader making the determination will verify with Regional Supervisors and shall ensure that this information is passed on to the proper contacts within the region.

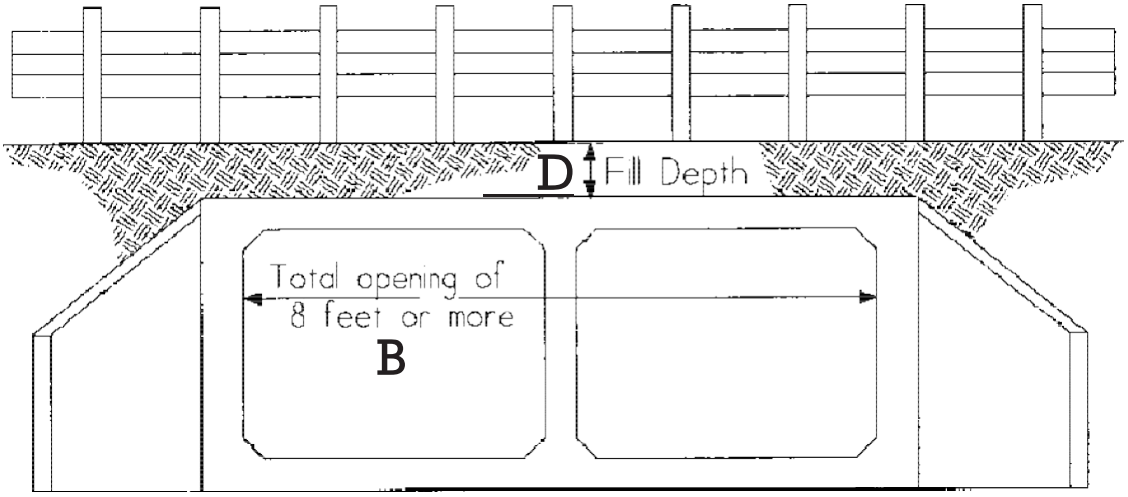
**Single Span, Pipe, Barrel, or Box Culverts or Bridges**

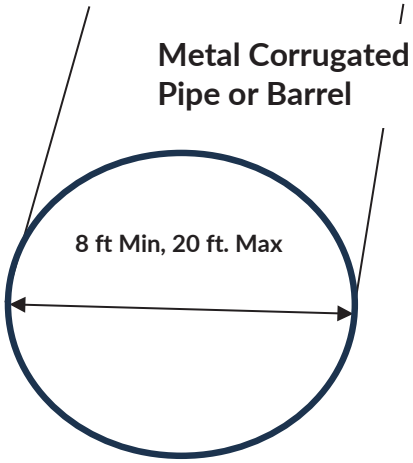
1. CONCRETE Structures: Opening of 6 feet or more.
   STEEL Structures: Opening of 6 feet or more.
   TIMBER Structures: Opening of 4 feet or more.
   Structures not meeting the minimum turned over to region maintenance for responsibility.
2. Depth of fill (D) must be less than B/2 (where B = Maximum opening distance).
   For structures 20 ft. and under, if the depth of fill is greater than B/2 the structure is turned over to region maintenance for responsibility of inspection and.

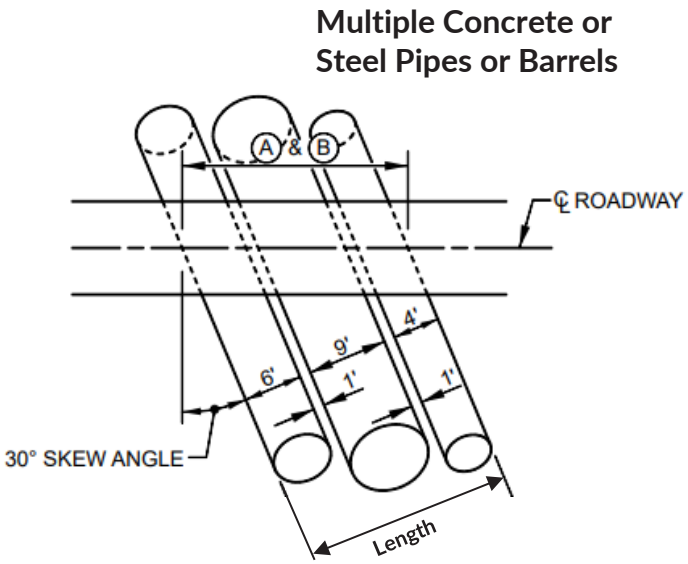


**Multi Span/Structure Pipe Barrel or Box Culverts or Bridges.**

1. Total Opening across all pipes, barrels, or boxes must be 8 feet or more.




Ⓐ = $\frac{\text{Length}}{\text{Cos } 30°}$ = 10 ft Min, 20 ft. Max  Ⓑ = Blank

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

# *Appendix 3-C UBIT Inspections and Procedures*

1. **Determining Bridges to Receive Inspections with a UBIT –** Team Leaders will work with supervisors to determine the appropriate resources and need in scheduling of UBIT resources for bridge inspections. UBITS or other resources are often needed to gain sufficient access to determine the structural condition of bridge members. These may include floor beam and stringer connections, pier caps, bearings, restraint devices or other features at midspan or on top of interior piers that are too high for ladders.
2. **Record and Update the UBIT Resource in the Inspection Report –** The UBIT resource, under the Resources portion of the report has to be updated after every inspection to ensure that the date for the next required use of resource stays in synchronization with the associated report. If inspection due dates for associated Routine, NSTM or Complex Feature reports move, the Resource due dates must also be adjusted. Team leaders and supervisors will need to coordinate this to insure it is done properly on a case-by-case basis when moving them around.

   Local Agencies may reach out to Bridge Preservation or Local Programs for assistance with this if necessary. See “Two- and Three-Man Agreement Inspections” under Chapter 3 Report Types.
3. **Interval –** There is no set criteria on which bridges, or how often UBIT resource inspections need to occur. Need and interval should be determined by ability to access all elements of a bridge against bridge condition and history, type and location of elements, bridge configuration coincidence of required regularly scheduled inspections. New bridges that would require a UBIT for complete access should, at a minimum, receive a UBIT resource inspection for the Initial Inspection or the first Routine Inspection to follow. For bridges that do not need a UBIT resource each Routine Inspection, the inspection interval can be scheduled to alternate with inspection years. The following criteria is provided as a guideline:

| Type of Structure | Maximum Interval (Months) |
|---|---|
| Timber | 24 |
| Steel Trusses NSTM | 24 |
| Steel Bridges with NSTM or Complex Features | 24 |
| Non-NSTM Steel Bridges | 48 |
| Concrete Bridges with Movable Bearings in the Interior Spans | 48 |
| Concrete Bridges with Fixed Bearings or No Bearings. | 72 |

5. **Agreement Work and Cost Recovery –** For agreement work, private consultants, acting as an Agent for a Local Agency, may inspect using State Owned UBIT Resources as long as the Local Agency itself is operating under agreement with WSDOT. State work force drivers and inspectors, must always include equipment hours under the appropriate RO number on time sheets in order to accurately reflect in cost recovery billing.
6. **Fall Protection Plans –** As in all other inspection work, all Agency, State (WISHA) and Federal (OSHA) requirements for equipment operation, and employee safety, to include Personal Protective Equipment and Training must be observed for any personnel involved in the utilization and operation of the equipment. This will normally include a PASP (Pre-Activity Safety Plan. Refer to Agency Standards, State and Federal Regulations.

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# Appendix 3-D FHWA Letter for Routine Extended Interval Inspections

Washington State Department of Transportation

Transportation Building
310 Maple Park Avenue S.E.
P.O. Box 47300
Olympia, WA 98504-7300
360-705-7000
TTY: 1-800-833-6388
www.wsdot.wa.gov

September 18, 2023

Ralph Rizzo, Division Administrator
FHWA Washington Division
711 S. Capital Way, Suite 501
Olympia, WA 98501-1284

Attention: Loren Wilson, P.E., Division Bridge Engineer

**RE: National Bridge Inspection Standards Extended Inspection Interval Policy**

Dear Mr. Rizzo:

This letter represents WSDOT's response to FHWA's June 13, 2022 Memorandum regarding the Extended Bridge Inspection Interval Policy and Implementation in accordance with Sub Part C NBIS 650.311 Paragraph (a)(1)(iii)(B). This policy and the documented criteria for Routine inspections, utilizes WSDOT's "48 Month Inspection Policy" previously approved in 1998 by FHWA and includes refinements to conform with the requirements outlined in Paragraph (a)(1)(iii)(A) of the 2022 NBIS. WSDOT does not currently have an extended interval policy for Underwater or Non-redundant Steel Tension Member (NSTM) inspections.

Bridges meeting the outlined criteria may have the routine inspection interval extended to 48 months but not greater. Bridges eligible for extended intervals must meet specified criteria and will be identified based on program needs, resources, and requirements. The eligibility of bridges with extended interval inspections will be reviewed each inspection cycle against the outlined criteria for continued eligibility, notwithstanding changes in condition due to damage or deterioration that may occur or become evident between inspection cycles.

Bridges evaluated for Routine extended interval inspections at a 48-month frequency shall meet all of the following criteria.

1) Component Condition Ratings
    a. Deck (B.C.01) equal to or greater than 6.
    b. Superstructure (B.C.02) equal to or greater than 6.
    c. Substructure (B.C.03) equal to or greater than 6.
    d. Culvert (B.C.04) equal to or greater than 6.

2) For Bridges over Water
    a. Channel Condition (B.C.09) equal to or greater than 6.
    b. Channel Protection (B.C.10) equal to or greater than 6.
    c. Scour Vulnerability (B.AP.05) Coded A or B

d. Scour Condition (B.C.11) equal to or greater than 6.

3) Load Ratings
   a. Inventory Load Rating Factor (B.LR.05) equal to or greater than 1.
   b. Routine Permit Loads (B.LR.08) coded A or N.
   c. No Administrative Load Ratings.

4) Steel Bridges
   a. Fatigue Details (B.IR.02) coded N (for no category E or E' weld details)

5) Vertical Clearances
   a. All roadway vertical clearances (B.H.13) equal to or greater than 14 feet.

6) Superstructure
   a. Span Material (B.SP.04)
      i. C01-C02 Reinforced Cast-In-Place or Precast Concrete.
      ii. C03-Prestressed Pretensioned Concrete.
      iii. C04P-Prestressed Cast-In-Place Concrete Post Tensioned.
      iv. C05-Prestressed Precast Concrete Post Tensioned
      v. S01-S05 Steel (Rolled, Welded, Bolted, Riveted or Bolted/Riveted)
   b. Span Type (B.SP.06)
      i. A01-Filled Arch (No Spandrels)
      ii. B02-B03 Multiple Box Girder/Beam (Adjacent or Spread)
      iii. F01-F02 Three- and Four-Sided Frames
      iv. G01-G02 Girder/Beam I-Shaped (Adjacent and Spread)
      v. G03-G04 Girder T-Beam/T-Beam Inverted
      vi. G05-G06 Girder/Beam Double T (Adjacent and Spread)
      vii. G07-G08 Girder/Beam Channel (Adjacent and Spread)
      viii. S01-S02 Slab (Solid or Voided)
      ix. P01-P02 Pipe (Rigid or Flexible)

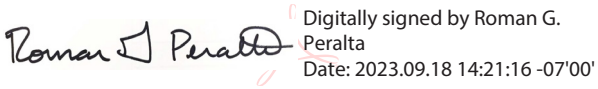
7) The maximum ADT (B.H.09) will be 100,000 and the maximum ADTT (B.H.10) will be 10,000.

8) Eligible bridges must receive an Initial Inspection and be in service for at least 24 months. This applies to:
   a. New bridges
   b. Rehabilitated bridges
   c. Structurally modified or widened bridges.

Washington State will be implementing these revisions within the upcoming 2024 Washington State Bridge Inspection Manual (WSBIM) updates and will continue to monitor structures for continued eligibility, in conjunction with the 2022 SNBI and any revisions or additions to it, going forward.

If you have any questions or concerns, please do not hesitate to contact me at 360-570-2557 or by email at peraltr@wsdot.wa.gov.

Sincerely,




Roman G. Peralta, P.E.
WSDOT Bridge Preservation Engineer

RGP:tms
GAS

cc: Sonia Lowry, WSDOT Local Programs Bridge Engineer
Greg Seipel, WSDOT Bridge Condition Engineer

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## List of WSDOT Elements by Number


12A Concrete Deck . . . . 4-13
12B Concrete Deck w/Coated Bars . . . . 4-13
12C Concrete Deck – Lightweight Aggregate . . . . 4-13
12D Thin Concrete Deck < 6” Thick . . . . 4-13
12E Fully Supported Concrete Deck . . . . 4-14
13 Post-Tensioned Concrete Deck . . . . 4-15
16 Bridge Deck Surface - Top Flange . . . . 4-16
17 Bridge Deck Surface - Solid Slab . . . . 4-17
28 Steel Deck – Open Grid . . . . 4-18
29 Steel Deck – Concrete Filled Grid . . . . 4-18
30A Steel Orthotropic Deck . . . . 4-18
30B Deck – Corrugated or Other Steel System . . . . 4-19
31 Timber Deck . . . . 4-20
32 Fiber Reinforced Polymer (FRP) Deck . . . . 4-21
35 Concrete Deck Soffit . . . . 4-22
36 Deck Rebar Cover - Smart Flag . . . . 4-23
38A Reinforced Concrete Solid Slab . . . . 4-24
38B Reinforced Concrete Hollow Slab . . . . 4-24
38C Reinforced Concrete Solid Slab w/Coated Bars . . . . 4-25
38D Reinforced Concrete Hollow Slab w/Coated Bars . . . . 4-25
39A Prestressed Concrete Solid Slab . . . . 4-26
39B Prestressed Concrete Hollow Slab . . . . 4-26
39C Prestressed Concrete Solid Slab w/Coated Strands . . . . 4-26
39D Prestressed Concrete Hollow Slab w/Coated Strands . . . . 4-27
54 Timber Slab . . . . 4-28
102 Steel Box Girder . . . . 4-29
104A Prestressed Concrete Tub Girder . . . . 4-30
104B Post-Tensioned Concrete Segmental Box Girder . . . . 4-31
104C Post-Tensioned Concrete Box Girder . . . . 4-31
105 Concrete Box Girder . . . . 4-32
107A Steel Rolled Girder . . . . 4-32

107B Steel Riveted Girder . . . . . 4-33
107C Steel Welded Girder . . . . . 4-33
107D Concrete Encased Steel Girder . . . . . 4-34
107E Steel Open Girder (Through Girder) . . . . . 4-35
109A Prestressed Concrete Girder . . . . . 4-36
109B Prestressed Concrete Girder w/Coated Strands. . . . . 4-36
109C Thin Flange Girder . . . . . 4-36
109D Prestressed Concrete Super Girder . . . . . 4-36
109E Prestressed Concrete Bulb-T Girder . . . . . 4-36
109F Prestressed Concrete Multiple Web Girder Units . . . . . 4-37
110A Concrete Girder . . . . . 4-38
110B Concrete Multiple Web Girder Unit . . . . . 4-38
111A Timber Glulam Girder . . . . . 4-39
111B Timber Sawn Girder. . . . . 4-39
113 Steel Stringer . . . . . 4-40
116 Concrete Stringer. . . . . 4-41
117 Timber Stringer . . . . . 4-42
120A Steel Thru Truss . . . . . 4-43
120B Steel Deck Truss. . . . . 4-43
135 Timber Truss . . . . . 4-44
136 Concrete Truss . . . . . 4-45
141A Steel Tied Arch . . . . . 4-46
141B Steel Arch . . . . . 4-46
142 Composite Arch . . . . . 4-47
144A Earth Filled Concrete Arch . . . . . 4-48
144B Concrete Arch . . . . . 4-48
146 Timber Arch . . . . . 4-49
147A Suspension – Main Cable . . . . . 4-50
147B Cable Stayed Bridge – Cable . . . . . 4-50
148A Suspension – Suspender Cable . . . . . 4-50
148B Tied Arch – Suspender Cable. . . . . 4-51
151 Concrete Column on Spandrel Arch . . . . . 4-52
152 Steel Floor Beam . . . . . 4-53
154 Prestressed Concrete Floor Beam . . . . . 4-54

155 Concrete Floor Beam . . . . . 4-55
156 Timber Floor Beam . . . . . 4-56
160 Steel Column on Spandrel Arch . . . . . 4-57
161A Steel Hanger . . . . . 4-57
161B Steel Pin . . . . . 4-58
162 Truss Gusset Plates . . . . . 4-59
164 Tension Hold Down Anchor Assembly . . . . . 4-60
200 Abutment Fill . . . . . 4-62
202 Steel Column . . . . . 4-63
204A Prestressed Concrete Column . . . . . 4-64
204B Prestressed Hollow Concrete Column . . . . . 4-64
205A Concrete Column . . . . . 4-65
205B Concrete Column w/Steel Jacket (Seismic) . . . . . 4-115
205C Concrete Pile/Column w/Composite Wrap (Seismic) . . . . . 4-117
206 Timber Column . . . . . 4-66
207A Steel Tower . . . . . 4-67
207B Movable Bridge Steel Tower . . . . . 4-135
208 Timber Trestle . . . . . 4-68
210 Concrete Pier Wall . . . . . 4-69
211 Other Pier Wall . . . . . 4-69
215 Concrete Abutment . . . . . 4-70
216 Timber Abutment . . . . . 4-72
218 Other Abutment . . . . . 4-73
219 Steel Abutment . . . . . 4-74
220 Concrete Pile Cap/Footing . . . . . 4-75
221 Concrete Web Wall between Columns . . . . . 4-75
222 Timber Foundation . . . . . 4-76
225 Steel Pile . . . . . 4-77
226A Prestressed Concrete Pile . . . . . 4-78
226B Prestressed Hollow Concrete Pile . . . . . 4-78
227 Concrete Pile . . . . . 4-79
228 Timber Pile . . . . . 4-80
231A Steel Pier Cap/Crossbeam . . . . . 4-81
231B Timber Cap Rehab with Steel . . . . . 4-81

233 Prestressed Concrete Pier Cap/Crossbeam . . . . . 4-82
234 Concrete Pier Cap/Crossbeam . . . . . 4-83
235 Timber Pier Cap . . . . . 4-84
237 Pontoon Hatch/Bulkhead. . . . . 4-85
238 Floating Bridge – Anchor Cable. . . . . 4-85
239 Concrete Floating Pontoon . . . . . 4-87
240 Metal Culvert . . . . . 4-89
241 Concrete Culvert . . . . . 4-90
242 Timber Culvert . . . . . 4-91
243 Other Culvert . . . . . 4-92
260 Steel Open Grid Sidewalk and Supports . . . . . 4-93
261 Steel Concrete Filled Grid Sidewalk and Supports. . . . . 4-93
262 Corrugated/Orthotropic Sidewalk and Supports . . . . . 4-94
264 Timber Sidewalk and Supports . . . . . 4-95
266 Concrete Sidewalk and Supports . . . . . 4-96
267 Fiber Reinforced Polymer (FRP) Sidewalk and Supports. . . . . 4-96
300A Strip Seal - Anchored . . . . . 4-123
300B Strip Seal – Welded. . . . . 4-123
301A Asphalt Butt Joint – Paving Joint Seal . . . . . 4-124
301B Silicone Rubber Joint. . . . . 4-124
302A Compression Seal/Concrete Header . . . . . 4-125
302B Compression Seal/Polymer Header . . . . . 4-125
302C Compression Seal/Steel Header . . . . . 4-126
303 Assembly Joint Seal (Modular). . . . . 4-127
304A Asphalt Open Joint – Paving Joint Seal . . . . . 4-128
304B Open Concrete Joint – Paving Joint Seal. . . . . 4-129
304C Steel Angle Header . . . . . 4-130
304D Steel Angle w/Raised Bars . . . . . 4-130
305A Steel Sliding Plate . . . . . 4-130
305B Steel Sliding Plate w/Raised Bars . . . . . 4-131
305C Steel Fingers. . . . . 4-131
305D Steel Fingers w/Raised Bars. . . . . 4-131
305E Bolt Down – Sliding Plate w/springs . . . . . 4-132
306A Concrete Bulb-T. . . . . 4-132

306B Bolt Down Panel – Molded Rubber . . . . . 4-133
306C Asphalt Plug . . . . . 4-133
306D Flexible Joint Seal . . . . . 4-134
308 Joint Paved Over - Smart Flag . . . . . 4-134
310 Elastomeric Bearing. . . . . 4-97
311 Moveable Bearing (Roller, Sliding, etc.) . . . . . 4-97
312 Concealed Bearing or Bearing System . . . . . 4-97
313 Fixed Bearing . . . . . 4-97
314 Pot Bearing . . . . . 4-98
315 Disk Bearing . . . . . 4-98
316 Isolation Bearing . . . . . 4-98
321 Concrete Roadway Approach Slab . . . . . 4-99
322 Approach Roadway Impact – Smart Flag . . . . . 4-108
330 Metal Bridge Rail . . . . . 4-100
331 Concrete Bridge Rail . . . . . 4-101
332 Timber Bridge Rail . . . . . 4-102
333 Other Bridge Rail . . . . . 4-103
340 Metal Pedestrian Rail . . . . . 4-104
341 Concrete Pedestrian Rail . . . . . 4-105
342 Timber Pedestrian Rail . . . . . 4-106
343 Other Pedestrian Rail . . . . . 4-107
351 Chloride Impact – Smart Flag . . . . . 4-109
353 Encampment Impact – Smart Flag . . . . . 4-110
355 Damaged Bolts or Rivets – Smart Flag . . . . . 4-110
356 Steel Cracking – Smart Flag . . . . . 4-111
357 Pack Rust – Smart Flag . . . . . 4-111
360 Bridge Movement – Smart Flag. . . . . 4-111
361 Scour – Smart Flag. . . . . 4-112
368 Seismic Pier Crossbeam Bolster . . . . . 4-118
369 Seismic Pier Infill Wall . . . . . 4-118
370 Seismic – Longitudinal Restrainer . . . . . 4-119
371 Seismic – Transverse Restrainer . . . . . 4-119
372 Seismic – Link/Pin Restrainer . . . . . 4-119
373 Seismic – Catcher Block . . . . . 4-120

374 Seismic – Column Silo . . . . . 4-121
376 Concrete Deck Delamination Testing – Smart Flag . . . . . 4-113
378 WSDOT Undercrossing Safety – Smart Flag . . . . . 4-113
379 Local Agency Undercrossing Safety – Smart Flag . . . . . 4-114
381 Joint Seal/Gland Leaking – Smart Flag . . . . . 4-114
506 BST on Concrete (Chip Seal) . . . . . 4-139
510A Asphalt Concrete Overlay . . . . . 4-140
510B Asphalt Concrete Overlay w/Waterproofing Membrane . . . . . 4-140
510C Thin Polymer Overlay . . . . . 4-140
510D Modified Concrete Overlay . . . . . 4-140
510E Polyester Concrete Overlay . . . . . 4-141
510F AC Over a Polymer Overlay . . . . . 4-141
510G Asphalt Concrete Overlay w/High Performance Membrane . . . . . 4-141
515A Red Lead Alkyd Paint System . . . . . 4-142
515B Inorganic Zinc/Vinyl Paint System . . . . . 4-142
515C Inorganic Zinc/Urethane Paint System . . . . . 4-142
515D Organic Zinc/Urethane Paint System . . . . . 4-142
515E Coal Tar Epoxy Paint System . . . . . 4-142
515F Metalizing . . . . . 4-142
515G Galvanizing . . . . . 4-143
515H Epoxy Paint for Weathering Steel . . . . . 4-143
515J Zinc Primer . . . . . 4-143
515K Weathering Steel Patina . . . . . 4-144
515L Paint System - Other . . . . . 4-144
705 Bridge Luminaire Pole and Base . . . . . 4-136
707 Fender System/Pier Protection . . . . . 4-137
710 Bridge Mounted Sign Structures . . . . . 4-138

## 4-1 Introduction

This chapter defines the Washington State Department of Transportation (WSDOT) approach for inspection, evaluation and recording of the structural condition state of the bridge structures within the WSDOT obligation to the National Bridge Inventory.

Local Agencies with inventory not on the National Highway System are encouraged, but not required, to use the WSDOT Bridge Element approach as defined in this chapter.

Doing so will enable the Local Agency to benefit from WSDOT Management strategies and lessons learned.

The intent of the element-level condition reporting is to supplement the National Bridge Inventory (NBI) structural condition state of the Bridge Deck, Superstructure, and Substructure. NBI information such as bridge location, traffic, and geometry is useful, however, element-level condition reporting provides a greater degree of information from which to draw upon to more effectively apply solutions to emergent bridge preservation and management needs.

Though the NBIS provides a consistent standard for the collection of bridge data, it is not comprehensive enough to provide performance-based decision support that includes economic considerations.

Limitations within the NBI system include:

- Each bridge is divided into only three major components for condition assessment: deck, superstructure, and substructure. This level of detail is not sufficient to identify appropriate repair strategies, or to accurately estimate repair/rehabilitation/replacement costs.
- Each of the three major components are 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 broad language of the condition definitions. Because the bridges include multiple distress symptoms and ratings to describe the overall or “average” condition of the bridge, it 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 the Bridge Inspection Program needed to have a connection to the NBI bridge condition rating convention.

WSDOT elements have been in use since 1992 and are 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 following ways:

- Element data is used to identify current bridge condition, need, and cost.
- Provides a logical and realistic method to prioritize bridge projects.
- Provides realistic and reliable forecasts of future preservation needs and costs.
- Adapts to changes in management philosophies without changing an element definition or category.
- Tracks the performance of desired bridge needs.

## 4-1.1 *Element Description*

A bridge is divided into three major components which includes the:

- Bridge deck
- Bridge superstructure
- Bridge substructure

Bridge *elements* are individual members comprised of basic shapes and materials connected together to form bridge components. (Ref BIRM Sec. 3.3). The WSDOT Inspection program is based upon documenting the condition state of these elements. This is accomplished through documenting the results of the visual and physical examination of these elements.

## 4-1.2 *Smart Flag*

The “Smart Flag” provides supplemental information gathered by the Inspector concerning an observed condition or defect that may or may not be included in the National Bridge Inventory element condition state language – and is judged to be necessary in order to accurately document the element commentary.

## 4-1.3 *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 recommended 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 12A, or epoxy coated steel which is element 12B because this information is not visible to the inspector. Likewise, field measuring the deck length and width in traffic would not be necessary and usually less accurate than if plan dimensions are available.

An average bridge made of the same material will have six to ten elements. A large or complex bridge may have up to 20 elements. A typical bridge will have a bridge deck, possibly a deck overlay, bridge rails, a primary load carrying member like a prestressed concrete girder, primary substructure support like concrete columns, other elements like abutments, expansion joints and/or bearings.

In order to maintain quality element data, the Inspector is responsible for updating the elements and quantities as they change with time by maintenance or by contract. Many bridges will have construction work that changes the joints, asphalt depth, rail, concrete overlay, or widens the structure, etc. These activities can change elements that apply to the bridge and must be updated accordingly. WSDOT uses a Contract History database to log contract work and for reference. See Section 2-2 for more information on the Contract History database.

## 4-1.4 *Application of Element Units*

Each element is assigned a unit of measure which quantifies the extent of an observed defect. Unit descriptions are:

- **Square Feet (SF):** Where the surface area is used to document the element condition state, such as deck surface and paint surface elements.
- **Lineal Feet (LF):** Represents 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 girder was individually precast 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.
- **Each (EA):** Applies to the number of members in a condition state. For example: A bridge may include 5 piles at 3 pier locations for a total pile element quantity of 15. Then, each pile is inspected, evaluated, and recorded in the appropriate condition state. Elements with units of “EA” are coded to reflect the entire member in one condition state, such as pile, where the entire pile is in one of the defined condition states.
- **“Cell”:** Applies to floating bridge concrete pontoon segments.

## 4-1.5 *Quantifying Element Defects*

To quantify the condition of an element, the first step is to review the element condition state language. A complete list of the condition state descriptions is provided in this chapter.

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.

Element condition state (CS) language is typically based on four condition state levels as noted above. However, it is important to note that only three condition states (CS1, CS2 & CS3) apply to Expansion Joint and Overlay elements. Additionally, certain Smart Flag defects may include only one or two condition states or use all four.

### 4-1.5.A Affected Quantity

Prior to 2025 the concept of the "Affected quantity" was applied in two ways. Previously beam type and structural slab elements coded in Condition State 4 used a load path consideration, thereby coding the entire span length of the member as being affected. Going forward, with the exception of trusses and joints, "Affected Quantity" is the actual length of the defect, defects, or repairs to the member.

In the case of joints, the percentage of the joint element in any given condition state will determine the recorded length for the purposes of asset management. 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 all defects CS2 through 4 by panel the length of truss. For specific information, see condition state coding instruction for each of the joint and truss elements.

### 4-1.5.B WSDOT Condition States for Structural Members

The following discusses and summarizes the WSDOT element condition state philosophy for primary structural members. Different condition philosophies apply to some of 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.

For additional information and suggestions for superficial, minor, moderate, and major defects in concrete, wood, steel and prestressed concrete, see Exhibits 4-1 through 4-4 located in Appendix 4-A. Inspector judgement should be used for all cases.

**Condition State 1: Good Condition –** This condition state describes elements with either no defects or elements with insignificant or superficial defects. These defects do not require repair recommendations and are not typically indicative of progressing deterioration. The defects may be inherent to the material or construction methods. Inherent defects may include checks or shakes in timber elements, or patches in concrete elements.

Permanent, in-kind repairs may be considered in Good Condition.

**Condition State 2: Fair Condition –** This condition state describes elements with minor defects, including completed and effective repairs or patches. Repairs for these defects may be recommended but are not required for serviceability or strength of the element. Minor defects may be indicative of an active deterioration mode; however, this deterioration has been remediated, either with a repair or naturally, or the deterioration is occurring at a slow pace (little change between subsequent inspections).

Any repairs or patches are considered in Fair Condition if they are functioning as intended.

**Condition State 3: Poor Condition –** This condition state describes elements with moderate defects. Moderate defects may be indicative of an active deterioration mode that will continue if left unchecked. Structural capacity is not significantly affected, and a structural analysis is not recommended, or has already been done to determine capacity is not significantly affected. Repairs may be recommended and necessary to prevent further deterioration.

Existing repairs and patches that are ineffective or failed may be in Poor Condition, with consideration of the original defect.

**Condition State 4: Severe Condition –** This condition state documents elements with defects that have impacted the structural capacity of the element. Severe defects are typically the product of active deterioration or damage caused by an event (high-load impact, earthquake, etc.). A structural analysis is warranted to determine the safe load carrying capacity of the bridge, or an analysis has been completed and confirmed the capacity is significantly affected. Repairs or other actions may be required to preserve or restore the capacity of the member.

## 4-1.6 *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 piles/footings that are buried or submerged 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 an element change would be deck delaminations recorded in CS4 which are not visible to the inspector and are removed by hydro milling 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.

## 4-1.7 *Concrete Element Cracking*

The following table is provided for use to distinguish between different sizes of concrete cracks.

**Exhibit 4-1 WSDOT Element Concrete Crack Width Guidelines**

| | Reinforced Concrete | | Prestressed Concrete | |
|---|---|---|---|---|
| | English | Metric | English | Metric |
| Hairline (HL) | < 0.0625" | < 1.6 mm | < 0.004" | < 0.1 mm |
| | < 1/16" | | | |
| Narrow (N) | 0.0625" to 0.125" | 1.6 to 3.2 mm | 0.004" to 0.009" | 0.1 to 0.23 mm |
| | 1/16" to 1/8" | | | |
| Medium (M) | 0.125" to 0.1875" | 3.2 to 4.8 mm | 0.010" to 0.030" | 0.25 to 0.75 mm |
| | 1/8" to 3/16" | | | |
| Wide (W) | > 0.1875" | > 4.8 mm | > 0.030" | > 0.76 mm |
| | > 3/16" | | | |

**Concrete Structural Cracking –** For the purpose of evaluating element condition, concrete structural cracks are narrow (or wider) in regions of high shear or moment (see BIRM).

Crack width is significant to the extent that it indicates exposure of rebar to water and/or a structural problem in a concrete element. Generally, most concrete elements will exhibit some level of hairline cracking which is not considered significant from a structural standpoint.

### 4-1.8 *WSDOT Deck Element to SNBI Deck Overall Rating*

Overall Rating of SNBI Decks was originally addressed here but is now addressed for both SNBI and WSDOT Specific within Chapter 2 Coding Guide.

## 4-2 Bridge Decks

The intent of the bridge deck elements is to record the top surface deterioration. The Concrete Deck Soffit, slab, or deck-girder elements record the edge and soffit deterioration. Condition States should be supported in the notes for each element. Do not count filling in of the rut as a patch. These locations have filled in a rut with Liquid Concrete or urethane-based repair materials and are not considered a deck structural repair.

All asphaltic patching material on a concrete bridge deck shall be considered a spalled area, or CS3, and is an 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 may be only a deck surface element. The one exception is an earth filled arch structure with an asphalt pavement surface only.

Traditional concrete bridge decks use elements 12A, 12B, 12C or 12D to record the top surface deterioration; and have the WSDOT Soffit Element (35) to record the structural deterioration. It should be noted for element 12B that epoxy coated rebar in bridge decks became an industry standard in Washington State in the early 1980s.

Non-Traditional concrete decks use elements 12E, 16, or 17 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, 30A, 30B, 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 reported curb-to-curb when deck curb-to-curb dimensions vary.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **12A** | 12 | **Concrete Deck** | **Units - SF** | 12 | -- | N |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **12B** | 26 | **Concrete Deck w/Coated Bars** | **Units - SF** | 12 | -- | Y |

This WSDOT element defines a concrete bridge deck constructed with coated (epoxy, galvanizing, stainless steel, fiber reinforced polymer (FRP), etc.) reinforcement. The total quantity for this element is the actual bridge deck area from curb line to curb line.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **12C** | 20 | **Concrete Deck – Lightweight Aggregate** | **Units - SF** | 12 | -- | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **12D** | 16 | **Thin Concrete Deck < 6” Thick** | **Units - SF** | 12 | -- | Y |

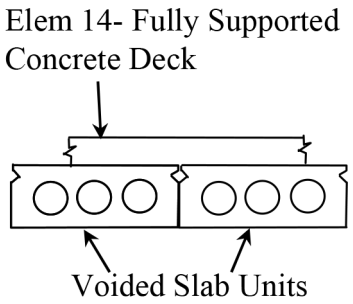
This element defines a concrete bridge deck constructed with a deck that is less than 6” in thickness. The total quantity for this element is the actual bridge deck area from curb line to curb line.

| WSDOT BMSE 12E | Prior BMS 14 | Fully Supported Concrete Deck | Units - SF | NBE 12 | BME -- | ADE Y |
|---|---|---|---|---|---|---|

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 39A, 39C, 109E, 109F, or 110B. The total quantity for this element is the actual bridge deck area from curb line to curb line.

**Condition States for WSDOT Elements 12A, 12B, 12C, 12D, and 12E**

1. Deck surface defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Deck surface area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Deck surface area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Deck surface area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Abrasion or wear is causing significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.



| WSDOT BMSE | Prior BMS | Post-Tensioned Concrete Deck | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **13** | 15 | | | 13 | -- | N |

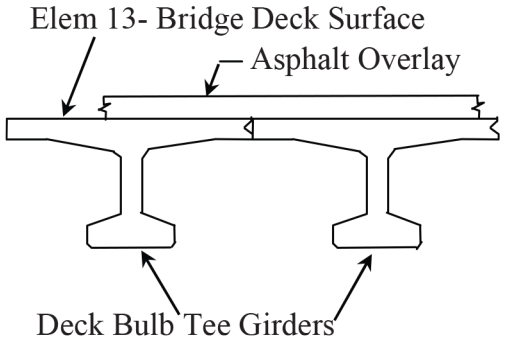
This element is defined by a concrete bridge deck that has transverse or longitudinal post tensioning; and includes the deck on elements 104B Post Tensioned Segmental and 104C Post Tensioned Concrete Box. These decks require a higher level of care for maintenance, special attention by management, and have a higher replacement cost. This element does not include the deck of elements 105 Concrete Box Girder and 104A Prestressed Concrete Tub Girder. The total quantity for this element is the actual bridge deck area from curb line to curb line.

**Condition States for WSDOT Element 13 if the top of the deck is visible**

1. Deck surface defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”)
2. Deck surface area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/ wide cracks.
3. Deck surface area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Deck surface area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Abrasion or wear is causing significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or tensioning strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Tensioning strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Bridge Deck Surface - Top Flange | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **16** | 13 | | | 16 | -- | N |

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 38B, 38D, 39B, 39D, 54, 109E, 109F, or 110B. The total quantity for this element is the actual bridge deck area from curb line to curb line.



| WSDOT BMSE | Prior BMS | Bridge Deck Surface - Solid Slab | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **17** | -- | | | -- | -- | Y |

This WSDOT element defines a surface of a bridge deck that consists of a solid slab without a traditional deck. Usually there is a deck protection system (overlay) present, but in some cases, traffic may be driving directly on the slab. This WSDOT element is used with superstructure elements 38A, 38C, 39A or 39C, corresponding to SNBI Item BSP06 coded S01 for solid slab. The total quantity for this element is the actual bridge deck area from curb line to curb line.

**Condition States for WSDOT Elements 16 and 17 if the top of the slabs or girders are visible**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Deck surface area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Deck surface area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Deck surface area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Abrasion or wear is causing significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **28** | 28 | **Steel Deck – Open Grid** | **Units - SF** | 28 | -- | N |

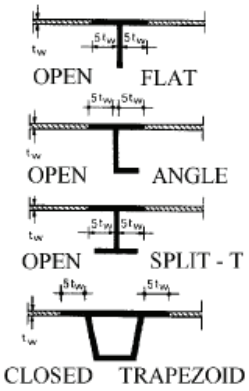
This WSDOT element defines a bridge deck constructed of steel grids that are open and unfilled. The total quantity for this deck WSDOT element is the actual bridge deck area from curb line to curb line.

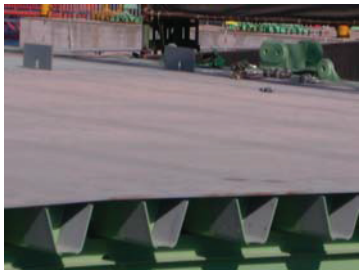
| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **29** | 29 | **Steel Deck – Concrete Filled Grid** | **Units - SF** | 29 | -- | N |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **30A** | 27 | **Steel Orthotropic Deck** | **Units - SF** | 30 | -- | Y |

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.



| WSDOT BMSE | Prior BMS | Deck – Corrugated or Other Steel System | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **30B** | 30 | | | 30 | -- | N |

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 28, 29, 30A, and 30B (Structural Decks)**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Deck area with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose or damaged fasteners. Bolts/rivets may have been replaced.
3. Deck area with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Deck area with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | Timber Deck | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **31** | 31 | | | 31 | -- | N |

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.

**Condition States for WSDOT Element 31**

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Deck area with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Deck area with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Deck area with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | Fiber Reinforced Polymer (FRP) Deck | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **32** | 32 | | | 60 | -- | Y |

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.

**Condition States for WSDOT Element 32**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Deck surface area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Deck surface area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Deck surface area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Abrasion or wear is causing significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Concrete Deck Soffit | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 35 | 35 | | | 12 | -- | Y |

This WSDOT element defines the bottom (or undersurface) and edge of a concrete deck and is to be included with concrete WSDOT deck elements 12A, 12B, 12C, and 12D. 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 is 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.

**Condition States for WSDOT Element 35**





1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Soffit area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Soffit area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended..
4. Soffit area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Deck Rebar Cover - Smart Flag | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **36** | 36 | | | -- | -- | Y |

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 existence of exposed reinforcement in CS1 or CS2 as appropriate.

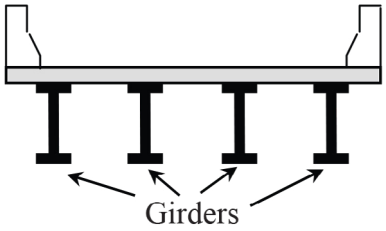
1. Deck top surface has exposed reinforcement due to lack of cover.
2. Deck top surface has exposed reinforcement within rutted wheel.



# 4-3 Superstructure

## 4-3.1 *Girders*

A girder is defined as any longitudinal structural member (single web or box section) that directly supports the bridge deck. A girder type bridge will typically have two or more girders. Girders may be constructed of the following typical materials: Rolled, welded or bolted (riveted) steel sections; Post tensioned, prestressed or reinforced concrete sections; or Timber sections.




## 4-3.2 *Diaphragms*

Diaphragms are structural members used to tie adjoining girders together to improve the strength and rigidity of the girder and to distribute forces in the lateral direction.

Diaphragms do not have an element but if a diaphragm has advanced deterioration, it should be noted in the element comments of the associated girder.

## 4-3.3 *Pedestrian Bridges*

The same WSDOT elements used for bridges that carry vehicular traffic can be used for pedestrian bridges. Do not use the WSDOT sidewalk elements (#260 through #267) for pedestrian bridges.

## 4-3.4 *Slab Bridges*

Slab bridges can have precast segments or cast in place concrete. The bridge in the picture is a cast in place concrete slab and will have a deck element for the deterioration of the top surface. Structural deficiencies of the slab bottom and edge are documented in WSDOT element 38A Reinforced Concrete Solid Slab.

***Note:*** The total quantity for slab elements is the actual bridge deck area. Do not use the reported curb-to-curb value when a deck curb-to-curb dimensions vary.

| **WSDOT BMSE** | Prior BMS | **Reinforced Concrete Solid Slab** | **Units - SF** | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **38A** | 38 | | | 38 | -- | N |

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.




| **WSDOT BMSE** | Prior BMS | **Reinforced Concrete Hollow Slab** | **Units - SF** | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **38B** | 49 | | | 38 | -- | Y |

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.

| WSDOT BMSE | Prior BMS | Reinforced Concrete Solid Slab w/Coated Bars | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 38C | 52 | | | 38 | -- | Y |

This element defines a concrete slab bridge and edge that has been constructed with coated (epoxy, etc.) 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.

| WSDOT BMSE | Prior BMS | Reinforced Concrete Hollow Slab w/Coated Bars | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 38D | -- | | | 38 | -- | Y |

This element defines a concrete slab bridge and edge that has been constructed with sono-tubes and coated (epoxy, galvanizing, stainless steel, fiber reinforced polymer (FRP), etc.) 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.

**Condition States for WSDOT Elements 38A, 38B, 38C, and 38D**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625")
2. Slab area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1" deep and 6" in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½" deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625" - 0.125") or sealed medium/wide cracks.
3. Slab area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½"-1" deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125" - 0.1875") that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Slab area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875") that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **39A** | 50 | **Prestressed Concrete Solid Slab** | **Units - SF** | 39 | -- | Y |

This element defines a concrete slab bridge that has been constructed with prestressed concrete and uncoated steel 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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **39B** | -- | **Prestressed Concrete Hollow Slab** | **Units - SF** | 39 | -- | Y |

This element defines a concrete slab bridge and edge that has been constructed with sono-tubes using prestressed concrete and 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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **39C** | 51 | **Prestressed Concrete Solid Slab w/Coated Strands** | **Units - SF** | 39 | -- | Y |

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.

| WSDOT BMSE | Prior BMS | Prestressed Concrete Hollow Slab w/Coated Strands | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 39D | -- | | | 39 | -- | Y |

This element defines a concrete slab bridge and edge that has been constructed with sono-tubes using prestressed concrete and coated (epoxy, galvanizing, stainless steel, fiber reinforced polymer (FRP), etc.) 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

**Condition States for WSDOT Elements 39A, 39B, 39C, and 39D**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”)
2. Slab area with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Slab area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Slab area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Timber Slab | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 54 | 54 | | | 54 | -- | N |

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.

**Condition States for WSDOT Element 54**

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Slab area with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Slab area with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Slab area with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | Steel Box Girder | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **102** | 102 | | | 102 | -- | N |

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.

**Condition States for WSDOT element 102**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of box girder with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of box girder with moderate defects, failed repairs, or any identified distortion, or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of box girder with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **104A** | 97 | **Prestressed Concrete Tub Girder** | **Units - LF** | 104 | -- | Y |

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.

**Condition States for WSDOT Element 104A**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004")
2. Length of girder with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1" deep and 6" in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½" deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004" - 0.009") or sealed medium/wide cracks.
3. Length of girder with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½"-1" deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010" - 0.030") that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of girder with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030") that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Post-Tensioned Concrete Segmental Box Girder | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 104B | 100 | | | 104 | -- | Y |

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.

| WSDOT BMSE | Prior BMS | Post-Tensioned Concrete Box Girder | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 104C | 104 | | | 104 | -- | N |

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.

**Condition States for WSDOT Elements 104B and 104C**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”)
2. Length of girder with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Length of girder with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of girder with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **105** | 105 | **Concrete Box Girder** | **Units - LF** | 105 | -- | N |

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 Element 105**

1. Concrete box girder defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625")
2. Length of concrete box girder with minor defects or effective functioning repairs/ patches are present. May have delaminations and spalling typically up to 1" deep and 6" in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½" deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625" - 0.125") or sealed medium/wide cracks.
3. Length of concrete box girder with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½"-1" deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125" - 0.1875") that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of concrete box girder with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875") that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **107A** | 90 | **Steel Rolled Girder** | **Units - LF** | 107 | -- | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **107B** | 91 | **Steel Riveted Girder** | **Units - LF** | 107 | -- | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **107C** | 92 | **Steel Welded Girder** | **Units - LF** | 107 | -- | Y |

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 107A, 107B, and 107C**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of girder with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of girder with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of girder with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | Concrete Encased Steel Girder | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 107D | 96 | | | 107 | -- | Y |

This element defines a steel girder that is encased in concrete. The total quantity for this element is the sum of each girder length.

**Condition States for WSDOT Element 107D**

1. Defects in the concrete encasing the girders, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of the concrete encasing with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of the concrete encasing with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of the concrete encasing with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Steel Open Girder (Through Girder) | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **107E** | 107 | | | 107 | -- | N |

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.

**Condition States for WSDOT Element 107E.**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of girder with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of girder with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of girder with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **109A** | 115 | **Prestressed Concrete Girder** | **Units - LF** | 109 | -- | Y |

This element defines a girder constructed of precast prestressed concrete that may or may not be post-tensioned and supports the bridge deck. The total quantity for this element is the sum of each girder length.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **109B** | 89 | **Prestressed Concrete Girder w/ Coated Strands** | **Units - LF** | 109 | -- | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **109C** | 98 | **Thin Flange Girder** | **Units - LF** | 109 | -- | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **109D** | 103 | **Prestressed Concrete Super Girder** | **Units - LF** | 109 | -- | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **109E** | 108 | **Prestressed Concrete Bulb-T Girder** | **Units - LF** | 109 | -- | Y |

This element defines a precast prestressed concrete Bulb-Tee girder unit which has little or no span between the top flanges. 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.

| WSDOT BMSE | Prior BMS | Prestressed Concrete Multiple Web Girder Units | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **109F** | 109 | | | 109 | -- | N |

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.

**Condition States for WSDOT Elements 109A, 109B, 109C, 109D, 109E, and 109F**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004").
2. Length of girder with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1" deep and 6" in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½" deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004" - 0.009") or sealed medium/wide cracks.
3. Length of girder with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½"-1" deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010" - 0.030") that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of girder with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030") that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **110A** | 110 | **Concrete Girder** | **Units - LF** | 110 | -- | N |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **110B** | 114 | **Concrete Multiple Web Girder Unit** | **Units - LF** | 110 | -- | Y |

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.

**Condition States for WSDOT Elements 110A and 110B**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of concrete girder with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of concrete girder with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of concrete girder with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **111A** | 111 | **Timber Glulam Girder** | **Units - LF** | 111 | -- | N |

This element defines a girder unit constructed of glulam timber. This element directly supports the bridge deck. The total quantity for this element is the sum of each girder length.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **111B** | 117 | **Timber Sawn Girder** | **Units - LF** | 111 | -- | Y |

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.

**Condition States for WSDOT Elements 111A and 111B**

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of timber girder with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of timber girder with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of timber girder with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | Steel Stringer | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **113** | 113 | | | 113 | -- | N |

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.

**Condition States for WSDOT Element 113**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of stringer with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of stringer with moderate defects, failed repairs, or any identified distortion, or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of stringer with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | Concrete Stringer | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **116** | 116 | | | 116 | -- | N |

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 Element 116**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of stringer with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of stringer with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of stringer with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **117** | 118 | **Timber Stringer** | **Units - LF** | 117 | -- | N |

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 Element 117**

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of timber stringer with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of timber stringer with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of timber stringer with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **120A** | 126 | **Steel Thru Truss** | **Units - LF** | 120 | -- | N |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **120B** | 131 | **Steel Deck Truss** | **Units - LF** | 120 | -- | Y |

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 120A and 120B**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Steel Deck Truss panel length with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Steel Deck Truss panel length with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Steel Deck Truss panel length with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | Timber Truss | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 135 | 135 | | | 135 | -- | N |

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.

**Condition States for WSDOT Element 135**

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Truss panel length with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Truss panel length with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Truss panel length with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | Concrete Truss | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **136** | 119 | | | 136 | -- | N |

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.

**Condition States for WSDOT Element 136**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Truss panel length with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Truss panel length with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Truss panel length with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) **that** appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **141A** | 142 | **Steel Tied Arch** | **Units - LF** | 141 | -- | Y |

This element includes all members of a tied arch constructed of structural steel. The bottom chord, top chord, and steel hangers are included in this element. The total quantity for this element is the length measured from one arch support to the other. If steel hangers are cable elements, report them in element 148B.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **141B** | 141 | **Steel Arch** | **Units - LF** | 141 | -- | N |

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.

**Condition States for WSDOT Elements 141A and 141B**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Arch panel length with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member or damage to wires within a cable does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Arch panel length with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Arch panel length with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | Composite Arch | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **142** | 140 | | | 142 | -- | N |

This element includes all members of an arch constructed of Composite material. The total quantity for this element is the length measured from one arch support to the other.

**Condition States for WSDOT Element 142**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”). Noted defects have no effect on the structural capacity of the element.
2. Arch panel length with minor defects or effective repairs that are in place and functioning as intended. There is no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended.
3. Arch panel length with moderate defects that may be surrounded by other minor deterioration such as cracking delamination. Any section loss is measurable and there may be open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Arch span length affected by major defects or damage Significant section loss may be associated with other signs of deterioration. (Note remaining diameter or cross section). Any repairs or patching is ineffective. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **144A** | 145 | **Earth Filled Concrete Arch** | **Units - LF** | 144 | -- | Y |

This element defines an earth filled arch constructed of reinforced concrete. The total quantity for this element is the length measured from one arch foundation to the other. If there is a concrete deck constructed on the fill, WSDOT element 12E applies. If there is an ACP wearing surface, WSDOT element 510A or 510B applies.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **144B** | 144 | **Concrete Arch** | **Units - LF** | 144 | -- | N |

This element only defines the arch (open/closed spandrel, bowstring, etc.) and is constructed of non-prestressed reinforced concrete. When coding SNBI, 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.

**Condition States for WSDOT Element 144A and 144B**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Arch panel length with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Arch panel length with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Arch panel length with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Timber Arch | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **146** | 139 | | | 146 | -- | N |

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.

**Condition States for WSDOT Element 146**

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Arch panel length with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Arch panel length with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Arch panel length with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **147A** | 146 | **Suspension – Main Cable** | **Units - EA** | 147 | -- | N |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **147B** | 149 | **Cable Stayed Bridge – Cable** | **Units - EA** | 147 | -- | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **148A** | 147 | **Suspension – Suspender Cable** | **Units - EA** | 148 | -- | N |

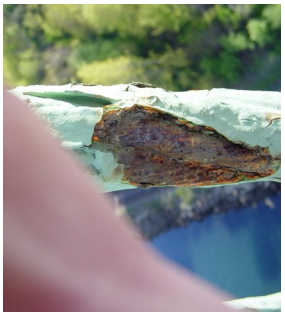
This element defines a suspender steel cable that connects the bridge superstructure to the main suspension cable. Suspender cables include the anchor device at the ends and the zinc protection on the wires. The outer protection system is usually a form of a paint element. The total quantity for this element is the number of steel cables.

**Condition States for WSDOT Elements 147A, 147B, and 148A**

1. Number of cables with no defects. Zinc coating may be dull gray showing early signs/stages of zinc oxidation. No breaks in cable stay protective polyethylene pipe. 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. Cable stay protective polyethylene pipe may have cracks but not separation exposing underlying grout or cable wires/strands.
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. Cable stay protective polyethylene pipe has cracked and separated, exposing grout or cable wires/strands. No corrosion present in exposed wires/strands.




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.



| WSDOT BMSE | Prior BMS | Tied Arch – Suspender Cable | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **148B** | 143 | | | 148 | -- | Y |

This element defines a steel cable used to suspend a bridge deck from an arch or truss. The total quantity for this element is the total number of suspenders.

**Condition States for WSDOT Element 148B**

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.

| WSDOT BMSE | Prior BMS | Concrete Column on Spandrel Arch | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 151 | 150 | | | -- | -- | Y |

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.

**Condition States for WSDOT Element 151**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Number of columns with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Number of columns with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Number of columns with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Steel Floor Beam | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **152** | 152 | | | 152 | -- | N |

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 floor beam length.

**Condition States for WSDOT Element 152**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Steel Floor Beam length with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Steel Floor Beam length with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Steel Floor Beam length with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

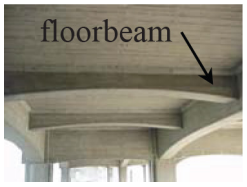
| WSDOT BMSE | Prior BMS | Prestressed Concrete Floor Beam | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **154** | 154 | | | 154 | -- | N |

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 floor beam length.

**Condition States for WSDOT Element 154**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”).
2. Length of floor beam with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Length of floor beam with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of floor beam with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Concrete Floor Beam | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **155** | 155 | | | 155 | -- | N |




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 floor beam length.

**Condition States for WSDOT Element 155**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625")
2. Length of floor beam with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1" deep and 6" in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½" deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625" - 0.125") or sealed medium/wide cracks.
3. Length of floor beam with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½"-1" deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125" - 0.1875") that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of floor beam with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875") that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Timber Floor Beam | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **156** | 156 | | | 156 | -- | N |

This element defines a stringer constructed of timber that supports the bridge deck. The total quantity for this element is the sum of each floor beam length. See Steel Floor beam, WSDOT Element 152, for a more general description.

**Condition States for WSDOT Element 156**

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of floor beam with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of floor beam with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of floor beam with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **160** | 160 | **Steel Column on Spandrel Arch** | **Units - EA** | -- | -- | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **161A** | 161 | **Steel Hanger** | **Units - EA** | 161 | -- | N |

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 161A**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Number of steel columns or hangers with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member or damage to wires within a cable does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Number of steel columns or hangers with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Number of steel columns or hangers with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | Steel Pin | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 161B | 162 | | | 161 | -- | Y |

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.

**Condition States for WSDOT Element 161B**

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.

| WSDOT BMSE | Prior BMS | Truss Gusset Plates | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **162** | 133 | | | 162 | -- | N |

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.

**Condition States for WSDOT Element 162**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Number of Truss Gusset Plates with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Number of Truss Gusset Plates with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Number of Truss Gusset Plates with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | Tension Hold Down Anchor Assembly | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 164 | 163 | | | -- | -- | Y |



This is a NSTM 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 the NSTM 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 161B 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: 2/35, 20/204, 25/130, 169/8, 261/125, 305/10 and 395/545.

**Condition States for WSDOT Element 164**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Number of Tension Hold-Down Anchor Assemblies with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any noted distortion in the member does not require repair or monitoring. Concrete anchorage may have minor scale, spalling or rust staining but connections are functioning as intended.
3. Number of Tension Hold-Down Anchor Assemblies with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Number of Tension Hold-Down Anchor Assemblies with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

## 4-4 Substructure

The evaluation of the substructure elements is based on those portions of the member that are exposed for visual inspection and included in the element quantity. If an element is added to a bridge or quantities are changed due to exposure or discovery by other means, do not delete the historical information in subsequent inspections. Simply note the prior exposure or those members not visible and document the current condition.

### 4-4.1 *Abutments*

An abutment is a substructure unit located at the end of a bridge that is designed to retain the fill supporting the roadway and support the bridge superstructure. Bridges that terminate in mid-span or at a pier that is not at grade do not have an abutment substructure unit and do not have abutment elements. These cases will use other appropriate structural elements to evaluate condition.

All abutments shall be evaluated for the capacity to transfer design loads to a foundation thru structural elements. The roadway embankment with non-monolithic concrete wingwalls, timber planking, or other abutment retaining systems are included in the evaluation of the WSDOT Abutment Fill element 200 (EA) where the evaluation is limited to no more than 25 feet from the abutment. Timber Abutment element 216 (LF) is equivalent to element 200.

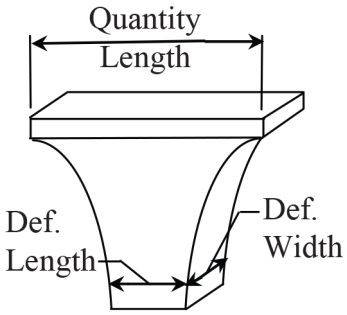
### 4-4.2 *Pier Cap/Cross Beam*

A pier cap is an element that is attached to the top of a pier and is used to support the superstructure of a bridge. A pier cross beam is generally attached to the girders and is used to distribute the loads from the girders to the pier.

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

### 4-4.3 *Pier Wall Definition*

A pier wall is a substructure pier element. For WSDOT elements, a pier wall is defined using two criteria: if the length (transverse direction) is 3 times greater than the width (longitudinal direction) at the bottom; and the wall extends full height from the foundation to the superstructure. If the pier does not meet these two criteria, then the element would be coded as a column or other pier.




### 4-4.4 *Pile/Column Elements*

These long slender members transfer load normally as a part of the bridge substructure. The bottom of a column element may be visible or supported on unknown foundations. For element and inspection purposes, a pile is inspected as a designed column for the visible portion above ground or if visible in the past. Single columns supported on a single shaft are to be considered the same as one column or column length even though a part of the shaft is visible.

## 4-4.5 *Foundation Elements*

WSDOT Timber Foundation and Concrete Foundation elements document that a foundation is visible, and the structural condition may or may not be related to scour. The foundation may be a spread footing, or a footing supported by piles or drilled shafts. The foundation element is based on the footing material and the piles may be of any material. The condition of the foundation is the focus of these elements, not the pile design or material.

If the supporting piles are visible, then the pile element should be added to the bridge. Do not delete the pile element in subsequent inspections. The total quantity is the quantity of piles supporting the exposed foundation, not just the number of exposed piles. When scour threatens or reduces the condition, the scour documentation and condition is recorded separately in WSDOT element 361 and not recorded in the foundation element.

| **WSDOT BMSE** | Prior BMS | **Abutment Fill** | **Units - EA** | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **200** | 200 | | | -- | -- | Y |

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. This element also includes abutment ends of cantilevered spans (formerly element 219).

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).

Erosion outside of the abutment/wingwalls can be documented in the notes but is not included in the evaluation or condition of the element.

**Condition States for WSDOT Element 200**

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 for problems with retaining fill.
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.

| WSDOT BMSE | Prior BMS | Steel Column | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 202 | 202 | | | 202 | -- | N |

This element defines a column or portion of a column constructed of structural steel visible for inspection.

**Condition States for WSDOT Element 202**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Number of steel columns with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced
3. Number of steel columns with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Number of steel columns with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | Prestressed Concrete Column | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 204A | 204 | | | 204 | -- | N |

This element defines a column or portion of a column constructed of prestressed concrete visible for inspection.

| WSDOT BMSE | Prior BMS | Prestressed Hollow Concrete Column | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 204B | 203 | | | 204 | -- | Y |

This element defines a column or portion of a column constructed of prestressed concrete and hollow. Inspection includes the visible portion above ground line.

**Condition States for WSDOT Element 204A and 204B**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”)
2. Number of columns with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Number of columns with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Number of columns with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Concrete Column | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **205A** | 205 | | | 205 | -- | N |

This element defines a column or portion of a column constructed of reinforced concrete visible for inspection.

**Condition States for WSDOT Element 205A**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Number of columns with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Number of columns with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Number of columns with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **206** | 206 | **Timber Column** | **Units - EA** | 206 | -- | N |

This element defines a column or portion of a column constructed of timber visible for inspection.

**Condition States for WSDOT Element 206**

1. Defects if any are superficial with no effect on the structural capacity. Checks, mold or staining may be present, and all connections are in place and functioning as intended.
2. Number of timber column with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Number of timber columns with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Number of timber columns with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **207A** | -- | **Steel Tower** | **Units - LF** | 207 | -- | N |

This element defines a truss framed tower support or built-up steel tower. Quantity is calculated as the sum of the heights of built up or framed tower supports.

**Condition States for WSDOT Element 207A**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Tower panel length (height) with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Tower panel length (height) with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Tower panel length (height) with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **208** | -- | **Timber Trestle** | **Units - LF** | 208 | -- | N |

This element defines a truss framed timber trestle or tower support or built up timber tower. Quantity is calculated as the sum of the heights of built up or framed tower supports.

**Condition States for WSDOT Element 208**

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of trestle with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of trestle with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of trestle with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **210** | 210 | **Concrete Pier Wall** | **Units - LF** | 210 | -- | N |

This element defines a pier wall, including submerged pier walls (formerly under Element 212), constructed of reinforced concrete. The total quantity for this element is the length at the top of the wall.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **211** | 211 | **Other Pier Wall** | **Units - LF** | 211 | -- | N |

This element defines a pier wall including submerged non-standard material (rock and mortar) or non-standard construction type walls (formerly element 213), 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 and 211**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”).
2. Length of pier wall with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of pier wall with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of pier wall with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Concrete Abutment | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **215** | 215 | | | 215 | -- | N |

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 when oriented parallel to the abutment or skewed towards the approaching roadway. Wingwalls extending inboard towards the bridge are not included in the quantity (Fig. 1). Skewed wingwalls are measured from either the back of the pavement (when parallel to roadway, Fig. 2) or from the abutment wall angle point. Wingwalls monolithic with the abutment shall be included in the 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.

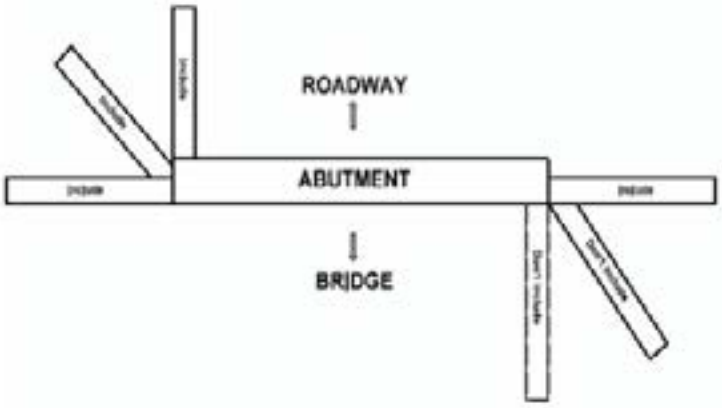



Fig. 1

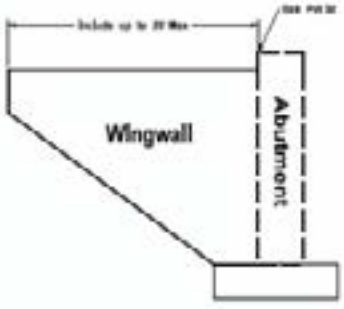



Fig. 2

**Condition States for WSDOT Element 215**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of abutment with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.Length of abutment.
3. Length of abutment with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of abutment with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Timber Abutment | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 216 | 216 | | | 216 | -- | N |

This element defines the roadway embankment fill behind a timber cap and 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.

**Condition States for WSDOT Element 216**

1. Defects if any are superficial with no effect on the structural capacity. Checks, mold or staining may be present, and all connections are in place and functioning as intended.
2. Length of abutment with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Timber Length of abutment with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of abutment with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | Other Abutment | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **218** | 217 | | | 218 | -- | N |

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.

**Condition States for WSDOT Element 218**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of abutment with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of abutment with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of abutment with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Steel Abutment | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **219** | 218 | | | 219 | -- | N |

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.

**Condition States for WSDOT Element 219**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed
2. Length of abutment with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of abutment with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of abutment with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | Concrete Pile Cap/Footing | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **220** | 220 | | | 220 | -- | N |

This element defines a reinforced concrete pile cap/footing supported by shafts, piles, or soil (spread footing) that is visible for inspection and may be always, or seasonably covered by water. (Formerly covered by Elements 220 and 221). Scour deficiencies at a concrete pile cap/footing 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. Quantity is sum of the length of footings or pile caps along the skew angle.

The supporting piles may be timber, concrete, or steel. If the supporting piles become visible, then the pile element should be added to the bridge.

| WSDOT BMSE | Prior BMS | Concrete Web Wall between Columns | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **221** | 214 | | | -- | -- | Y |

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.

**Condition States for WSDOT Elements 220 and 221**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of pile cap, footing or web wall with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of pile cap, footing or web wall with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of pile cap, footing or web wall with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Timber Foundation | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 222 | 222 | | | -- | -- | Y |

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 where a timber horizontal footing member provides support for the columns and the timber member is supported by piles. The total quantity for this element is the length of timber foundation.

**Condition States for WSDOT Element 222**

1. Defects if any are superficial with no effect on the structural capacity. Checks, mold or staining may be present, and all connections are in place and functioning as intended.
2. Timber foundation length with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Timber foundation length with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Timber foundation length with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | Steel Pile | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **225** | 225 | | | 225 | -- | N |

This element defines a pile or pile portion of a pile constructed of structural steel visible for inspection. 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 Element 225**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Number of Steel Piles with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Number of Steel Piles with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Number of Steel Piles with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **226A** | 226 | **Prestressed Concrete Pile** | **Units - EA** | 226 | -- | N |

This element defines a pile or portion of a pile constructed of prestressed concrete and is visible for inspection. This includes all prestressed concrete piles, submerged or not. Do not delete the element from the bridge because the element is no longer visible. The exposure may be intentional or caused by scour.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **226B** | 232 | **Prestressed Hollow Concrete Pile** | **Units - EA** | 226 | -- | Y |

This element defines a pile or portion of a pile constructed of prestressed concrete pile that has an interior void or is hollow. This includes all hollow prestressed concrete piles, submerged or not.

**Condition States for WSDOT Elements 226A and 226B**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”)
2. Number of piles with minor defects or effective functioning repairs/patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Number of piles with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Number of piles with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **227** | 227 | **Concrete Pile** | **Units - EA** | 227 | -- | N |

This element defines a pile or portion of a pile constructed of reinforced concrete and is visible for inspection. This includes all concrete piles, submerged or not. Usually, WSDOT concrete piles are designed and constructed inside a sacrificial steel pipe casing. 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 Element 227**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Number of piles with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Number of piles with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Number of piles with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Timber Pile | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 228 | 228 | | | 228 | -- | N |

This element defines a pile or portion of a pile constructed of timber and is visible for inspection. This includes all timber piles, submerged or not. 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 Element 228**

1. Defects if any are superficial with no effect on the structural capacity. Checks, mold or staining may be present, and all connections are in place and functioning as intended.
2. Number of timber piles with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Number of timber piles with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Number of timber piles with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **231A** | 231 | **Steel Pier Cap/Crossbeam** | **Units - LF** | 231 | -- | N |

This element defines a steel pier cap or crossbeam. The total quantity for this element is the length at the top of the crossbeam.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **231B** | 229 | **Timber Cap Rehab with Steel** | **Units - LF** | 231 | -- | Y |

This element consists of a timber cap rehabilitation where alternate load paths to piling are provided by steel members on the exterior of the cap and the timber cap remains in place. The timber conditions are excluded from the condition evaluation. The total quantity for this element is the length of the existing timber pier cap, where this quantity is deducted from the total quantity of Element 234.

**Condition States for WSDOT Elements 231A and 231B**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of pier cap, crossbeam or rehabilitation with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of pier cap, crossbeam or rehabilitation with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of pier cap, crossbeam or rehabilitation with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | Prestressed Concrete Pier Cap/ Crossbeam | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 233 | 233 | | | 233 | -- | N |

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.

**Condition States for WSDOT Element 233**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”).
2. Length of pier cap or crossbeam with minor defects or effective functioning repairs/ patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Length of pier cap or crossbeam with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of pier cap or crossbeam with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| **WSDOT BMSE** | Prior BMS | **Concrete Pier Cap/Crossbeam** | **Units - LF** | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **234** | 234 | | | 234 | -- | N |

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 Element 234**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.004”)
2. Length of pier cap or crossbeam with minor defects or effective functioning repairs/ patches present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar or prestressing may be exposed with no signs of corrosion or section loss and surface efflorescence may be present without rust staining. May have open narrow cracks (0.004” - 0.009”) or sealed medium/wide cracks.
3. Length of pier cap or crossbeam with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar or prestressing has corrosion with insignificant section loss, but all strands are intact. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.010” - 0.030”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of pier cap or crossbeam with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar or prestressing strands exhibit corrosion with measurable section loss (Note remaining diameter or cross section). Prestressing strands may be stretched or severed. Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.030”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Timber Pier Cap | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **235** | 235 | | | 235 | -- | N |

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.

**Condition States for WSDOT Element 235**

1. Defects if any are superficial with no effect on the structural capacity. Checks, mold or staining may be present, and all connections are in place and functioning as intended.
2. Length of timber pier cap with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of timber pier cap with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of timber pier cap with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **237** | 237 | **Pontoon Hatch/Bulkhead** | **Units - EA** | -- | -- | Y |

This element defines a deck or bulkhead access hatch made of steel or aluminum. Deck hatches are accessed from the exterior of a pontoon and bulkhead hatches provide access between cells. The condition evaluation of a pontoon hatch is based on the condition of the hatch and 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 hatches on a bridge.

**Condition States for WSDOT Element 237**

1. Defects are superficial and are insignificant to the performance of the hatch to moderate surface corrosion with no appreciable pitting or section loss. Insignificant amounts of water enter a cell when a deck hatch is closed.
2. Number of hatches with temporary repairs such as: partially replaced seals, repaired hold-down dogs or locks. Light to moderate surface corrosion with some pitting resulting in section loss of up to 5% of the surface area of the hatch.
3. Number of hatches with structural defects. The defects do not threaten performance of the hatch. Moderate to heavy surface corrosion with more frequent section loss due to pitting. Section loss estimated between 5% and 25% of the surface area of the hatch. Heavy pitting and section loss along seal edges which compromises the watertight integrity of the hatch. Superficial chipping noted in hatch components. Number of hatches which allow water accumulation into a cell of less than 1” per year.
4. Number of hatches with damage that threatens performance during an extreme event. Heavy surface corrosion with more uniform pitting. Visually corresponds to approximately 25% or more section loss of the surface area of the hatch. Cracking present in hatch components. Chips or broken hatch components that compromise the strength of the hatch or the watertight seal. Number of hatches which allow water accumulation into a cell of 1” or more per year. All pontoon cells in WSDOT element 239 shall be coded CS4 that have a deck hatch or bulkhead hatch coded CS4.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **238** | 238 | **Floating Bridge – Anchor Cable** | **Units - EA** | 149 | -- | Y |

This element defines a steel anchor cable or structural strand used to stabilize the position of a floating bridge. The condition of a floating pontoon anchor cable is evaluated during underwater inspections performed by divers and remotely operated vehicles. Condition evaluation is based on the cable protection system, breakage of wires within the cable and the condition of the cable anchor. The total element quantity should equal the number of floating pontoon anchor cables attached to the bridge.

Floating bridge anchor cables Condition Definitions: The amount of corrosion noted corresponds to the following criteria.

**LIGHT (CS2) –** Light surface corrosion (freckle rust, not white oxidation) and rusting of the outer layers of wires, no appreciable rust nodules or section loss detected.

**LIGHT TO MODERATE –** More significant corrosion with scattered rust nodules 1/16 inch thick, very early stages of section loss due to occasional pitting less than 1/32 inch deep.

**MODERATE (CS3) –** Rust nodules more uniform and typically 1/16 to ¼ inch thick with more frequent section loss due to pitting, typically still less than 1/32 inch deep, but with occasional pitting up to 1/32 inch deep. Visually corresponds to approximately 5% section loss in outer wires.

**MODERATE TO HEAVY –** Uniform rust nodules typically ¼ inch thick with uniform section loss due to pitting typically 1/32 inch deep. Outer wire section loss estimated between 5% and 25%.

**HEAVY (CS4) –** Uniform rust nodules typically ¼ inch to 3/8 inch thick with uniform section loss due to pitting typically 1/32 to 1/16 inch deep. Visually corresponds to approximately 25% section loss to the outer wires (obvious flattening of the wires, with grooves between the wires still visible).

1. Number of cables or anchors with no defects in the cable or anchor and the galvanized protection system is functioning properly, which includes white zinc oxidation. New replacement cables are coded in this condition state. (Corresponds to SNBI Substructure Condition (SNBI Item B.C.03) and SNBI Underwater Inspection Condition (SNBI Item B.C.15) rating of 7 or 8.)
2. Number of cables or anchors with defects that are insignificant and do not affect the capacity of the cable. The galvanized protection system is showing signs of failure, and surface or freckled rust may exist with no measurable loss of section. Any individual wire up to 75% out of lay and no closer than 30 LF apart is CS2. If any portion of the cable or anchor is CS2, then the NBI Substructure Condition rating (SNBI Item B.C.03) and SNBI Underwater Inspection Condition (SNBI Item B.C.15) shall be a maximum of 6.
3. Number of cables or anchors with defects that are beginning to affect the capacity of the cable but are within acceptable design limits. Corrosion section loss is not more than 25% of the outer wire layer. Single wire failures of the cable may exist due to corrosion or hydrogen embrittlement, but no closer than 30 feet apart. Gaps in the outer wires exposing the inner layer with no ferrous corrosion to inner layer. Multiple adjacent wires up to 100% out of lay. Wires more than 100% out of lay with second layer exposed are considered broken wires. If any portion of the cable or anchor is CS3, then the SNBI Substructure Condition rating (SNBI Item B.C.03) and SNBI Underwater Inspection Condition (SNBI Item B.C.15) shall be a maximum of 5.
4. Number of cables or anchors with defects that have significantly affected the capacity. Two or more broken wires, or equivalent section loss due to other defects, are within 30 feet. Outer wire section loss greater than 25%. Exposed inner wires with measurable section loss. Any cable which exhibits permanent deformation. If any portion of the cable or anchor is CS4, then the SNBI Substructure Condition rating (SNBI Item B.C.03) 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 SNBI Substructure Condition rating (SNBI Item B.C.03) and SNBI Underwater Inspection Condition (SNBI Item B.C.15) shall be 3.

| WSDOT BMSE | Prior BMS | Concrete Floating Pontoon | Units - Cell | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 239 | 236 | | | -- | -- | Y |

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 watertight and dry while in service. The concrete is specifically designed to be visually crack free and have low permeability with watertight construction joints. Watertight 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. Watertight 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. Ballasted cells shall establish a void ratio of the ballast to calculate a volume of water in a cell, and also the actual infiltration rate of water assuming no ballast was present.

This Concrete Floating Pontoon element also defines the relationship between the bridge element condition and the corresponding SNBI Substructure Condition rating, Item BC03. For cases where defects are observed in pontoons underwater and defects are independent of those seen on the interior of pontoons, Underwater Inspection Condition (SNBI Item B.C.15) coding will follow the same coding correlations as defined below for NBI Substructure Condition rating.

1. Number of pontoon cells with defects that are superficial and are insignificant to structural capacity or buoyancy of the cell, pontoon or bridge. The cell concrete surfaces may have structurally insignificant hairline cracks, possibly sealed with Crystalline during construction, with no history of seepage. The cell is dry. A cell may have water

present due to condensation or from water accumulating at a rate slower than would be considered a CS3 “trace’ amount of water.

- If the total quantity is in CS1, then Item BC03 shall be an 8.

2. Number of pontoon cells with a repair such as, but not limited to a concrete patch or an epoxy injected sealed crack.
   - If repairs are above water level, or on interior walls between cells, then Item BC03 shall be a 7.
   - If repairs are below water level, then Item BC03 shall be a 6.
3. Number of pontoon cells with significant defects. Conventional concrete defects which do not affect structural capacity of the bridge. Watertight defects below the waterline which may affect buoyancy of the cell, pontoon or the bridge. Typical CS3 submerged defects include but are not limited to seepage of less than 1” of water accumulation in a year (trace). Trace is further defined as the amount of water required to manifest as puddled water over more than 50% of the pontoon floor. Below this amount of water, the pontoon cell is considered dry. Pontoon cells which have water present but does not increase in amount for 3 consecutive years are considered CS1 cells.

   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 Item BC03 shall be a 6.
   - If eight or more adjacent or contiguous cells in a single pontoon are in CS3, then Item BC03 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 Item BC03 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 at a rate greater than what would be classified as seepage for a CS3 cell. Any cell with a pontoon hatch or bulkhead in CS4, see WSDOT element 237.
   - If cells are in CS4, then Item BC03 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 Item BC03 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 Item BC03 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 Item BC03 shall be a 2.
   - If one cell leaks 1 inch of water per month, for three consecutive months, then the Item BC03 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 Item BC03 shall be a 1 and the bridge shall be closed to traffic.

## 4-5 Culverts

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **240** | 240 | **Metal Culvert** | **Units - LF** | 240 | -- | N |

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.

**Condition States for WSDOT Element 240**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of culvert with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Length of culvert with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of culvert with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **241** | 241 | **Concrete Culvert** | **Units - LF** | 241 | -- | N |

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.

**Condition States for WSDOT Element 241**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of culvert with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of culvert with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of culvert with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | Timber Culvert | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **242** | 242 | | | 242 | -- | N |

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.

**Condition States for WSDOT Element 242**

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of culvert with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of culvert with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of culvert with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **243** | 243 | **Other Culvert** | **Units - LF** | 243 | -- | N |

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.

**Condition States for WSDOT Element 243**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of culvert with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of culvert with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of culvert with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Signs of significant deficiencies may include distortion, deflection, misalignment or roadway settlement. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

## 4-6 Sidewalk and Supports

A sidewalk is an element that provides pedestrian access across a bridge. A sidewalk is supported by a bridge deck and/or by sidewalk brackets that consist of several types of materials. The purpose of the sidewalk BMS is to record the structural integrity of the support system and sidewalk. Identify these elements in BMS if the sidewalk width is greater than or equal to 3 feet.

However, there are exceptions that must be accommodated. When there is a true sidewalk on a bridge as determined by the design, approach sidewalks, and location, it is appropriate to enter a sidewalk element in the BMS. Timber sidewalks, for example, may be narrow and have a support system. These exceptions should include a sidewalk WSDOT element. A specific note explaining the reasoning for including the sidewalk element should be provided.

If a rail retrofit or a wide curb has been determined to NOT be a sidewalk, then Bridge Rail elements will be used to document defects.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **260** | 260 | **Steel Open Grid Sidewalk and Supports** | **Units - SF** | -- | -- | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **261** | 261 | **Steel Concrete Filled Grid Sidewalk and Supports** | **Units - SF** | -- | -- | Y |

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.

| WSDOT BMSE | Prior BMS | Corrugated/Orthotropic Sidewalk and Supports | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 262 | 262 | | | -- | -- | Y |

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.

**Condition States for WSDOT Elements 260, 261, and 262**

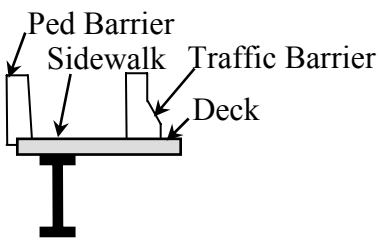
1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Sidewalk area with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Sidewalk area with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Sidewalk area with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

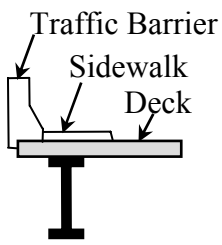
| WSDOT BMSE | Prior BMS | Timber Sidewalk and Supports | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 264 | 264 | | | -- | -- | Y |

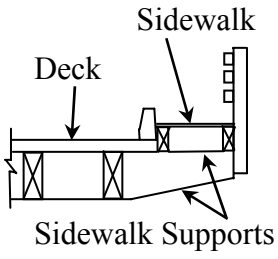
This element defines a sidewalk constructed of timber. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall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

**Condition States for WSDOT Element 264**

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Sidewalk area with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Sidewalk area with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Sidewalk area with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.



| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **266** | 266 | **Concrete Sidewalk and Supports** | **Units - SF** | -- | -- | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **267** | 267 | **Fiber Reinforced Polymer (FRP) Sidewalk and Supports** | **Units - SF** | -- | -- | Y |

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 266 and 267**

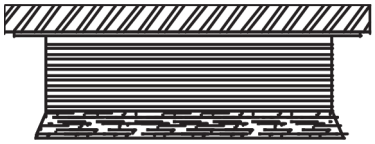
1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Sidewalk area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks
3. Sidewalk area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Sidewalk area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

## 4-7 Bearings

When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **310** | 310 | **Elastomeric Bearing** | **Units - EA** | 310 | -- | N |

This element defines a bridge bearing that is constructed primarily of elastomers, with or without fabric or metal reinforcement.





| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **311** | 311 | **Moveable Bearing (Roller, Sliding, etc.)** | **Units - EA** | 311 | -- | N |

This element defines those bridge bearings that provide for both deflection and longitudinal movement by means of roller, rocker or sliding mechanisms.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **312** | 312 | **Concealed Bearing or Bearing System** | **Units - EA** | 312 | -- | N |

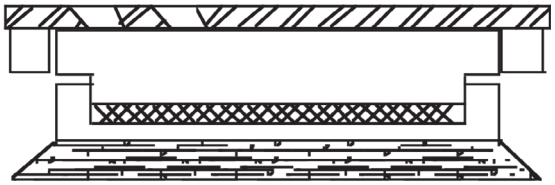
This element defines those bridge bearings and/or bearing seats that are not accessible with tools or equipment and therefore are not open for detailed inspection.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **313** | 313 | **Fixed Bearing** | **Units - EA** | 313 | -- | N |

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

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **314** | 314 | **Pot Bearing** | **Units - EA** | 314 | -- | N |

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.



| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **315** | 315 | **Disk Bearing** | **Units - EA** | 315 | -- | N |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **316** | 316 | **Isolation Bearing** | **Units - EA** | 316 | -- | N |

This element defines a bearing that is laminated and is a sandwich of neoprene and steel plates. The bearing contains a lead core that is primarily used for seismic loads. The isolation bearing is used to protect structures against earthquake damage.

**Condition States for WSDOT Elements 310, 311, 312, 313, 314, 315, and 316**

1. Defects are superficial and have no effect on the superstructure movements or safe transfer of load to the substructure. Shear deformation, displacement, or cracking of grout pad may be present. Top and bottom surfaces may not be parallel.
2. Number of bearings with a repair.
3. Number of bearings with structural defects. The defects are not detrimental to the superstructure or the safe transfer of load to the substructure. Deficiencies do not warrant analysis but may require repairs.
4. Number of bearings with defects that are detrimental to the superstructure or the safe transfer of load to the substructure. Loss of minimum bearing area may be imminent. Structural analysis is warranted or has determined bearing repairs are essential to restore the safe movement or transfer of load to the substructure.

# 4-8 Bridge Approach

| WSDOT BMSE | Prior BMS | Concrete Roadway Approach Slab | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **321** | 321 | | | -- | 321 | N |

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.

**Condition States for WSDOT Element 321**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Slab surface area with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Slab surface area with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended..
4. Slab surface area with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Abrasion or wear is causing significant section loss and may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies may be due to shifting or movement off of the bridge seat and will require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

## 4-9 Bridge Rail

WSDOT element for bridge railing are to be entered for each type of rail. For example, if there is W-beam or Thrie-beam guardrail mounted on the concrete bridge rail, then the length of each metal and concrete element should be entered. If the original concrete bridge rail has aluminum rail installed on top (with or without a rail retrofit), enter that quantity into the appropriate WSDOT element as well. In the element notes, describe what type of metal bridge or pedestrian rail has been entered.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **330** | 330 | **Metal Bridge Rail** | **Units - LF** | 330 | -- | N |

This element defines all types and shapes of metal bridge railing aluminum, metal beam, rolled shapes, etc. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

**Condition States for WSDOT Element 330**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Bridge rail length with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced.
3. Bridge rail length with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Bridge rail length with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | Concrete Bridge Rail | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **331** | 331 | | | 331 | -- | N |

This element defines all types and shapes of reinforced concrete bridge railing. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

**Condition States for WSDOT Element 331**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of rail with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of rail with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of rail with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **332** | 332 | **Timber Bridge Rail** | **Units - LF** | 332 | -- | N |

This element defines all types and shapes of timber railing. All elements of this rail (except connectors) must be timber. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

**Condition States for WSDOT Element 332**

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Bridge rail length with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Bridge rail length with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Bridge rail length with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | Other Bridge Rail | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **333** | 333 | | | 333 | -- | N |

This element defines all types and shapes of bridge railing except those defined as METAL, CONCRETE or TIMBER. This element will include cable rails, and combinations of materials. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

**Condition States for WSDOT Element 333**

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Length of rail with minor defects or effective repairs that are in place and functioning as intended. There is no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners.
3. Length of rail with moderate defects. Defects may include traffic impact damage, cracks, decay, broken or missing fasteners, or measurable section loss. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of rail with major defects or damage. Defects may include severe traffic impact damage, cracks, decay, broken or missing fasteners, or significant section loss. (Note remaining diameter or cross section). Any previous repairs are ineffective. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

## 4-10 Pedestrian Rail

A pedestrian rail will typically be on the outside of a sidewalk and protected from traffic by a Bridge Rail.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **340** | 340 | **Metal Pedestrian Rail** | **Units - LF** | -- | -- | Y |

This element defines all types and shapes of metal pedestrian bridge railing including steel (excluding weathering steel), aluminum, metal beam, rolled shapes, etc. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

**Condition States for WSDOT Element 340**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element. Connections are in place and functioning as designed.
2. Length of pedestrian rail with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners. Bolts/rivets may have been replaced
3. Length of pedestrian rail with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Connections have missing fasteners, broken welds, or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.
4. Length of pedestrian rail with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Connections are no longer functioning as intended due to missing fasteners, broken welds, distortion, or other defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **341** | 341 | **Concrete Pedestrian Rail** | **Units - LF** | -- | -- | Y |

This element defines all types and shapes of reinforced concrete pedestrian bridge railing. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

**Condition States for WSDOT Element 341**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625")
2. Length of rail with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1" deep and 6" in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½" deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625" - 0.125") or sealed medium/wide cracks.
3. Length of rail with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½"-1" deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125" - 0.1875") that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of rail with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875") that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **342** | 342 | **Timber Pedestrian Rail** | **Units - LF** | -- | -- | Y |

This element defines all types and shapes of timber pedestrian bridge railing. All elements of this rail (except connectors) must be timber. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

**Condition States for WSDOT Element 342**

1. Defects if any are superficial and have no effect on the structural capacity. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of pedestrian rail with minor distortion or defects not requiring repair or monitoring, and any existing repairs are in place and functioning as intended. Any evidence or presence of rot or insect infestation still has greater than 90% section remaining. Significant checks are not located within tension zones and do not penetrate more than ½ the member thickness. Any splitting does not penetrate the full thickness of the member or is fully arrested within a repair. Connections may have loose fasteners, or superficial corrosion or pack rust but are functioning as intended.
3. Length of pedestrian rail with moderate distortion or defects that may require repair or monitoring, or any existing repairs that have failed or are not functioning as intended. Rot pockets or insect infestation result in less than 90% section remaining. For a remaining shell thickness >= 1-½" location is YELLOW TAGGED. Checks penetrate more than ½ the member thickness at any location or more than 5% of the thickness within a tension zone. Splitting penetrates the full thickness of the member but does not affect capacity. Connections have missing fasteners, broken welds or distortion. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity, do not warrant analysis but may require repairs.
4. Length of pedestrian rail with major defects or failed repairs that may require immediate action. Rot pockets or insect infestation have resulted in significant section loss affecting capacity. For a remaining shell thickness < 1-½" location is RED TAGGED. Checks, splits or distortion are significant and are affecting structural capacity. Connections are no longer functioning as intended with missing fasteners, broken welds, distortion, or due to other local timber defects. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects are affecting structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **343** | 343 | **Other Pedestrian Rail** | **Units - LF** | -- | -- | Y |

This element defines all types and shapes of pedestrian bridge railing except those defined as METAL, CONCRETE or TIMBER. This element will include cable rails, and combinations of materials. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

**Condition States for WSDOT Element 343**

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Length of rail with minor defects or effective repairs that are in place and functioning as intended. There is no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring. Connections are functioning as intended but may have loose fasteners.
3. Length of rail with moderate defects. Defects may include traffic impact damage, cracks, decay, broken or missing fasteners, or measurable section loss. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended..
4. Length of rail with major defects or damage. Defects may include severe traffic impact damage, cracks, decay, broken or missing fasteners, or significant section loss. (Note remaining diameter or cross section). Any previous repairs are ineffective. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

## 4-11 Smart Flags

| WSDOT BMSE | Prior BMS | Approach Roadway Impact – Smart Flag | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **322** | 322 | **Smart Flag** | | -- | -- | Y |

Assigned to document the increase to the bridge live load, or impact, due to hammering or dynamic response of the bridge from traffic (specifically trucks) coming onto the bridge. Traffic speed may be considered when slower speeds reduce the impact. Total quantity is based on the direction of traffic coming onto the bridge. Bridges with two-way traffic will have two approaches and bridges with one way traffic such as ramps or divided main line structures will have only one approach. Code the approach roadway lanes in the condition state that best indicates the severity of the problem. For the roadway lanes where traffic is 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.

| WSDOT BMSE | Prior BMS | Chloride Impact – Smart Flag | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **351** | 351 | | | -- | -- | Y |

Assigned when chloride contamination of a structure is identified through testing or field evaluation. Contamination may be in any of the Deck, Superstructure or Substructure elements. Condition state coding represents levels of impact, deterioration and degree of mitigation or rehabilitation expected to be necessary to extend structure life or restore it.

1. Structure has been identified to have chloride contamination through testing and or field evaluation by the Bridge Preservation Repair section. Best practices are required to extend the life of the structure to include:
   - Maintain the seal of all deck expansion joints to protect superstructure and substructure elements below.
   - Seal all cracking in deck surface or overlay and restore membranes prior to new overlay.
   - Seal barrier expansion joints within 6” above the deck surface and all leaking deck to barrier construction joints.
   - Direct all bridge and roadway drainage away from the structure to include extending any bridge drains away from pier caps and columns.
   - Initiate practices to minimize or eliminate use of chlorides on or in vicinity of the bridge.
2. Chloride contamination is actively contributing to deterioration of bridge elements with areas of concrete cracking, discoloration and delamination primarily concentrated in locations exposed to chloride use. Corrosion of reinforcement may not be openly evident but is occurring. These include the deck surface or soffit and areas of the superstructure and substructure exposed to water spray or uncontrolled drainage. Mitigation is required to reduce further impact, protect damaged elements, and slow the progression of ongoing damage. By the nature of chloride impacts, deterioration will continue, but without mitigation and extensive repair, damage will spread in extent and severity at increasing rates.
   - Once contamination reaches reinforcing steel. patching with cementitious products can result in a “Halo Effect” pattern of deterioration, accelerating corrosion of the steel. All chloride contaminated concrete and steel must be removed and replaced as part of a proper repair. (See ACI 364.6T-02, July 2002)
3. Chloride contamination has caused damage and decay of bridge Deck, Superstructure, or Substructure elements. Damage is widespread with areas of delamination, possible spalling, and open cracking progressing into and throughout structural elements. Corrosion of reinforcement has resulted in section loss that is directly impacting the overall serviceability and integrity of elements. Loss of capacity may or may not be indicated. Current condition risks necessity for restrictions or closure. Additional invasive evaluation may be necessary to fully determine the extent of damage. Extensive rehabilitation is indicated to extend useable life of the structure.
4. Chloride contamination has caused extensive damage and decay of bridge Deck, Superstructure, or Substructure elements and continues at increased rates. Damage is widespread with areas of delamination, spalling and open cracking progressing throughout structural elements. Corrosion of reinforcement has resulted in heavy section loss that is directly impacting the serviceability, integrity, and capacity of elements. Overall damage is extensive and expected to expand at increased rates reducing or eliminating options for rehabilitation. Remaining structure life is limited with high risk of near-term restrictions or closure that precipitate replacement.

| WSDOT BMSE | Prior BMS | Encampment Impact – Smart Flag | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 353 | 353 | | | -- | -- | Y |

Assigned when encampment activity is impacting inspection, maintenance, and condition of a bridge. Activity indicates the presence of encampments and/or encampment related activity or debris that prevents full access for adequate inspection or maintenance of a structure.

Activity may be causing or has previously caused damage to the structure. Condition state coding represents levels of impact, or damage. Write any repairs for removal or clean up under the “0” Note”.

1. Encampment activity is evident with accumulations of debris under and/or in the immediate vicinity of the structure. Activity may be hindering inspection and maintenance activities in one or more areas making access and thorough examination of bridge elements difficult.
2. Heavy encampment activity and accumulations of related debris under and around the immediate vicinity of the bridge is creating a hazardous situation and prevents full and adequate inspection of the structure.
3. Encampment is causing or has caused physical damage to the structure through vandalism, break-in, theft or excavation of footings or slope protection. Damage may or may not require repairs. Graffiti is not considered.
4. Encampment is causing or has caused physical damage as a result of fire. Damage may or may not require repairs but may affect longevity of bride element conditions. Resulting access conditions may be hazardous.

| WSDOT BMSE | Prior BMS | Damaged Bolts or Rivets – Smart Flag | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 355 | 355 | | | -- | -- | Y |

Assigned to identify superstructure steel elements that have broken or missing bolts and/or rivets.

Report a quantity of one unit in the appropriate condition states identified, but no more than one unit per condition state total.

1. Bolts or rivets missing, damaged or replaced in the superstructure due to fatigue.
2. Bolts or rivets missing, having more than 10% section loss in the superstructure due to corrosion.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **356** | 356 | **Steel Cracking – Smart Flag** | **Units - EA** | -- | -- | Y |

Assigned to identify superstructure steel elements with cracks. Report a quantity of one unit in the appropriate condition states identified, but no more than one unit per condition state total. If fatigue damage exists, which may warrant analysis of the element or the serviceability of the element is uncertain, contact a supervisor immediately. Any cracks (typically cope cracks) on WSDOT bridges must be repaired accordance with WSDOT Bridge Preservation Office procedures.

1. Steel cracks, of any length, are present in a secondary member(s).
2. Steel cracks within a load path that have been repaired or arrested are present.
3. Steel cracks within a load path that are not arrested and less than 1 inch.
4. Steel cracks within a load path that are not arrested and 1 inch or greater in length are present.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **357** | 357 | **Pack Rust – Smart Flag** | **Units - EA** | -- | -- | Y |

Assigned to identify the presence of pack rust within steel connections. Steel connections where pack rust is significant or rust expansion is visually deflecting steel plates and should be addressed when the bridge is painted. Structural impacts to pack rust overstressing are recorded within the steel elements. Report a quantity of one unit in the appropriate condition states identified, but no more than one unit per condition state total.

1. Pack rust exists and is less than ¼ inch thick.
2. Pack rust exists where rust is more than ¼ inch thick and/or the deformation of connection steel members is evident.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **360** | 360 | **Bridge Movement – Smart Flag** | **Units - EA** | -- | -- | Y |

Assigned 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.

| WSDOT BMSE | Prior BMS | Scour – Smart Flag | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **361** | 361 | | | -- | -- | Y |

Assigned to identify foundation scour for bridge 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 foundation's 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 BC03).

   Examples:

   - Top of spread footings are exposed due to scour.
   - Bottom of pile caps are exposed due to scour.
   - Minimum known pile embedment is between 5' and 10' or the column unbraced length has increased, but does not threaten pile capacity.
4. Number of pier/abutment foundations with scour damage in significant locations or quantity and has reduced the foundations structural capacity. Structural analysis is warranted. Repair and or action are required to protect exposed foundation and to restore capacity to the pier.

   Scour at this level may impact the SNBI Substructure Overall rating code, item BC03. A comment is necessary if the SNBI Substructure Overall rating code is lowered.

   Examples:

   - Undermining of spread footings or foundation material is occurring.
   - Minimum known pile embedment is less than 5' or the column unbraced length has increased and threatens pile/column capacity. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

| WSDOT BMSE | Prior BMS | Concrete Deck Delamination Testing – Smart Flag | Units - SF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **376** | 376 | | | -- | -- | Y |

Assigned to document deck delamination testing or condition to include repairs at the time of a contract. Documented condition must be included in the evaluation of a concrete deck and overlay. ASTM 4580, Chain Drag Testing will locate and quantify the patches, spalls, delaminations and other defects on the entire top surface of the bridge deck that are not visible to the inspector This information is supplemental to the deck/overlay elements and the quantities do not change unless new testing information is provided. 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.

If a Chain Drag was completed before a concrete overlay was constructed, then element 376 should be deleted from the report since patching and delaminations are addressed during the construction.

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 or a concrete overlay, this quantity of spalling and delamination 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.

| WSDOT BMSE | Prior BMS | WSDOT Undercrossing Safety – Smart Flag | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **378** | 378 | | | -- | -- | Y |

Assigned to cover the WSDOT Safety Inspection report type, to be used when the structure is not owned by WSDOT but interacts with a route that is. WSDOT Safety Inspections only address significant safety issues on those parts of the structure that affect the route that is owned by WSDOT.

This smart flag is intended to hold all notes associated with the primary safety inspection, and the inspector should not create or edit any other inspection notes except for repair recommendations, if warranted.

Examples include:

- railroad owned structures over state or local agency routes.
- locally owned structures over state routes.
- state owned structures over locally owned routes.

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

| WSDOT BMSE | Prior BMS | Local Agency Undercrossing Safety – Smart Flag | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **379** | 379 | | | -- | -- | Y |

Assigned to cover the Local Agency Safety Inspection report type, to be used when the structure is not owned by the local agency performing the inspection but interacts with a route that is. Local Agency Safety Inspections only address significant safety issues on those parts of the structure that affect the route that is owned by the local agency performing the inspection.

This smart flag is intended to hold all notes associated with the secondary safety inspection, and the inspector should not create or edit any other inspection notes except for repair recommendations, if warranted.

Examples include:

- railroad owned structures over local agency routes.
- a state route crosses over a city street and a county road.

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

| WSDOT BMSE | Prior BMS | Joint Seal/Gland Leaking – Smart Flag | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **381** | 381 | | | -- | -- | Y |

Assigned when inspection identifies that the joint seal or gland is no longer effective in providing a watertight seal within the joint gap, or the joint design does not include a seal, allowing water to pass through on to bridge elements below. Active corrosion or damage may or may not already be present in the elements below. Identify the joints in the notes for the flag and describe any joint defects and impacts under the joint BMS Element. Code a quantity for each joint identified as leaking.

In cases where a leaking joint only affects roadway or embankment fill (joints at integral abutments and approach slabs, for example) do not use this smart flag.

1. Seal/Gland is separated or missing, whole or in part, allowing water to pass through the joint gap onto structural bridge elements below.

## 4-12 Seismic Retrofit



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. Gap measurements are required during an inspection if visual inspection or loose double nuts indicate the gaps are not uniform.

| WSDOT BMSE | Prior BMS | Concrete Column w/Steel Jacket (Seismic) | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 205B | 207 | | | 205 | -- | Y |

This element defines a column, including a submerged column or portion of a concrete column where the exposed surface has been retrofitted top to bottom with a steel jacket visible for inspection. This changes the deterioration and management of the pile. Element 205B replaces existing column elements 204A and 205A where the existing column quantities decrease, and Element 205B quantities increase by the number of steel jacketed columns. Construction of the steel jacket also rehabilitates any pre-existing defects, and the quantities are initially coded in condition state one.

Columns that are not jacketed top to bottom are considered a repair and Element 205B does not apply, such as a timber element with a steel splice. Code these repairs in the applicable condition state with the original element 204A or 205A.

**Condition States for WSDOT Element 205B**

1. Defects if any are superficial. There may be surface rust or rust staining having no effect on the structural capacity of the element
2. Number of columns with minor defects or effective repairs that are in place and functioning as intended. Corrosion and superficial pack rust may have initiated with no measurable section loss. Any cracking has been effectively arrested or self-arrested. Any noted distortion in the member does not require repair or monitoring.
3. Number of columns with moderate defects, failed repairs, or any identified distortion, damaged wires or cracking that requires repair or monitoring. Corrosion with insignificant section loss is more widespread, or areas of significant section loss may be present in locations but not contributing to loss of capacity. Pack rust may be up to ¼" thick but is not causing distress to load carrying members. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects do not significantly affect structural capacity and do not warrant analysis, but may require repairs. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion.

4. Number of columns with major defects or failed repairs that may require immediate action. Significant corrosion with measurable section loss affecting capacity is present. Any pack rust is greater than ¼" thick or is causing distress to load carrying members. Cracking or deformation is significant enough or identified in locations that affect load carrying capacity. This includes cracks in primary load path members or in welded connections to primary members. Ineffective or failed repairs should be coded based on the original or unrepaired defect. Generally, noted defects affect structural capacity. Structural analysis is warranted, or repairs are essential to restore capacity. Structural defects or deficiencies may be due to fatigue, deterioration, or impact damage. Note locations of defects. Measure and record lengths of cracks, and section loss/remaining section due to corrosion. For corrosion painted over, retain the quantity of the element reported in CS4 if the section loss has not been addressed.

| WSDOT BMSE 205C | Prior BMS 208 | Concrete Pile/Column w/ Composite Wrap (Seismic) | Units - EA | NBE 205 | BME -- | ADE Y |
|---|---|---|---|---|---|---|

This element defines a concrete pile/column or portion of a pile/column where the exposed surface has been retrofitted top to bottom with a composite wrap. Examples of composite material are carbon fiber and fiberglass. This changes the deterioration and management of the pile/column. Element 205C replaces existing pile/column elements 204A, 205A, 226, or 227 where the existing pile/column quantities decrease, and Element 205C quantities increase by the number of composite wrapped piles/columns. Composite wrapping also rehabilitates any pre-existing defects and the quantities are initially condition state one.

Pile/columns that are not wrapped top to bottom are considered a repair and Element 205C does not apply, such as a fiberglass repair to a timber pile at the ground line. Code these repairs in the applicable condition state with the existing pile/column element.

The structural condition should be based on the quantity and location of visible defects. Defects should be documented well enough to determine a change in condition. Defects include cracked or damaged composite reinforcement, abrasions, or seepage of moisture. Sounding with a rock hammer should use caution and not damage the resin materials.

**Condition States for WSDOT Element 205C**

1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Number of composite wrapped pile/columns with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Number of composite wrapped pile/columns with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Number of composite wrapped pile/columns with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE 368 | Prior BMS 368 | Seismic Pier Crossbeam Bolster | Units - LF | NBE -- | BME -- | ADE Y |
|---|---|---|---|---|---|---|

This element identifies those piers that have been seismically retrofit with crossbeam bolsters. The quantity for this element is the length along the top of each crossbeam face (typically two lengths) that has been retrofitted with a bolster.



| WSDOT BMSE 369 | Prior BMS 369 | Seismic Pier Infill Wall | Units - EA | NBE -- | BME -- | ADE Y |
|---|---|---|---|---|---|---|

This element identifies concrete piers with seismic structural improvements.

Number of piers with a seismic pier infill wall.

**Condition States for WSDOT Elements 368 and 369**



1. Defects, if any, are superficial including small spalls, rock pockets or popouts. Any cracks are limited to hairline (<0.0625”)
2. Length of bolster or pier wall with minor defects or effective functioning repairs/patches are present. May have delaminations and spalling typically up to 1” deep and 6” in diameter with no other signs of deterioration. Any exposed aggregate due to wear or exfoliation will be <½” deep. Rebar may be exposed with no signs of corrosion and surface efflorescence may be present without rust staining. May have open narrow cracks (0.0625” - 0.125”) or sealed medium/wide cracks.
3. Length of bolster or pier wall with moderate defects. May have spalling with exposed rebar or surrounded by other minor deterioration such as cracking delamination, or efflorescence. Any exposed aggregate due to wear or exfoliation will be ½”-1” deep. Repairs/patches may be cracked, delaminated or losing adhesion. Exposed rebar has corrosion with insignificant section loss. Efflorescence may be building up or have rust staining present. May have open medium cracks (0.125” - 0.1875”) that do not appear active under loads and have not increased since the last inspection. Deficiencies may require repairs to prevent further damage or deterioration, but structural analysis is not recommended.
4. Length of bolster or pier wall with major defects. May have spalling with exposed corroded rebar or surrounded by other signs of moderate or major deterioration such as cracking delamination, or efflorescence. Significant section loss may be associated with other signs of deterioration. Any repairs or patching is ineffective. Exposed rebar exhibits corrosion with measurable section loss (Note remaining diameter or cross section). Built up efflorescence will be associated with other signs of deterioration such as cracking, delamination, or spalling. May have open wide cracks (>0.1875”) that appear to be active under loads or increased since the last inspection. Deficiencies require repairs to prevent further deterioration and maintain or restore element capacity. Structural analysis is recommended.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **370** | 370 | **Seismic – Longitudinal Restrainer** | **Units - EA** | -- | -- | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **371** | 371 | **Seismic – Transverse Restrainer** | **Units - EA** | -- | -- | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **372** | 372 | **Seismic – Link/Pin Restrainer** | **Units - EA** | -- | -- | Y |

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.





| WSDOT BMSE | Prior BMS | Seismic – Catcher Block | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **373** | 373 | | | -- | -- | Y |

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.

| WSDOT BMSE | Prior BMS | Seismic – Column Silo | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 374 | 374 | | | -- | -- | Y |

**I-5 N-N RAMP OVER I-5** - 5/628N-N - 0016991A



This element is used to identify when a column has been designed to be isolated from the surrounding soil during a seismic event. This will usually consist of a corrugated metal pipe buried in the ground with a cap at the base of a column. The inspection note needs to identify the individual columns that are siloed along with the planned depth (relative to an identifiable elevation) at each one. In cases with small numbers of siloed columns, that could be done in the note. In other situations, a spreadsheet attached as a file or something similar may be useful. In-depth inspections are required upon the occurrence of a seismic event that is judged to have potentially affected the structure. Due to the dimensional variation of the column isolation feature at each structure, the 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)

## 4-13 Expansion Joint Elements

The expansion joint evaluation considers the overall function of the joint assembly including any observed structural defects such as spalling, cracking, patches, raveling, or defects connected with the joint seal, filler or gland component.

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. Note that condition state CS4 is not used within this section.

When a joint is entirely reconstructed or replaced with a new joint type, then revise the WSDOT element to reflect the new joint type. These new joint types may include the use of a header assembly to form the new joint configuration. These headers may consist of cementitious or polymer types of concrete material and are to be included within the joint element, not the deck surface element.

Deck surface spalling, cracking, or raveling within 1′-0″ of a joint or joint header assembly is considered a joint defect, not a deck surface defect.

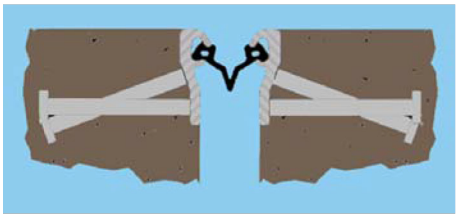
Assign Smart Flag 381 when inspection identifies that the joint seal or gland is no longer effective in providing a watertight seal within the joint gap, or the joint design does not include a seal, allowing water to pass through on to bridge elements below. Certain joint types are designed to allow the passage of water through the joint gap, and in such cases, Smart Flag 381 still applies. Active corrosion or damage may or may not already be present in the elements below. Identify the joints in the notes for the flag and describe any joint defects and impacts under the joint BMS Element.

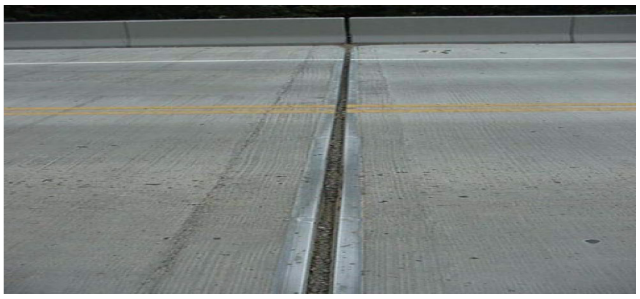
Do not use more than one WSDOT element for a joint location, unless the structure has been widened and there are two joint systems present. Joint notes should reference specific joints by pier or span number. If multiple joint types exist within a joint location where the deck has not been widened, then record the joint type that represents the larger quantity of the skewed length. Make a note of the other (lesser quantity) joint type.

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.

| WSDOT BMSE | Prior BMS | Strip Seal - Anchored | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 300A | 412 | | | -- | 300 | Y |

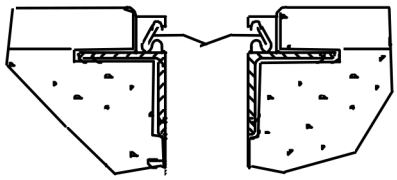
This element defines an expansion joint that uses a neoprene type waterproof gland with steel extrusion or other system to anchor the gland. The steel extrusion is anchored into the concrete deck or header. The quantity should equal the length measured along the expansion joint.





| WSDOT BMSE | Prior BMS | Strip Seal – Welded | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 300B | 413 | | | -- | 300 | Y |

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 preexisting steel expansion joint. The quantity should equal the length measured along the expansion joint.





**Condition States for WSDOT Elements 300A and 300B**

1. The expansion joint is functioning as designed. Defects are superficial and have no effect on the structural capacity of the joint. 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.

| WSDOT BMSE | Prior BMS | Asphalt Butt Joint – Paving Joint Seal | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 301A | 400 | | | -- | 301 | Y |

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.

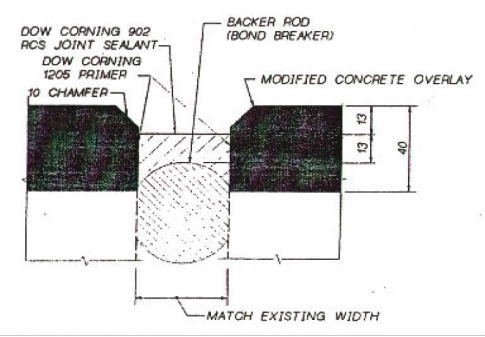
This element applies to the asphalt butt joint located at the back of the abutment pavement seat. It does not apply to the asphalt butt joint located at the roadway end of an approach slab. The quantity should equal the length measured along the joint.

| WSDOT BMSE | Prior BMS | Silicone Rubber Joint | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 301B | 417 | | | -- | 301 | Y |

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 301A and 301B**

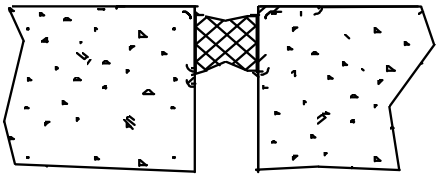
1. The joint is functioning as designed. Defects are superficial and have no effect on the performance of the joint. The adjacent deck or header is sound.
2. Skewed joint length at each location. “D” spalls, patches, cracking or raveling is present in the concrete or asphalt within one foot of either 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 potholes or patches adjacent to the seal; Asphalt was placed without a sawcut or the sawcut was not in the proper location.






| WSDOT BMSE | Prior BMS | Compression Seal/Concrete Header | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 302A | 404 | | | -- | 302 | Y |

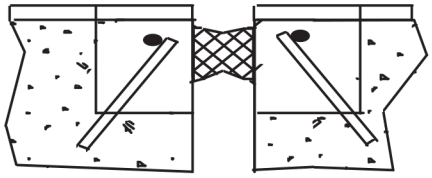
This element defines a joint with concrete headers formed during the original construction of the bridge. The joint is filled with a pre-formed compression type seal. The quantity should equal the length measured along the expansion joint.





| WSDOT BMSE | Prior BMS | Compression Seal/Polymer Header | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 302B | 405 | | | -- | 302 | Y |

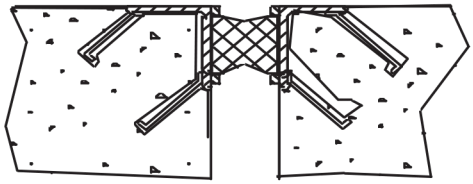
This element defines those joints that have been rehabilitated with a polymer header and filled with a pre-formed compression type seal. The quantity should equal the length measured along the expansion joint.





| WSDOT BMSE | Prior BMS | Compression Seal/Steel Header | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 302C | 406 | | | -- | 302 | Y |

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.





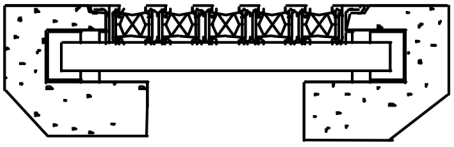
**Condition States for WSDOT Elements 302A, 302B, and 302C**

1. The expansion joint is functioning as designed. Defects are superficial and have no effect on the structural capacity of the joint. 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.

| WSDOT BMSE | Prior BMS | Assembly Joint Seal (Modular) | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 303 | 416 | | | -- | 303 | Y |

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.





**Condition States for WSDOT Elements 303**

1. The expansion joint is functioning as designed. Defects are superficial and have no effect on the structural capacity of the joint. 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.

| WSDOT BMSE | Prior BMS | Asphalt Open Joint – Paving Joint Seal | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 304A | 401 | | | -- | 304 | Y |

This element represents a sealed and sawcut contraction joint or an 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 304B - Open Concrete Joint and 308 - Joint Paved Over - Smart Flag do not apply at these locations. The quantity should equal the length measured along the joint. It does not apply to the asphalt open joint located at the roadway end of an approach slab.

WSDOT Element 308 - the Joint Paved Over – Smart Flag does apply for all locations of a buried steel joint due to the risk of planing equipment damaging the bridge deck.

**Condition States for WSDOT Element 304A**

1. The joint is functioning as designed. Defects are superficial and have no effect on the performance of the joint. The adjacent deck or header is sound.
2. Skewed joint length at each location. “D” spalls, patches, cracking or raveling is present in the concrete or asphalt 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 potholes or patches adjacent to the seal; Asphalt was placed without a sawcut or the sawcut was not in the proper location.

| WSDOT BMSE | Prior BMS | Open Concrete Joint – Paving Joint Seal | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 304B | 402 | | | -- | 304 | Y |

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 floor beam, 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. It does not apply to the open concrete joint located at the roadway end of an approach slab.

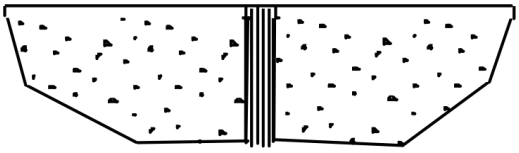
This joint type does not apply to: WSDOT Element 306A - Concrete Bulb-T -Paving Joint Seal joint, WSDOT Elements 302B or 302C Compression Seals with the seal missing, or WSDOT Element 301B - Silicone Rubber Joint.

**Condition States for WSDOT Element 304B**

1. The expansion joint is functioning as designed. Defects are superficial and have no effect on the performance of the joint. 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 of either side of the joint and is less than 25 percent of the joint length.
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 floor beam where water is corroding the top flange and/or connections.

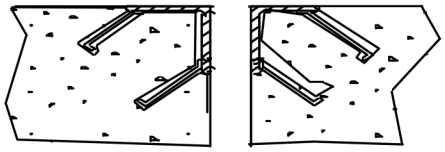






| WSDOT BMSE | Prior BMS | Steel Angle Header | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 304C | 407 | | | -- | 304 | Y |

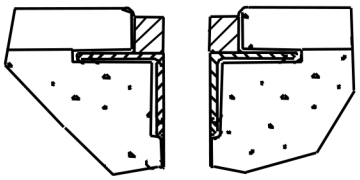
This element defines an open joint with steel angle plate headers. The quantity should equal the length measured along the expansion joint.






| WSDOT BMSE | Prior BMS | Steel Angle w/Raised Bars | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 304D | 419 | | | -- | 304 | Y |

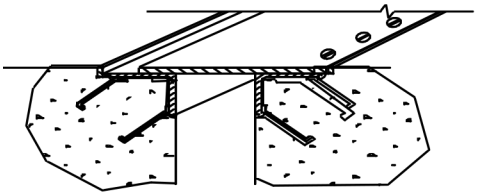
This element defines a joint with steel angles and steel raised bars welded to the angles to accommodate an overlay. The quantity should equal the length measured along the expansion joint.





| WSDOT BMSE | Prior BMS | Steel Sliding Plate | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 305A | 408 | | | -- | 305 | Y |

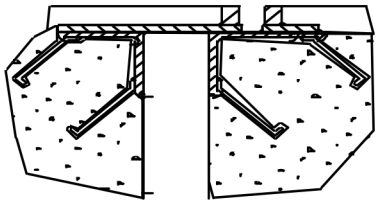
This element defines a joint with steel sliding plates. The quantity should equal the length measured along the expansion joint.

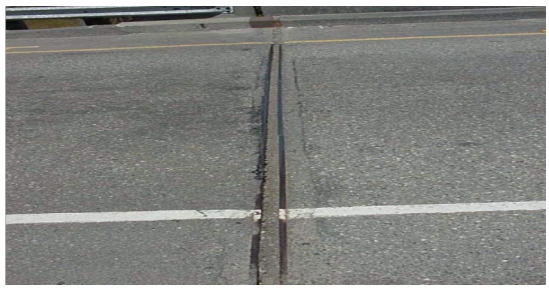




| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **305B** | 409 | **Steel Sliding Plate w/Raised Bars** | **Units - LF** | -- | 305 | Y |

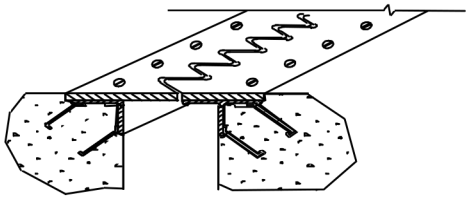
This element defines a joint with steel sliding plates and steel raised bars welded to the plates to accommodate an overlay. The quantity should equal the length measured along the expansion joint.





| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **305C** | 410 | **Steel Fingers** | **Units - LF** | -- | 305 | Y |

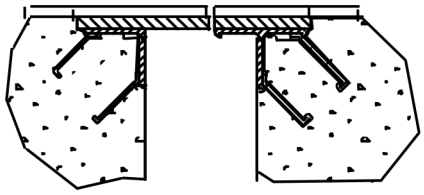
This element defines a joint with open steel fingers. The quantity should equal the length measured along the expansion joint.





| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **305D** | 411 | **Steel Fingers w/Raised Bars** | **Units - LF** | -- | 305 | Y |

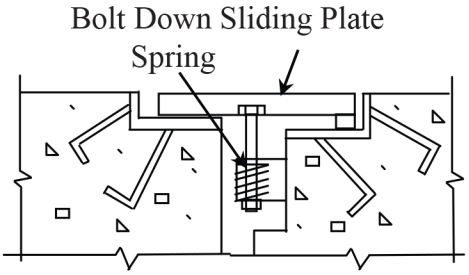
This element defines a joint with bars or plates welded to the steel finger plates to accommodate an overlay. The quantity should equal the length measured along the expansion joint.





| WSDOT BMSE | Prior BMS | Bolt Down – Sliding Plate w/ springs | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 305E | 414 | | | -- | 305 | Y |

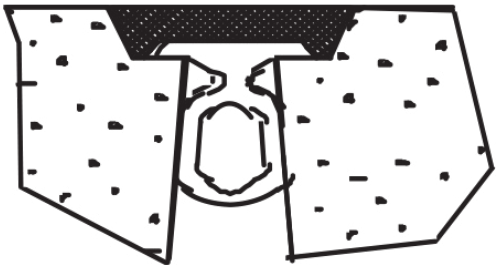
This element defines a bolted sliding plate expansion joint that uses steel springs. The quantity should equal the length measured along the expansion joint.






| WSDOT BMSE | Prior BMS | Concrete Bulb-T | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 306A | 403 | | | -- | 306 | Y |

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.





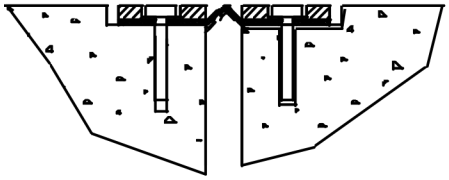
**Condition States for WSDOT Elements 304C, 304D, 305A, 305B, 305C, 305D, 305E, and 306A**

1. The expansion joint is functioning as designed. Defects are superficial and have no effect on the structural capacity of the joint. 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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **306B** | 415 | **Bolt Down Panel – Molded Rubber** | **Units - LF** | -- | 306 | Y |

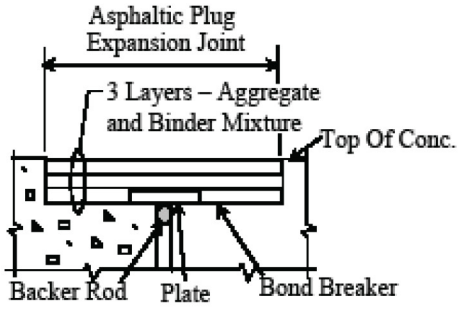
This element defines an expansion joint that uses a waterproof gland that is held in place by molded rubber panels that are attached with bolts. The quantity should equal the length measured along the expansion joint.





| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **306C** | 418 | **Asphalt Plug** | **Units - LF** | -- | 306 | Y |

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.





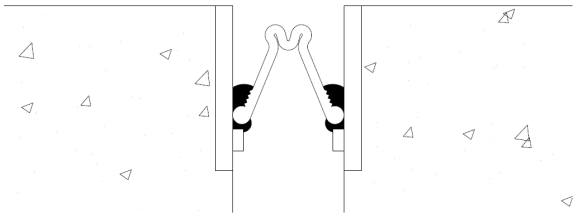

| WSDOT BMSE | Prior BMS | Flexible Joint Seal | Units - LF | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 306D | 422 | | | -- | 306 | Y |

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.

**Condition States for WSDOT Elements 306B, 306C, and 306D**

1. The expansion joint is functioning as designed. Defects are superficial and have no effect on the structural capacity of the joint. 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.





| WSDOT BMSE | Prior BMS | Joint Paved Over - Smart Flag | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| 308 | 420 | | | -- | -- | Y |

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.

# 4-14 Movable Bridges

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **207B** | 501 | **Movable Bridge Steel Tower** | **Units - LF** | 207 | -- | Y |

This element defines the structural steel columns and members used to support a counterweight 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

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **705** | 705 | **Bridge Luminaire Pole and Base** | **Units - EA** | -- | -- | Y |

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 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.

| WSDOT BMSE | Prior BMS | Fender System/Pier Protection | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **707** | 707 | | | -- | -- | Y |

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 cofferdams 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.



| WSDOT BMSE | Prior BMS | Bridge Mounted Sign Structures | Units - EA | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **710** | 710 | | | -- | -- | Y |

This element defines bridge mounted sign structures anchored to the bridge. This includes signs mounted to the outside face of the bridge or over the deck using a beam, truss, or cantilevered support. The condition states address any physical damage defects with the sign or its anchorage and the inventory status of the sign. The inventory status may be determined by the presence of a "Bridge Preservation Sign Structure Identification Tag". The quantity should equal the number of signs mounted to the bridge.

1. The sign has been inventoried and has the appropriate identification tag. The sign, support, and anchorage are in good condition with no significant structural defects.
2. The sign has not been inventoried. The sign, support, and anchorage are in good condition with no apparent defects.
3. The sign may or may not have been inventoried and has defects to the structure or anchorage but is safe and the 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 into two different types. The first type consists of Asphalt Concrete Pavements (ACP) and Thin Overlays. These are 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 represented by the WSDOT element 510A can generally be identified in the field where as WSDOT element 510B represents asphalt with a membrane below it that is not visible. Thin overlays may be identified in the field if the system has failed, and areas of the thin layers 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.

| **WSDOT BMSE** | Prior BMS | **BST on Concrete (Chip Seal)** | **Units – SF** | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **506** | 806 | | | -- | -- | Y |

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 510A or 510B is used when a chip seal is intentionally applied to a structure. WSDOT discontinued use of this element in the year 2012.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **510A** | 800 | **Asphalt Concrete Overlay** | **Units - SF** | -- | 510 | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **510B** | 801 | **Asphalt Concrete Overlay w/ Waterproofing Membrane** | **Units - SF** | -- | 510 | Y |

This element defines an Asphalt Concrete (AC) with waterproofing membrane bridge deck overlay. The quantity should equal the overlay's width times the length.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **510C** | 802 | **Thin Polymer Overlay** | **Units - SF** | -- | 510 | Y |

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 510A, 510B, and 510C**

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 (510C) 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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **510D** | 803 | **Modified Concrete Overlay** | **Units - SF** | -- | 510 | Y |

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), Fiber Reinforced (FRC)). The quantity should equal the overlay's width times the length.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **510E** | 804 | **Polyester Concrete Overlay** | **Units - SF** | -- | 510 | Y |

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 510D and 510E**

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **510F** | 805 | **AC Over a Polymer Overlay** | **Units - SF** | -- | 510 | Y |

This defines an asphaltic concrete applied over a thin polymer bridge deck overlay (i.e., epoxy, methyl-methacrylate). 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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **510G** | 807 | **Asphalt Concrete Overlay w/ High Performance Membrane** | **Units - SF** | -- | 510 | Y |

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.



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 |

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **515A** | 901 | **Red Lead Alkyd Paint System** | **Units - SF** | -- | 515 | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **515B** | 902 | **Inorganic Zinc/Vinyl Paint System** | **Units - SF** | -- | 515 | Y |

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.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **515C** | 903 | **Inorganic Zinc/Urethane Paint System** | **Units - SF** | -- | 515 | Y |

This paint protection system consists of an 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.**

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **515D** | 904 | **Organic Zinc/Urethane Paint System** | **Units - SF** | -- | 515 | Y |

This paint protection system is a 3-coat system incorporating an organic zinc primer, an epoxy second coat and a moisture cured urethane topcoat and is typically used on existing WSDOT steel bridges.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **515E** | 905 | **Coal Tar Epoxy Paint System** | **Units - SF** | -- | 515 | Y |

This paint protection system incorporates a coal tar epoxy-based product.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **515F** | 906 | **Metalizing** | **Units - SF** | -- | 515 | Y |

This protection system consists of a sprayed coating of zinc or zinc/aluminum.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **515G** | 907 | **Galvanizing** | **Units - SF** | -- | 515 | Y |

This protection system consists of zinc applied to steel in a variety of spray-on methods.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **515H** | 908 | **Epoxy Paint for Weathering Steel** | **Units - SF** | -- | 515 | Y |

This protection system consists of a clear epoxy coating applied to weathering steel to prevent excessive corrosion.

| WSDOT BMSE | Prior BMS | | | NBE | BME | ADE |
|---|---|---|---|---|---|---|
| **515J** | 909 | **Zinc Primer** | **Units - SF** | -- | 515 | Y |

This paint protection system consists of a zinc silicate shop applied primer system.

**Condition States for WSDOT Elements 515A thru 515J**

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.





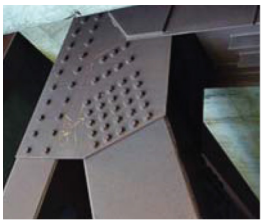


| WSDOT BMSE 515K | Prior BMS 910 | Weathering Steel Patina | Units - SF | NBE -- | BME 515 | ADE Y |
|---|---|---|---|---|---|---|

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 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.

**Condition States for WSDOT Element 515K**

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.







| WSDOT BMSE 515L | Prior BMS 911 | Paint System - Other | Units - SF | NBE -- | BME 515 | ADE Y |
|---|---|---|---|---|---|---|

This element applies to any protective structural steel coating system not included in the previously listed protective coating elements.

Examples may include:

- High Ratio Calcium Sulfonate Alkyd (HRCSA) which is typically a single-coat system and behaves as a flexible elastomeric film once applied to steel surfaces.
- Two-coat Polyurethane based (Polyaspartic) coatings applied to steel surfaces.
- Polysiloxane based coatings applied to steel surfaces.

**Condition States for WSDOT Element 515L**

1. Defects are superficial. The protection system is sound and functioning as intended to protect the metal surfaces.
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.

## 4-18 Appendices

Appendix 4-A Common Material Defects

Appendix 4-B National Bridge Element Translation Guide

# Appendix 4-A Common Material Defects

## Exhibit 4-A-1 Prestressed Concrete Common Defects

The table below is intended to be general guidance only. Inspector judgement should be used when coding and quantifying defects. If engineering judgement is required, consult with a licensed engineer with inspection experience.

| Defect | CS1<br>Good - Superficial | CS2<br>Fair - Minor | CS3<br>Poor - Moderate | CS4<br>Severe - Major |
|---|---|---|---|---|
| Delamination/Spall | None or superficial spalls, including small rock pockets or popouts. | Delaminated or spalls without other signs of deterioration.<br>Spalls typically less than 1” deep or 6” diameter. | Spalls with exposed rebar and/or combined with other signs of minor deterioration in the area surrounding the spall (efflorescence, cracking, delamination). | Spalls with exposed and corroded rebar and/or combined with signs of ongoing moderate or major deterioration in the area surrounding the spall (efflorescence, cracking, delamination). |
| Repairs/patches | None. | Repair or patch is in-place and effective or functioning as intended. | Patches may be partially cracked, delaminated or losing adhesion. | Patches are ineffective, they may be broken or otherwise failed. |
| Exposed Rebar | None or superficial. | Rebar is exposed without signs of corrosion or section loss. | Exposed rebar has signs of corrosion and insignificant section loss. | Exposed rebar has signs of corrosion and measurable section loss. Remaining diameter or cross-section of rebar should be noted. |
| Exposed Prestressing | None. | Prestressing is exposed without signs of corrosion or section loss. | Exposed prestressing has signs of corrosion. All strands/wires are intact. | Exposed prestressing has signs of corrosion and measurable section loss. Strands/wires may be stretched or severed. |
| Efflorescence/Rust Staining | None. | Surface white without build-up or leaching without rust staining. | Heavy build-up with rust staining. | Heavy build-up with rust staining combined with other signs of deterioration (cracking, delaminations, spalls). |
| Cracking | None or hairline cracks (< 0.004”). | Narrow cracks (0.004” to 0.009”) or sealed medium/wide cracks. | Medium cracks (0.010” to 0.030”). Cracks do not appear active under live load and have not increased since the previous inspection. | Wide cracks (> 0.030”). Cracks appear active under live load or have increased since the previous inspection. |

## Exhibit 4-A-2 Reinforced Concrete Common Defects

The table below is intended to be general guidance only. Inspector judgement should be used when coding and quantifying defects. If engineering judgement is required, consult with a licensed engineer with inspection experience.

| Defect | CS1<br>Good - Superficial | CS2<br>Fair - Minor | CS3<br>Poor - Moderate | CS4<br>Severe - Major |
|---|---|---|---|---|
| Delamination/Spall | None or superficial spalls, including small rock pockets or popouts. | Delaminated or spalls without other signs of deterioration. Spalls typically less than 1” deep or 6” diameter. | Spalls with exposed rebar and/or combined with other signs of minor deterioration in the area surrounding the spall (efflorescence, cracking, delamination). | Spalls with exposed and corroded rebar and/or combined with signs of ongoing moderate or major deterioration in the area surrounding the spall (efflorescence, cracking, delamination). |
| Repairs/patches | None. | Repair or patch is in-place and effective or functioning as intended. | Patches may be partially cracked, delaminated or losing adhesion. | Patches are ineffective, they may be broken or otherwise failed. |
| Exposed Rebar | None or superficial. | Rebar is exposed without signs of corrosion or section loss. | Exposed rebar has signs of corrosion and insignificant section loss. | Exposed rebar has signs of corrosion and measurable section loss. Remaining diameter or cross-section of rebar should be noted. |
| Efflorescence/Rust Staining | None. | Surface white without build=up or leaching without rust staining. | Heavy build-up with rust staining. | Heavy build-up with rust staining combined with other signs of deterioration (cracking, delaminations, spalls). |
| Cracking | None or hairline cracks (< 0.0625”). | Narrow cracks (0.0625” to 0.125”) or sealed medium/ wide cracks. | Medium cracks (0.125” to 0.1875”). Cracks do not appear active under live load and have not increased since the previous inspection. | Wide cracks (> 0.1875”). Cracks appear active under live load or have increased since the previous inspection. |
| Abrasion/Wear | None or superficial. | Exposed aggregrate; concrete matrix intact. Typically < 1/2” wear. | Exposed aggregate, may be loose or popped out; concrete matrix is breaking down. Typically 1/2” to 1” wear. | Abrasion/wear has caused significant section loss of the member. Other signs of deterioration, such as exposed rebar, cracking, and spalling may be present. |

## Exhibit 4-A-3 Structural Steel Common Defects

The table below is intended to be general guidance only. Inspector judgement should be used when coding and quantifying defects. If engineering judgement is required, consult with a licensed engineer with inspection experience.

| Defect | CS1<br>Good - Superficial | CS2<br>Fair - Minor | CS3<br>Poor - Moderate | CS4<br>Severe - Major |
|---|---|---|---|---|
| Corrosion | None or superficial rust staining. | Freckled rust. Corrosion of the steel has initiated. No measurable section loss. | Rust is widespread. Section loss is insignificant. More significant corrosion may be present in areas not contributing to element capacity. | Steel has signs of significant corrosion and measurable section loss. Remaining cross-section should be noted. Section loss affects the load capacity of the element. |
| Repairs | None. | Repair is in-place and effective or functioning as intended. Includes bolt/ rivet replacement, and arrested or plated cracks. | Ineffective or failed repairs should be coded based on the original defect. | Ineffective or failed repairs should be coded based on the original defect. May require immediate action. |
| Pack Rust | None. | Superficial. | Pack rust < 1/4” thick and/or causing no distress to a load carrying member. | Pack rust > 1/4” thick and/or causing deformation to a load carrying member. |
| Distortion | None. | Distortion is insignificant and does not require monitoring or repair. | Distortion requires monitoring or repair. | Distortion is significant and affects load carrying capacity of the member. May require immediate action. |
| Cracking | None. | Crack has self arrested or has been effectively arrested or otherwise repaired. | Crack has been identified and requires monitoring and may require repair. | Crack is significant and affects load carrying capacity of the member. May require immediate action. |
| Connection | In place and functioning as intended. | Loose fasteners or superficial pack-rust, connection functioning as intended. | Missing fasteners, broken welds, or distortion. | Connection is not functioning as intended due to missing fasteners, broken welds, distortion, or other defects. |

## Exhibit 4-A-4 Timber Common Defects

The table below is intended to be general guidance only. Inspector judgement should be used when coding and quantifying defects. If engineering judgement is required, consult with a licensed engineer with inspection experience.

| Defect | CS1<br>Good - Superficial | CS2<br>Fair - Minor | CS3<br>Poor - Moderate | CS4<br>Severe - Major |
|---|---|---|---|---|
| Decay/Section Loss | None. Superficial mold or staining may be present. | Evidence of rot is present. Section loss is insignificant (> 90% section remaining). | Rot or rot pockets evident with section loss (< 90% section remaining). Shell thickness >= 1-1/2". YELLOW TAG. | Rot or rot pockets evident with significant section loss affecting structural capacity. Shell thickness < 1-1/2". RED TAG. |
| Repairs | None. | Repair is in-place and effective or functioning as intended. | Ineffective or failed repairs should be coded based on the original defect. | Ineffective or failed repairs should be coded based on the original defect. May require immediate action. |
| Check/Shake | None or superficial. | Not in a tension zone and penetrates less than half the thickness of the member. | Penetrates more than half the thickness of the member at any location or more than 5% of the member thickness in a tension zone. | Check/shake is significant and affects load carrying capacity of the member. May require immediate action. |
| Split | None. | Length less than the member depth or arrested with effective repair. | Length equal to or greater than the member depth but does not significantly affect load carrying capacity. | Split is significant and affects load carrying capacity of the member. May require immediate action. |
| Distortion | None. | Distortion is insignificant and does not require monitoring or repair. | Distortion requires monitoring or repair. | Distortion is significant and affects load carrying capacity of the member. May require immediate action. |
| Connection | In place and functioning as intended. | Loose fasteners or superficial pack-rust on steel connection elements, connection functioning as intended. | Missing fasteners, broken welds, or distortion. | Connection is not functioning as intended due to missing fasteners, broken welds, or distortion in steel elements or other local defects in the timber member. |
| Insect Infestation | None | Evidence of insect infestation. May have insignificant section loss (> 90% section remaining). | Evidence of insect infestation. < 90% section remaining. Mitigation of infestation may be required. YELLOW TAG. | Insect infestation has resulted in significant section loss affecting structural capacity. RED TAG. |

# Appendix 4-B National Bridge Element Translation Guide

## Appendix 4-B-1 Bridge Element Translation Table

| WSDOT Bridge Management System Elements (BMSE) | | | | National Bridge Elements (NBE) and Bridge Management Elements (BME) | | | |
|---|---|---|---|---|---|---|---|
| 2025 BMSE # | 2024 BMSE # | BMS Element Name | BMSE Unit | NBE # | BME # | NBE or BME Name | Translation Notes |
| 12A | 12 | Concrete Deck | SF | 12 | -- | Reinforced Concrete Deck | Note 1 |
| 12B | 26 | Concrete Deck w/Coated Bars | | | | | |
| 12C | 20 | Conc. Deck - Lightweight | | | | | |
| 12D | 16 | Thin Concrete Deck <6" Thick | | | | | |
| 12E | 14 | Fully Supported Concrete Deck | | | | | |
| 35 | 35 | Concrete Deck Soffit | | | | | |
| 13 | 15 | Post-Tensioned Concrete Deck | SF | 13 | -- | Prestressed Concrete Deck | |
| -- | -- | Intentionally Blank | -- | 15 | -- | Prestressed Concrete Top Flange | |
| 16 | 13 | Bridge Deck Surface - Top Flange | SF | 16 | -- | Reinforced Concrete Deck Top Flange | |
| 17 | -- | Bridge Deck Surface - Solid Slab | SF | 38 or 39 | -- | Intentionally Blank | Note 2 or 3 |
| 28 | 28 | Steel Deck - Open Grid | SF | 28 | -- | Steel Deck with Open Grid | |
| 29 | 29 | Steel Deck - Concrete Filled Grid | SF | 29 | -- | Steel Deck with Concrete Filled Grid | |
| 30A | 27 | Steel Orthotropic Deck | SF | 30 | -- | Steel Deck Corrugated/ Orthotropic/Etc. | |
| 30B | 30 | Deck - Corrugated or Other Steel System | | | | | |
| 31 | 31 | Timber Deck | SF | 31 | -- | Timber Deck | |
| 32 | 32 | Fiber Reinforced Polymer (FRP) Deck | SF | 60 | -- | Other Deck | |
| 36 | 36 | Deck Rebar Cover - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 38A | 38 | Reinforced Concrete Solid Slab | SF | 38 | -- | Reinforced Concrete Slab | Note 2 |
| 38B | 49 | Reinforced Concrete Hollow Slab | | | | | |
| 38C | 52 | RC Solid Slab w/Coated Bars | | | | | |
| 38D | -- | RC Hollow Slab w/Coated Bars | | | | | |

## Appendix 4-B-1 Bridge Element Translation Table

| WSDOT Bridge Management System Elements (BMSE) | | | | National Bridge Elements (NBE) and Bridge Management Elements (BME) | | | |
|---|---|---|---|---|---|---|---|
| 2025 BMSE # | 2024 BMSE # | BMS Element Name | BMSE Unit | NBE # | BME # | NBE or BME Name | Translation Notes |
| 39A | 50 | Prestressed Concrete Solid Slab | SF | 39 | -- | Prestressed Concrete Slab | Note 3 |
| 39B | -- | Prestressed Concrete Hollow Slab | | | | | |
| 39C | 51 | PS Solid Slab w/Coated Strands | | | | | |
| 39D | -- | PS Hollow Slab w/Coated Strands | | | | | |
| 54 | 54 | Timber Slab | SF | 54 | -- | Timber Slab | |
| -- | -- | Intentionally Blank | -- | 60 | -- | Other Deck | |
| -- | -- | Intentionally Blank | -- | 65 | -- | Other Slab | |
| 102 | 102 | Steel Box Girder | LF | 102 | -- | Steel Closed Web/Box Girder | |
| 104A | 97 | Prestressed Concrete Tub Girder | LF | 104 | -- | Prestressed Concrete Closed Web/Box Girder | |
| 104B | 100 | Post-Tensioned Conc. Segmental Box Girder | | | | | |
| 104C | 104 | Post-Tensioned Concrete Box Girder | | | | | |
| 105 | 105 | Concrete Box Girder | LF | 105 | -- | Reinforced Concrete Closed Web/Box Girder | |
| -- | -- | Intentionally Blank | -- | 106 | -- | Other Closed Web/Box Girder | |
| 107A | 90 | Steel Rolled Girder | LF | 107 | -- | Steel Open Girder/Beam | |
| 107B | 91 | Steel Riveted Girder | | | | | |
| 107C | 92 | Steel Welded Girder | | | | | |
| 107D | 96 | Concrete Encased Steel Girder | | | | | |
| 107E | 107 | Steel Open Girder (Through Girder) | | | | | |
| 109A | 115 | Prestressed Concrete Girder | LF | 109 | -- | Prestressed Concrete Open Girder/Beam | |
| 109B | 89 | Prestressed Concrete Girder w/Coated Strands | | | | | |
| 109C | 98 | Thin Flange Girder | | | | | |
| 109D | 103 | Prestressed Concrete Super Girder | | | | | |
| 109E | 108 | Prestressed Concrete Bulb-T Girder | | | | | |
| 109F | 109 | PS Conc. Multiple Web Girder Units | | | | | |
| 110A | 110 | Concrete Girder | LF | 110 | -- | Reinforced Concrete Open Girder/Beam | |
| 110B | 114 | Concrete Multiple Web Girder Unit | | | | | |
| 111A | 111 | Timber Glulam Girder | LF | 111 | -- | Timber Open Girder/ Beam | |
| 111B | 117 | Timber Sawn Girder | | | | | |
| -- | -- | Intentionally Blank | -- | 112 | -- | Other Open Girder/Beam | |

## Appendix 4-B-1 Bridge Element Translation Table

| WSDOT Bridge Management System Elements (BMSE) | | | | National Bridge Elements (NBE) and Bridge Management Elements (BME) | | | |
|---|---|---|---|---|---|---|---|
| 2025 BMSE # | 2024 BMSE # | BMS Element Name | BMSE Unit | NBE # | BME # | NBE or BME Name | Translation Notes |
| 113 | 113 | Steel Stringer | LF | 113 | -- | Steel Stringer | |
| -- | -- | Intentionally Blank | -- | 115 | -- | Prestressed Concrete Stringer | |
| 116 | 116 | Concrete Stringer | LF | 116 | -- | Reinforced Concrete Stringer | |
| 117 | 118 | Timber Stringer | LF | 117 | -- | Timber Stringer | |
| -- | -- | Intentionally Blank | -- | 118 | -- | Other Stringer | |
| 120A | 126 | Steel Thru Truss | LF | 120 | -- | Steel Truss | |
| 120B | 131 | Steel Deck Truss | | | | | |
| 135 | 135 | Timber Truss | LF | 135 | -- | Timber Truss | |
| 136 | 119 | Concrete Truss | LF | 136 | -- | Other Truss | |
| 141A | 142 | Steel Tied Arch | LF | 141 | -- | Steel Arch | |
| 141B | 141 | Steel Arch | | | | | |
| 142 | 140 | Composite Arch | LF | 142 | -- | Other Arch | |
| -- | -- | Intentionally Blank | -- | 143 | -- | Prestressed Concrete Arch | |
| 144A | 145 | Earth Filled Concrete Arch | LF | 144 | -- | Reinforced Concrete Arch | |
| 144B | 144 | Concrete Arch | | | | | |
| -- | -- | Intentionally Blank | -- | 145 | -- | Masonry Arch | |
| 146 | 139 | Timber Arch | LF | 146 | -- | Timber Arch | |
| 147A | 146 | Suspension - Main Cable | EA | 147 | -- | Steel Main Cables | Note 4 |
| 147B | 149 | Cable Stayed Bridge - Cable | | | | | |
| 148A | 147 | Suspension - Suspender Cable | EA | 148 | -- | Secondary Steel Cable | |
| 148B | 143 | Tied Arch - Suspender Cable | EA | | | | |
| -- | -- | Intentionally Blank | -- | 149 | -- | Other Secondary Cable | |
| 151 | 150 | Concrete Column on Spandrel Arch | EA | -- | -- | Intentionally Blank | |
| 152 | 152 | Steel Floor Beam | LF | 152 | -- | Steel Floor Beam | |
| 154 | 154 | Prestressed Concrete Floor Beam | LF | 154 | -- | Prestressed Concrete Floor Beam | |
| 155 | 155 | Concrete Floor Beam | LF | 155 | -- | Reinforced Concrete Floor Beam | |
| 156 | 156 | Timber Floor Beam | LF | 156 | -- | Timber Floor Beam | |
| -- | -- | Intentionally Blank | -- | 157 | -- | Other Floor Beam | |
| 160 | 160 | Steel Column on Spandrel Arch | EA | -- | -- | Intentionally Blank | |
| 161A | 161 | Steel Hanger | EA | 161 | -- | Steel Pin and Pin & Hanger Assembly or both | Note 5 |
| 161B | 162 | Steel Pin | | | | | |
| 162 | 133 | Truss Gusset Plates | EA | 162 | -- | Steel Gusset Plate | |
| 164 | 163 | Tension Hold Down Anchor Assembly | EA | -- | -- | Intentionally Blank | |

## Appendix 4-B-1 Bridge Element Translation Table

| WSDOT Bridge Management System Elements (BMSE) | | | | National Bridge Elements (NBE) and Bridge Management Elements (BME) | | | |
|---|---|---|---|---|---|---|---|
| 2025 BMSE # | 2024 BMSE # | BMS Element Name | BMSE Unit | NBE # | BME # | NBE or BME Name | Translation Notes |
| 200 | 200 | Abutment Fill | EA | -- | -- | Intentionally Blank | |
| 202 | 202 | Steel Column | EA | 202 | -- | Steel Column | |
| -- | -- | Intentionally Blank | -- | 203 | -- | Other Column | |
| 204A | 204 | Prestressed Concrete Column | EA | 204 | -- | Prestressed Concrete Column | |
| 204B | 203 | Prestressed Hollow Concrete Column | | | | | |
| 205A | 205 | Concrete Column | EA | 205 | -- | Reinforced Concrete Column | |
| 205B | 207 | Concrete Column w/Steel Jacket | | | | | |
| 205C | 208 | Conc. Column w/ Composite Wrap | | | | | |
| 206 | 206 | Timber Column | EA | 206 | -- | Timber Column | |
| 207A | -- | Steel Tower | LF | 207 | -- | Steel Tower | |
| 207B | 501 | Moveable Bridge Steel Tower | | | | | |
| 208 | -- | Timber Tower | LF | 208 | -- | Timber Trestle | |
| 210 | 210 | Concrete Pier Wall | LF | 210 | -- | Reinforced Concrete Pier Wall | |
| 211 | 211 | Other Pier Wall | LF | 211 | -- | Other Pier Wall | |
| -- | -- | Intentionally Blank | -- | 212 | -- | Timber Pier Wall | |
| -- | -- | Intentionally Blank | -- | 213 | -- | Masonry Pier Wall | |
| 215 | 215 | Concrete Abutment | LF | 215 | -- | Reinforced Concrete Abutment | |
| 216 | 216 | Timber Abutment | LF | 216 | -- | Timber Abutment | |
| -- | -- | Intentionally Blank | -- | 217 | -- | Masonry Abutment | |
| 218 | 217 | Other Abutment | LF | 218 | -- | Other Abutments | |
| 219 | 218 | Steel Abutment | LF | 219 | -- | Steel Abutment | |
| 220 | 220 | Concrete Pile Cap/ Footing | LF | 220 | -- | Reinforced Concrete Pile Cap/Footing | |
| 221 | 214 | Concrete Web Wall between Columns | LF | -- | -- | Intentionally Blank | |
| 222 | 222 | Timber Foundation | LF | -- | -- | Intentionally Blank | |
| 225 | 225 | Steel Pile | EA | 225 | -- | Steel Pile | |
| 226A | 226 | Prestressed Concrete Pile | EA | 226 | -- | Prestressed Concrete Pile | |
| 226B | 232 | Prestressed Hollow Concrete Pile | | | | | |
| 227 | 227 | Concrete Pile | EA | 227 | -- | Reinforced Concrete Pile | |
| 228 | 228 | Timber Pile | EA | 228 | -- | Timber Pile | |
| -- | -- | Intentionally Blank | -- | 229 | -- | Other Pile | |
| 231A | 231 | Steel Pier Cap/Crossbeam | LF | 231 | -- | Steel Pier Cap | |
| 231B | 229 | Timber Cap Rehab with Steel | | | | | |
| 233 | 233 | Prestressed Concrete Pier Cap/Crossbeam | LF | 233 | -- | Prestressed Concrete Pier Cap | |

## Appendix 4-B-1 Bridge Element Translation Table

| WSDOT Bridge Management System Elements (BMSE) | | | | National Bridge Elements (NBE) and Bridge Management Elements (BME) | | | |
|---|---|---|---|---|---|---|---|
| 2025 BMSE # | 2024 BMSE # | BMS Element Name | BMSE Unit | NBE # | BME # | NBE or BME Name | Translation Notes |
| 234 | 234 | Concrete Pier Cap/ Crossbeam | LF | 234 | -- | Reinforced Concrete Pier Cap | |
| 235 | 235 | Timber Pier Cap | LF | 235 | -- | Timber Pier Cap | |
| -- | -- | Intentionally Blank | -- | 236 | -- | Other Pier Cap | |
| 237 | 237 | Pontoon Hatch/Bulkhead | EA | -- | -- | Intentionally Blank | |
| 238 | 238 | Floating Bridge - Anchor Cable | EA | 149 | -- | Other Secondary Cable | |
| 239 | 236 | Concrete Floating Pontoon | Cell | -- | -- | Intentionally Blank | |
| 240 | 240 | Metal Culvert | LF | 240 | -- | Steel Culvert | |
| 241 | 241 | Concrete Culvert | LF | 241 | -- | Reinforced Concrete Culvert | |
| 242 | 242 | Timber Culvert | LF | 242 | -- | Timber Culvert | |
| 243 | 243 | Other Culvert | LF | 243 | -- | Other Culvert | |
| -- | -- | Intentionally Blank | -- | 244 | -- | Masonry Culvert | |
| -- | -- | Intentionally Blank | -- | 245 | -- | Prestressed Concrete Culvert | |
| 260 | 260 | Steel Open Grid Sidewalk and Supports | SF | -- | -- | Intentionally Blank | |
| 261 | 261 | Steel Conc. Filled Grid Sidewalk and Supports | | | | | |
| 262 | 262 | Corrugated/Orthotropic Sidewalk and Supports | | | | | |
| 264 | 264 | Timber Sidewalk and Supports | | | | | |
| 266 | 266 | Concrete Sidewalk and Supports | | | | | |
| 267 | 267 | FRP Sidewalk and Supports | | | | | |
| 300A | 412 | Strip Seal - Anchored | LF | -- | 300 | Strip Seal Expansion Joint | Note 6 |
| 300B | 413 | Strip Seal - Welded | | | | | |
| 301A | 400 | Asphalt Butt Joint - Paving Joint Seal | LF | -- | 301 | Pourable Joint Seal | Note 6 |
| 301B | 417 | Silicone Rubber Joint | | | | | |
| 302A | 404 | Compression Seal/ Concrete Header | LF | -- | 302 | Compression Joint Seal | Note 6 |
| 302B | 405 | Compression Seal/ Polymer Header | | | | | |
| 302C | 406 | Compression Seal/Steel Header | | | | | |
| 303 | 416 | Assembly Joint Seal (Modular) | LF | -- | 303 | Assembly Joint with Seal | Note 6 |

## Appendix 4-B-1 Bridge Element Translation Table

| WSDOT Bridge Management System Elements (BMSE) | | | | National Bridge Elements (NBE) and Bridge Management Elements (BME) | | | |
|---|---|---|---|---|---|---|---|
| 2025 BMSE # | 2024 BMSE # | BMS Element Name | BMSE Unit | NBE # | BME # | NBE or BME Name | Translation Notes |
| 304A | 401 | Asphalt Open Joint - Paving Joint Seal | LF | -- | 304 | Open Expansion Joint | Note 6 |
| 304B | 402 | Open Concrete Joint - Paving Joint Seal | | | | | |
| 304C | 407 | Steel Angle Header | | | | | |
| 304D | 419 | Steel Angle W/Raised Bars | | | | | |
| 305A | 408 | Steel Sliding Plate | LF | -- | 305 | Assembly Joint without Seal | Note 6 |
| 305B | 409 | Steel Sliding Plate w/ Raised Bars | | | | | |
| 305C | 410 | Steel Fingers | | | | | |
| 305D | 411 | Steel Fingers w/Raised Bars | | | | | |
| 305E | 414 | Bolt Down - Sliding Plate w/Springs | | | | | |
| 306A | 403 | Concrete Bulb-T | LF | -- | 306 | Other Expansion Joint | Note 6 |
| 306B | 415 | Bolt Down Panel - Molded Rubber | | | | | |
| 306C | 418 | Asphalt Plug | | | | | |
| 306D | 422 | Flexible Joint Seal | | | | | |
| 308 | 420 | Joint Paved Over - Smart Flag | EA | -- | -- | Intentionally Blank | |
| -- | -- | Intentionally Blank | -- | -- | 301A | Poured-In-Place Plug Joint System | Note 7 |
| -- | -- | Intentionally Blank | -- | -- | 302A | Bonded Preformed Joint Seal | Note 7 |
| -- | -- | Intentionally Blank | -- | -- | 302B | Bonded Preformed Joint Seal | Note 7 |
| -- | -- | Intentionally Blank | -- | -- | 303A | Segmental Joint System | Note 7 |
| -- | -- | Intentionally Blank | -- | -- | 303B | Modular Joint Assembly | Note 7 |
| -- | -- | Intentionally Blank | -- | -- | 305A | Sliding Plate Joint Assembly | Note 7 |
| -- | -- | Intentionally Blank | -- | -- | 305B | Finger (tooth) Joint Assembly | Note 7 |
| 310 | 310 | Elastomeric Bearing | EA | 310 | -- | Elastomeric Bearing | |
| 311 | 311 | Moveable Bearing (Roller, Sliding, etc.) | EA | 311 | -- | Movable Bearing | |
| 312 | 312 | Concealed Bearing or Bearing System | EA | 312 | -- | Enclosed/Concealed Bearing | |
| 313 | 313 | Fixed Bearing | EA | 313 | -- | Fixed Bearing | |
| 314 | 314 | Pot Bearing | EA | 314 | -- | Pot Bearing | |
| 315 | 315 | Disc Bearing | EA | 315 | -- | Disk Bearing | |
| 316 | 316 | Isolation Bearing | EA | 316 | -- | Other Bearing | |
| -- | -- | Intentionally Blank | -- | -- | 320 | Prestressed Concrete Approach Slab | |
| 321 | 321 | Concrete Roadway Approach Slab | SF | -- | 321 | Concrete Roadway Approach Slab | |

## Appendix 4-B-1 Bridge Element Translation Table

| WSDOT Bridge Management System Elements (BMSE) | | | | National Bridge Elements (NBE) and Bridge Management Elements (BME) | | | |
|---|---|---|---|---|---|---|---|
| 2025 BMSE # | 2024 BMSE # | BMS Element Name | BMSE Unit | NBE # | BME # | NBE or BME Name | Translation Notes |
| 322 | 322 | Approach Roadway Impact - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 330 | 330 | Metal Bridge Rail | LF | 330 | -- | Metal Bridge Railing | |
| 331 | 331 | Concrete Bridge Rail | LF | 331 | -- | Reinforced Concrete Railing | |
| 332 | 332 | Timber Bridge Rail | LF | 332 | -- | Timber Bridge Railing | |
| 333 | 333 | Other Bridge Rail | LF | 333 | -- | Other Bridge Railing | |
| -- | -- | Intentionally Blank | -- | 334 | -- | Masonry Bridge Railing | |
| 340 | 340 | Metal Pedestrian Rail | LF | -- | -- | Intentionally Blank | |
| 341 | 341 | Concrete Pedestrian Rail | LF | -- | -- | Intentionally Blank | |
| 342 | 342 | Timber Pedestrian Rail | LF | -- | -- | Intentionally Blank | |
| 343 | 343 | Other Pedestrian Rail | LF | -- | -- | Intentionally Blank | |
| 351 | 351 | Chloride Impact - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 353 | 353 | Encampment Impact - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 355 | 355 | Damaged Bolts or Rivets - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 356 | 356 | Steel Cracking - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 357 | 357 | Pack Rust - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 360 | 360 | Bridge Movement - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 361 | 361 | Scour - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 368 | 368 | Seismic Pier Crossbeam Bolster | LF | -- | -- | Intentionally Blank | |
| 369 | 369 | Seismic Pier Infill Wall | EA | -- | -- | Intentionally Blank | |
| 370 | 370 | Seismic - Longitudinal Restrainer | EA | -- | -- | Intentionally Blank | |
| 371 | 371 | Seismic - Transverse Restrainer | EA | -- | -- | Intentionally Blank | |
| 372 | 372 | Seismic - Link/Pin Restrainer | EA | -- | -- | Intentionally Blank | |
| 373 | 373 | Seismic - Catcher Block | EA | -- | -- | Intentionally Blank | |
| 374 | 374 | Seismic - Column Silo | EA | -- | -- | Intentionally Blank | |
| 376 | 376 | Conc. Deck Delam Testing - Smart Flag | SF | -- | -- | Intentionally Blank | |
| 378 | 378 | WSDOT Undercrossing Safety - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 379 | 379 | LA Undercrossing Safety - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 381 | 381 | Joint Seal/Gland Leaking - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 506 | 806 | BST on Concrete (Chip Seal) | SF | -- | -- | Intentionally Blank | |

## Appendix 4-B-1 Bridge Element Translation Table

| WSDOT Bridge Management System Elements (BMSE) | | | | National Bridge Elements (NBE) and Bridge Management Elements (BME) | | | |
|---|---|---|---|---|---|---|---|
| 2025 BMSE # | 2024 BMSE # | BMS Element Name | BMSE Unit | NBE # | BME # | NBE or BME Name | Translation Notes |
| 510A | 800 | Asphalt Concrete Overlay | SF | -- | 510 | Wearing Surfaces | Note 8 |
| 510B | 801 | AC Overlay w/ Waterproofing Mem. | | | | | |
| 510C | 802 | Thin Polymer Overlay | | | | | |
| 510D | 803 | Modified Concrete Overlay | | | | | |
| 510E | 804 | Polyester Concrete Overlay | | | | | |
| 510F | 805 | AC Over a Polymer Overlay | | | | | |
| 510G | 807 | AC Overlay w/High Performance Membrane | | | | | |
| 515A | 901 | Red Lead Alkyd Paint System | SF | -- | 515 | Steel Protective Coating | |
| 515B | 902 | Inorganic Zinc/Vinyl Paint System | | | | | |
| 515C | 903 | Inorganic Zinc/Urethane Paint System | | | | | |
| 515D | 904 | Organic Zinc/Urethane Paint System | | | | | |
| 515E | 905 | Coal Tar Epoxy Paint System | | | | | |
| 515F | 906 | Metalizing | | | | | |
| 515G | 907 | Galvanizing | | | | | |
| 515H | 908 | Epoxy Paint for Weathering Steel | | | | | |
| 515J | 909 | Zinc Primer | | | | | |
| 515K | 910 | Weathering Steel Patina | | | | | |
| 515L | 911 | Paint System - Other | | | | | |
| -- | -- | Intentionally Blank | -- | -- | 520 | Concrete Reinforcing Steel Protective System | |
| -- | -- | Intentionally Blank | -- | -- | 521 | Concrete Protective Coating | |
| 705 | 705 | Bridge Luminaire Pole and Base | EA | -- | -- | Intentionally Blank | |
| 707 | 707 | Fender System/Pier Protection | EA | -- | -- | Intentionally Blank | |
| 710 | 710 | Bridge Mounted Sign Structures | EA | -- | -- | Intentionally Blank | |

## Translation Notes for Appendix 4-B-1

1. Concrete Deck BMSE 12A through 12E will be combined with the deck soffit BMSE 35 and submitted as NBE 12. See 4-B-1 Step Sequencing 1 for details.
2. Bridge Deck Surface - Solid Slab BMSE 17 will be combined with a reinforced concrete solid slab element, either BMSE 38A or 38C, and submitted as NBE 38. See 4-B-1 Step Sequencing 2 for details.
3. Bridge Deck Surface - Solid Slab BMSE 17 will be combined with a prestressed solid slab element, either BMSE 39A or 39C, and submitted as NBE 39. See 4-B-1 Step Sequencing 3 for details.
4. Main Cable BMSE 147A and 147B have units of EA. Quantities in each condition state and total will be summed and reported in NBE 147 as LF without alteration.
5. Steel pin and hanger BMSE 161A and 161B will be combined and submitted as NBE 161. See Note 4-B-1 Step Sequencing 5 for details.
6. Bridge joint BMSE 300A through 306E will be combined and translated to four condition states and submitted to the appropriate NBE. See Note 4-B-1 Step Sequencing 6 for details.
7. Bridge joint BME 301A through 305B are in the 2024 Manual for Bridge Element Inspection but have not been adopted by FHWA into the NBI.
8. Wearing surface BMSE 510A through 510G will be combined and translated to four condition states and submitted to the appropriate NBE. See Note Step Sequencing 6 for details.

## 4-B-1 Step Sequencing 1

| Step | Description |
|---|---|
| 1 | Sum total quantities and all quantities in each condition state from WSDOT BMSE 12A - 12E into an NBE Temp 12. |
| 2 | Add WSDOT BMSE 35 quantities in CS2, CS3, and CS4 to NBE Temp 12. |
| 3 | If NBE Temp total quantity = NBE Temp CS1 + CS2 + CS3 + CS4, go to Step 8. |
| 4 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS1 to zero limit, then go to Step 3. |
| 5 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS2 to zero limit, then go to Step 3. |
| 6 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS3 to zero limit, then go to Step 3. |
| 7 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, set NBE Temp CS4 = NBE Temp total quantity, then go to Step 8. |
| 8 | Move NBE Temp total quantity and all Temp CS1 through CS4 quantities to final NBE 12. |

## 4-B-1 Step Sequencing 2

| Step | Description |
|---|---|
| 1 | Sum total quantities and all quantities in each condition state from WSDOT BMSE 38A or 38C with BMSE 17 into an NBE Temp 38. |
| 2 | If NBE Temp total quantity = NBE Temp CS1 + CS2 + CS3 + CS4, go to Step 7. |
| 3 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS1 to zero limit, then go to Step 2. |
| 4 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS2 to zero limit, then go to Step 2. |
| 5 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS3 to zero limit, then go to Step 2. |
| 6 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, set NBE Temp CS4 = NBE Temp total quantity, then go to Step 7. |
| 7 | Move NBE Temp total quantity and all Temp CS1 through CS4 quantities to final NBE 38. |

## 4-B-1 Step Sequencing 3

| Step | Description |
|---|---|
| 1 | Sum total quantities and all quantities in each condition state from WSDOT BMSE 39A or 39C with BMSE 17 into an NBE Temp 39. |
| 3 | If NBE Temp total quantity = NBE Temp CS1 + CS2 + CS3 + CS4, go to Step 7. |
| 4 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS1 to zero limit, then go to Step 2. |
| 5 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS2 to zero limit, then go to Step 2. |
| 6 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS3 to zero limit, then go to Step 2. |
| 7 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, set NBE Temp CS4 = NBE Temp total quantity, then go to Step 7. |
| 8 | Move NBE Temp total quantity and all Temp CS1 through CS4 quantities to final NBE 38. |

## 4-B-1 Step Sequencing 5

| Step | Description |
|---|---|
| 1 | Sum total quantities and all quantities in each condition state from WSDOT BMSE 161A and 161B into an NBE Temp 161. |
| 2 | If NBE Temp total quantity = NBE Temp CS1 + CS2 + CS3 + CS4, go to Step 7. |
| 3 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS1 to zero limit, then go to Step 2. |
| 4 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS2 to zero limit, then go to Step 2. |
| 5 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS3 to zero limit, then go to Step 2. |
| 6 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, set NBE Temp CS4 = NBE Temp total quantity, then go to Step 7. |
| 7 | Move NBE Temp total quantity and all Temp CS1 through CS4 quantities to final NBE 161. |

## 4-B-1 Step Sequencing 6

| Step | Description |
|---|---|
| 1 | Sum the WSDOT element total quantities into NBE element total quantity.<br>Note that multiple WSDOT elements will be combined into a single NBE element. |
| 2 | Sum the WSDOT element CS1 quantities into NBE element CS2 quantity.<br>Note that NBE will have zero quantity in CS1. |
| 3 | Sum the WSDOT element CS2 quantities into NBE element CS3 quantity. |
| 4 | Sum the WSDOT element CS3 quantities into NBE element CS4 quantity. |

## Appendix 4-B-2 Washington State Ferries - Bridge Element Translation Table

| WSDOT Bridge Management System Elements (BMSE) | | | | National Bridge Elements (NBE) and Bridge Management Elements (BME) | | | |
|---|---|---|---|---|---|---|---|
| 2025 BMSE # | 2024 BMSE # | BMS Element Name | BMSE Unit | NBE # | BME # | NBE or BME Name | Translation Notes |
| 8216 | 8216 | Concrete Deck Soffit | SF | 12 | -- | Reinforced Concrete Deck | Note 1 |
| 8217 | 8217 | Concrete Deck | SF | | | | |
| 8213 | 8213 | Bridge Deck Surface | SF | 16 | -- | Reinforced Concrete Deck Top Flange | |
| 8218 | 8218 | Steel Deck - Open Grid | SF | 28 | -- | Steel Deck with Open Grid | |
| 8219 | 8219 | Steel Deck - Concrete Filled Grid | SF | 29 | -- | Steel Deck with Concrete Filled Grid | |
| 8222 | 8222 | Deck - Corrugated or Other Steel System | SF | 30 | -- | Steel Deck Corrugated/ Orthotropic/Etc. | |
| 8221 | 8221 | Timber Deck | SF | 31 | -- | Timber Deck | |
| 8150 | 8150 | Prestressed Concrete Slab | SF | 39 | -- | Prestressed Concrete Slab | |
| 8151 | 8151 | Prestressed Concrete Slab w/ Coated Strands | SF | | | | |
| 8200 | 8200 | Steel Box Girder | LF | 102 | -- | Steel Closed Web/Box Girder | |
| 8090 | 8090 | Steel Rolled Girder | LF | 107 | -- | Steel Open Girder/Beam | |
| 8201 | 8201 | Steel Open Girder | LF | | | | |
| 8108 | 8108 | Prestressed Concrete Bulb-T Girder | LF | 109 | -- | Prestressed Concrete Open Girder/Beam | |
| 8109 | 8109 | Prestressed Concrete Multiple Web Girder Units | LF | | | | |
| 8111 | 8111 | Prestressed Concrete Girder | LF | | | | |
| 8110 | 8110 | Concrete Girder | LF | 110 | -- | Reinforced Concrete Open Girder/Beam | |
| 8112 | 8112 | Timber Sawn Girder | LF | 111 | -- | Timber Open Girder/Beam | |
| 8114 | 8114 | Timber Laminated Girder | LF | | | | |
| 8209 | 8209 | Steel Stringer | LF | 113 | -- | Steel Stringer | |
| 8204 | 8204 | Steel Thru Truss | LF | 120 | -- | Steel Truss | |
| 8206 | 8206 | Steel Floor Beam | LF | 152 | -- | Steel Floor Beam | |
| 8341 | 8341 | Lift Beam (NSTM) | LF | | | | |
| 8342 | 8342 | Live Load Hanger Bars (NSTM) | LF | 161 | -- | Steel Pin and Pin & Hanger Assembly or both | |
| 8343 | 8343 | Apron Two Hinge Pin System/ LL Hanger Pins (NSTM) | EA | | | | |
| 8210 | 8210 | Truss Gusset Plates | EA | 162 | -- | Steel Gusset Plate | |
| 8127 | -- | Steel Column | EA | 202 | -- | Steel Column | |
| 8125 | 8125 | Concrete Column | EA | 205 | -- | Reinforced Concrete Column | |
| 8129 | 8129 | Transfer Span/OHL Supercolumn | EA | | | | |
| 8123 | -- | Timber Column | EA | 206 | -- | Timber Column | |
| 8102 | 8102 | Concrete Abutment | LF | 215 | -- | Reinforced Concrete Abutment | |
| 8103 | 8103 | Timber Abutment | LF | 216 | -- | Timber Abutment | |
| 8101 | 8101 | Steel Abutment | LF | 219 | -- | Steel Abutment | |
| 8136 | 8136 | Concrete Pile Cap/Footing | LF | 220 | -- | Reinforced Concrete Pile Cap/ Footing | |
| 8128 | 8128 | Steel Pile | EA | 225 | -- | Steel Pile | |
| 8126 | 8127 | Prestress Concrete Pile | EA | 226 | -- | Prestressed Concrete Pile | |
| 8124 | 8124 | Timber Pile | EA | 228 | -- | Timber Pile | |
| 8130 | 8130 | Steel Pier Cap/Crossbeam | LF | 231 | -- | Steel Pier Cap | |

## Appendix 4-B-2 Washington State Ferries - Bridge Element Translation Table

| WSDOT Bridge Management System Elements (BMSE) | | | | National Bridge Elements (NBE) and Bridge Management Elements (BME) | | | |
|---|---|---|---|---|---|---|---|
| 2025 BMSE # | 2024 BMSE # | BMS Element Name | BMSE Unit | NBE # | BME # | NBE or BME Name | Translation Notes |
| 8132 | 8132 | Concrete Pier Cap/Crossbeam | LF | 234 | -- | Reinforced Concrete Pier Cap | |
| 8131 | 8131 | Timber Pier Cap | LF | 235 | -- | Timber Pier Cap | |
| 8391 | 8391 | Moveable Bearing (Roller, Sliding, etc.) | EA | 311 | -- | Movable Bearing | |
| 8390 | 8390 | Fixed Bearing | EA | 313 | -- | Fixed Bearing | |
| 8810 | 8810 | Metal Bridge Railing | LF | 330 | -- | Metal Bridge Railing | |
| 8811 | 8811 | Concrete Bridge Railing | LF | 331 | -- | Reinforced Concrete Railing | |
| 8812 | 8812 | Timber Bridge Railing | LF | 332 | -- | Timber Bridge Railing | |
| 8813 | 8813 | Other Bridge Railing | LF | 333 | -- | Other Bridge Railing | |
| 8404 | 8404 | Compression Seal/Concrete Header | LF | -- | 302 | Compression Joint Seal | Note 2 |
| 8406 | 8406 | Compression Seal/Steel Header | LF | | | | |
| 8407 | 8407 | Steel Angle Header | LF | -- | 304 | Open Expansion Joint | Note 2 |
| 8408 | 8408 | Steel Sliding Plate | LF | -- | 305 | Assembly Joint without Seal | Note 2 |
| 8223 | 8223 | Asphalt Concrete Overlay | SF | -- | 510 | Wearing Surfaces | Note 2 |
| 8224 | 8224 | Thin Polymer Overlay | SF | | | | |
| 8901 | 8901 | Protective Coating - Bridge | SF | -- | 515 | Steel Protective Coating | |
| 8902 | 8902 | Protective Coating - Piling | SF | | | | |
| 8907 | 8907 | Galvanizing | SF | | | | |
| 8225 | 8225 | Non-skid Metal Surfacing | SF | -- | -- | Intentionally Blank | |
| 8261 | 8261 | Steel Filled Grid Sidewalk and Supports | SF | -- | -- | Intentionally Blank | |
| 8262 | 8262 | Corrugated/Orthotropic Sidewalk and Supports | SF | -- | -- | Intentionally Blank | |
| 8263 | 8263 | Steel Open Grid Sidewalk w/ Cover Plate & Suppt. | SF | -- | -- | Intentionally Blank | |
| 8264 | 8264 | Timber Sidewalk and Supports | SF | -- | -- | Intentionally Blank | |
| 8265 | 8265 | Fiber Reinforced Polymer (FRP) Sidewalk and Supports | SF | -- | -- | Intentionally Blank | |
| 8266 | 8266 | Concrete Sidewalk and Supports | SF | -- | -- | Intentionally Blank | |
| 8301 | 8301 | Apron Steel Orthotropic Deck | SF | -- | -- | Intentionally Blank | |
| 8305 | 8305 | Apron Hinge Multi-Pin & Plate | EA | -- | -- | Intentionally Blank | |
| 8307 | 8307 | Apron Lips & Pins | EA | -- | -- | Intentionally Blank | |
| 8310 | 8310 | Apron Hoist/Cables/Spool/ Platform/Supports/Rigging | EA | -- | -- | Intentionally Blank | |
| 8312 | 8312 | Span Apron/Cab Gangplank Pivot/Raise/Rams/Fittings | EA | -- | -- | Intentionally Blank | |
| 8348 | 8348 | Span Hoist/Cables/Spool/ Platform/Supports/Rigging | EA | -- | -- | Intentionally Blank | |
| 8355 | 8355 | Damaged Bolts or Rivets - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 8356 | 8356 | Steel Cracking - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 8357 | 8357 | Pack Rust - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 8359 | 8359 | Bridge Impact | EA | -- | -- | Intentionally Blank | |
| 8360 | 8360 | Bridge Movement - Smart Flag | EA | -- | -- | Intentionally Blank | |
| 8361 | 8361 | Scour - Smart Flag | EA | -- | -- | Intentionally Blank | |

## Appendix 4-B-2 Washington State Ferries - Bridge Element Translation Table

| WSDOT Bridge Management System Elements (BMSE) | | | | National Bridge Elements (NBE) and Bridge Management Elements (BME) | | | |
|---|---|---|---|---|---|---|---|
| 2025 BMSE # | 2024 BMSE # | BMS Element Name | BMSE Unit | NBE # | BME # | NBE or BME Name | Translation Notes |
| 8362 | 8362 | Impact Damage | EA | -- | -- | Intentionally Blank | |
| 8370 | 8370 | Seismic - Longitudinal Restrainer | EA | -- | -- | Intentionally Blank | |
| 8371 | 8371 | Seismic - Transverse Restrainer | EA | -- | -- | Intentionally Blank | |
| 8375 | 8375 | Cathodic Protection | EA | -- | -- | Intentionally Blank | |
| 8376 | 8376 | Concrete Deck Delamination Testing - Smart Flag | SF | -- | -- | Intentionally Blank | |
| 8413 | 8413 | Steel Tower | EA | -- | -- | Intentionally Blank | |
| 8414 | 8414 | Timber Tower | EA | -- | -- | Intentionally Blank | |
| 8415 | 8415 | Steel Headframe | LF | -- | -- | Intentionally Blank | |
| 8416 | 8416 | Timber Headframe | LF | -- | -- | Intentionally Blank | |
| 8417 | 8417 | Tower Base Platform | SF | -- | -- | Intentionally Blank | |
| 8418 | 8418 | Counterweight Guides | EA | -- | -- | Intentionally Blank | |
| 8419 | 8419 | Concrete Counterweights | EA | -- | -- | Intentionally Blank | |
| 8420 | 8420 | CTWT Sheaves/Shafts(NSTM)/ Bearings/Anchor Blts. | EA | -- | -- | Intentionally Blank | |
| 8421 | 8421 | Counterweight Cable Protective Systems | LF | -- | -- | Intentionally Blank | |
| 8423 | 8423 | Steel Counterweights | EA | -- | -- | Intentionally Blank | |
| 8450 | 8450 | Timber Wingwalls | LF | -- | -- | Intentionally Blank | |
| 8451 | 8451 | Steel Pile Frame Wingwalls | LF | -- | -- | Intentionally Blank | |
| 8460 | 8460 | Timber Pile Dolphins | EA | -- | -- | Intentionally Blank | |
| 8462 | 8462 | Steel Pile Frame Dolphins | EA | -- | -- | Intentionally Blank | |
| 8463 | 8463 | Timber Floating Dolphin | LF | -- | -- | Intentionally Blank | |
| 8464 | 8464 | Concrete Pontoon Floating Dolphin | LF | -- | -- | Intentionally Blank | |
| 8640 | 8640 | Moveable Pedestrian Gangplank | LF | -- | -- | Intentionally Blank | |
| 8650 | 8650 | Overhead Passenger Loading Cab | SF | -- | -- | Intentionally Blank | |
| 8653 | 8653 | Passenger Cab Floor System and Lift Beam(NSTM) | LF | -- | -- | Intentionally Blank | |
| 8701 | 8701 | Ferry Concrete Floating Pontoon | Cell | -- | -- | Intentionally Blank | |
| 8702 | 8702 | Ferry Steel Floating Pontoon | Cell | -- | -- | Intentionally Blank | |
| 8703 | 8703 | Spud Piling & Wells | EA | -- | -- | Intentionally Blank | |
| 8704 | 8704 | Pontoon Anchors, Anchor Chain/Cables/Clamps | EA | -- | -- | Intentionally Blank | |
| 8705 | 8705 | Bridge Luminaire Pole and Base | EA | -- | -- | Intentionally Blank | |
| 8815 | 8815 | Metal Pedestrian Rail | LF | -- | -- | Intentionally Blank | |
| 8816 | 8816 | Concrete Pedestrian Rail | LF | -- | -- | Intentionally Blank | |
| 8817 | 8817 | Timber Pedestrian Rail | LF | -- | -- | Intentionally Blank | |
| 8818 | 8818 | Other Pedestrian Rail | LF | -- | -- | Intentionally Blank | |
| 8910 | 8910 | Safety Access Ladders | EA | -- | -- | Intentionally Blank | |
| 8911 | 8911 | Safety Railing & Catwalks | LF | -- | -- | Intentionally Blank | |
| -- | 8909 | Zinc Primer | SF | -- | -- | Intentionally Blank | |

**Appendix 4-B-2 Washington State Ferries - Bridge Element Translation Table**

| WSDOT Bridge Management System Elements (BMSE) | | | | National Bridge Elements (NBE) and Bridge Management Elements (BME) | | | |
|---|---|---|---|---|---|---|---|
| 2025 BMSE # | 2024 BMSE # | BMS Element Name | BMSE Unit | NBE # | BME # | NBE or BME Name | Translation Notes |
| -- | 8903 | Inorganic Zinc/Urethane Paint System | SF | -- | -- | Intentionally Blank | |
| -- | 8904 | Organic Zinc/Urethane Paint System | SF | -- | -- | Intentionally Blank | |
| -- | 8905 | Coal Tar Epoxy Paint System | SF | -- | -- | Intentionally Blank | |
| -- | 8906 | Epoxy Paint System | SF | -- | -- | Intentionally Blank | |

## Translation Notes for Appendix 4-B-2

1. Concrete Deck BMSE 8217 will be combined with the deck soffit BMSE 8216 and submitted as NBE 12. See 4-B-2 Step Sequencing 1 for details.
2. Bridge joint BMSE 8404 through 8408 will be translated to four condition states and submitted to the appropriate NBE. See Note 4-B-2 Step Sequencing 2 for details.
3. Wearing surface BMSE 8223 through 8224 will be translated to four condition states and submitted to the appropriate NBE. See 4-B-2 Step Sequencing 2 for details.

## 4-B-2 Step Sequencing 1

| Step | Description |
|---|---|
| 1 | Sum total quantities and all quantities in each condition state from WSDOT BMSE 8216 and 8217 into an NBE Temp 12. |
| 2 | If NBE Temp total quantity = NBE Temp CS1 + CS2 + CS3 + CS4, go to Step 7. |
| 3 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS1 to zero limit, then go to Step 2. |
| 4 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS2 to zero limit, then go to Step 2. |
| 5 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS3 to zero limit, then go to Step 2. |
| 6 | If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, set NBE Temp CS4 = NBE Temp total quantity, then go to Step 7. |
| 7 | Move NBE Temp total quantity and all Temp CS1 through CS4 quantities to final NBE 12. |

## 4-B-2 Step Sequencing 2

| Step | Description |
|---|---|
| 1 | Sum the WSDOT element total quantities and into NBE element total quantities. |
| 2 | Sum the WSDOT element CS1 quantities into NBE element CS2 quantities. Note that NBE will have zero quantities in CS1. |
| 3 | Sum the WSDOT element CS2 quantities into NBE element CS3 quantities. |
| 4 | Sum the WSDOT element CS3 quantities into NBE element CS4 quantities. |

# Chapter 5 Load Rating and Scour

## 5-1 General

The National Bridge Inspection Standards (NBIS) requires a load rating be on file for each reportable bridge as well as a scour evaluation for any reportable structure over water. Temporary structures that will be in service for more than 90 days shall be load rated as well as assessed for scour.

The load rating calculations and scour evaluations are a permanent part of the bridge file and are to be updated when the condition of the bridge changes. All load rating calculations shall be signed and dated by a Licensed Professional Engineer. New and updated scour assessments done by WSDOT or Local Programs employees shall be signed and dated. In cases where a consultant performs the assessment, the report shall be signed and dated by a Licensed Professional Engineer.

## 5-2 Bridge Load Rating

Load rating of structures shall be completed per *Bridge Design Manual* (BDM) Chapter 13 and the AASHTO *Manual for Bridge Evaluation* (MBE). See BDM Section 13.4 for summary sheets and information included in the Load Rating Report. See the appendix in the MBE for examples of load rating different types of structures. Newly discovered or transfer of ownership of bridges shall have load ratings completed with data entered into the inventory within 90 days.

### 5-2.1 *General Load Rating and Re-Rating Guidelines*

- The Load rating of new structures shall be completed within 90 days of opening the structure to the traveling public in the anticipated final configuration.
- The ratings of existing bridges shall be re-examined when the “Revise Rating Flag” is turned on. The condition of identified bridge elements shall be reviewed, and the load ratings shall be updated if needed. In cases where the capacity of a member is reduced significantly, such as impact damage to a girder with loss of reinforcing or damage to steel members, ratings shall be updated within 30 days. In other cases, such as increase in dead load, a preliminary assessment can be made based on the increase in dead load, condition of the structure and existing ratings. If in the Load Rating Engineer’s judgment, the ratings will not be affected significantly and will not require a need to post or lower the load restriction on the bridge, ratings should be updated within 12 months, however, the decision and findings shall still be documented in the Load Rating File.

  Load ratings of structures shall be reviewed and updated as necessary. Factors to be reviewed to assess the need for updating the rating should be changes in the design code or changes in the load rating criteria as well as the criteria listed in Section 5-2.2 below or updates to load rating models due to software upgrades.

### 5-2.1.A Load Posting Review Period

Load rating of a structure can be an iterative process due to the assumptions and simplifications made during the calculation phase. WSDOT has developed a load posting review period to address this concern. Bridges that pose a safety concern and require immediate posting will be exempt from this process.

1. Initial load rating completed, and load posting is recommended. This may be a complete stamped and signed load rating package.
2. Load rating is reviewed by the owner. Assumptions and simplifications in the calculations are considered. Load rater and owner discuss possible mitigations:
    a. Refined calculations, including advanced modeling, or assumptions.
    b. Material testing, field measurements, nondestructive testing, or other techniques to verify material properties or conditions followed by refined calculations.
    c. Third party QC/QA of the load rating or new load rating completed.
    d. No refinements or investigation recommended.
3. If the bridge poses a safety risk while mitigations are explored or if the process will likely take more than 60 days, the bridge shall be posted within 30 days. Each structure will be tracked throughout this process with updates provided to FHWA monthly.
4. Updated or new load rating is reviewed by the owner.
5. If bridge requires posting, FHWA is notified and 30-day timeline to have signage in place begins.
    a. If repair or strengthening is required, the bridge shall be posted until the work is complete and the load rating is updated.

## 5-2.2 *Bridge Load Rating Revision Criteria*

WSBIS Item 2688, Revise Rating should be coded as “Y” when one or more of the following items apply:

1. The Superstructure, crossbeam, or floor beam elements’ condition changes from either Condition State 1, 2 or 3 to Condition State 4, or Superstructure or Substructure Overall Condition Code is reduced to 4 or less.
2. If the approach condition to the structure causes severe impact to the bridge, call for a high priority repair to fix the approaches so the transition onto the structure is smooth.
3. If the deck has potholes on the surface or at the joints, call for a high priority repair to patch the potholes in the deck at the joints.
4. The thickness of the overlay has increased.
5. The railing is replaced with a heavier traffic barrier.
6. New utilities, such as a water main or sewer line, have been installed on the structure. For State owned structures, verify with the Load Rating engineer whether to check the “Revise Rating” flag based on this change. Utility plans/designs are typically reviewed within the Risk Reduction unit prior to installation and impact to the load rating would have been addressed.

7. The number of striped lanes has increased on 2-line superstructure members such as trusses or 2-line girder bridge, and box girder bridges.
8. Damaged or deficient structural elements have been repaired/replaced, such as replacement of timber caps or girders or replacement or repair of damaged girders due to high load hits or other deterioration.

When a deficiency is observed in the field such as rot pockets in timber or section loss in a steel member, the inspector should provide the following items to assist in providing accurate rating factors:

1. The description "shell thickness" shall state whether the thickness is all around the member or on one side and whether it is full depth and location. For timber girders and piles, provide the dimensions of the cross section of the element.
2. Section loss in steel members shall include, if possible, the remaining section thickness, location of the section loss and required dimensions.

Provide a sketch of the deficient member and show deterioration as stated above and provide the dimensions of the deteriorated area. It is of great importance to provide as accurate information as possible instead of estimates. Posting or restricting a bridge is greatly dependent on this information. When trying to figure what information should be provided, inspectors should ask the question, can an engineer calculate accurate capacity of the element/member in question?

The load rating group shall write a comment under "Note 11" addressing the "Revise Rating Flag". The comments should state whether the ratings were updated based on the Inspector's findings or that no need for updating the rating with the reasoning.

## 5-2.3 *Bridges With Unknown Structural Components*

For concrete and masonry bridges with no design plans, and when the necessary reinforcing details are unknown and cannot be measured, load capacity ratings may be determined based on field inspection by a qualified bridge inspector followed by evaluation by a qualified engineer. Such a bridge does not need to be posted for load restrictions if it has been carrying normal traffic for an appreciable period of time and shows no sign of distress; reference the AASHTO *Manual for Bridge Evaluation* (MBE) second edition, Sections 6.1.4 and 6A.8.1. General rating guidelines for these structures are:

- Inventory rating shall be equal to the design truck at the time the bridge was constructed. Operating rating shall be equal to the inventory rating multiplied by 1.667.
- Legal trucks rating factors shall be equal to 1 when the Superstructure, Substructure, or culvert NBI code is equal or greater than 5. Restriction of permit loads shall be assessed.
- Posting or restricting of a bridge shall be assessed when NBI code of the superstructure, substructure or culvert is 4 or less or when there are signs of structural distress.

Full documentation for an administrative rating shall be placed in the bridge load rating file. Administrative ratings imply ratings based on field evaluation and documented engineering judgment.

The table below shows typical design loads and the era they were utilized. The information in the table is based on State bridge inventory and it is dependent on the class of highway.

| | Design Load in Tons | Design Era |
|---|---|---|
| H-10 | 10 | Early 1900- mid 20's |
| H-15 | 15 | Mid 1910's-Mid 1960's |
| H-20 | 20 | Mid 1910's-1920's |
| HS-15 | 27 | Mid 1940's-Late 60's |
| HS-20 | 36 | Mid-1940's- Early 2000's |

## 5-2.4 *Data Management*

The WSBIS database shall be updated within 30 days from the completion and approval of a load rating of a structure.

## 5-2.5 *Posting Requirements*

Posting of a structure shall occur when the Operating rating factor for any of the legal loads is less than 1.00 based on the Load Factor or Allowable Stress Methods or the rating factor for any of the legal loads is less than 1.00 based on the Load and Resistance Factor Method. Legal loads in the State consist of the AASHTO legal trucks: Type 3 (Single Unit), Type 3S2 (Truck- Semi Trailer) and Type 3-3 (Truck Trailer), and the Specialized Hauling Vehicles (SU4, SU5, SU6 and SU7) and a State defined legal load, WA-105. Emergency Vehicles EV2 and EV3 are also considered legal loads on the Interstate and within one road mile from the Interstate per FHWA Memo dated November 3, 2016.

Agencies generally post a bridge between the Inventory Rating and the Operating Rating using the Load Factor Method and Allowable Stress Methods. The minimum permissible posting value is three tons at inventory or operating levels. Bridges not capable of carrying a minimum gross live load of three tons shall be closed. Follow the MBE for calculating the posting limits.

In general, posting of a structure, when warranted, shall occur as soon as possible but not to exceed 30 days. In instances where the load carrying capacity of a bridge is significantly reduced, such as by impact to the structure, posting or closing of the bridge shall occur as soon as it is determined it is not safe to carry legal vehicular loads.

The procedures for notification of postings for reportable structures to FHWA is as follows:

1. When it is determined that a bridge requires posting, notification as indicated below is required within 5 business days.
    a. WSDOT Bridge Load Rating Engineer shall notify the WSDOT Bridge Preservation Engineer.
    b. Local Agencies shall notify the WSDOT Local Programs Bridge Engineer.
2. The WSDOT Bridge Preservation Engineer or WSDOT Local Programs Bridge Engineer will notify the FHWA Division Bridge Engineer within 48 hours of notification as described above.
3. Bridges subject to this notification process will be tracked in a database maintained by WSDOT Bridge Preservation Office for state-owned structures and WSDOT Local Programs for local agency-owned structures.
4. An update will be provided to FHWA Division Bridge Engineer every two weeks.

For State structures, a posting memo from the Statewide Program Manager would be addressed to the Region Administrator; the Bridge and Structures Engineer, FHWA Bridge Engineer, Region Maintenance and Operation Engineer, Region Traffic Engineer, State Traffic Engineer, and Commercial Vehicle Services. The posting memos would state that the Restricted List on Commercial Vehicles website will be updated within thirty days from the date the posting memo is sent. It would also request that the region email the Risk Reduction Engineer when posting signs have been placed and include photos of the posting. At the thirty-day point, if the region doesn't respond to the memo, the Risk Reduction Engineer will contact the region and request a status update and follow up after fifteen days thereafter.

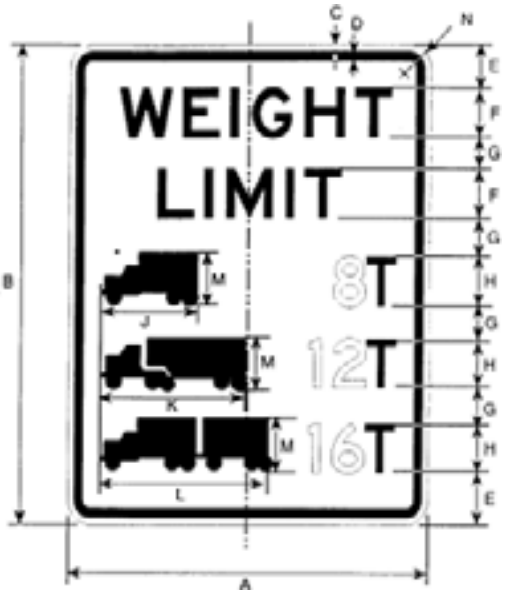
After sixty days, if the posting signs haven't been installed, the issue would be elevated to upper management. To track the postings, a spreadsheet shall be developed which shows the Bridge Number, Structure ID, date Load rating was completed, date memo sent to region, and date the posting was implemented, and it shall be maintained by the Risk Reduction group.

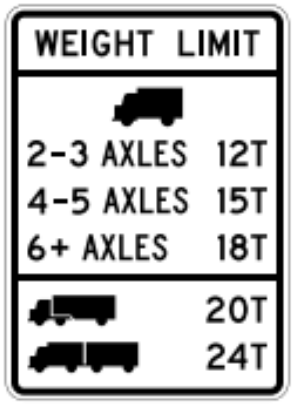
When possible, additional tests such as concrete strength or steel yield strength shall be performed to validate the assumption in the load rating analysis, hence mitigate the need for posting or restriction of the bridge. Strengthening or repair of an element should also be considered to eliminate the need for posting or restriction.

Load Posting Signs for structures where needed, shall follow the current *Manual on Uniform Traffic Control Devices* (MUTCD) and WSDOT *Sign Fabrication Manual* M 55-05. See Exhibit 5-1 and Exhibit 5-2 for additional signage information.

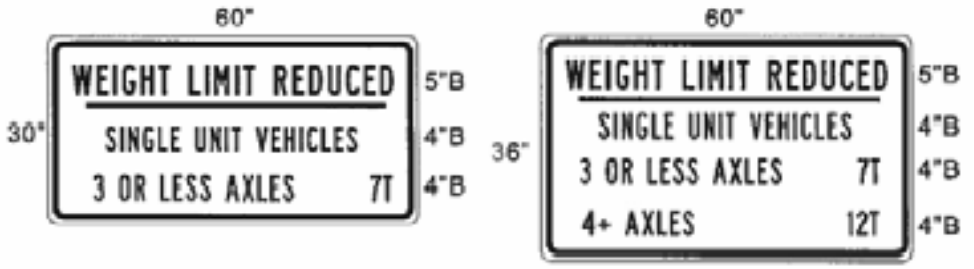
All bridges requiring load posting shall have posting signs at the bridge and additional advance posting signs in advance of the nearest intersecting roads, ramps or a wide point in the road where a driver can detour or turn around.

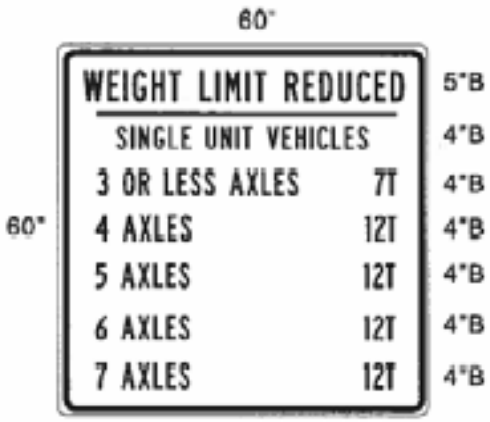
## Exhibit 5-1 AASHTO Legal Trucks Posting and SUV's




R12-6



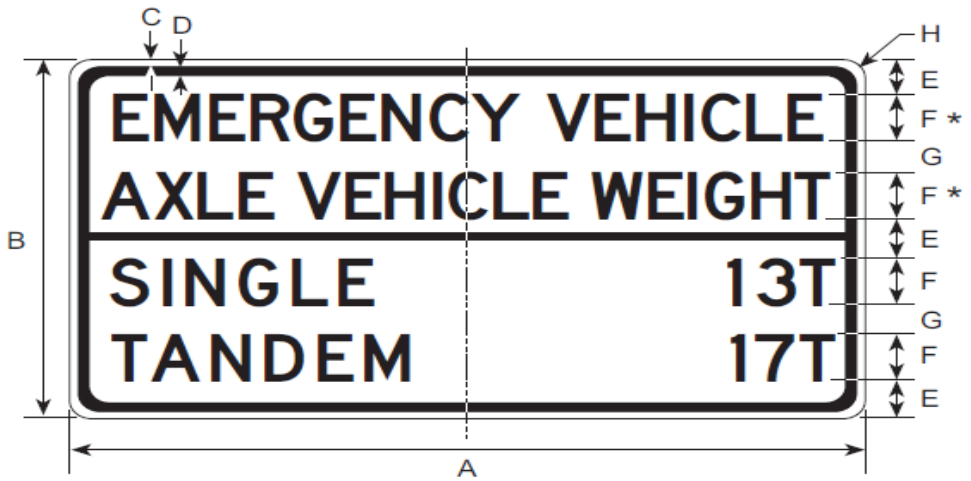

7/8" Border, 5/8" Margin, Corner Radius 2-1/4"

COLORS

LEGEND & BORDER - BLACK (NON-REFL)
BACKGROUND - WHITE (REFL)

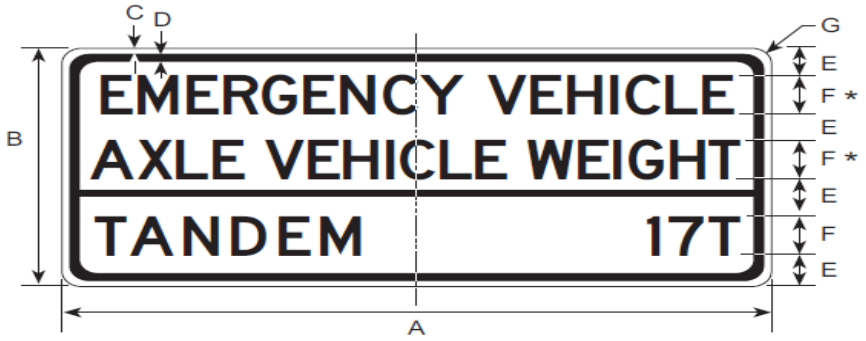
## Exhibit 5-2 Emergency Vehicles Posting

**R12-701**
11/18




* Reduce Spacing 40%

**R12-702**
11/18




* Reduce Spacing 40%

## 5-2.6 *Overload Permits*

Overweight loads traveling over state or local agency roads are required to obtain permits/approval from the state, county, or city maintaining those roadways. No permit loads shall be allowed over posted bridges. The first step in evaluating a permit is to determine if the configuration meets RCW 46.44 for maximum gross weight, load per axle, or axle group (E-Snoopi) is a tool on WSDOT Commercial Vehicle website is used to calculate axle weight per RCW). The second step is to evaluate the structures on the traveled route. This can be accomplished in two methods.

The first method, which is more precise for a specific structure, is to model the permit load moving on the bridge and calculating its load rating factor. A single lane distribution factor can be used in the model, which means that no other trucks are permitted in the adjacent lanes. A rating factor equal to or above 1 means the permit truck can safely travel over the particular structure. Permit loads that have unusual configuration or have more than 4 tires per axle shall be evaluated using this method.

The second method is more general and the engineer shall be extremely cautious when applying it to ensure that the permit load is enveloped by one of the typical rated trucks. The method calculates the maximum weight per axle allowed over a bridge and is dependent on the load rating factors for the particular structure, as follows:

- **Truck Type SA**

  **Definition:** Construction Equipment Tires (a.k.a., Super Single Axle) (RCW 46.44.091(3))

  **Range:** Up to 45,000 lbs. per axle.

  **Criteria:** Using the Load Rating Factor for the Overload 1 Truck (a.k.a., OL1), which has a dual axle weighing 43,000 lbs., the equation is 45,000 lbs.* Rating Factor* *43/45 rounded to the nearest 500 lbs.

- **Collection Truck (RCW 46.44.041) Restriction List Truck Type S/A**

  **Definition:** Two-axle trucks where the rear drive axle is the item in question on non-interstate routes only.

  **Range:** Up to 26,000 lbs. on rear axle.

  **Criteria:** Using the Load Rating Factor for the AASHTO1 Truck (a.k.a., Type 3), which has a dual axle weighing 34,000 lbs., the equation is **26,000 lbs.*** **Rating Factor* 26/34** rounded to the nearest 500 lbs.

- **Truck Type T/D**

  **Definition:** Three-axle trucks where the rear tandem drive axles are the item in question on non-interstate routes only.

  **Range:** Up to 42,000 lbs. on rear dual.

  **Criteria:** Using the Load Rating Factor for the AASHTO1 Truck (a.k.a., Type 3), which has a dual axle weighing 34,000 lbs., the equation is **42,000 lbs.*** **Rating Factor* 34/42** rounded to the nearest 500 lbs.

- **Tow Truck (RCW 46.44.015) Restriction List**

  **Truck Type:** Tow truck with tandem (dual) drive axles.

  **Definition:** Three axle tow truck with tandem drive axles towing a variety of vehicles.

  **Range:** Up to 48,000 lbs. on drive dual axles.

  **Criteria:** Using the Load Rating Factor for the AASHTO2 Truck (a.k.a., Type 3S2), which has dual weighing 31,000 lbs., the equation is **48,000 lbs.*** **Rating Factor* 31/48** rounded to the nearest 500 lbs.

- **Truck Type CL8**

  **Definition:** Class 8 Short Hitch five-axle combination (three-axle tractor with a two-axle trailer).

  **Range:** Up to 21,500 lbs. per axle in dual group and 20,000 to 22,000 for a single axle.

  **Criteria:** Use the Load Rating Factor for the OL1 Truck based on single lane distribution factor. The equation is **22,000 lbs.* Rating Factor** rounded to the nearest 500 lbs.

- **Truck Type BL**

  **Definition:** Big load six plus axle combination and three to four axle single units.

  **Range:** Up to 22,000 lbs. per axle in dual and tridem groups and up to 22,000 lbs. for a single axle.

  **Criteria:** Use the Load Rating Factor for the OL2 Truck based on a single lane distribution factor. The equation is **22,000 lbs.* Rating Factor*** Modifying Factor (MF)* rounded to the nearest 500 lbs. In some instances engineering judgment may be used in establishing restrictions on a structure.

  *Modifying Factor (MF) is 1.15 if Superstructure or Substructure Condition is 6 or above; 1.10 for Condition of 5 and 1 for 4 or less. The MF is applicable to concrete and steel members. For timber members the MF is 1.

For permits traveling over State routes, WSDOT can request the weighing of a permit load at any time, however, here are typical triggers:

- Analysis shows that the load is close to overstressing one or more bridges.
- Multiple load requests: 10 or more loads in the 200-300 thousand pound range.
- 5 or more loads over 300 thousand pounds.
- Any load over 400,000 pounds.

**Commentary:** *The SA load is assumed to act as a tandem axle due to the size of the tire. The occurrence of these permitted loads are occasional, hence, the OL1 was used to envelope these vehicles due to the lower Live Load Factor instead of the Type 3S2 which was previously used.*

*The MF multiplier applied to the BL is used since the OL2 is an envelope truck and is not permitted in the State. The Engineer shall use the MF with extreme caution and it shall not be applied to every permit load.*

## 5-3 Scour Appraisal

All reportable structures spanning waterways or reliefs are required by the NBIS/SNBI to have a scour appraisal to identify the susceptibility to erosion of streambed material and the degree to which it affects foundation stability. The documentation should include pertinent information that supports the conclusions of the appraisal such as: as-built foundation details, current condition of the foundation, a stream bed cross section profile, stream flow rates, scour calculations, etc. A scour appraisal starts with a qualitative assessment using a rational approach following engineering judgement. The qualitative assessment is a screening tool to determine the susceptibility of a structure to scour. Based on the assessment, initial scour (1680/113/SNBI BAP03), waterway adequacy (1662/72), and channel protection (1677/61) codes are determined. If a scour code (1680/113/SNBI BAP03) cannot be determined using the qualitative approach, a quantitative analysis shall be conducted and the NBI 1680 (113) scour code set to '3' and SNBI BAP03 set to 'D', Scour Critical, in the interim.

Qualitative assessments and quantitative analyses are to be performed by the BPO Scour Engineer, a hydraulics engineer, a professional engineer with knowledge of hydraulics engineering, or any subject matter expert (SME) deemed appropriate by the bridge owner. Reports will be dated and signed by the person conducting the evaluation. Reports written by engineers outside of the bridge owner agency shall also be stamped by the engineer conducting the evaluation. Bridge owners take responsibility for the content of the reports done by their designated SME.

Quantitative analyses shall include calculated scour depths based on the effects of the flood event that causes the worst predicted scour (design flood). The scour elevations are compared to the structure foundations and a determination of stability is made from which the scour code is set. When a quantitative analysis determines a bridge is scour critical, additional analysis is required to help establish monitoring triggers. The additional analysis shall determine, as a minimum (items 1, 2, and 3):

1. The flow at which the structure becomes scour critical (based on structural analysis or to the bottom of the spread footing or to within 10' of the average pile tip elevation),
2. The estimated water surface elevation (WSEL) at the structure that coincides with the flow which causes the bridge to become scour critical (see 1. above),
3. The flow and WSEL at the structure where scour depths start to become a concern (close to scour critical elevations). This level is to be set by the bridge owner or Structural Engineer based on structural stability. But, in the lack of structural analysis, can be taken as scour to the top of spread footings or to within 15 feet of the shallowest pile tip.
4. Quantitative analyses may also include recommendations for the design of countermeasures that will protect the structure from the scour potential and to prevent channel migration to protect the piers, abutments, and approach roadways.

***NOTE (Discussion on scour critical and scour concern depths):*** The scour critical depth is the precise scour elevation that triggers the decision of whether the bridge is or is not scour critical. The scour analysis may show that the design flood scour elevation is well below the scour critical depth. Further analysis shall determine what event takes the scour depth to the brink of becoming scour critical. Scour concern depth is the scour elevation that the bridge owner sets. Above this elevation, scour is of no concern. Below this level, the bridge owner starts to raise concern and begins periodic monitoring of the structure to ensure safety to the travelling public.

As the bridge foundation condition changes and/or the stream bed characteristics change, the scour criticality may have to be reanalyzed. Scour appraisals shall be reviewed as necessary. Indicators that may warrant a review of the scour appraisal include but are not limited to: Significant land development or change in land use in the upstream watershed; Removal of a dam from the channel within the influence of the bridge; Gravel mining or other significant in-stream work within the influence of the bridge; Unexpected streambed movement (lateral or vertical); Removal or loss of previously installed countermeasures; Observed significantly increasing bridge scour. Bridge inspectors must be aware of conditions that may influence scour and/or stream stability at the bridge and report their findings to the scour engineer or other SME.

Upon determining that a bridge is scour critical, the agency needs to develop a written plan of action (POA) to manage the structure (see Section 5-3.2 Action Plans for Scour Critical Bridges). For additional information, see FHWA HEC 18 Evaluating Scour at Bridges.

Scour evaluations of new bridges completed during the design phase that are provided to the Scour Engineer shall be used to complete an appraisal with appropriate codes entered into the data inventory within 90 days of the structure being open to traffic. Newly discovered or transfer of ownership bridges shall have scour appraisal completed with appropriate codes entered into the data inventory within 12 months.

## 5-3.1 *Determining Susceptibility to Scour*

Each bridge's susceptibility to scour damage must be determined to be either:

1. Stable for calculated scour conditions (NBI 1680/113 scour code 8, 7, 5, 4/SNBI BAP03 code A. Or code B in the case of an engineered repaired scour critical bridge).
2. Scour critical (NBI 1680/113 scour code 3, 2, 1, 0/SNBI BAP03 code C if temporary countermeasures are in place or D if no countermeasures are placed).
3. Scour risk cannot be determined due to unknown foundations (scour code U for NBI and SNBI)
4. Structures that have not had an appraisal made (NBI 1680/113 scour 6/SNBI BAP03 code 0) must have an appraisal complete before the next submittal to NBI.
5. Structures over tidal water that have not been evaluated for scour but considered low risk are coded T in NBI (NBI 1680/113 scour code 5 (SNBI BAP03 code A) for WSDOT owned bridges). If the tidal structure is considered high risk, the scour code shall be NBI 1680/113 code 6 (SNBI BAP03 code 0) and an appraisal shall be completed before the next submittal to NBI. If the tidal structure has unknown foundations, it shall be coded U. Scour NBI 1680/113 code 'T' is not used by WSDOT except for ferry terminal structures as determined by Washington State Ferries Delegated Program Manager.
6. Structures over waterways or reliefs with foundations on dry land well above floodwaters and channel migration to the piers is not likely in the life of the bridge (NBI 1680/113 scour code 9/SNBI BAP03 code Z).

See FHWA coding guide revision at www.fhwa.dot.gov/engineering/hydraulics/policymemo/revguide.cfm.

A qualitative scour appraisal, Level 1 Screening and Assessment may be applicable considering foundations, behavior of the stream and thalweg, history of scour, and countermeasures (Appendix 5-A, WSDOT Form 722-011).

The results of a quantitative scour appraisal are to be recorded in the Scour Summary Sheet (See Appendix 5-B, WSDOT Form 722-010).

The completed scour appraisal is to be placed in the bridge scour file. Upon completion of all scour appraisals, there should not be any bridges with an NBI 1680/113 code 6 (SNBI BAP03 code 0). The completed scour appraisals, information required to do the appraisals, and the best mitigation option for the bridge are to be incorporated into the bridge scour file located at W:\Data\Bridge\RiskReduction\Scour\SCOUR FILES for WSDOT.

**Table 5-1 Default Maximum Soundings Frequency**

| NBI/SNBI Code | Soundings Max. Frequency (months) |
|---|---|
| 2/D | 12 |
| 3/C or D | 24 |
| U/U | 24 |
| 4/ no SNBI equivalent | 24 |
| 5/A | 72 |
| 7/B | 72 |
| 8/A | 72 |

The soundings frequency for state bridges are determined by the Scour Engineer as needed based on field and/or historic observations as well as scour appraisals. In the absence of further guidance by the Scour Engineer, Table 5-1 (Default Maximum Soundings Frequency) shall govern. The list of bridges that require soundings for State bridges is created by the Scour Engineer and provided to the Information Group within BPO no later than December 31st of each year to be added to BridgeWorks.

## 5-3.2 *Action Plans for Scour Critical Bridges*

For each bridge that has been determined to be scour critical or has unknown foundations (1680/113 code 3 or less or U/SNBI BAP03 code C, D, or U), SNBI BAP04 will be coded Y or N depending on whether the Scour POA is implemented or not. A Scour Plan of Action (POA) shall be developed to identify the appropriate measures necessary to monitor and/or to make the bridge less vulnerable to damage or failure due to scour. The POA is to provide specific direction as to essential actions required at the site for region field staff and inspectors to observe and take the appropriate action without further communication. It should have details of whom to contact after a bridge has been closed due to scour. The action to be taken must be documented in the POA in sufficient detail that is easy to follow and thorough enough that field personnel can make appropriate decisions without higher approval.

Region field staff inspecting the condition of structures and elements susceptible to scour must have the authority to close a bridge and must know how to conduct an emergency closure. They must have the necessary equipment with them to take this action at the time of the determination without leaving the bridge or calling for assistance.

The two primary components of the POA are 1) instructions regarding the frequency of inspections to be made at the bridge, and 2) a schedule for the timely design and construction of scour countermeasures (see Appendices 5-C through 5-F for WSDOT and FHWA POA templates). The POA should have defined triggering events that initiate a flood scour inspection and actions to be performed. Triggering events are defined during the scour evaluation and should have the ability to be monitored 24/7. The POA's for WSDOT are

updated by the Scour Engineer as needed when condition changes warrant it. Current POAs are available on BEISt with changes made in real time.

The POA should include:

- Physical site identification (bridge, route, stream, etc.); features that are vulnerable (approach roadway, pier/s, pier orientation/beginning of bridge).
- Hydrologic and Hydraulic Characteristics (water surface elevation as appropriate).
- Party responsible for decision on closure/reopen.
- Responsible party contact information.
- Trigger mechanisms for closure and opening such as on-site water surface elevation marked on piers or abutments so that field crews can observe them from riverbank.
- Communication to public (detour signage, law enforcement, press, etc.)
- Records of mitigation in place (quarry spall, weirs, mats, barbs, etc.) with photo and original dimensions for future examination and reference. This information should be made available to inspectors and region field staff to use during inspections and flood events.

**Monitoring** – It is important that all scour critical bridges be monitored during and after triggering flood events. The POA should include specific instructions to bridge inspectors or maintenance workers on what to look for, at what locations, and methods of inspection to use. Guidance should also be included as to when a bridge should be closed to traffic. Agencies should also develop and inform appropriate personnel of bridge closure procedures. The intensity of the monitoring effort is related to the risk of the scour hazard, as determined from the scour evaluation. Some of the items to consider when developing the monitoring plan include:

- Amount of existing rotational movement or settlement of substructure units
- Degree of streambed degradation, aggradation, or lateral movement
- Recommended procedures and equipment for taking measurements of streambed elevations (rods, probes, weights, portable sonic equipment, etc.)
- Instructions for inspecting existing countermeasures such as riprap, dikes, barbs, mats, etc.
- Guidance on maximum permissible scour depths, flood flows, water surface elevations, etc. beyond which the bridge should be closed to traffic.
- Instructions for checking the operation of fixed scour monitoring devices.
- Reporting procedures for conditions that warrant bridge closure. Establish the chain of command with authority to close bridges.
- Forms and procedures for documenting inspection results and instructions regarding follow-up actions when necessary.

**Temporary Countermeasures** – Temporary countermeasures provide a degree of protection for scour critical bridges. They may prevent damage for most flows, but are sacrificial, low-cost treatments that help ensure the safety of a bridge during normal flood events. Use of such measures may postpone the need to close a bridge during high flows. Temporary countermeasures, such as riprap, should not be viewed as an alternative to monitoring, but rather as a supplement.

**Permanent Countermeasures** – Permanent countermeasures are engineered to make a bridge safe from damage due to scour. A variety of methods exist including channel improvements, structural strengthening or underpinning, drop structures, relief bridges or constructing additional spans. These types of fixes would eliminate the bridge from being "scour critical," but are more costly. Agencies prioritize permanent countermeasures to address the most critical needs as funds permit.

## 5-3.3 *Recording Bridge Scour Information*

The completed bridge scour appraisal shall include the resulting WSBIS 1680 scour code (SNBI BAP03 code), the information required to do the appraisal, and the written action plan to mitigate scour risk if appropriate. The appraisal is to be incorporated into the permanent bridge scour file for the bridge. Any changes to bridge inventory data should be accomplished within 90 days after the appraisal or field review are complete. The scour monitoring information or schedule should be communicated to all affected parties.

Fields that relate to bridge hydraulics and/or scour are:

- Waterway Adequacy Appraisal- WSBIS 1662 (NBI Item 71) and SNBI BAP02 (Overtopping Likelihood)
- Substructure Condition - WSBIS 1676 (NBI Item 60)
- Channel Protection - WSBIS 1677 (NBI Item 61), SNBI BC 09 (Channel Condition) and BC 10 (Channel Protection Condition)
- Scour – WSBIS 1680 (NBI Item 113) and SNBI BAP03 (Scour Vulnerability Appraisal)
- Scour Condition – BMS 361 and BC11 (Scour Condition Rating)

### 5-3.3.A Scour Monitoring Report (SNBI BIE 01)

Whenever a scour POA triggering event occurs, a Scour Monitoring Report (BIE 01 = 9) shall be entered into WSBIS. These inspections may have multiple site visits for the same event. In such cases, the first day the inspection is conducted is the start date. The last day the bridge is inspected for the event is the end date of the inspection. See Chapter 2 and Chapter 3 for details regarding Scour Monitoring report types.

### 5-3.3.B Transitioning from NBI to SNBI

When transitioning from NBI to SNBI, use Table 5-2 (Scour Critical to Scour Vulnerability Translation) to set initial codes. All codes should be reviewed for accuracy.

**Table 5-2 NBI Scour Critical to SNBI Scour Vulnerability Translation**

| Scour Critical Code NBI 1680/113 | Scour Vulnerability Appraisal SNBI BAP03 | Scour Condition SNBI BC11 (suggested) | Comments |
|---|---|---|---|
| 9 | Z | 8 | Code Z is a WSDOT created code to identify bridges over waterways or reliefs that have foundations away from the channel, well above floodwaters, and outside the influence of channel migration. Bridge is not likely to ever have its substructure exposed to channel flow |
| 8 | A | 7 or better | |
| 7 | B | 5 or better | Bridge has engineered repairs to protect the foundations from destabilizing scour. |
| 6 | 0 | TBD | Bridge needs a scour appraisal completed |
| 5 | A | 5 or better | |
| 4 | A | 5 or less | Not scour critical but has active pier/abutment scour |
| 3 | D | 3 or better | Scour Critical. Code D until a review determines countermeasures in place warrants a code of C |
| 2 | D | 2 or 3 | BC11 could be 3 if the bridge has not been restricted or posted due to scour. |
| 1 | D | 1 | Imminent failure of the foundations due to scour – Bridge is closed |
| 0 | D | 0 | Bridge has failed due to scour and is closed. |
| U | U | 3 or better | Unknown foundations, treat as if it is scour critical |
| T | See 5-3.1.5 | 5 or better | No equivalent in SNBI |
| N | N | N | WSDOT created Code N to eliminate NULL fields and indicates the bridge is not over a waterway or relief. |

## 5-3.4 *Scour Analysis*

The procedure for analyzing stream stability and scour shall be per HEC Publications (see Exhibit 5-3) which could involve the following three levels of analysis:

- **Level 1** – Application of simple geomorphic concepts and other qualitative analyses.
- **Level 2** – Application of basic hydrologic, hydraulic and sediment transport engineering concepts.
- **Level 3** – Application of mathematical or physical modeling studies.

**Data Needs for Level 1 Qualitative and Other Geomorphic Analyses** – The data required for a qualitative assessment include maps, aerial photographs, notes, and photographs from field inspections, historic channel profile data, information on human activities, changes in stream hydrology and hydraulics over time, stream gage data, bridge foundation plans, and geotechnical studies.

A flowchart of the typical steps in qualitative geomorphic analyses is provided in Exhibit 5-4.

The six steps are generally applicable to most stream stability problems. As shown in the figure, the qualitative evaluation leads to a conclusion regarding the need for more detailed (Level 2) analysis or a decision to complete a screening or evaluation based on the Level 1 analysis. A Level 1 qualitative analysis is a prerequisite for a Level 2 engineering analysis for bridge design or rehabilitation.

## Exhibit 5-3 Scour and Stream Stability Analysis

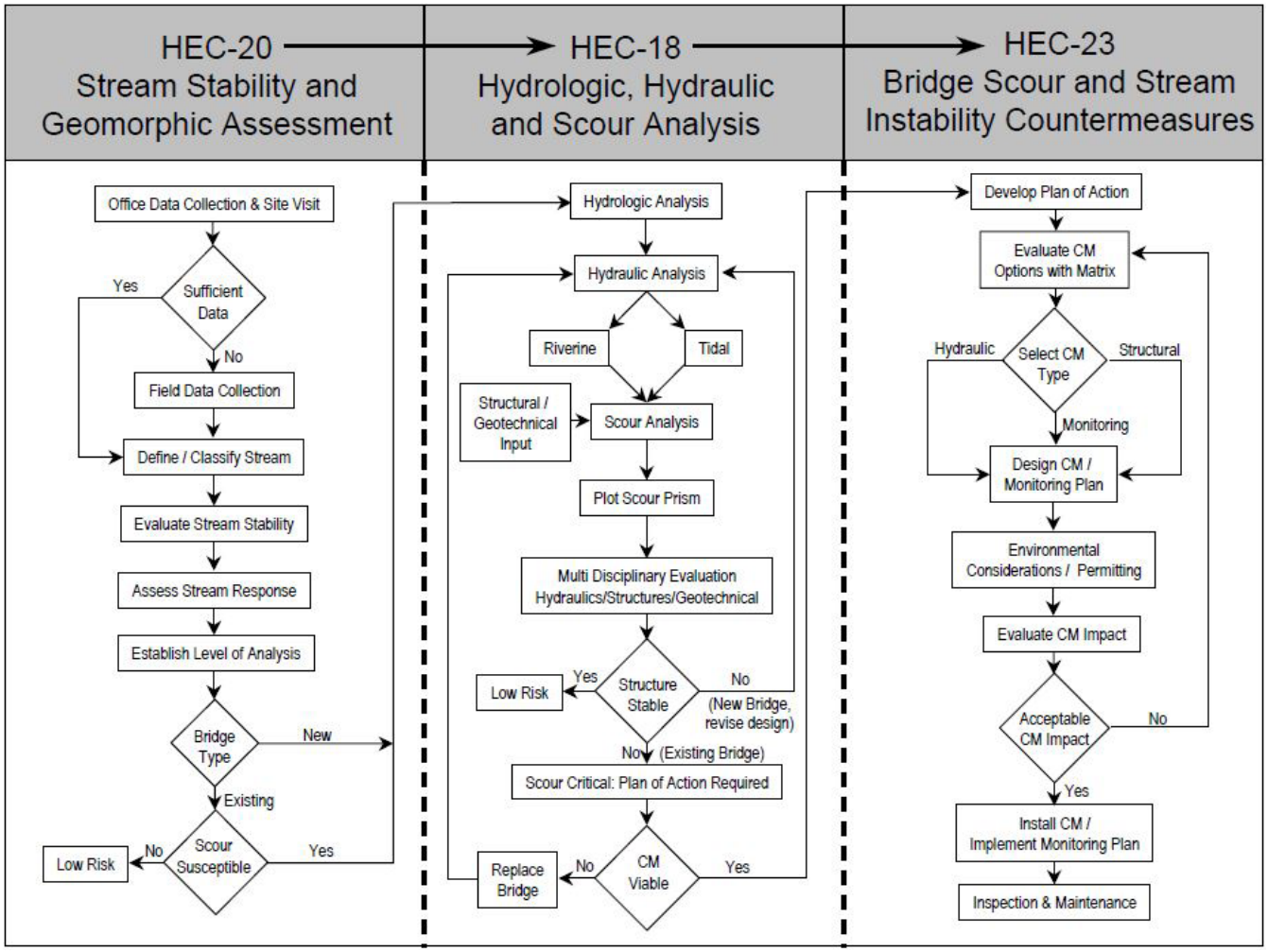
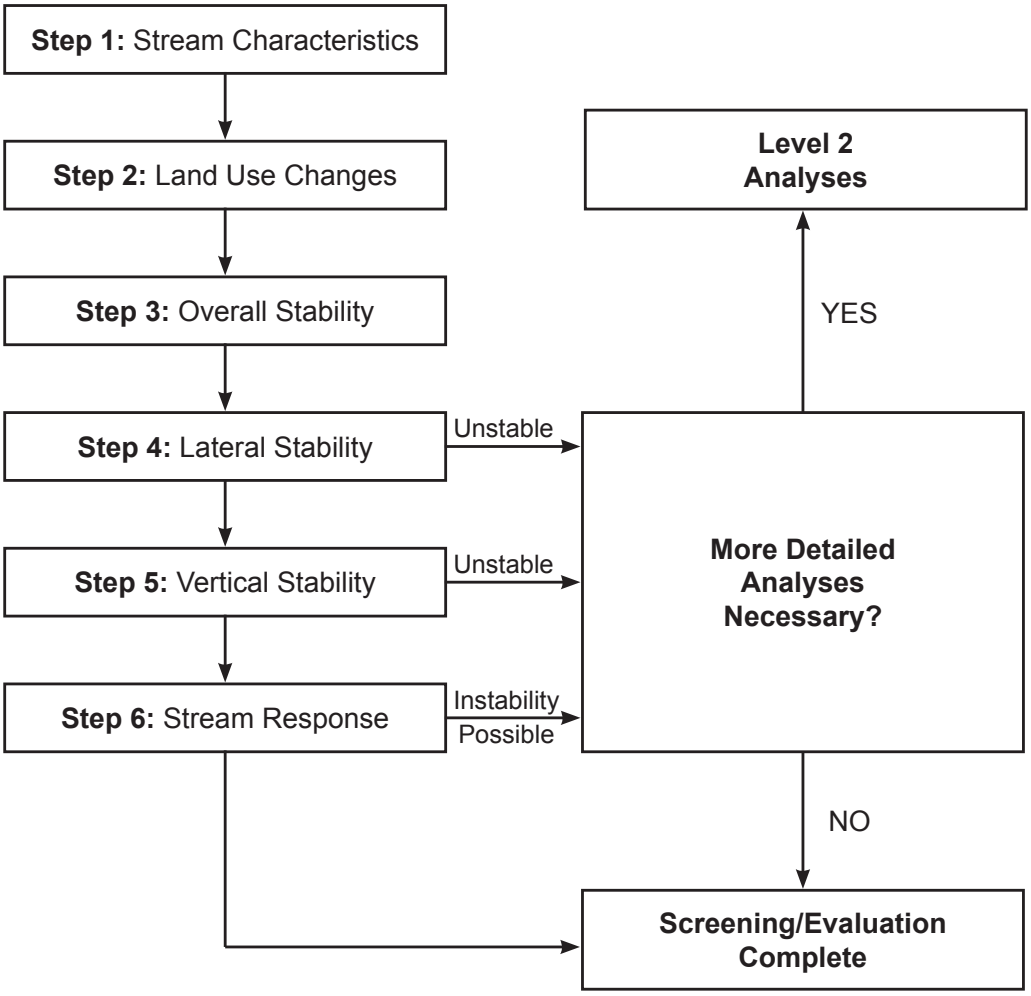


**Exhibit 5-4 Level 1 Analysis**

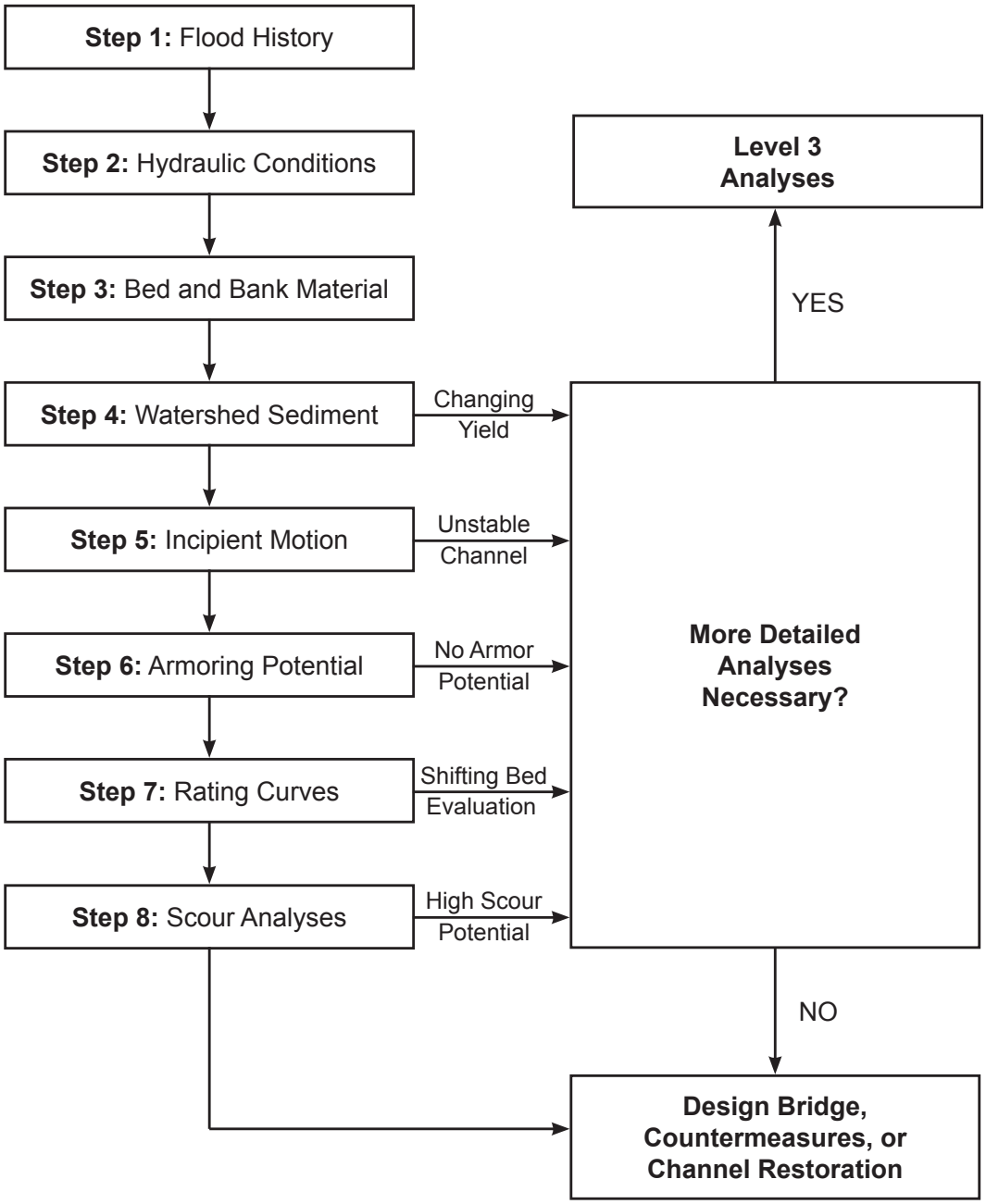



**Data Needs for Level 2 Basic Engineering Analyses** – Data requirements for basic hydrologic, hydraulic and sediment transport engineering analyses are dependent on the types of analyses that must be completed. Hydrologic data needs include dominant discharge (or bank full flow), flow duration curves, and flow frequency curves. Hydraulic data needs to include cross sections, channel and bank roughness estimates, channel alignment, and other data for computing channel hydraulics, up to and including water surface profile calculations. Analysis of basic sediment transport conditions requires information on land use, soils, geologic conditions, watershed and channel conditions, and available measured sediment transport rates (e.g., from USGS gauging stations).

More detailed quantitative analyses require data on the properties of bed and bank materials and field data on bedload and suspended-load transport rates. Properties of bed and bank materials that are important to a study of sediment transport include size, shape, fall velocity, cohesion, density, and angle of repose.

Level 3 analyses are performed by a professional engineer with hydraulic expertise or bridge owner designated subject matter expert (SME) (see Exhibit 5-5).

Exhibit 5-5 Level 2 Analysis




## 5-4 Appendices

| | |
|---|---|
| Appendix 5-A | Bridge Scour Appraisal Level 1 (WSDOT Form 722-011) |
| Appendix 5-B | Scour Summary Sheet (WSDOT Form 722-010) |
| Appendix 5-C | WSDOT Plan of Action Template |
| Appendix 5-D | Instructions for Completing WSDOT Plan of Action |
| Appendix 5-E | FHWA Plan of Action Template |
| Appendix 5-F | Instructions for Completing FHWA Plan of Action |

# *Appendix 5-A Bridge Scour Appraisal Level 1 (WSDOT Form 722-011)*

Clear Form

**Washington State Department of Transportation**

## Bridge Scour Appraisal Level 1 - Screening and Assessment

| Date | Evaluated By | Agency |
|---|---|---|
| SID | Bridge # | Bridge Name |
| Superstructure Type | | Substructure Type |
| Foundations (check all that apply): ☐ Piles/drilled shafts ☐ Spread footings ☐ Sills ☐ Other: | | |

**Qualitative Scour Assessment Guidance**

- This form is a basic qualitative assessment tool. Further quantitative scour evaluation may be required to adequately determine scour potential and the appropriate scour coding. Refer to FHWA documents *HEC-18: Evaluating Scour at Bridges* and *HEC-20: Stream Stability at Highway Structures* for more information.
- A qualitative scour appraisal will consider the extent of information known about foundations, behavior of the stream and thalweg, history of scour (if any), and countermeasures (if any).

### Section A: Initial Assessment

| | | | |
|---|---|---|---|
| ☐ Yes | ☐ No | | Does the thalweg meander within the bridge limits or across the flood plain? If yes, the *potential* for a scour critical condition is increased and further evaluation should be considered. |
| ☐ Yes | ☐ No | | Are foundation elevations known? If yes, continue Section A assessment. If no, bridge considered scour critical. Go to Section B and document coding of 1680/BAP03 = U, 'Unknown foundations'. Scour plan of action (POA) required. |
| ☐ Yes | ☐ No | | Are all piers on dry land and above floodwater elevations, without thalweg meander/migration potential? If no, continue Section A assessment. If yes, bridge is not scour critical. Go to Section B and document coding of 1680 = 9, BAP03 = A. |
| ☐ Yes | ☐ No | | Is the waterway a controlled flow irrigation canal, either lined or unlined? If no, continue Section A assessment. If yes, go to Section C (page 3) for further information and assessment. |
| ☐ Yes | ☐ No | ☐ N/A | For piles or drilled shaft foundations in the channel, with or without cap/footing, are the pile/shaft tip elevations 10-ft or less below the thalweg (or above the thalweg)? If yes, bridge may be scour critical. If no, further evaluation may be required to determine appropriate scour code. |
| ☐ Yes | ☐ No | ☐ N/A | For spread footing foundations in the channel, is the bottom of the footing or seal above the thalweg? If yes, bridge may be scour critical. If no, further evaluation may be required to determine appropriate scour code. |

Go to Section B (next page) and consider additional criteria.

## Section B: Scour Code and Notes

**Additional Criteria**

- Additional non-quantifiable parameters should also be considered when determining scour criticality, such as substructure condition, channel condition, condition of riprap or other protection devices, erodible channel bed material versus non-erodible (i.e. rock), and meander bends. Describe using Notes section below.
- Consider the long-term effects of contraction scour, if present. Describe using Notes section below.

**Is further investigation or evaluation warranted?** ☐ Yes ☐ No (If 'Yes', Level 1 Screening & Assessment is not applicable. Code 1680 = 6, BAP03 = 0 until an appraisal is completed.)

**Is bridge scour critical?** ☐ Yes ☐ No (If 'Yes', scour plan-of-action (POA) required)

**NBI item 1680 Scour Code:** _____

**SNBI item BAP03 Scour Code:** _____

*(Note: NBI item 1680 coding applicable until 2026)*

**Attach supporting documents such as plan sheets (as-builts, countermeasures, applicable repairs), channel cross-section with pier and thalweg elevations noted, sounding history, site photos, aerial photos, etc.**

**Notes:**

DOT Form 722-011 Revised 08/2024 Page 2 of 3
**● Previous Versions Obsolete ●**

## Section C: Controlled Flow Irrigation Canal, Lined or Unlined

This section is applicable only to irrigation or other canals with a well-defined waterway cross-section at the bridge. Canal may be lined or unlined and flow is assumed to be controlled and/or regulated in some manner. Piers or abutments may be considered low-risk for scour due to the well-defined waterway and controlled flow conditions. Current scour condition, condition of the channel and channel protection are to be evaluated at each routine bridge inspection.

**Choose and check the box that is most applicable:**

☐ Lined channel. Channel liner is in 'very good' to 'fair' condition (BC10 >= 5) with no evidence of undermining of the liner or significant pier/abutment scour (BC11 >=5). Code 1680 = 8, BAP03 = A and document in Section B.

☐ Lined channel. Channel liner has evidence of damage, instability, or undermining (BC09 or BC10 <=4) and/or inspection report evidence of pier/abutment scour or other flow related defects (BC11 <=4). Further investigation of substructure and/or a quantitative scour evaluation may be required to adequately determine scour potential and the appropriate scour coding. Level 1 Screening & Assessment is not applicable. Code 1680 = 6, BAP03 = 0 until an appraisal is completed.

☐ Unlined channel. Channel and channel protection devices (if applicable) are in 'very good' to 'fair' condition (BC09 and BC10 >= 5). History of groundlines show insignificant or no changes to the channel. No evidence of local pier scour or other flow related defects. Code 1680 = 8, BAP03 = A and document in Section B.

☐ Unlined channel. Channel or channel protection devices have evidence of damage or instability (BC09 or BC10 <=4) -OR- history shows changes to the groundline -OR- inspection report notes local pier scour or other flow related defects (BC11 <=4). Further investigation of substructure and/or a quantitative scour evaluation may be required to adequately determine scour potential and the appropriate scour coding. Level 1 Screening & Assessment is not applicable. Code 1680 = 6, BAP03 = 0 until an appraisal is completed.

DOT Form 722-011 Revised 08/2024 Page 3 of 3
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# *Appendix 5-B Scour Summary Sheet (WSDOT Form 722-010)*

CLEAR FORM

**Washington State Department of Transportation**

## Scour Summary Sheet

| Bridge Number | Structure ID |
|---|---|
| Bridge Name | |
| Waterway | |
| Owner | |

| Analyzed By | Date of Analysis |
|---|---|
| Updated By | Date of Update |

*Place PE Stamp Here (if req'd)*

| | | | |
|---|---|---|---|
| **Q100 (cfs)** | | **Q100 Water Surface Elev. (ft.)** | |
| **Q500 (cfs)** | | **Q500 Water Surface Elev. (ft.)** | |
| **V100 (ft./sec)** | | **V500 (ft./sec)** | |
| **Angle of Attack** | | **Thalweg Elevation (ft.)** | |
| **Superstructure Low Point (pt. obstructs water flow) Elev. (ft.)** | | | |
| **Q When High Water Touches Bottom of Bridge if less than Q500 (cfs)** | | | |

**Scour Appraisal**

| Pier Number | Bottom of Foundation Elev. (ft.) | *Calculated Scour Elev. (ft.) | Monitor (R, UW, F) | Inspection Frequency (Months) |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |

**R = Routine/Interim; UW = Underwater; F = Fathometric**

*Calculated Scour Elevation is the result of a quantitative analysis in accordance with HEC 18, HEC 20, or other FHWA recommended methods. Use Page 3 if additional piers are needed.

DOT Form 722-010 (Revised 08/2024) Page 1

**• Previous Versions Obsolete •**

**Mitigation:** In-Place and Functioning ☐ Yes ☐ No ☐ N/A

| Description of Mitigation: |
|---|
| |

**Comments:**

| |
|---|
| |

**Frequencies:**

| Type of Inspection | Frequency (years) | Year Frequency Established |
|---|---|---|
| Stream Cross-Section (upstream)** | | |
| Underwater | | |
| Fathometric | | |

**See WSBIM Table 5-1 for recommended sounding frequencies

**Recommended Scour Coding:**

| |
|---|
| NBI Item 113 (WSBIS 1680) *(1680 Code applicable until 2026)* |
| SNBI Item B.AP.03 (WSBIS BAP03) |

Scour Plan-of-Action Required (Y/N)
☐ Yes ☐ No

Scour Plan-of-Action Implemented (Y/N/NA)
☐ Yes ☐ No ☐ N/A

DOT Form 722-010 (Revised 08/2024) Page 2

**• Previous Versions Obsolete •**

## Scour Summary Sheet - Additional Piers

| Bridge Number | Structure ID |
|---|---|
| Bridge Name | |

| Scour Appraisal | | | | |
|---|---|---|---|---|
| **Pier Number** | **Bottom of Foundation Elev. (ft.)** | ***Calculated Scour Elev. (ft.)** | **Monitor (R, UW, F)** | **Inspection Frequency (Months)** |
| 11 | | | | |
| 12 | | | | |
| 13 | | | | |
| 14 | | | | |
| 15 | | | | |
| 16 | | | | |
| 17 | | | | |
| 18 | | | | |
| 19 | | | | |
| 20 | | | | |
| 21 | | | | |
| 22 | | | | |
| 23 | | | | |
| 24 | | | | |
| 25 | | | | |
| 26 | | | | |
| 27 | | | | |
| 28 | | | | |
| 29 | | | | |
| 30 | | | | |
| 31 | | | | |
| 32 | | | | |
| **R = Routine/Interim; UW = Underwater; F = Fathometric** | | | | |

*Calculated Scour Elevation is the result of a quantitative analysis in accordance with HEC 18, HEC 20, or other FHWA recommended methods.

DOT Form 722-010 (Revised 08/2024) Page 3

**• Previous Versions Obsolete •**

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# *Appendix 5-C WSDOT Plan of Action Template*

## SCOUR CRITICAL BRIDGE - PLAN OF ACTION

| | | | | |
|---|---|---|---|---|
| Structure ID | Brg No | Bridge Name | | |
| Region | Route | Mile Post | | |
| Owner | | Last Inspection Date | | |
| Waterway | | Brg Length | Main Span | Appr Spans |

Foundations: Date POA Modified:

Subsurface soil information: ☐ Non-Cohesive ☐ Cohesive ☐ Rock Modified By:

Title:

Does the bridge provide service to emergency facilities and/or an evacuation route? ☐ ☐ N/A

### SCOUR VULNERABILITY

NBIS coding :

| | |
|---|---|
| Scour Code NBIS | Item 113 WS 680 |
| Substructure NBIS | Item 60 WS 676 |
| Channel Protection | Item 60 WS 677 |
| Waterway Adequacy | Item 71 WS 662 |

Source of Scour Rating ☐ Observed ☐ Assessment ☐ Calculated

Scour Evaluation Summary:

9 Note:

361 Note:

677 Note:

680 Note:

Scour Critical Elements:

### RECOMMENDED ACTION(S)

| | Recommended | | Implemented | |
|---|---|---|---|---|
| a. Flood Monitoring Program | ☐ Yes | ☐ No | ☐ Yes | ☐ No |
| b. Hydraulic/Structural Countermeasures | ☐ Yes | ☐ No | ☐ Yes | ☐ No |

### MONITORING PROGRAM

☐ Regular Inspection Program ☐ w/ cross sections

Items to Watch:

☐ Underwater Inspection Program

Items to Watch:

☐ Flood Monitoring Program ☐ Visual Inspection

☐ Flood monitoring required during event:

Flood monitoring event defined by (check all that apply):

☐ Discharge ☐ Staqe

☐ Elevation measured from

☐ Flood warning system:

Frequency of flood monitoring:

Post-flood monitoring required: ☐ within

Frequency of post-flood monitoring:

Criteria for termination of flood monitoring:

Agency and Department responsible for monitoring:

Contact
Number

## COUNTERMEASURE RECOMMENDATIONS

Countermeasure
implementation
project type:

Contact person:

Target design completion date:

Target construction completion date:

Countermeasures
already completed:

## BRIDGE CLOSURE PLAN

Scour monitoring criteria for consideration of bridge closure:

Agency and department responsible for closure:

Closure contact name:

Criteria for reopening the bridge:

Person responsible for Re-opening bridge after inspection:

## DETOUR ROUTE

Detour route description ( route number, from/to, distance from bridge, etc.) :

Bridges on Detour Route:

Traffic control equipment (detour signing and barriers) and locations(s):

News release, other public notice (include authorized person(s),information to be provided and limitaions):

Scour Files (From BEIST)

# *Appendix 5-D Instructions for Completing WSDOT Plan of Action*

**SECTION 1: General Information**

- The general bridge information is usually available via BEISt or from Bridge Works.
- Subsurface soil information is available from boring logs or site visits.
- Included under this section is whether the bridge provides service to emergency services or is a part of an evacuation route.
- POA updates (date, person, and title) provided here.

**SECTION 2: Scour Vulnerability**

- NBI codes 1680, 1676, 1677, and 1682 obtained from most recent bridge inspection report via a query.
- Source of scour rating (observed, assessment, or calculated) defined.
- The Scour Evaluation Summary lists pier foundation elevations and calculated scour elevations when available.
- The bridge inspection notes 9, 361, 1677, and 1680 are obtained from the most recent bridge inspection report via a query.
- The scour critical bridge elements are listed in this section.

**SECTION 3: Recommended Actions**

- Check boxes determine whether a flood monitoring program and hydraulic/structural countermeasures have been recommended and/or implemented.

**SECTION 4: Monitoring Program**

- Regular and underwater inspection programs items to watch as well as cross sections included (under regular inspections).
- Flood monitoring program and visual inspection (during the flood) check boxes listed in this section.
- Flood monitoring required during the event checkbox. Provided with region input.
- Flood monitoring definition checkboxes listed (discharge, stage, elevation measured from, flood warning system).
- Flood elevations tied to bridge structure when possible.
- Specific USGS river gauge listed.
- Flood monitoring and post flood monitoring frequencies listed. These frequencies are provided by the regions.
- Criteria for flood monitoring termination stated.
- Agency, department responsible for flood monitoring along with contact information listed.

**SECTION 5: Countermeasure Recommendations**

- Countermeasure implementation project type as well as targeted design and construction completion dates provided. A list of completed scour countermeasures is included here.
- Scour engineer contact information listed here.

**SECTION 6: Bridge Closure Plan**

- Scour monitoring criteria (flood elevations, debris piles, obvious bridge distress) listed for consideration of bridge closure.
- Agency, department, closure contact information listed here.
- Criteria for reopening bridge, person responsible for reopening bridge (BPO engineer) contact information listed.

**SECTION 7: Detour Route**

- Detour route description (route number, distance from bridge) provided by regions.
- Bridges on detour route along with any load or geometric restrictions provided by regions.
- Traffic control equipment (signing and barriers) and locations provided by region maintenance.
- News releases, other public notices including authorized persons provided by region public relations.

**SECTION 8: Scour files**

- Electronic scour file locations listed.

# *Appendix 5-E FHWA Plan of Action Template*

## SCOUR CRITICAL BRIDGE - PLAN OF ACTION

### 1. GENERAL INFORMATION

| | | |
|---|---|---|
| **Structure number:** _____ | **City, County, State:** _____ | **Waterway:** _____ |
| **Structure name:** _____ | **State highway or facility carried:** _____ | **Owner:** _____ |

| | | |
|---|---|---|
| **Year built:** ____ | **Year rebuilt:** ____ | **Bridge replacement plans (if scheduled):** _____<br>**Anticipated opening date:** _____ |

**Structure type:** ☐ Bridge ☐ Culvert
**Structure size and description:** _____

**Foundations:** ☐ Known, type: _____ Depth: _____ ☐ Unknown

**Subsurface soil information (*check all that apply*):** ☐ Non-cohesive ☐ Cohesive ☐ Rock

| | | |
|---|---|---|
| **Bridge ADT:** _____ | **Year/ADT:** _____ | **% Trucks:** _____ |

**Does the bridge provide service to emergency facilities and/or an evacuation route (Y/N)?** ____
**If so, describe:** _____

### 2. RESPONSIBILITY FOR POA

**Author(s) of POA (name, title, agency/organization, telephone, pager, email):**

_____

**Date:** _____

**Concurrences on POA (name, title, agency/organization, telephone, pager, email):**

_____

**POA updated by (name, title, agency, organization):** _____ **Date of update:** ___
**Items update:** _____

**POA to be updated every** _____ **months by (name, title, agency/organization):**_____

**Date of next update:**_____

### 3. SCOUR VULNERABILITY

**a. Current Item 113 Code:** ☐ 3 ☐ 2 ☐ 1 Other: _____

**b. Source of Scour Critical Code:** ☐ Observed ☐ Assessment ☐ Calculated Other: _____

**c. Scour Evaluation Summary:** _____

**d. Scour History:** _____

**Scour Critical Bridge - Plan of Action** **Page 1 of 5**

## 4. RECOMMENDED ACTION(S) (see Sections 6 and 7)

| | Recommended | | Implemented | |
|---|---|---|---|---|
| **a. Increased Inspection Frequency** | ☐ Yes | ☐ No | ☐ Yes | ☐ No |
| **b. Fixed Monitoring Device(s)** | ☐ Yes | ☐ No | ☐ Yes | ☐ No |
| **c. Flood Monitoring Program** | ☐ Yes | ☐ No | ☐ Yes | ☐ No |
| **d. Hydraulic/Structural Countermeasures** | ☐ Yes | ☐ No | ☐ Yes | ☐ No |

## 5. NBI CODING INFORMATION

| | Current | Previous |
|---|---|---|
| **Inspection date** | | |
| **Item 113 Scour Critical** | | |
| **Item 60 Substructure** | | |
| **Item 61 Channel & Channel Protection** | | |
| **Item 71 Waterway Adequacy** | | |
| **Comments: (drift, scour holes, etc. - depict in sketches in Section 10)** | | |

## 6. MONITORING PROGRAM

☐ **Regular Inspection Program** ☐w/surveyed cross sections
Items to Watch: _____

☐ **Increased Inspection Frequency of __ mo.** ☐w/surveyed cross sections
Items to Watch: _____

☐ **Underwater Inspection Required**
Items to Watch: _____

☐ **Increased Underwater Inspection Frequency of __ mo.**
Items to Watch: _____

☐ **Fixed Monitoring Device(s)**
Type of Instrument: _____
Installation location(s): _____
Sample Interval: ☐ 30 min. ☐ 1 hr. ☐ 6 hrs. ☐ 12 hrs. ☐ Other: _____
Frequency of data download and review: ☐ Daily ☐ Weekly ☐ Monthly ☐ Other _____
Scour alert elevation(s) for each pier/abutment: _____
Scour critical elevations(s) for each pier/abutment:_____
Survey ties: _____
Criteria of termination for fixed monitoring: _____

**Scour Critical Bridge - Plan of Action** **Page 2 of 5**

☐ **Flood Monitoring Program**
Type: ☐ Visual inspection
☐ Instrument (*check all that apply*):
☐ Portable ☐ Geophysical ☐ Sonar ☐ Other: _____
Flood monitoring required: ☐ Yes ☐ No
Flood monitoring event defined by (*check all that apply*):
☐ Discharge _____ ☐ Stage _____
☐ Elev. measured from _____ ☐ Rainfall _____ (in/mm) per _____ (hour)
☐ Flood forecasting information: _____
☐ Flood warning system: _____
Frequency of flood monitoring: ☐1 hr. ☐3 hrs. ☐6 hrs. ☐ Other: _____
Post-flood monitoring required: ☐ No ☐Yes, within _____ days
Frequency of post-flood monitoring: ☐Daily ☐Weekly ☐Monthly ☐Other: _____
Criteria for termination of flood monitoring: _____
Criteria for termination of post-flood monitoring: _____
Scour alert elevation(s) for each pier/abutment: _____
Scour critical elevation(s) for each pier/abutment: _____

*Note: Additional details for action(s) required may be included in Section 8.*
Action(s) required if scour alert elevation detected (*include notification and closure procedures*): _____
Action(s) required if scour critical elevation detected (*include notification and closure procedures*): _____

**Agency and department responsible for monitoring:** _____

**Contact person (*include name, title, telephone, pager, e-mail*):** _____

## 7. COUNTERMEASURE RECOMMENDATIONS

*Prioritize alternatives below. Include information on any hydraulic, structural or monitoring countermeasures.*

☐ **Only monitoring required (see Section 6 and Section 10 – Attachment F)**
Estimated cost $_____

☐ **Structural/hydraulic countermeasures considered (see Section 10, Attachment F):**

| **Priority Ranking** | **Estimated cost** |
|---|---|
| **(1)** _____ | $ _____ |
| **(2)** _____ | $ _____ |
| **(3)** _____ | $ _____ |
| **(4)** _____ | $ _____ |
| **(5)** _____ | $ _____ |

**Basis for the selection of the preferred scour countermeasure:** _____

**Countermeasure implementation project type:**
☐ Proposed Construction Project ☐ Maintenance Project
☐ Programmed Construction - Project Lead Agency:
☐ Bridge Bureau ☐ Road Design ☐ Other _____

**Agency and department responsible for countermeasure program (if different from Section 6 contact for monitoring):** _____

**Contact person (*include name, title, telephone, pager, e-mail*): _____**

**Target design completion date: _____**

**Target construction completion date: _____**

**Countermeasures already completed: _____**

## 8. BRIDGE CLOSURE PLAN

**Scour monitoring criteria for consideration of bridge closure:**

- ☐ Water surface elevation reaches _____ at _____
- ☐ Overtopping road or structure
- ☐ Scour measurement results / Monitoring device (See Section 6)
- ☐ Observed structure movement / Settlement
- ☐ Discharge: _____ cfs/cms
- ☐ Flood forecast: _____
- ☐ Other: ☐ Debris accumulation ☐ Movement of riprap/other armor protection ☐ Loss of road embankment

**Emergency repair plans (*include source(s), contact(s), cost, installation directions*): _____**

**Agency and department responsible for closure: _____**

**Contact persons (name, title, agency/organization, telephone, pager, email): _____**

**Criteria for re-opening the bridge: _____**

**Agency and person responsible for re-opening the bridge after inspection: _____**

## 9. DETOUR ROUTE

**Detour route description** (route number, from/to, distance from bridge, etc.) - Include map in Section 10, Attachment E.

**Bridges on Detour Route:**

| Bridge Number | Waterway | Sufficiency Rating/ Load Limitations | Item 113 Code |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

**Traffic control equipment (detour signing and barriers) and location(s): _____**

**Additional considerations or critical issues (susceptibility to overtopping, limited waterway adequacy, lane restrictions, etc.) : _____**

**News release, other public notice (include authorized person(s), information to be provided and limitations):** _____

## 10. ATTACHMENTS

Please indicate which materials are being submitted with this POA:

- ☐ **Attachment A: Boring logs and/or other subsurface information**
- ☐ **Attachment B: Cross sections from current and previous inspection reports**
- ☐ **Attachment C: Bridge elevation showing existing streambed, foundation depth(s) and observed and/or calculated scour depths**
- ☐ **Attachment D: Plan view showing location of scour holes, debris, etc.**
- ☐ **Attachment E: Map showing detour route(s)**
- ☐ **Attachment F: Supporting documentation, calculations, estimates and conceptual designs for scour countermeasures.**
- ☐ **Attachment G: Photos**
- ☐ **Attachment H: Other information:** _____

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# *Appendix 5-F Instructions for Completing FHWA Plan of Action*

The existing bridge management system in your state will provide much of the information required to fill out this template.

***Note:*** All blocks in this template will expand automatically to allow as much space as you require. All fields can be modified to accommodate local terminology, as desired. Where check boxes are provided, they can be checked by double-clicking on the box and selecting the "checked" option. If you include additional attachments, please indicate this in Section 10.

## Section 1

**Foundations** – It is recommended that substructure depths be shown in the bridge elevation, Attachment C (see Section 10). The minimum depth should be reported in Section 1 as a worst-case condition.

**Subsurface Soil Information** – If conditions vary with depth and/or between substructure units, this should be noted and included in Attachments A and/or C (see Section 10).

**Sections 1, 2, 3, and 4**

These sections are intended as an executive summary for the reviewer/manager who may not need the details of Sections 5 through 10, and show:

- **Section 1** – General information
- **Section 2** – Who prepared the POA
- **Section 3** – The source of the problem
- **Section 4** – What actions are recommended and their status

## Section 3

Reasons why the bridge has been rated scour critical for Item 113:

**Scour Critical**

- Aggressive stream or tidal waterway (high velocity, steep slope, deep flow).
- Actively degrading channel.
- Bed material is easily eroded.
- Large angle of attack (> 10°).
- Significant overbank or floodplain flow (floodplain >50 m or 150 feet wide).
- Possibility of bridge overtopping (potential for pressure flow through bridge).
- Evidence of scour and/or degradation.
- Evidence of structural damage due to scour.
- Foundations are spread footings on erodible soil, shallow piles, or embedment unknown.
- Exposed footing in erodible material.
- Exposed piles with unknown or insufficient embedment.
- Loss of abutment and/or pier protection.
- No countermeasures or countermeasures in poor condition.
- Needs countermeasures immediately.

**Unknown Foundations**

- No record of foundation type (spread footing vs. piles).
- Depth of foundation or pile embedment unknown.
- Condition of foundation or pile embedment unknown.
- Subsurface soil strata not documented.

## Section 5

This section highlights recent changes in the scour/hydraulics coding items as an indication of potential problems or adverse trends. See FHWA Policy Memorandum on Revision of Coding Guide, Item 113 - Scour Critical Bridges dated April 27, 2001, for details on Items 113 and 60 which can be found at www.fhwa.dot.gov/engineering/hydraulics/policymemo/revguide.cfm.

## Section 6

Multiple individuals responsible for various monitoring activities may be listed, as appropriate.

## Section 7

Guidance on the selection and design of scour countermeasures may be found in FHWA Hydraulic Engineering Circular No. 23, Bridge Scour and Stream Instability Countermeasures, Second Edition, 2001. To facilitate the selection of alternative scour countermeasures, a matrix describing the various countermeasures and their attributes is presented in this circular and can be found at http://isddc.dot.gov/olpfiles/fhwa/010592.pdf.

## Section 8

Standard closure and reopening procedures, if available, may be appended to the POA (see Section 10, Attachment H).

## Section 9

In some situations, public transportation (e.g., bus routes) may be of importance to the public, and therefore could be included in the POA (see Section 10, Attachment).

# Chapter 6 Damage and Repairs

## 6-1 General

The purpose of this chapter is to provide consistent procedures for reporting bridge repair needs and following up on bridge repair work performed. FHWA has general reporting requirements related to critical findings (discussed later), but otherwise leaves the tracking of repair and maintenance to the owning agency.

Recommendations for repairs arising from bridge inspections range from preventive maintenance that will preserve the life of the structure by slowing down the processes of deterioration, to routine repairs that correct existing minor problems, to critical repairs that must be undertaken immediately to restore service or safeguard the public. The ability to identify and track bridge repair needs and to follow the status of repairs is a vital element of a quality bridge management program. Bridge program managers rely on accurate, timely information provided by concise reports and thorough procedures. The following sections outline both the reports to use and procedures to follow for various types of repair and maintenance needs.

This chapter is specifically written for the use of state forces conducting inspections on both state and locally owned structures. For inspection work performed by state forces on locally owned structures, it is important for the Local Agency to be aware of the procedures that will be used by the state inspectors. Local Agencies are encouraged to also follow these guidelines but are able to tailor internal procedures to their specific organizational need.

## 6-2 Critical Finding and Critical Finding Damage Report (CFDR)

The NBIS (23 CFR 650.313(q))/MBE (Chapter 4) make reference to critical findings/ deficiencies as a special category of repair need requiring immediate attention of the bridge owner with timely notification to FHWA and subsequent tracking of repair status.

In Washington State, a critical finding is defined as a structural or safety related deficiency that requires immediate action. Judgment must be used in determining whether to categorize a finding as critical. Some examples that may be considered a critical finding are provided in the BIRM. To provide greater clarity, the following examples are expected to result in a critical finding.

- The condition necessitates closing, posting, or restriction of a structure, a portion of a structure, or access under a structure.
- NBI Deck code is downgraded to 2 or less.
- NBI Scour code is downgraded to 2 or less.
- NBI Superstructure, Substructure or Culvert codes are downgraded to 3 or less.
- The condition warrants a structural review to determine the effect on the safety of the structure.

Critical findings can be the result of many factors. Examples include scour, fire, structural deterioration, vehicular impact or extreme events such as floods and earthquakes. A relatively frequent cause is vehicular impact. Short-term closure or restriction of a facility to clean up debris and perform inspections does not qualify as a critical finding incident by itself.

The Bridge Preservation Engineer (BPE) (for State bridges) or the WSDOT Local Programs Bridge Engineer (LPBE) (for Local Agency bridges) is to be notified by phone or email within one working day of identifying structural deficiencies to a structure that will likely result in a critical finding. For an incident on the state system, the BPE shall ensure that relevant WSDOT executives and staff are notified as soon as practical (usually via email). Similarly, for an incident involving a local agency structure, the LPBE shall ensure relevant local agency and WSDOT support staff are notified as soon as practical. In either case, the FHWA Division Bridge Engineer shall be included in the notification for an incident involving an NBI reportable structure. Incident information shall also be entered into the CFDR tracking system within five (5) business days after determination that the event qualifies as a CFDR event.

Initial notification for a critical finding is followed up by completing a Critical Finding Damage Report (CFDR) within BridgeWorks under the CFDR for the identified structure. Initiating and updating the CFDR is necessary to assist in documenting and tracking critical structural and safety related deficiencies on damaged structures.

FHWA will periodically review any generated reports and the tracking system to verify the needed repairs were promptly reported and the recommended repairs were completed within a reasonable period of time. FHWA may also conduct field checks to verify that critical repair work was accomplished.

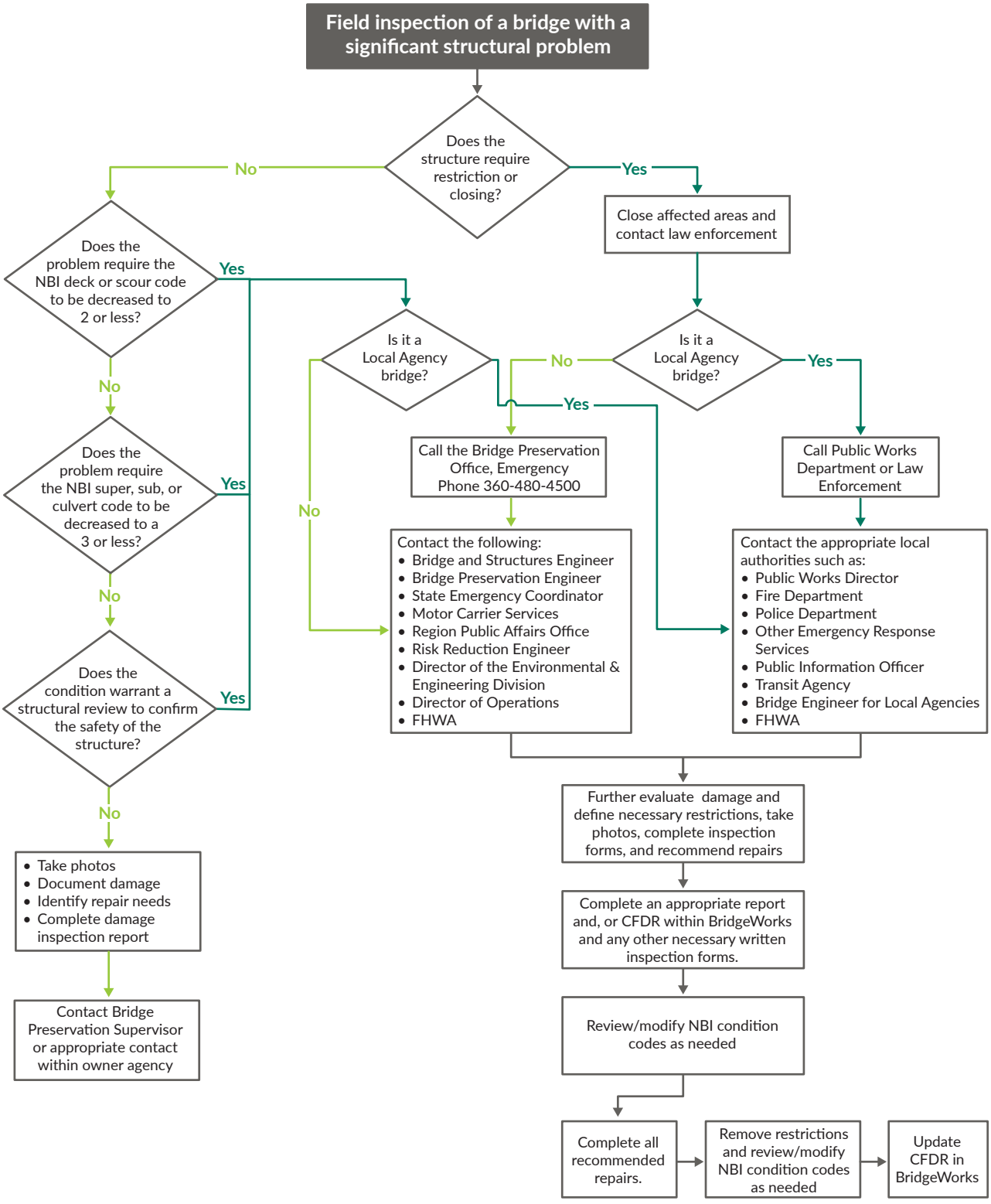
See Exhibit 6-1 for guidance on determining when a CFDR is required.

The CFDR must be filled in as completely as possible, as soon as practical after the post-incident inspection. See Section 6-2.2 for CFDR submittal requirements.

CFDR incidents will be registered in the database by completing a Routine, Damage, or Informational Report within BridgeWorks (BW). These report types are discussed further in Chapter 3. After initializing the CFDR in BridgeWorks attach all supporting materials (photos, sketches, etc.) to the Files Tab. All repair recommendations arising from the Critical Finding should be identified in the report and attached to the Critical Finding entry. Critical Finding repairs that must be completed to allow the lifting of any closure or restriction shall be assigned a priority of “C”.

Any time the recommended repairs cannot be accomplished immediately, the applicable NBI and BMS condition codes should be reviewed to ensure that the data accurately reflects the bridge’s current condition and status.

## Exhibit 6-1 Field Inspection Procedure




The following procedure describes how to fill out the CFDR.

## 6-2.1 *Completing the CFDR*

Generally, the author of the Critical Finding Damage Report (CFDR) will be the team leader of the team that inspected the structure and identified the critical finding. On occasion, there may be no inspection associated with the critical finding or an incident may be determined to be a critical finding sometime after the inspection has been completed. In such cases, the Bridge Repair Engineer or Bridge Owner can use an Informational Report type to enter it and shall be responsible to ensure the CFDR is completed and appropriately reported.

When filling out the CFDR within BridgeWorks, keep in mind the purpose of the CFDR entry is to provide a means of generating reports for managers and FHWA to track Critical Findings and their status. Detailed information can be referenced in the reports for the structures. The author should adhere to the following:

1. Select a unique Critical Finding Number for each new Critical Finding prior to entering additional information.
2. For follow on entries, always select the Critical Finding Number they will be associated with prior to entering additional information.
3. Select the proper entry type. Identified is for the initial entry. A complete process for any Critical Finding will usually include “Identified”, “Action Taken”, and “Resolved” entries, as well as any “Updates” entered in the process.
4. Always identify the current bridge status with each entry.
5. Estimated Resolution Date should be entered with as an update when it becomes known.
6. Keep descriptions brief, do not repeat, or copy detailed report information into the Critical Finding.
    - **Identified** entries, provide a short executive summary identifying the incident, effected elements and conditions warranting the Critical Finding. Complete and specific details on element condition or damage should be identified within the body of the report.
    - **Actions Taken** entries, provide a description of mitigating measures including temporary closing or restricting the structure, or putting temporary repairs in place while conducting additional evaluations of the structure for solutions to permanently mitigate the deficiencies.
    - **Update** entries can include results of follow up evaluations or inspections, changes in restriction or status, entering estimated resolution dates, or anticipated plans for repair or resolution. Updates can be entered at any step in the process after the Identification entry and as additional information or change in status becomes available.
    - **Resolved** entries close out a Critical Finding and any description should include information on completion of repairs that restore the structure or that a permanent solution has been implemented to completely mitigate the deficiencies and protect public safety. Aside from permanent repair, this could involve, long term closure, or permanent restrictions/barriers put in place pending replacement.
7. Provide the initials for the person entering the information on that line.
8. Go to the Repairs Tab and attach the Critical Finding to the appropriate repair if one has been written.

9. State team leaders are required to send an email to the Bridge Preservation Engineer and the Bridge Preservation Supervisor, with a cc to the Load Rating Engineer and the Bridge Repair Engineers, informing them that the CFDR Initial entry and supporting information is complete and saved within the BridgeWorks program.

   See Appendix 6-A for further CFDR Instructions.

## 6-2.2 *CFDR Tracking and Reporting*

1. **CFDR Submittals –** After the Initial entry for a CFDR is completed, the owner agency is responsible for continuing to update status of open (Un-Resolved) Critical Findings until they are Resolved. It is not uncommon that permanent repairs or mitigation of a CFDR event can take an extended time to complete, especially for replacement or substantial rehabilitation. When final repair/replacement is expected to occur at some unidentified future time, Update entries may should the status of the bridge at the time of the update and outline repair/replacement plans to the extent they are known. On a long-term basis, this can be done by the Inspector/Author, Repair Engineer, or other designated Program Engineers with access to BridgeWorks, through the use of open Informational Reports.

   For NBI reportable structures, the Bridge Preservation Engineer or the WSDOT Local Programs Bridge Engineer shall ensure that the FHWA Division Bridge Engineer is notified of the event as soon as possible but no later than five (5) business days after determination that the event qualifies as a CFDR event.

   To maintain ongoing CFDR status tracking the Bridge Repair Engineers with work with Informational Group, the Bridge Condition Engineer and the WSDOT Local Programs Bridge Engineer, at 6-month intervals (April 30 and October 31) to generate accurate reports, in the FHWA requested format, for submittal to the Bridge Preservation engineer. After review/approval, the reports will be forward to the FHWA Division Bridge Engineer within 1 month (June 1 and Dec 1).

   Local Agencies may develop their own systems for tracking and reporting CFDR events. CFDR reporting for Local Agency events shall be through the Local Programs Bridge Engineer. Local Agencies are encouraged to submit CFDR tracking reports to FHWA on the same schedule as the state system.

2. **Post Repair Reporting –** As Critical Findings are updated and resolved, accurate and timely information regarding the repairs and resolution must be submitted to program managers and other interested parties, informing them of the resolution and the removal of any traffic restrictions.

   The individual who completes the final Resolved entry on a CFDR may have to rely on reports and photos from those who have actually done the repair work. This is understandable and justified, recognizing that those who actually perform the work may not be the same person responsible for the bridge inspection and reporting. It is permissible in certain circumstances to verify the work and complete a post-repair Update or Resolved entry from the office based upon reports received from others. Consult with your supervisor, the Bridge Preservation Supervisor, or the Bridge Preservation Engineer to make the decision and to determine how the information is to be entered into the database (Usually by Informational Report).

However, it remains good and expected practice to have trained team leaders field verify that all the repairs are complete and satisfactory. If changes in condition coding are not anticipated, a Routine or In-Depth Inspection to verify the work should be conducted within six months of completion of the required work. But in cases where NBI/BMS condition codes were reduced due to the incident and may be considered for increase after completion of the repair work, the follow-up inspection work should be conducted as soon as possible following completion of the repair work. When a bridge is being reopened to traffic following closure and extensive rehabilitation or replacement, an Initial Inspection may need to be performed. Chapter 3 provides a description of reports.

After the repair verification is complete (from the office or by field inspection) the Critical Finding Tab shall be updated and with a Resolved entry and any NBI and BMS data will be updated as necessary. An e-mail providing notice of the update should be sent to the Bridge Preservation Engineer for State bridges, or the WSDOT Local Programs Bridge Engineer for Local Agency bridges.

## 6-3 Other Damage Reports

Most damage inspections do not end up requiring a CFDR. The most common case is related to vehicular impact damage, but other situations (e.g. scour, fire, sudden joint failure) are possible.

For those damage inspections that do not require a CFDR, complete the Damage Inspection Report (DIR) as outlined in Chapter 3. For some cases of minor damage that are not likely to require a structural repair and where the region has not specifically requested our assistance a field inspection may not be required by BPO. Consult with your supervisor, the Bridge Preservation Supervisor, or the Bridge Preservation Engineer for further guidance. For such cases, the DIR may be completed using information provided by the region or other sources. On occasion, a DIR may not be needed at all for vehicular impact incidents requiring nothing more than minor cosmetic repair provided there are no legal, or cost recovery issues involved. Consult BPO management to make the determination.

For all cases involving reported damages to structures, the assigned inspector receiving the report shall refer to the Emergency Phone Procedures and as a minimum provide an e-mail Supervisors and the Bridge Repair Engineers, including:

- Structure ID; Bridge Number; Bridge Name; Bridge Location (MP)
- Date of Incident (if known; note if unknown)
- Description of Incident
- Identity and contact info of the person or office who reported the incident to BPO. (Note if unknown)
- Date the incident was initially reported to BPO.
- Date of BPO Inspection; names of Lead Inspector and Co-inspector (actual date, expected date, or a note if no field inspection is expected)
- Brief description of damage to the structure
- Brief description of anticipated repair recommendations
- Status of inspection/report (for those cases where an inspection is expected)

All inspection related damage photos and sketches shall be uploaded to the Damage Directory on the network (W:\Data\Bridge\BridgeDamage\Year xxxx\[bridge no.] [structure type] [incident date]).

Permission levels for this network location are set such that information can be uploaded to and/or copied from this directory but edits and deletions can only be made by select individuals (Bridge Preservation Supervisor, Bridge Repair Engineer, and QA Engineer). Notify one of these individuals if corrections/deletions are needed.

# 6-4 Bridge Repairs

## 6-4.1 *New Repair Entries*

When a bridge inspection identifies a routine structural or non-structural deficiency, i.e., any deficiency that is not identified as a Critical Finding in Section 6-2, a repair note describing the deficiency and recommended repair should be written in the Bridge Inspection Report (BIR).

1. **BIR Repair Note –** The State utilizes the following guidelines when describing and documenting deficiencies needing repair.
   - Deficiencies that require repairs shall be documented in the body of the BIR with the associated BMS elements.
   - The description of the deficiency should be concise and detailed, including location and size of the defect.
   - Photos of deficiencies requiring repairs shall be taken for proposed and completed repair of any priority. Multiple photographs of a defect, including an overall view along with close-ups, are recommended.
   - A "REPAIR" notation should be put in the individual element note with the appropriate repair number. The repair number is generated by BridgeWorks and is referenced in the "Repairs" tab of the program.

   ***Example:*** Stringer F in Panel 2 at Floor Beam 2 has a 4-½" long crack at the top cope. See photo #7. REPAIR #12345.

2. **Repair Entry –** Repair entries for deficiencies found during the course of a bridge. inspection shall be entered within the "Repairs" tab found in the BridgeWorks program.

   The repair entry should include:
   - Priority for the repair.
   - Repair responsibility for the repair.
   - Date when the repair was first noted.
   - Accurate description of the repair required.
   - Proper identification of specific repair locations. (In addition to notes in the description, consider adding a map and/or spreadsheet to the Files tab to clarify locating a deficiency when a structure layout or terminology may be confusing.
   - Photographs of the damaged area.
   - Associate the repair entry to the appropriate BMS elements or condition notes.
   - Describe any difference in the bridge orientation (pier numbering) from that in the plan drawings accessible on BEISt.

   Repair entries with multiple items similar in nature (same element) are contained within the same repair. Do not put multiple repair items in the same repair note unless they are similar (same element).

**Similar –** Replace 10 ft. red tagged (RT) timber cap at Pier 2 and 5 ft. RT timber cap at Pier 3.

**Not Similar –** Replace upper 10 ft. RT timber Pile 5A and entire RT timber cap at Pier 6.

Due to the number of repairs generated for similar components, the WSDOT BPO strives to utilize consistent descriptions for similar types of repairs called the "Repair Protocols" which are located at W:\Data\Bridge\BridgeRepair\Repair Protocols. Contact BPO for examples and additional guidance for the protocols. For any repairs that are likely to require additional repair instructions from the BPO office, advise the Bridge Preservation Supervisor and the Bridge Repair Engineer of that need.

3. **Repair Responsibility –** Repair responsibilities utilized within the BridgeWorks program organizes repairs into separate repair types. The WSDOT BPO utilizes these repair types to assign responsibility to the various entities that will, in most cases, ultimately perform the repair.

   It is not the intent of this manual to direct region maintenance staff in their assignment of work. The following merely reflects our understanding of the most likely assignment.

   The following repair responsibility codes are utilized by team leaders for the state.

   - **B – Bridge Repair**

     These repair responsibilities are generally associated with the bridge structure or conditions that impact the bridge and its elements. These may include structural deficiencies, non-scour related erosion or conditions preventing proper inspection. Drift and debris that can cause scour, channel migration, and/or added lateral forces to the structure are to be entered as B repairs but noted in the appropriate scour or channel notes in the BIR (See scour repair below for more detail). Regional bridge crews are typically charged with completing these types of repairs for state structures.

     ***Note:*** BPO Regional Inspection staff are not expected to conduct in-depth inspection on bridge mounted signs and sign supports, but are expected to stay alert to obvious defects that can be safely observed and that may need further inspection and/or repair. Such defects on bridge mounted signs are to be communicated to the BPO sign bridge team at the first opportunity. They will typically provide repair recommendations via the Sign Bridge Repair List. But for a severe defect, direct communication to the regional bridge maintenance crew can and should be made if the BPO sign bridge crew is not available for quick response. Keep a record of any such communication and provide it to the BPO sign bridge team.

   - **V – Vertical Clearance Repair**

     This indicates that the bridge has restrictive overhead clearance for vehicular traffic and that no signing or improper signing is in place. Vertical clearance signs are required for measured clearances less than or equal to 15´-3˝. The policy for the WSDOT is to post clearances at 3" less than the actual measured clearance with a +2" or-1" tolerance when evaluating any existing posting. Measured clearances less than 14´-3˝ require advanced restrictive height warning signs as defined in the updated MUTCD. State team leaders shall follow the guidelines in Section 3-4.1.J for further instructions on vertical clearance repairs. The Bridge Preservation Office (BPO) Geometry Engineer is tasked with keeping track of vertical clearance issues and repairs for State structures. Regional Sign crews are typically charged with completing these types of repairs for state structures.

- **S – Scour Repair**

  This indicates that the bridge site needs to be evaluated for scour mitigation. A description of the condition of concern must be provided in the inspection notes. Repair actions to correct the condition should be included in the repair description. The BPO Scour Engineer, a hydraulics engineer, or other person with knowledge and expertise of the hydraulics at the bridge will review and may revise the recommended repair, the repair priority, or may deactivate the repair altogether after careful review of the bridge site. A note by the reviewer should be added to the inspection report detailing their findings, typically within the note of WSBIS Item 1680 or repair description.

  Engineering scour mitigation requires the bridge owner to work closely with environmental agencies to develop the best corrective action plan for all. Erosion caused by runoff from the bridge is not considered a scour repair.

  Team leaders for the state shall apply the following guidelines when selecting a Scour repair responsibility.

  - For new scour repairs or monitoring, a discussion with the BPO scour engineer regarding the site conditions should take place to determine what mitigation, if any, is needed to include the repair priority. Provide the BPO Bridge Scour Engineer, with all necessary information to include photos, sketches, and any measurements. Update the BMS Scour and Channel Element Notes in accordance with the scour engineer's directions and comments. Typically, all debris/drift removal scour repairs will be assigned to (B) Bridge Repair responsibility. Photos will however be flagged as scour photos.
  - For an existing scour related repair (responsibility S) with a previously set priority, leave the existing priority as it is set. If the inspector feels the field conditions justify a change in the current priority, notify the BPO Scour Engineer for review prior to releasing the report.
  - When an existing scour related repair responsibility is not S, ensure that the repair (responsibility) is correct and make changes if indicated. Notify the BPO Scour Engineer, including photos, sketches, and any other information. Code BMS Element #361 and describe the change noting the date that the scour engineer was contacted.

- **R – Railroad Repair**

  WSDOT conducts limited scope (non-structural and non-mandated) "WSDOT Safety." inspections of railroad owned bridges that cross over state-owned highways. The R repair indicates that a railroad owned bridge crossing over a public highway has a condition that could pose a hazard to the motoring public, such as ballast falling onto the roadway. The repair description should include some indication of the relative urgency of the recommended repair. The inspecting highway agency (WSDOT or local agency) must ensure that all such repair recommendations are communicated to the appropriate department/individual at the correct railroad. For higher priority conditions, consider reducing the inspection interval.

  ***Note:*** Vertical clearance signage needs on a railroad overcrossing will likely become the responsibility of the region. Assign such repairs the responsibility code V as outlined above.

- **U – Utility Repair**

  This indicates that there is a deficiency with a utility (not owned by the bridge owner) mounted to the bridge. The inspecting highway agency (WSDOT or local agency) should ensure that all such repair recommendations are communicated to the appropriate department/individual at the correct utility. If the deficiency poses a safety risk to the traveling public or to bridge inspection and maintenance crews, or if the deficiency is creating a problem for the structural integrity of the bridge, then the repair recommendations must be communicated to the appropriate department/individual at the correct utility. The Risk Reduction Engineer may be able to facilitate the communication in urgent situations.

- **J – Roadway Repair**

  This inspection responsibility is used by Local Agencies and may indicates that there is a non-bridge related deficiency in the roadway approach to a bridge. Roadway maintenance crews, separate from bridge crews may typically be charged with completing these types of repairs. WSDOT no longer uses or assigns J repairs.

4. **Repair Priority –** The priority of the required repair establishes the urgency at which the repair shall take place. The priority may evolve into a more urgent priority if repairs are not completed.

   - **Emergency/Urgent –** Describe situations presenting an immediate hazard to the traveling public. These situations are independent of repairs and priorities entered into Bridge Inspection Reports. Situations may require prompt action and must be completed as soon as possible to mitigate or remove the immediate hazard. Emergency or Urgent situations must be communicated directly to the region maintenance staff (or bridge owner) via phone call and follow-up email. Copy the Bridge Preservation Supervisor and the Bridge Repair Engineer on any such communication. Some situations may result in documented repairs in the report once the hazard has been mitigated. Whenever an emergency or urgent situation results in a repair being entered into the BIR, the repair entry must be assigned an appropriate priority from the following listings. This will usually be a Priority 1 or a Priority C when a CFDR event is involved.
   - **Priority C –** Priority C is to be assigned to any CFDR related repair entry that must be completed before the bridge may be returned to the level of unrestricted service that existed before the event and/or the associated low NBI codes can be increased. Priority C is to only be used in conjunction with a CFDR event. Do not use Priority C for repairs that do not directly lead to a lifting of the restrictions imposed as a result of the CFDR event. Completion of a Priority C repair (by maintenance or by contract) will require follow-up by inspectors to verify the repair, review the condition coding, update the CFDR, and disseminate the information to the appropriate individuals. Completion of a Priority C repair must be communicated directly to the Bridge Preservation Supervisor and the Bridge Repair Engineer. See Section 6-2.2 for CFDR reporting requirements.
   - **Priority 1 –** A Priority 1 repair describes a major deficiency to primary bridge elements or serious conditions that could cause a major impact to the bridge such as closure or load restrictions. This type of deficiency may lead to more extensive and costly structural repairs if not completed in a timely manner.

     Priority 1 is the highest priority assigned to a repair which if left uncompleted, could turn into an urgent or emergency situation with little or no warning.

Priorities 1 and C are the highest priorities that can be assigned within the inspection application.

These repairs are top priority to ensure:

- Public Safety
- Reliability of the Transportation System
- Protection of Public Investments
- Maintenance of Legal Federal Mandates

On occasion, the structure inspection interval may need adjustment to monitor that conditions do not deteriorate to urgent or emergency status, that safety of the traveling public does not become compromised, and to verify that repairs have been done in a timely manner. Additionally, the Rating Revision flag (WSBIS Item 2688) may require a "Y" to re-evaluate a bridge load rating.

Examples of deficiencies requiring Priority 1 repairs are as follows:

- Repairing exposure of damaged strands and/or rebar.
- Removing or mitigating any existing potential for material falling from the bridge.
- Repairing significant joint defects that impact the bridge or create traffic hazards such as 'D' spalls in the header with exposed steel.
- Mitigation of significant erosion or scouring that may indicate possible loss of support.
- Trimming or removal of trees, brush or debris that interfere with inspection procedures or equipment access. List the month and year of the next inspection by which this repair needs to be completed.

- **Priority 2 –** A Priority 2 repair describes a minor to moderate deficiency to a primary bridge element, a major deficiency to a secondary bridge element or existing conditions that may eventually elevate to a Priority 1. This type of deficiency would not cause major impact to the level of service of the bridge or compromise safety at its current level. However, this type of deficiency may lead to more extensive and costly structural repairs if not completed in a reasonable timeframe.

  Priority 2 is different from Priority 1 in that a Priority 2 deficiency does not immediately jeopardize:

  - Public Safety
  - Reliable Transportation System
  - Protection of Public Investments
  - Maintenance of Legal Federal Mandates

  A Priority 2 repair would not generally be cause for a reduction in inspection interval or a re-evaluation of a bridge's load rating.

  Examples of deficiencies requiring Priority 2 repairs are as follows:

  - Repair Yellow-tagged (YT) timber members.
  - Repair spalling in secondary members.
  - Repair spalling in the deck soffit and/or concrete girders. If not excessive, this could be a Priority 3.

- **Priority 3 –** A Priority 3 repair is generally a minor nonstructural or "Housekeeping" type of repair that could evolve into a higher priority if not corrected. Examples of deficiencies requiring Priority 3 repairs are as follows:
  - Cleaning of drains, bridge members or deck and sidewalk surfaces.
  - Remove debris from off of pier caps and abutments.
  - Remove garbage, debris, or vegetation from around abutments, piles, or retaining walls.

  Repairs shall be elevated to priority 1 if the material of concern is significantly impeding operation of bridge structural components or is making complete structural inspection of the bridge impossible.
- **Priority M –** Monitor repairs require no action from the region bridge crews, but they should be aware of the condition, since the problem/defect could evolve into a repair. A reduced inspection interval may be necessary in order to monitor the problem/defect. The state utilizes the following guidelines when implementing and administering monitor repairs.
  - Every monitor repair note must be updated at each routine or interim inspection with a clear statement of findings. This update should include the inspection date, inspector initials, and notes on any change in condition, and will be appended to the existing repair note. If the condition is unchanged state "No changes noted" and include the year and initials. This specific instruction applies to monitor repairs only. The "no changes" note is generally not expected for priority C, 1, 2, or 3 repairs.
  - Every monitor repair note must include measurable information about the condition of being monitored, allowing subsequent inspectors to more easily and accurately determine if the condition is changing. Photos, sketches, and/or measurements are among the ways to provide this information, which must also clearly include location and date. It may be appropriate to reference an attached file with historical data in the monitor repair note.
  - Over time, every monitor repair note will provide information on what circumstances warrant repair action and/or eliminate the need for further monitoring. Inspectors will be expected to provide this information, when possible, but it is recognized that this information may require more detailed evaluation and structural analysis beyond the scope of bridge inspection work.

    Some existing monitor repairs may not meet the requirements listed above. In this case, please coordinate with the Bridge Preservation Supervisor to determine if a monitor repair is appropriate.
- **Priority 0 –** A Priority 0 repair is no longer used by WSDOT. Existing Priority "0" Repairs should be migrated to Priority 3 as being the lowest priority.

## 6-4.2 *Modifying Existing Repairs*

When there is need to significantly change or update the verbiage within a repair entry after subsequent inspections, team leaders for the State shall apply the following guidelines when modifying the repair.

- The team leader shall add his/her initials along with a date in parenthesis with a brief description of any changes to an existing repair note, including a priority change.
- Minor edits to repair text (spelling, caps, and minor grammatical changes) should generally be avoided unless something else is being done to the entry.
- Edits to repair priority entries other than priority M need be made only when the conditions/needs change sufficiently to warrant an update.
- If a significant change to a repair is needed, eliminate the original repair entry by entering a date in the "Verified" column. Add a note in parenthesis in the repair description stating reasons for its removal, and then enter a new repair with the original repair date in the "Noted" field. The BridgeWorks application typically enters the "Report Opened Date" in the Noted field when a new repair is created. The Noted date can be changed by the inspector and must be changed in all cases where the contents of a previous repair entry are entered into a new repair entry.)
- Break out and rewrite repairs when dissimilar elements are called out in the same repair as described in Section 6.4.1.2. Date the new repair with the original repair date for the respective elements.

## 6-4.3 *Repair Verification*

At each routine inspection, the current status of all open (not previously verified) repair entries must be reviewed by the inspection team and field reviewed provided the necessary access equipment is available. If the recommended work has been completed, the repair entry in the BIR shall be verified in accordance with the following guidelines.

- BMS element condition states and notes where the repairs are referenced must be updated to accurately describe the repaired condition after the inspection.
- Any portion of a primary BMS element that has been repaired is typically coded in Condition State 2. Primary members that have been completely replaced should be returned to Condition State 1.
- A completed repair should have before and after photos with the verification date and the repair number referenced in the individual BMS element note. Remove this verification note during the subsequent inspection.

  ***Example:*** Stringer F in Panel 2 at Floor Beam 2 crack has been stop drilled. REPAIR #12345 verified on 1/20/02. See photos #7 and #9.
- In the "Repairs" tab of BridgeWorks, the team leader should enter the verification date within the "Verified" column and attach the after photos to the "Photo" column.
- Explain in the repair description why verification could not be accomplished and what it will take to do so for the next inspection (equipment, environment, etc.).
- For scour repair verification, follow guidance above AND send communication to the BPO Scour Engineer who will add the structure to the next annual scour review.

Repairs to state structures are most often performed by region bridge maintenance crews. Their work is sometimes reported to BPO via a Maintenance Bridge Repair Report (MBRR) (See also Section 6-5). When this is done, the BridgeWorks application uses the info entered in the MBRR to enter a Maintenance Date (Maint.).

The Maint. date informs the bridge inspection team that the work specified by the repair entry has been completed. Once the date is entered, the responsible maintenance crew does not see this entry on the Bridge Repair List and typically does not revisit this repair entry. The bridge inspection crew's responsibility at this point is to verify that the reported maintenance satisfactorily completes the recommended repair(s). When a Maintenance date has been entered, consideration should be given to the need to schedule appropriate access equipment prior to heading out to the field. Discuss with your supervisor as needed.

There are, on occasion, repair entries within BridgeWorks that contain inappropriate or unexplained maintenance completion dates. Scenarios include, but are not limited to:

1. The work performed does not complete the full scope of the original repair recommendation.
2. The work performed is not satisfactory.
3. Further deterioration has occurred rendering the work performed inadequate.
4. There is no visual evidence of any work done; (e) the work performed belongs in fact to a different repair entry (i.e., the MBRR was improperly entered).

In cases such as these, correction is needed to ensure that the repair needs continue to be properly communicated back to the region bridge maintenance crews.

The team leader shall apply case-by-case judgment in making these corrections. Two primary options should be considered:

- **Option A –** Add a verified date with photos and/or notes in the repair description (does not have to be both provided there is no question of the intent). Write a new repair entry with appropriate supporting information and noting the changes being made. (Example: A repair entry of large scope has been partially completed. The existing entry could be verified, the description modified to note the portion that was completed, and the new entry would be referenced. The new repair entry would reference the old entry, note the partial completion and would describe the remaining scope. In most cases, the noted date of the new entry should be the same as the original entry.)
- **Option B –** Enter an Override Date in the BridgeWorks application. Modify the repair description to explain the reason for the override and provide the date and initials of the author. (This option may be most appropriate for a case where the Bridge Repair report was incorrectly entered. It could also be appropriate for the case where only a small part of the overall scope of a repair was addressed by the work in the Bridge Repair Report.)

In some extreme and/or complex cases, direct communication with the region bridge maintenance crew to explain the situation may also be advisable.

## 6-5 Maintenance – Bridge Repair Report (MBRR)

The repair descriptions from the inspection reports for WSDOT-owned bridges are entered into the “Bridge Repair List” (BRL - a state document), which can be viewed on the internal homepage (BEISt) of the WSDOT website. The BRL is updated twice a year. Maintenance crews for the State will review the list and schedule the work to complete selected bridge repairs. When a repair is completed, the maintenance crew may submit a Maintenance – Bridge Repair Report (MBRR) documenting the completed repair. The MBRR is typically submitted electronically via a link provided on the Bridge Repair List website. If submitted electronically, the program inserts a “maintenance date” for that repair into the database.

Entering the maintenance date will automatically remove the repair from the next edition of the printed active “Bridge Repair List”. However, the unverified repair along with the maintenance date will still appear in the next Bridge Inspection Report (BIR). The MBRR is a state document, but it is available to Local Agencies for utilization if they do not have a bridge repair documentation process in place.

An example of a completed Maintenance - Bridge Repair Report can be found at the end of this chapter.

## 6-6 Appendices

Appendix 6-A Critical Finding Damage Report Instructions

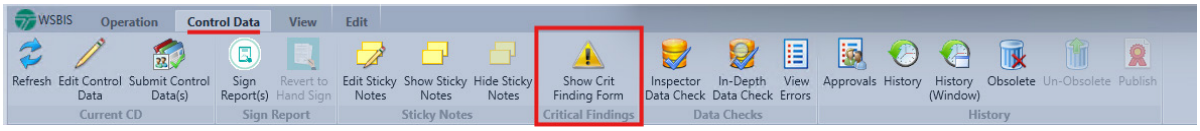
Appendix 6-B Maintenance - Bridge Repair Report Example

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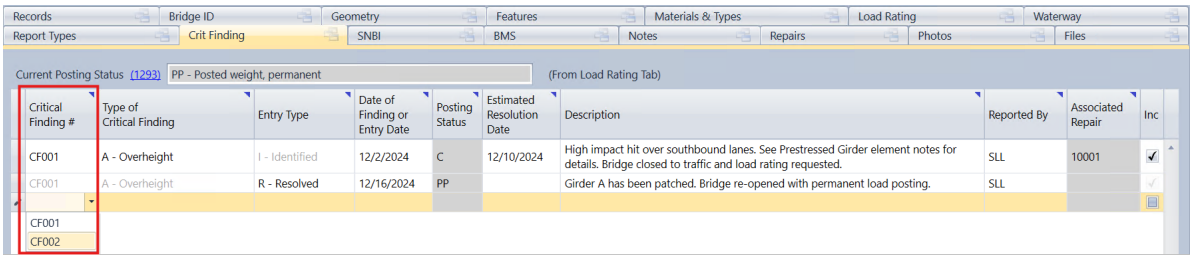
# *Appendix 6-A Critical Finding/Damage Report Instructions*

Critical Findings will normally be entered as part of a Routine or Damage Inspection, as described in Chapter 3.

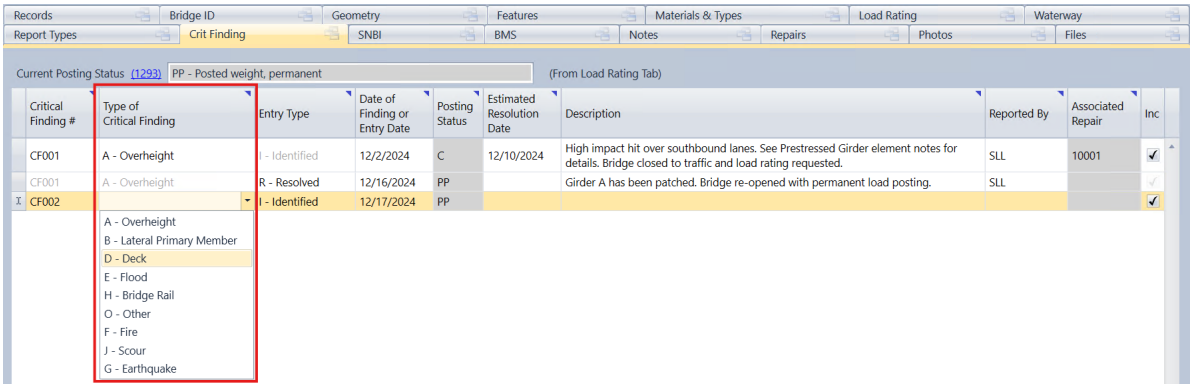
The Critical Finding Tab will only be visible if the current structure already has a Critical Finding associated with it. To open the Critical Finding Tab, select the icon on the Control Data ribbon. The Critical Finding Tab is to identify and track open Critical Findings. It is not a report type.



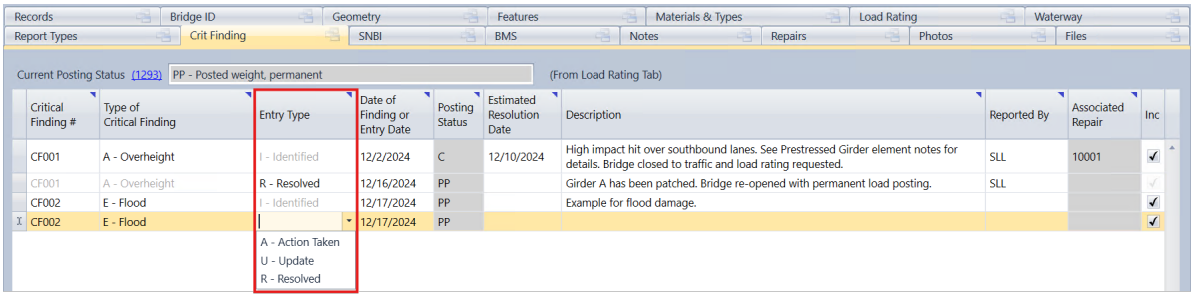

The initial step for every entry is to select the correct **Critical Finding #**. This field will default to the next available number for a newly identified Critical Finding. For an entry to a Critical Finding that has already been identified, select the associated **Critical Finding #**. Failure to select the correct **Critical Finding #** will prevent the entry from being properly recorded and ordered for reporting.



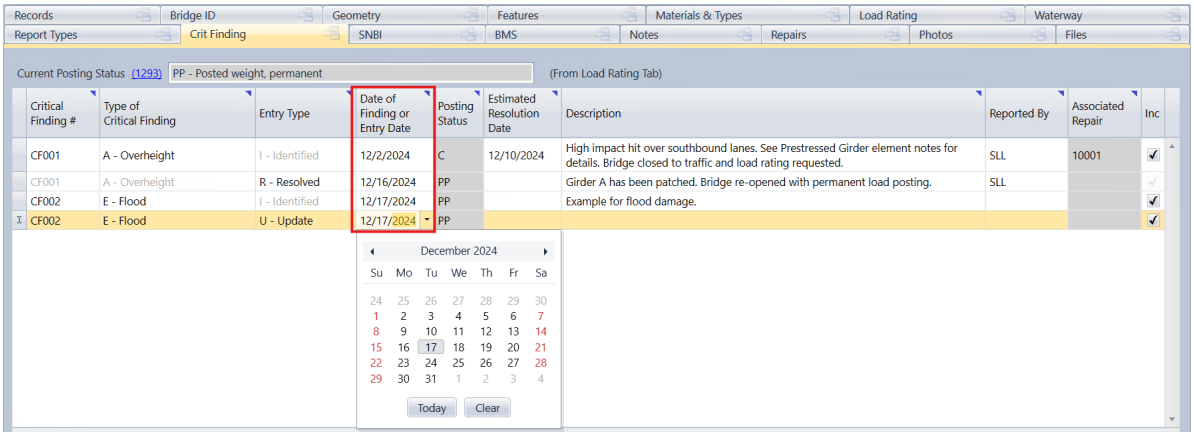

Select the **Type of Critical Finding** by type of damage or event. The selection options shown in the drop down may appear differently than shown here. After the first entry of a new Critical Finding, the **Type of Critical Finding** will self-populate when the associated **Critical Finding #** is selected for follow-up entries.



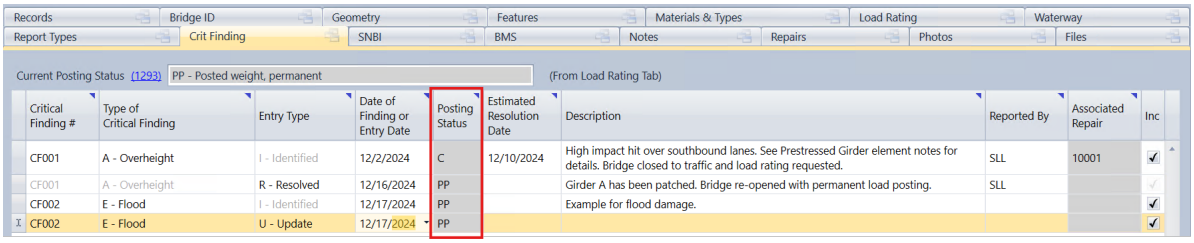
Select the **Entry Type** for the entry being made. The first entry for a new Critical Finding will self-populate as "I – Identified".



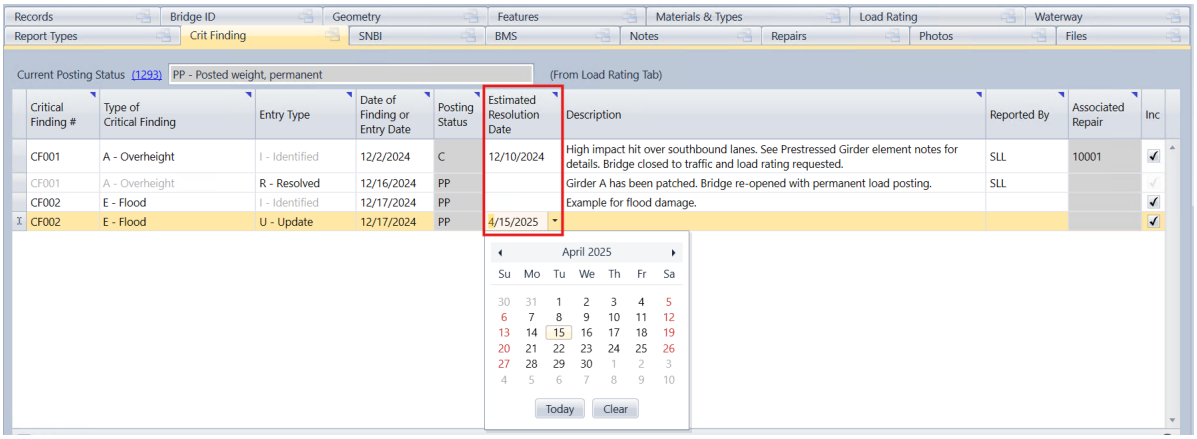

Enter the **Date of Finding or Entry Date** for the entry being made. For the initial entry, this should be the **Date of Finding**. Each of the follow-up entries should reflect the **Entry Date**. When the finding is resolved, this should be the Date of Resolution.



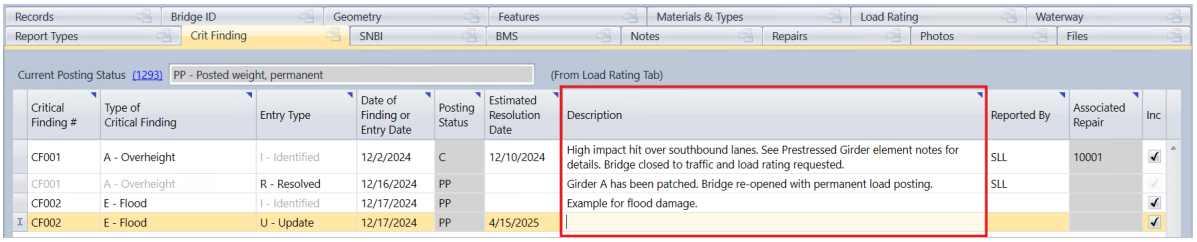

The current **Posting Status** will self-populate from Item BPS01. If this is not the correct **Posting Status**, then it will need to be updated on the Load Rating Tab.



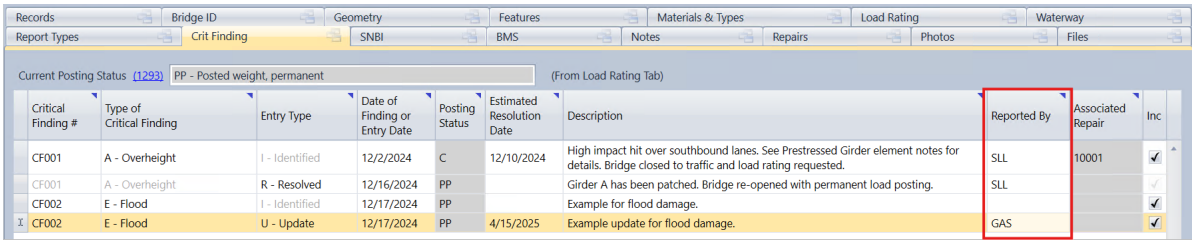
Provide an **Estimated Resolution Date** when it becomes available. This date may not be identified until more information is known or at a later **Entry Date**.



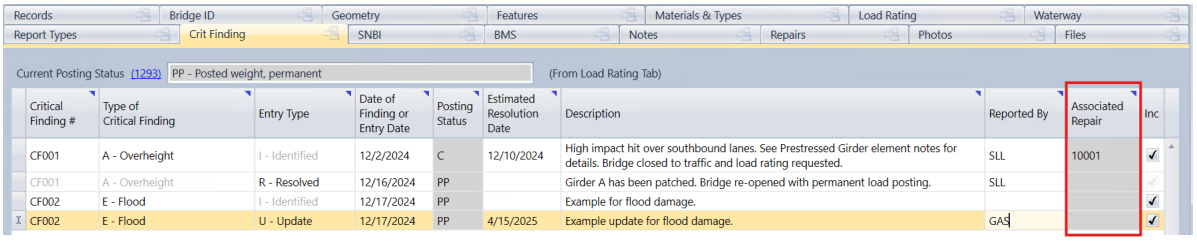

Provide a brief **Description** of the event or defect as a cause of the finding or the reason for the updated entry. Keep in mind that this is a summary. In-depth details should be entered into the body of the report for the affected BMS elements with supporting photos and/or files.



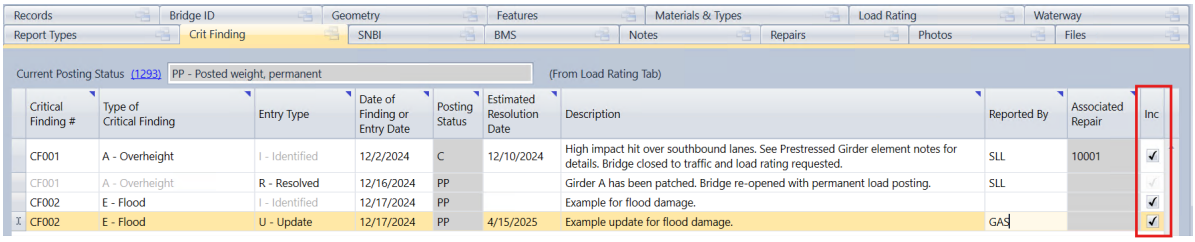

Enter the initials of the person making the entry in the **Reported By** field.




Go to the Repair Tab to link the Associated Repair(s). Repairs will identify the associated photos and element notes. If there is an associated repair, it will usually be a C – Priority Repair.



Check the **Inc** box to include the critical finding in the printed report.



# *Appendix 6-B Maintenance - Bridge Repair Report*

BEISt - Maintenance Report Page 1 of 1

To: Bridge Preservation Office
PO Box 47341, Olympia, WA 98504-7341

**Maintenance Date** 2006-07-18

Structure Identifier **0005090A** 10000

Bridge Number **5/321** Bridge Name **CAPITOL LAKE**

Mile Post **104.52** Location **0.5 N JCT US 101**

**Repairs Completed By**
B - Bridge Maintenance

**Origin of Repairs**
B - Bridge Repair List Repair No **S10000**, Priority **1**, Dated **2003-12-03**

**Repair Description**
Repair the strip seal at the north abutment. (Verified - repair completed but has failed again; see new repairs 10002-4)

**Type of Materials Used - Suppliers**
Sand blast and sika-flex with backer rod

**Repair Remarks and Details**
Cleaned expansion joint by sand blasting and poured sika- flex joint.

**Weather Conditions**

**Completed By** Steve McIntyre **Posted Date** 2006-07-18 **Map Repair** No

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# Chapter 7 Quality Control/Quality Assurance

## 7-1 General

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

The guidelines presented herein are those in use by the WSDOT Bridge Preservation Office (BPO). Sections 7-2 through 7-8 pertain to the QC/QA program implemented by the BPO. The QC/QA procedures established for local agencies are contained within the Local Agency Guidelines (LAG) Manual.

The QC/QA programs documented in this chapter, including the appendices, have been approved for use by the Federal Highway Administration (FHWA).

Any QC/QA program being developed will want to reflect on the five areas identified in 23 CFR 650.307 through 23 CFR 650.315 and 23 CFR 650.507 through 23 CFR 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 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 (23 CFR 650.307 and 23 CFR 650.507)
- Inspection Staff Qualifications and Re-Certification (23 CFR 650.309 and 23 CFR 650.509)
- Inspection Interval (23 CFR 650.311 and 23 CFR 650.511)
- Inspection Procedures (23 CFR 650.313 and 23 CFR 650.513)
- Inventory (23 CFR 650.315 and 23 CFR 650.515)

There are also many sources of information available that can help an agency in developing their own QC/QA programs. Authored by Dr. Glen Washer and Dr. C. Alec Chang, *Guideline for Implementing Quality Control and Quality Assurance for Bridge Inspection*, was sponsored by AASHTO to assist bridge owners 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 agency's 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.

# 7-2 WSDOT Bridge Preservation Office Quality Control Program

## 7-2.1 *Purpose*

To establish within management a diverse set of quality control (QC) procedures 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 review 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 to create a more consistent and accurate inspection program.

## 7-2.2 *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.

## 7-2.3 *Time Frame of Evaluation*

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

## 7-2.4 *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, including QC))

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.

## 7-3 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.

### 7-3.1 *Bridge File Maintenance*

The WSDOT Coding and Appraisal Unit maintains bridge and tunnel inspection reports for WSDOT structures in accordance with the NBIS 23 CFR 650.307(e)(5) and the NTIS 23 CFR 650.507(e)(2).

### 7-3.2 *Processing Inspection Reports*

**Field Inspections** – Bridge inspection reports are processed by the Bridge Data Steward after 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 WSBIS database.

When an inspection report is released for digital signature, the Bridge Data Steward has completed the process. The inspectors are automatically notified via email to digitally sign the reports using the BridgeWorks application, and when both signatures are added the report is automatically loaded onto BEISt.

When inspection reports are released for hand signature, the Bridge Data Steward then coordinates with the inspectors and others in the Unit to get the reports signed, scanned, and loaded onto the BEISt website. For both digitally signed and hand signed reports, the Bridge Data Steward then sends the WSBIS report with initials validating the inspector QC process to the Bridge Resource Technician, who also receives any hand signed inspection reports from the inspectors.

**Informational Reports** – The WSBIS 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 report describing the changes made.

### 7-3.3 Coding New and Repaired/Rehabilitated Structures

This Unit tracks bridge and tunnel construction with regular monitoring of several WSDOT sources, including CCIS and Unifier. Contracts are reviewed and when new or repaired/ rehabilitated structures are identified they are tracked in the ContractHistory database. When plans are available and the construction work is nearing completion, new or updated inventory inspections are added to the WSBIS database. For new bridges, inspection supervisors are notified to coordinate the initial inspection. For repaired/ rehabilitated bridges, inspection supervisors are not notified but contract information is available in the record for use by the next scheduled inspection team.

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 WSBIS database.

### 7-3.4 Data Concurrency

The Bridge Geometric Engineer is responsible to make sure that select 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-C.

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.

### 7-3.5 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.

### 7-3.6 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 Bridge Inspector Certification System (BrICS). 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.

### 7-3.7 *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.

## 7-4 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.

### 7-4.1 *QC Criteria*

All structures with new load ratings shall be fully checked by another engineer. For updated ratings by BPO, the Engineer of Record shall do a QC of the existing rating as part of the update; a checker might not be needed. Ratings submitted to WSDOT by consultants shall be reviewed as described below.

- 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 represents 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.

**Data Check:** Query database for superstructure or substructure with SNBI Condition 4 or less. Evaluate whether any of the structures will require updating and address accordingly. QC or independently load rate a minimum of eight structures per calendar year for state bridges. Condition of the superstructure or substructure will be the main factors in choosing the bridges as well as evaluating ratings completed by consultants or by WSDOT.

## 7-5 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.

### 7-5.1 *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 regarding new directions to the regions.
- All new state bridges over water.
- All state bridges with a scour code of 2 or less.

These four 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 3, 4, or 7.

### 7-5.2 *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 (NBI 1680 and SNBI B.AP.03) based on a documented scour assessment. If scour calculations have been made and are available for review, verify that the assessment complies with the calculated scour or that documented justification to disregard the calculations is available.
- Verify that each scour critical bridge has a Scour Plan of Action and that it has clear direction for the field staff to follow.
- Review waterway adequacy code (1662) for accuracy.

### 7-5.3 *On Site Field Review*

- Verify when the scour code (1680) is coded a 7, 4 and 2 or less in the bridge inspection report that it reflects the field conditions.
- Verify from both office and field that the scour note (1680) added to all bridges over water has clear and direct information.
- Verify any scour related concerns such as exposed footings, channel migration, presence or need for countermeasures.
- Verify that the POAs reflect the conditions in the field.
- Verify the channel protection code (1677, SNBI B.C0.9 and B.C.10) for accuracy.
- Verify that the channel protection note (1677) adequately reflects site conditions.
- Verify BMS 361 (SNBI B.C.11) for completeness and accuracy of coding/condition states.
- Review 1662 code and note, if applicable, and observe for indications of highway or bridge deck overtopping.

## 7-6 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.

### 7-6.1 *Office Review of Structural Inspections*

A Regional Inspection Engineer or a second Team Leader will review 100 percent of NSTM, In-Depth, Interim, Damage, Complex Feature, 48-month Interval, Initial and Local Agency inspection reports under their responsibility. Reports outside the above criteria, and not meeting "Team Leader Approval" criteria, receive a lower level of review. See Appendix 7-D for specific criteria. The reviews are random regarding Team Leaders and are based on complexity and risk of structures and report.

The Special Structures Engineer reviews 100 percent of the following structural reports: Special Structures Bridges, Tunnels, and Ferry Terminals. In rare cases, a review by a second Team Leader may be substituted for Special Structures Engineer review.

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 Interval –** Verify that inspection interval is based on condition or office policy (i.e., 48-month interval criteria).
- **Inspection Hours** – Verify that the correct inspection hours are reported based on history of previous report hours, structure type and condition.
- **Organization of Report** – Verify that the report is organized, understandable, and 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 current inspection report content.
- **Follow-Up Actions on 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 Finding Damage Report (CFDR) –** Verify that CFDRs 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 generally scheduled to inspect bridges randomly. This limits the same bridges getting inspected by the same Team Leader repetitively.
- Both Regional Inspection Engineers can review bridge inspection reports written by all Team Leaders that perform regional bridge inspections at the BPO.
- All changes made or suggested for any 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 Condition Engineer or Program Manager 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 Appendices 7-E and 7-F.

## 7-6.2 *Field Review of Structural Inspections*

Each year, up to 2 percent of all structural inspections should be 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 regional and special structure inspection engineers an opportunity to observe how all Team Leaders are evaluating structures, relative to the NBI and office procedures, policies and requirements

The following are the expectations that the regional and special structures inspection engineers have regarding the variance of coding elements, condition codes and condition states:

- NBI Condition Codes “Deck, Superstructure, and Substructure,” shall be within plus or minus 1 for codes 5 or higher. Codes of 4 or less will not deviate.
- BMS elements: there should be no missing elements.
- BMS condition states: verbiage in the report should be supportive of the condition state ratings and quantities.
- Repairs, all repairs need to be supported by inspection observations.

All deviations from the above standards are documented, and the regional and special structures inspection supervisors shall dialogue one-on-one with the Team Leader responsible for the report concerning all deviations. It is the responsibility of the team leader’s direct supervisor to determine if more training is necessary for the Team Leader to ensure consistency of the bridge inspection reports. A field review form is included in Appendix 7-G.

## 7-7 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.

### 7-7.1 *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:

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.

### 7-7.2 *Field Review of Underwater Bridge Inspections*

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

## 7-8 WSDOT Bridge Preservation Office Quality Assurance Program

### 7-8.1 *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 23 CFR 650.307 through 23 CFR 650.315 and 23 CFR 650.507 through 23 CFR 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.

### 7-8.2 *Definitions*

Quality assurance (QA) is defined in 23 CFR 650.305 and 23 CFR 650.505 as the use of sampling and other measures to ensure 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.

## 7-8.3 *Timeframe of the Quality Assurance Evaluation*

QA will be conducted on bridges inspected in the previous inspection season. See Appendix 7-H for details on the selection process.

## 7-8.4 *Personnel*

To meet the federal requirement identified in 23 CFR 650.307(e), 23 CFR 650.313(p), 23 CFR 650.507(e), and 23 CFR 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.

## 7-8.5 *Quality Assurance*

The QA program treats the separate units within BPO as one when evaluating 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-H:
   - Contents of bridge letter and electronic files (see Appendix 7-I).
   - Load ratings.

   Review of load rating information:
   - Load posting at bridge matches that of load rating documentation.
   - Reported load rating factors match information recorded on load rating summary sheet.
   - Summary sheet in the letter file is signed and stamped by Engineer of Record (EOR).

   Inspection reports:
   - Appropriate report forms:
     - NSTM report
     - Underwater Inspection report
     - Complex Feature Inspection report
     - Damage inspections
   - Bridges on 48-month interval.
   - 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-H:
   - Appropriate forms used.
   - NBI/SNBI coding and element level 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-H for details.
   - Individual QA field and office reports for each bridge selected.
   - Findings (from both office and field procedures).
   - Recommendations to management.

## 7-9 Appendices

| | |
|---|---|
| Appendix 7-A | Vacated |
| Appendix 7-B | Vacated |
| Appendix 7-C | WSBIS Fields Maintained With Other WSDOT Database Source Information |
| Appendix 7-D | Bridge Preservation Office Lead Approval Criteria |
| Appendix 7-E | Bridge Preservation Office Quality Control Review Tracking Form |
| Appendix 7-F | Bridge Preservation Office Quality Control Report Review Tracking Form |
| Appendix 7-G | Bridge Preservation Office Quality Control Field Review Form |
| Appendix 7-H | Bridge Preservation Office Quality Assurance Bridge Selection Process |
| Appendix 7-I | Bridge Preservation Quality Assurance Bridge File Review |

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# *Appendix 7-A Vacated*

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# *Appendix 7-B Vacated*

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# *Appendix 7-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 (new SNBI fields will be identified in 2025):

   **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.

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# *Appendix 7-D Bridge Preservation Office Lead Approval Criteria*

Please use the following criteria to help you determine which reports can be sent directly to the Bridge Information Group without further review by a supervisor or a second Team Leader.

A "Bridge Inspection Report" that fits any one of the following nine criteria must be reviewed by a Regional Bridge Inspection Engineer or a second Team Leader.

1. If NBI codes for Deck Overall, Superstructure or Substructure are less than "6".
2. Structures with repairs or conditions to be monitored (excluding 'J' type repairs).
3. New bridge structures (Initial Inspections).
4. Interim Inspections to monitor deterioration of BMS elements.
5. NSTM bridges.
6. Local Agency bridges.
7. UBIT Bridge Inspections with NBI codes for Deck, Superstructure or Substructure are less than 6.
8. Any inspection with a interval >24 months.
9. Any bridge that is currently having issues with scour.
10. Any time an inspection/report type and/or interval is either changed, added, or deleted.

Additionally, the Team Leader may submit for review any report that the Team Leader feels needs further input from the Regional Bridge Inspection Engineer.

For quality assurance reasons, the "Bridge Inspection Report" can be randomly reviewed at the Regional Bridge Inspection Engineer's option.

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# *Appendix 7-E Bridge Preservation Office Quality Control Review Tracking Form*

## 2011 Inspection Report Status

| | Total | Structure ID | Bridge Number | Bridge Name | Lead Inspector | CO-Inspector | Inspection Date | Date Received | Non UBIT Totals = 10 | | | | | UBIT Totals= 10 | | | | | | Returned to Lead |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Routine | Short | Damage | Interim | Safety | Hours | Routine | Interim | F.C. | Special | UBIT Hours | |
| | | | | | | | | | 8 | 0 | 1 | 0 | 1 | 10.5 | 3 | 1 | 6 | 0 | 107.5 | |
| Routines | 1 | 0009245A | 16/120 | OLYMPIC DR NW OVER SR 16 | WDS | HDR | 1/4/11 | 1/6/11 | | | 1 | | | 1.5 | | | | | | 1/6/11 |
| | 2 | 0017677A | 285/10P | GEORGE SELLAR PED TUNNEL | GAS | GAS | 1/8/11 | 3/21/11 | | | | | 1 | 1.0 | | | | | | 3/22/11 |
| | 3 | 0013077C | 2/101 | SLOUGH | DCC | TKK | 4/7/11 | 5/4/11 | 1 | | | | | 1.0 | | | | | | 5/6/11 |
| | 4 | 0013077D | 2/102 | STREAM | DCC | TKK | 4/7/11 | 5/4/11 | 1 | | | | | 1.0 | | | | | | 5/6/11 |
| | 5 | 0006347A | 9/117 | SNOHOMISH R OVERFLOW | DCC | TKK | 4/7/11 | 5/4/11 | 1 | | | | | 1.0 | | | | | | 5/6/11 |
| | 6 | 0008375C | 405/103E | 228TH ST OC | DCC | TKK | 4/4/11 | 5/4/11 | 1 | | | | | 1.0 | | | | | | 5/6/11 |
| | 7 | 0008375D | 405/103W | 228TH ST OC | DCC | TKK | 4/4/11 | 5/4/11 | 1 | | | | | 1.0 | | | | | | 5/6/11 |
| | 8 | 0008673D | 512/23N | FRUITLAND AVE OC | DCC | TKK | 4/4/11 | 5/4/11 | 1 | | | | | 1.0 | | | | | | 5/6/11 |
| | 9 | 0008673C | 512/23S | FRUITLAND AVE OC | DCC | TKK | 4/4/11 | 5/4/11 | 1 | | | | | 1.0 | | | | | | 5/6/11 |
| | 10 | 0008761A | 522/142 | SR 522 OVER W MAIN ST | DCC | TKK | 4/7/11 | 5/4/11 | 1 | | | | | 1.0 | | | | | | 5/6/11 |
| UBITS | 1 | 0003477A | 285/10 | SEN. GEORGE SELLAR BR. | GFC | ABK | 1/8/11 | 1/ /11 | | | | | | | | | 1 | | 28.0 | 1/27/11 |
| | 2 | 0002001B | 2/215 | WENATCHEE R | DCC | TKK | 4/5/11 | 4/11 | | | | | | | | | 1 | | 7.0 | 5/10/11 |
| | 3 | 0002657A | 207/4 | WENATCHEE RIVER | DCC | TKK | 4/6/11 | 5/4/11 | | | | | | | | | 1 | | 8.0 | 5/10/11 |
| | 4 | 0008116A | 5/345W | NISQUALLY R | DAG | AES | 4/17/11 | 4/11 | | | | | | | | | 1 | | 14.0 | 5/10/11 |
| | 5 | 0013731C | 504/36 | MARATTA CREEK | RAA | RCD | 5/5/11 | 5/ /11 | | | | | | | 1 | | | | 2.5 | 5/12/11 |
| | 6 | 0005358A | 509/30 | DRY GULCH | RAA | RCD | 4/30/11 | 5/12/11 | | | | | | | | 1 | | | 1.0 | 5/12/11 |
| | 7 | 0013620A | 504/27 | HOFFSTADT CREEK | RAA | RCD | 5/5/11 | 5/6/11 | | | | | | | | | 1 | | 23.0 | 6/6/11 |
| | 8 | 0002069A | 5/345E | NISQUALLY RIVER | RAA | RCD | 5/1/11 | 5/ /11 | | | | | | | | | 1 | | 18.0 | 6/7/11 |
| | 9 | 0008175E | 167/127E | BN RR OC (NP) | RAA | RCD | 5/ /11 | 6/8/11 | | | | | | | 1 | | | | 3.0 | 6/8/11 |
| | 10 | 0008175F | 167/127W | BN RR OC (NP) | RAA | RCD | 5/ /11 | 6/8/11 | | | | | | | 1 | | | | 3.0 | 6/8/11 |

EXAMPLE

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# *Appendix 7-F Bridge Preservation Office Quality Control Report Review Tracking Form*

## 2011 REPORT REVIEW STATUS

| REVIEW DATE | REPORT DATE | 006/115 | INSPECTOR | APPROVAL STATUS | COMMENTS |
|---|---|---|---|---|---|
| 03/26 | 02/28 | 006/101 | FPP/WAW | AAN | |
| 03/29 | 03/19 | 099/540NB | DCC/GAS | AAN | |
| 03/29 | 03/19 | 099/540SB | DCC/GAS | AAN | |
| 03/30 | 03/20 | 099/540W-S | DCC/GAS | APPROVED | |
| 03/30 | 03/07 | 08507600 | WDS/AES | AAN | LA Centralia |
| 03/30 | 03/21 | 08039100 | WDS/TJN | APPROVED | LA Klickitat County |
| 03/30 | 03/21 | 08118500 | WDS/TJN | AAN | LA Klickitat County |
| 03/30 | 03/08 | 08201200 | WDS/AES | AAN | LA Lewis County |
| 03/31 | 03/24 | 08647200 | WDS/SMP | AAN | LA State Park |
| 03/31 | 03/23 | 08276000 | WDS/TJN | AAN | LA Clark County |
| 03/31 | 03/22 | 0012160A | WDS/TJN | AAN | LA Skamania County |
| 03/31 | 03/22 | 08218700 | WDS/TJN | AAN | LA Klickitat County |
| 03/31 | 03/07 | 08288400 | JED/TJN | AAN | LA Yakima County |
| 04/01 | 03/08 | 08396900 | JED/TJN | AAN | LA Yakima County |
| 04/01 | 03/07 | 08651000 | JED/TJN | AAN | LA Skamania County |
| 04/04 | 03/17 | 08271700 | DAG/TJN | AAN | LA Cowlitz County |
| 04/04 | 03/15 | 08557500 | DAG/TJN | AAN | LA Longview |
| 04/04 | 03/15 | 08558400 | DAG/TJN | AAN | LA Longview |
| 04/04 | 03/03 | 0009236C | DAG/TKK | APPROVED | LA Cowlitz County |
| 04/05 | 03/03 | 167/112W | DAG/TKK | AAN | |
| 04/05 | 02/28 | 167/110 | DAG/TKK | AAN | |
| 04/05 | 03/03 | 167/116 | DAG/TKK | APPROVED | |
| 04/05 | 03/03 | 167/112W-N | DAG/TKK | AAN | |
| 04/05 | 03/03 | 167/111W-N | DAG/TKK | AAN | |
| 04/05 | 03/02 | 167/123W | DAG/TKK | AAN | |
| 04/05 | 03/02 | 167/129 | DAG/ | AAN | |
| 04/05 | 03/02 | 167/131.25 | DAG/TKK | AAN | |
| 04/05 | 03/28 | 0010756A | DAG/HDR | AAN | LA Cowlitz County |
| 04/05 | 03/29 | 08492300 | DAG/HDR | AAN | LA Cowlitz County |
| 04/05 | 03/14 | 0003093A | DAG/TJN | AAN | LA Kelso |
| 04/06 | 03/09 | 08230200 | WDS/AES | AAN | LA Cowlitz County |
| 04/06 | 03/31 | 08164100 | DAG/ | AAN | LA Cowlitz County |
| 04/06 | 03/03 | 005/626.5A | JHL/RCD | APPROVED | |
| 04/06 | 03/01 | 020/223N | JHL/RCD | APPROVED | |
| 04/06 | 03/02 | 005/706 | JHL/RCD | AAN | void under south approach |
| 04/06 | 03/03 | 005/651W | JHL/RCD | AAN | |
| 04/06 | 03/02 | 005/708 | JHL/RCD | AAN | |
| 04/06 | 03/03 | 005/726E | JHL/RCD | APPROVED | |

EXAMPLE

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# *Appendix 7-G Bridge Preservation Office Quality Control Field Review Form*

**Field Review**

**2012 WASHINGTON STATE QUALITY CONTROL REVIEW**

**Bridge Number:** _____ Bridge Name: _____
**Inspectors:** _____ QC Reviewer: _____
**Inspection Date:** _____
**Frequency:** _____
**Previous Report Date** _____

| Description of Quality Control Method |
|---|
| |
| Are all the applicable FHWA items for the structure properly coded? Yes _____ No _____ |
| |
| Are all the BMS elements for the structure correctly identified? Yes _____ No _____ |
| |
| Are all the BMS element condition states for the structure properly coded? Yes _____ No _____ |
| |
| Do the BMS codes support the NBI Codes? Yes _____ No _____ |
| |

**Field Review**

## 2012 WASHINGTON STATE QUALITY CONTROL REVIEW

**Bridge Number:** _____ Bridge Name: _____

**Inspectors:** _____ QC Reviewer: _____

**Inspection Date:**

| | |
|---|---|
| Does the verbiage within the report support the condition states? | Yes _____ No _____ |
| | |
| Were proper safety procedures practiced? | Yes _____ No _____ |
| | |
| Are the existing repairs supported by the inspection findings? | Yes _____ No _____ |
| | |
| Are improvement processes necessary? | Yes _____ No _____ |
| | |

**(page 2 of 2)**

# *Appendix 7-H Bridge Preservation Office Quality Assurance Bridge Selection Process*

This appendix describes two possible methods for selecting a random sample for QA. The goal of the program is to QA approximately 5% of bridges inspected each calendar year.

The first method, like the NBIP compliance review trips performed in Washington state, the QA selection process may use a three-year cycle in which bridges are selected from two different regions each year. In this three-year cycle, a random set of state bridges are selected and receive a QA inspection from two 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 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 second method will take a random set of state bridges representing all six regions within the state. Due to the disparity in the number of bridges within each region and to get a representative sample, this method may be required. Bridges within the Northwest Region will represent the largest percentage of the random sample due to the number of bridges within that region.

The final list developed prior to generating a random sample is screened for inspection types that consist of a reportable Routine type inspection. 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 a 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 maximum of five bridges previously receiving a QA 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 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.

The following list identifies categories used to help evaluate whether or not the random selection is representative sample of the previous season's 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.

- Region
- Scour Code
- Primary Material Type
- Open/Closed/Posted
- Primary Design Type
- Year Built
- Inspection Type
- Inspection Interval
- By Team Leader
- NBI Reportable
- Bridge Length
- 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.

# *Appendix 7-I Bridge Preservation Quality Assurance Bridge File Review*

The following is a list of contents in a typical bridge file for structures owned by the State of Washington which also includes Washington State Ferries (WSF) structures.

- Letter file contents include:
- Deck and Elevation Photos (More recent photos are stored on BEISt)
- Vicinity map
- Load Rating summary sheet
- Scour Summary sheet**
- Signed Inspection reports
- NSTM Inspection report*
- Complex Feature Inspection report*
- Underwater (U/W) Inspection report*
- WSBIS forms (in file drawer)
- Correspondence
- Maintenance records
- Plan sheets (Most plans are stored on BEISt)

*For bridges that may include an underwater, NSTM and/or Complex Feature inspections.
**For bridges over water.

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# Chapter 8 Electrical and Mechanical

## 8-1 General

The National Bridge Inspection Standards (NBIS)/National Tunnel Inspection Standards (NTIS), 23 CFR 650, requires that complex bridges and tunnels have specialized inspection procedures, and additional inspector training. These structures have numerous mechanical and electrical systems requiring inspection, troubleshooting, repair, and rehabilitation. This chapter serves as a guideline to illustrate inspection and reporting procedure as followed by the Complex Bridge and Tunnel section of the Bridge Preservation Office.

### 8-1.1 *References*

Inspection staff may refer to the following:

- AASHTO *LRFD Movable Highway Bridge Design Specifications*, 2023
- AASHTO *Movable Bridge Inspection, Evaluation, and Maintenance Manual*, 2024
- AASHTO *Standard Specifications for Movable Highway Bridges*, 1988
- FHWA *Bridge Inspector's Manual for Movable Bridges* IP 77-10
- *Emergency Operations Manual* M 54-11
- Blue Ribbon Commission, Resolution No. 398
- FHWA *Tunnel Operations, Maintenance, Inspection and Evaluation* (TOMIE) *Manual*, 2015
- FHWA *Specifications for the National Tunnel Inventory*, 2015

### 8-1.2 *Definitions*

Some definitions for use with this chapter are as follows:

**Complex Bridge** – Complex bridges are defined in the NBIS as movable, suspension, cable stayed, and other bridges with unusual characteristics.

***Complex bridges in Washington are referred to as "Complex Feature" bridges where discussed in other chapters of this manual.***

**Complex Tunnel** – Complex tunnels are defined in this manual as tunnels characterized by advanced or unique structural elements or functional systems.

**National Bridge Inspection Standards (NBIS)** – Title 23 Code of Federal Regulations 650 Part C defines the NBIS regulations, and establishes requirements for inspection procedures, interval 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 Tunnel Inspection Standards (NTIS)** – Title 23 Code of Federal Regulations 650 Subpart E defines the NTIS regulations, and establishes requirements for inspection procedures, interval 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.

See Section 1-1.1 for additional definitions used in this manual.

## 8-2 Description of Complex Bridges and Tunnels

In accordance with the description of the Bridge Inspection Organization offered in Section 1-2, a bridge inspection program/tunnel inspection program as required by the NBIS and NTIS has been constructed to ensure safe and reliable operation of electrical/mechanical systems present on the bridges and tunnels listed in Appendix 8-E.

The Complex Bridge and Tunnel section is staffed by individuals, specialized in electrical or mechanical engineering, who have defined roles and responsibilities. Their roles and qualifications are as follows:

### 8-2.1 *Delegated Program Manager (DPM)*

A delegated program manager assumes some functions for the statewide program manager for the selected subset of structures under their direct control. To qualify as a delegated program manager, the individual must meet, at a minimum, the requirements as follows:

1. The individual in charge of the organizational unit that has been delegated the responsibilities for bridge inspection, reporting, and inventory shall possess the following minimum qualifications:
    a. Be a registered professional engineer in the State of Washington; or
    b. Have a minimum of 10 years' experience in complex bridge or tunnel inspection assignments in a responsible capacity.

***Note:*** Although DPMs perform functions for the bridge inspection organization, overall responsibility for NBIS compliance still resides with the Statewide Program Manager.

### 8-2.2 *Electrical/Mechanical Complex Bridge Lead Inspector (CBLI)*

A CBLI is in charge of inspections and is responsible for planning, preparing, performing the field inspection of bridges/tunnels, and reporting observations/findings. The CBLI 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 CBLI, the individual must meet, at a minimum, the requirements as follows:

(a) An individual in charge of an inspection team shall possess the following minimum qualifications:
    (1) Be a registered professional engineer in the State of Washington.
    (2) Have a minimum of 4 years' experience in complex bridge or tunnel inspection.

A continued certification of complex bridge inspection personnel has been developed in order to ensure that all program managers and CBLIs are kept up to date with the latest practices and technology in the areas of complex bridge and tunnel inspections. The continued certification of complex bridge inspection personnel is detailed in Appendix 8-D.

## 8-3 Inspections

Several different types of inspections are in place to adhere to the requirements of the NBIS and NTIS. This section identifies and describes the inspection types and reporting procedures used for mechanical and electrical inspections by the Bridge Preservation Office (BPO).

## 8-3.1 *Routine Inspections*

Regularly scheduled comprehensive safety and operational reliability inspections encompassing all mechanical/electrical elements of the structures listed in Appendix 8-E. Routine inspections are performed by a licensed professional engineer to evaluate safety as well as whether the electrical and mechanical systems are performing as designed, identify any changes from initial or previously recorded conditions, and ensure that electrical and mechanical components of structures pertaining to the Complex Bridge and Tunnels section continue to satisfy present service requirements.

1. **Interval** – Routine electrical and mechanical inspections are conducted at a maximum of every 24 months as required by NBIS, Section §650.311 and NTIS, Section §650.511. Every complex bridge is inspected annually as suggested by AASHTO *Movable Bridge Inspection, Evaluation, and Maintenance Manual* Chapter 2.3 and required by the *Transportation Structures Preservation Manual*, Bridge Inventory and Inspection Rules.
2. **Inspecting Methodology** – Critical electrical and mechanical components are visually and operationally inspected. Non-destructive testing methods adhering to guidelines established by the AASHTO *Movable Bridge Inspection, Evaluation, and Maintenance Manual* Chapter 2, are used in evaluation of bridge components as well. Following these procedures throughout routine inspections helps ensure the safety and operational reliability of the mechanical and electrical systems by providing a thorough and comprehensive inspection.
3. **Inspection Report** – A routine inspection report (RIR) shall be prepared at the completion of each routine inspection to record the inspection findings, provide a narrative description of conditions at the site, and note any changes in the coding information. The CBLI shall record and submit the findings of the routine inspection into BridgeWorks as follows:
    a. At the conclusion of the routine inspection, confirm the Numerical Rating Condition (NRC), Appendix 8-C, coding for the various elements and make any changes necessary. Complete the narrative portion corresponding to any condition rating change describing the existing condition of its respective element. For tunnels, the FHWA *Specifications for the National Tunnel Inventory* is used as a guideline for rating tunnel specific elements which are submitted to the NTI by the following process:
        - Tunnels with mechanical and/or electrical elements are entered into Bridgeworks by the CBLIs via the corresponding RIR. The same table is attached to both reports in cases where a structure has both mechanical and electrical elements. Condition states and quantities are the same in both RIRs when a tunnel has both mechanical and electrical elements.
        - Every NTI table included in a RIR contains a complete set of Mechanical, Electrical, Fire/Life Safety/Security Systems and Signs NTI elements with quantities other than zero for applicable elements to the structure.
        - All applicable electrical and mechanical elements are then combined with the structural elements from the structural inspection for submittal to the NTI. These elements are always pulled from the NTI table of the Electrical RIR. See Chapter 9 for inspection responsibilities between the structural and mechanical/electrical inspectors.

b. Enter onto the inspection report: CBLI initials, CBLI identification number, date of inspection, total number of crew hours at the site, average bridge openings per month since last inspection, average marine traffic bridge openings per month since last inspection, average maintenance bridge openings per month since last inspection, and the number of inspection bridge openings.

c. Prepare a list of 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. Assign each repair a priority level. Text describing each repair should appear in the relevant element description. Deficiency photos are to be referenced in the column alongside the element description as well as the repair.

## 8-3.2 *Blue Ribbon Inspections*

Shall be unannounced random inspections intended to assess the reliability of the mechanical and electrical systems, identify needed preventative maintenance activities and develop the scope of required rehabilitation projects on the floating bridges. Blue ribbon inspections and the corresponding reports are completed by consultants considered to be experts in their field, managed by CBLIs, in accordance with Resolution No. 398. When blue ribbon electrical and mechanical inspections are performed, they are used in conjunction with the routine inspection for that structure.

1. **Interval** – Due to permissions granted by the Bridge and Structures Engineer in 1994, blue ribbon inspections shall be conducted unannounced at least once every two years. This augmentation to the original annual inspection schedule recommended by Resolution No. 398 is provided in the memo in Appendix 8-A.

2. **Inspection Methodology** –Blue ribbon inspections consist of visual and operational inspection of the electrical and mechanical systems. Disassembly of electrical and mechanical components for closer inspection is also conducted throughout these inspections to gather a higher level of detail than is typical in the routine inspections. Non-destructive testing methods adhering to guidelines established by the AASHTO *Movable Bridge Inspection, Evaluation, and Maintenance Manual* Chapter 2, are used in evaluation of bridge components as well. Following these procedures throughout blue ribbon inspections helps ensure the safety and operational reliability of the mechanical and electrical systems by providing a thorough and comprehensive inspection.

3. **Reporting** – After completion of a blue ribbon inspection a RIR is to be entered into BridgeWorks in the same fashion as outlined in Section 8-3.1.3. In addition to this RIR another inspection report is to be generated by a consulting engineer. Consultant reports are detailed reports to be formatted as dictated by the document provided in Appendix 8-B. These reports include identified deficiencies, recommended actions to correct deficiencies, and cost estimates to complete recommended rehabilitation items. The DPM will coordinate the implementation of the recommended repairs and rehabilitation items with the Region maintenance staff.

## 8-3.3 *In-Depth Inspection*

Shall be a close-up inspection of one, several, or all electrical and mechanical elements to identify any deficiencies not readily detectable using routine inspection procedures. The results of these inspections are used to assess the reliability of mechanical and electrical systems, identify needed preventative maintenance activities, review and correct as-built schematics, review and correct OIM manuals, and develop the scope of required

rehabilitation projects. In-depth electrical and mechanical inspections are used in conjunction with the routine inspection. Consultants, specialized in the specific field of interest, are used in conducting these inspections due to constant change in demand of disciplines, equipment, and vendors needed to accomplish the various in-depth inspections. Consulting engineers are managed by CBLIs in the same manner as those used in blue ribbon inspections.

1. **Interval** – An in-depth inspection shall be performed in conjunction with a routine inspection every six years in accordance with the AASHTO *Movable Bridge Inspection, Evaluation, and Maintenance Manual* Chapter 2 Section 2.2.3. An in-depth inspection may also be performed as a follow-up inspection to a routine or blue ribbon inspection to better identify any deficiencies found. The first inspection on a new or rehabilitated structure shall be an in-depth inspection in order to establish a detailed baseline for the structure file.
2. **Inspection Methodology** – In-depth inspections consist of visual and operational inspections of the electrical and mechanical systems. Extensive disassembly of electrical and mechanical components for closer inspection is conducted throughout these inspections to gather a higher level of detail than is typical in blue ribbon and routine inspections. Non-destructive testing methods adhering to guidelines established by the AASHTO *Movable Bridge Inspection, Evaluation, and Maintenance Manual* Chapter 2, are used in evaluation of bridge components as well. Following these procedures throughout in-depth inspections helps ensure the safety and operational reliability of the mechanical and electrical systems by providing a thorough and comprehensive inspection.
3. **Reporting** – After completion of an in-depth inspection an RIR is to be entered into BridgeWorks in the same fashion as outlined in Section 8-3.1.3. In addition to this RIR another inspection report is to be generated by a consulting engineer. Consultant reports are detailed reports to be formatted as dictated by the document provided in Appendix 8-B and 8-G. These reports include identified deficiencies, recommended actions to correct deficiencies, and cost estimates to complete recommended rehabilitation items. The DPM will coordinate the implementation of the recommended repairs and rehabilitation items with the Region maintenance staff.
4. **Specialized Inspections** – Occasionally certain components/systems have their own specialized inspections carried out separately. Examples of components/systems that may require special inspections are trunnion bearings, counterweight ropes, and cathodic protection. Each of these inspections is functionally an in-depth inspection, pertaining only to that component or system, which are conducted and reported as such. This practice is suggested by AASHTO *Movable Bridge Inspection, Evaluation, and Maintenance Manual* Chapter 2 Section 2.2.4.

## 8-4 Complex Bridge and Tunnel QC/QA Program

The CBLIs review 100% of inspection reports under their responsibility prior to release. The majority of inspections involving the Complex Bridge and Tunnel section only concern one inspection engineer of each discipline. If multiple CBLIs of the same discipline participated in an inspection then that report will be reviewed by both engineers prior to submittal to the DPM.

An effort shall be made to rotate which CBLIs conduct routine inspections on each structure on an annual basis to add variation to the Complex Bridge and Tunnel section's internal QC program.

The DPM reviews 100% of all Complex Bridge and Tunnel reports under his area of responsibility prior to release.

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

- **Inspection Type** – The appropriate inspection types are identified.
- **Inspection Date** – Ensure that bridges are inspected on time.
- **Inspection Interval** – Verify that inspection interval is based on condition or policy (i.e., 12 month interval criteria).
- **Inspection Hours** – Verify that the correct inspection hours are reported based on history of previous report hours, structure type and condition.
- **Organization of Report** – Verify that the report is organized, understandable, uses correct photo and file references that follow office policy.
- **Inspection Resources** – Verify that the appropriate resources needed for safety, access, and adequate inspection are being used.
- **NRC Codes** – Verify that the Numerical Rating Condition codes are supported by inspection report content. Coding information available in Appendix 8-C.
- **Elements** – Verify that the elements are complete and accurate.
- **Repair Recommendations 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.

Utilizing consultants on blue ribbon and in-depth inspections serves to act as QA for the Complex Bridge and Tunnel section. An effort is made to rotate which consultant conducts each blue ribbon or in-depth inspection. This process helps to ensure delivery of a comprehensive and high quality inspection program.

## 8-5 Tunnel Inspection Duties

Routine inspections of the electrical and mechanical systems present in highway tunnels are to be conducted at a maximum of 24 month intervals. Routine inspections result in an inspection report created and submitted through BridgeWorks. In-depth inspections result in detailed consultant reports that are reviewed by CBLIs in addition to a standard RIR. In-depth inspections of the mechanical and electrical systems are to be conducted at least once every six years on complex tunnels. Maintenance and inspection guidelines for mechanical and electrical systems present in tunnels are outlined in the FHWA *Tunnel Operations, Maintenance, Inspection and Evaluation* (TOMIE) *Manual*.

## 8-6 Complex Bridge and Tunnel Records

### 8-6.1 *Operation, Inspection and Maintenance Manuals*

*Operation, Inspection, and Maintenance (OIM) Manuals* developed by the Bridge Preservation Office as mandated by *Transportation Structures Preservation Manual* M 23-11 exist for nearly all complex bridges in WSDOT's inventory. OIM manuals contain important information relevant to their corresponding structure including but not limited to specific operational procedures, emergency procedures, recommended maintenance scheduling and procedure,

as well as inspection procedures. OIM manuals are invaluable for planning of inspection and maintenance activities. They are a source of information recommended by AASHTO *Movable Bridge for Inspection, Evaluations, and Maintenance Manual* Section 2.6.1.1 and AASHTO *LRFD Movable Highway Bridge Design Specifications* Section 1.7.1.1. Critical information needs mentioned in FHWA *Tunnel Operations, Maintenance, Inspection and Evaluation* (TOMIE) *Manual* Sections 2.4 and 3.3 are standard in an OIM manual.

Both of these manuals as well as any as-builts must be periodically updated as structures are rehabilitated and the information contained within them becomes obsolete. Region(s) input is invaluable in the process of creating OIM manuals and correctly identifying operating procedures for each structure. OIM Manuals are developed partially using the Operations and Maintenance (O&M) manuals provided to WSDOT as a result of *Standard Specifications* Section 1-06.5. O&M manuals consist of catalog cuts or shop drawings of each piece of equipment found on its corresponding structure. Contract documents, special provisions, and as-builts are also used in the process of generating the OIM manual.

Master copies of each OIM manual are retained by the BPO and the regions are provided with copies of every manual relevant to their bridges. A complete list of OIM manuals developed by the BPO is included in Appendix 8-F.

### 8-6.2 *Structure Files*

Every complex bridge and tunnel has its own structure file maintained in accordance with the standards set in Chapter 2 of this manual to satisfy the FHWA. The physical location of structure file documents is indicated in Appendix 2-A "Bridge Preservation Floor Plan." A more detailed explanation of the legend is as follows:

- "B- Movable Bridge Files" refers to project files, signed copies of every bridge inspection report, signed copies of every tunnel inspection report, contract documents, microfilm cards and antiquated pictures from old inspections.
- "F- Letter Files" refers to the movable bridge letter files as well as reports generated by consultants. These reports are the original stamped and signed copies that come as a result of a Blue Ribbon inspection or an In-Depth inspection.

The current Routine and In-Depth inspection databases containing inspection dates and intervals for scheduling purposes are available to view on the Corporate drive. These files are only editable by members of the Complex Bridge and Tunnel section. These databases are available along the following file path on the Corporate drive: \Data\Bridge\Movable. Folders labeled "Routines" and "In-Depth Database" contain the relevant files.

## 8-7 Bridge Damage/Emergency Responsibilities

As dictated in the WSDOT *Emergency Operations Plan* M 54-11 BPO personnel are provided with emergency responder training. The BPO employs multiple mechanical and electrical engineers with offset schedules such that in the event of an emergency situation involving an electrical or mechanical component failure, personnel will be available to provide technical assistance to the Region(s). Should an emergency situation occur the Region(s) are to contact the BPO at which point technical assistance will be dispatched. After any emergency response situation the CBLI onsite for the incident shall prepare a report to be distributed amongst the BPO and the Region(s) via email. The BPO can always be reached via the emergency response phone at 360-480-4500.

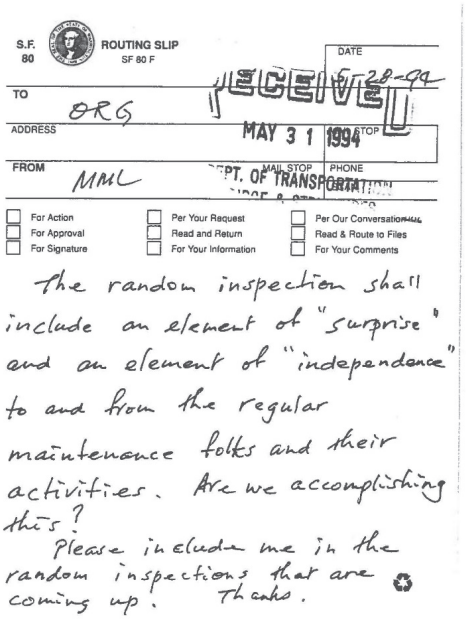
## 8-8 Plans, Specifications and Estimates

The BPO assists the region with preparation of Plans, Specifications & Estimates documentation for the purpose of special inspections, requiring consultants, as well as rehabilitation activities. In the event electrical and mechanical components need to be acquired through the bidding process, the BPO provides assistance to the region with preparation of the proper documentation. During construction of repairs or rehabilitation of structures the BPO is available to assist the Region(s) and the Project Engineer Office as needed.

## 8-9 Appendices

| | |
|---|---|
| Appendix 8-A | BPO Memo for Blue Ribbon Inspection Schedule Alteration |
| Appendix 8-B | Guideline for Writing Bridge Electrical and Mechanical Inspection Reports |
| Appendix 8-C | Numerical Rating Condition Description |
| Appendix 8-D | Continued Certification of Bridge Inspection Personnel |
| Appendix 8-E | Complex Bridge and Tunnel Inspection List |
| Appendix 8-F | Operations, Inspection, and *Maintenance Manual* List |
| Appendix 8-G | Guideline for Writing Tunnel Electrical and Mechanical Inspection Reports |

# *Appendix 8-A BPO Memo for Blue Ribbon Inspection Schedule Alteration*



S.F. 80 ROUTING SLIP SF 80 F

DATE 5-28-94

TO ORG

ADDRESS

RECEIVED MAY 31 1994

STOP

FROM MML

MAIL STOP DEPT. OF TRANSPORTATION PHONE

☐ For Action ☐ Per Your Request ☐ Per Our Conversation
☐ For Approval ☐ Read and Return ☐ Read & Route to Files
☐ For Signature ☐ For Your Information ☐ For Your Comments

The random inspection shall include an element of "surprise" and an element of "independance" to and from the regular maintenance folks and their activities. Are we accomplishing this?

Please include me in the random inspections that are coming up. Thanks.

Washington State Department of Transportation

Memorandum

Date: May 10, 1994

From: O. R. George ORG
Phone: 753-4739

Subject: Proposed Schedule For Floating Bridge Random Inspections

To: M. Myint Lwin
Bridge & Structures - 7340

Random inspections of the four floating bridges are conducted by our office as outlined in the attached June 8, 1993 memorandum from A. H. Walley to S. A. Moon. We propose to delay the mechanical and electrical inspections on the Evergreen Point Bridge (520/8) until 1995 due to the major mechanical and electrical renovations taking place this summer. Inspections by our office during the construction phase would be redundant since the designer, Sverdrup Corporation will be assisting with construction services.

We also propose to conduct the first electrical random inspection on the Lacey V. Murrow Bridge (90/25S) in 1995. This first inspection will be within 2 years of opening the bridge to traffic and will meet the requirements of the June 8, 1993 memorandum. It was determined after the 1992 mechanical inspection of the Third Lake Bridge (90/25N) that mechanical inspections on both of the I-90 floating bridges are not needed due to their lack of mechanical components.

When in-depth mechanical/electrical inspections performed by consultants coincide with the random mechanical/electrical inspections, we will use the in-depth inspections in place of the random inspections. This occurs on the Hood Canal Bridge in 1994 and is denoted on the schedule by an asterisk.

With your approval, we would like to adopt the inspection schedule shown below which allows us to conduct 1 mechanical and 2 electrical inspections per year, rather than 2 mechanical and 4 electrical inspections every other year.

RECEIVED
MAY 12 1994
DEPT. OF TRANSPORTATION
BRIDGE & STRUCTURES

DOT 700-008X
Revised 6/92

M. Myint Lwin
May 10, 1994
Page 2

Inspection Schedule

| Bridge No. | Water-Tightness* | Electrical | Mechanical |
|---|---|---|---|
| 90/25S | Annually | 1995, 1997, ... | NA** |
| 90/25N | Annually | 1994, 1996, ... | NA** |
| 104/5.1 & 5.2 | Annually | 1994*, 1996, ... | 1994*, 1996, ... |
| 520/8 | Annually | 1995, 1997, ... | 1995, 1997, ... |

* In-depth electrical/mechanical inspections by consultants

** Random mechanical inspections not needed, as determined after the 1992 random mechanical inspection on 90/25S.

* Shall include inspection/testing of sensors piping system and pumps.

ORG:jj
MPP/DLS
Attachment

Approval: Myint Lwin Date: 5-28-94
M. MYINT LWIN, P.E.
Bridge and Structures Engineer

Washington State Department of Transportation

Memorandum

Date: June 8, 1993

From: A. H. Wall
J. F. Conrad

Subject: Floating Bridge Random Inspections

Thru: E. R. Burch
J. R. Buss

To: S. A. Moon

As directed by the Transportation Commission, random inspections have been conducted on the three state floating bridges. Based on our office's evaluation of the initial inspections, we request your approval of the following proposals on the process to be used in the future:

1. Responsibility for planning and conducting the random inspections should be delegated to the Bridge Office, and clearly defined in Directive D23-11.

2. A report on findings on each inspection should be prepared by the Bridge Office and sent to the Chief Maintenance Engineer for further transmittals to the districts.

3. Annual random inspections should be conducted to verify water-tightness of the bridge pontoons.

   Random inspections focusing on reliability of mechanical and electrical systems of the bridges should be conducted at two year intervals.

The following background is provided to assist in your consideration of the above proposals:

The Report issued on May 2, 1991 by the Blue Ribbon Panel investigating the sinking of the Lacey V. Murrow Bridge included a recommendation for "Independent Random Inspections" of the state's floating bridges. These inspections were to be "in addition to the scheduled major inspections" and were to be conducted "by people not responsible for bridge maintenance". Emphasis of the inspections was to be "placed on the water-tightness of the bridge and on the reliability of electrical and mechanical systems.

S. A. Moon
June 8, 1993
Page 2

Transportation Commission Resolution 398 directed the department to "carefully review, analyze and, if feasible incorporate certain recommendations of the Blue Ribbon Panel". The Resolution's "implementing action document" directs us to address random inspections as follows:

> "The Department will hire a consultant or utilize an independent division internal to the Department to provide random inspections on the floating bridges. These inspections are to occur unannounced at least once a year for each bridge and will be an in-depth review of the water-tightness of the structure plus an inspection of the mechanical and electrical component of each bridge. A detailed report will be required."

Copies of pertinent sections of the Blue Ribbon Panel Report and Resolution 398 are attached.

An initial random inspection was conducted on the Hood Canal, Evergreen Point and 3rd Lake Floating Bridges in August and September of 1992. The inspection team consisted of members from the Bridge and Structures and Marine Transportation Offices and from the office of the State's mechanical and electrical consultant; the Sverdrup Corporation. Reports on inspection findings were prepared by the Bridge Office and provided to the districts through the HQ Maintenance Office. Inspection recommendations are now being implemented or considered for implementation by the districts.

A post inspection review of the random inspection process by our offices led to the recommendations in this letter. Responsibilities for these inspections need to be clearly defined in a Department Directive. Also, although a one year interval for random inspection of pontoon watertightness appears to be appropriate, a longer interval is needed between random inspections of the electrical and mechanical systems. The longer interval is needed to provide sufficient time to cost effectively address any problems identified on these complex systems.

AHW/JFC:sf
ORG
Attachments

Approval: S. A. Moon Date: 6-22-93
Deputy Secretary of Transportation

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# *Appendix 8-B Guideline for Writing Bridge Electrical and Mechanical Inspection Reports*

**GUIDELINE FOR WRITING BRIDGE ELECTRICAL AND MECHANICAL INSPECTION REPORTS FOR WSDOT**

**General - Format and fonts used in the electrical and mechanical inspection reports must be the same. The reports shall be written in the past tense. Single side print. The body of the text shall be left-justified. Condition descriptions shall be consistent with the verbiage in the Numerical Rating Condition Description in Appendix B.**

**See page 5 of 15 for a sample cover page.**

**The first submittal received by WSDOT shall be an unsigned final report. This submittal shall consist of 2 copies of each report. Unsigned final reports shall be signed and dated by person(s) who conducted internal quality control review. The stamp shall remain unsigned.**

**The title of the report and the bridge name and bridge number will be indicated exactly as spelled out in the scope of work for the inspection.**

**A photograph of the general outline of the bridge will appear on the cover of the reports.**

**The Consultant's Company name will appear under the photograph.**

**The PE Seal shall be placed below the photograph on the first submittal but not signed. When the final submittal is ready for the PE Seal it shall be placed on the original report and signed by the Consultant. Color copies will then be made of the original report.**

**The Table of Contents page shall be page number i. Each page of the report will be numbered sequentially and will agree with the page numbers listed in the Table of Contents. Font size shall be No. 12.**

**See page 6 of 15 for a sample Table of Contents.**

**The footers for each report page and appendices shall have the bridge name and number on two lines on the bottom left, the page number in the bottom center and the type of inspection and month and year on two lines on the bottom right. The font shall be No. 10.**

**The font for the report titles and text shall be No. 12. Heading shall be capitalized and bold.**

**The report shall include the following sections in the order listed:**

**The Executive Summary should be brief but give a general assessment of the condition of the bridge systems and major conclusions.**

1 wirgrev16

**The Purpose and Scope of Inspection should state that the purpose of the inspection is to determine the condition of the bridge equipment and identify any deficiencies. The dates of the inspection and the Consultant's Company name should also be indicated. Reference shall be made to the Scope of Work provided by WSDOT in the inspection request for proposal and it shall be attached to the report in Appendix A.**

**See page 7 of 15 for a sample of the Executive Summary and the Purpose and Scope of Inspection.**

**Any deviations from the Scope of Work should be identified with an explanation of why the deviations occurred.**

**Inspection Methodology should briefly describe the type of inspections, tests or measurements performed. The following text shall be included in the Inspection Methodology: "The ratings in this report are based upon the field conditions. These ratings may be low due to conditions that cannot be repaired or do not require immediate rehabilitation. Listed deficiencies are used to identify repair or rehabilitation items. If a component has a Condensed Mechanical/Electrical Rating of minor or moderate deterioration, there may be no associated deficiency or repair item for that component."**

**A general description of the bridge is not required. We know where the bridge is, what river it crosses and how it operates.**

**Inspection Findings shall identify the condition of the systems in the order that they are listed in the Scope of Work. Inspection findings that are not considered repair or rehabilitation items shall be included as observations in paragraph format. All deficiencies shall be identified and reference shall be made to any corresponding photograph. Deficiencies shall be listed in bullet format. Deficiencies that were repaired during the inspection shall be listed in bullet format. The condition statement for each Scope of Work item shall be the last sentence of its respective Inspection Findings section. The photographs shall be the last Appendix in the report except when additional data such as oil sample analysis or other sub-consultant reports are attached. The photos shall be referenced in the body of the report as follows: (See Photo ___ in Appendix ___). Data such as motor currents, insulation resistance, gear tooth measurements, etc. shall be tabulated and included in the Appendices. The tabulated data shall be referenced in the body of the report as follows: (See Table ____ in Appendix ___).**

**See pages 8 and 9 of 15 for a sample of the Inspection Findings section.**

**Conclusions shall summarize major findings and condition of the structure. The conclusion is intended to be brief. Major findings shall be listed in the order in which they appear in the Scope of Work. The Conclusions and Executive Summary should not be identical.**

**Recommendations shall include Emergency Repairs, Maintenance Repairs or Rehabilitation Recommendations. Emergency Repair recommendations which are not addressed during the inspection shall be made in writing within 48 hours of the finding from the Consultant to the Bridge Preservation Engineer. Recommendations for Maintenance Repairs must be within the capabilities of the available maintenance forces. The order of the Maintenance Repairs shall match the order of the deficiencies in the body of the report. Rehabilitation recommendations should be made for conditions which will provide 20+ years of extended service. The order of the rehabilitation recommendations shall match the order of the deficiencies in the body of the report. See page 10 of 15 for an example Recommendations section.**

**Cost estimates shall be listed for each rehabilitation recommendation in the order that the system appears in the Scope of Work. (Service Entrance; Power Distribution; Motors and Brakes; Control System; Wire and Conduit; etc.) Do not say Electrical and Mechanical Rehabilitation and give a lump sum figure. Beneath the cost estimate a note shall indicate that cost estimates are for material and installation labor (bridge items only). They do not include cost for design engineering, maintenance, traffic control, construction management or administration. See page 10 of 15 for an example cost estimate.**

**Appendices shall be attached in the following order:**

**Appendix A – Scope of Work – This should be the Scope of Work document provided by the WSDOT, not a retyped version.**

**Appendix B – Condensed Mech/Elect Rating Summary**
- **B1 Numerical Rating Condition Description (WSDOT provided with Scope of Work)**
- **B2 Condensed Mech/Elect Rating Summary**

**Appendices C, D, etc – tabulated data, schematics, tables of measurements etc.**

**See pages 11 through 13 of 15 for an example of Appendix B.**

**The last Appendix should be photographs unless there are Co-Consultant documents like oil analysis in which case the photographs are the next to last and the Co-Consultant data is last. There shall be two photographs on each page.**

**Appendices shall have a cover page with a Table of Contents.**

**See page 14 of 15 for a sample Appendix Table of Contents**
**Appendices sheets shall have the same footer as the report but the page number will be prefaced with the letter of the Appendix.**

**Data sheets and measurement sheets shall be arranged in the order that the subject appears in the Scope of Work.**

**See page 15 of 15 for a sample photograph page.**

**All reports are to be comb bound with clear plastic front covers and black plastic rear covers. The unsigned final report submittal shall consist of 2 copies of each report and an electronic copy of each report. The final submittal shall consist of one bound final report with original photographs which shall be stamped and signed by an Engineer of the appropriate discipline licensed in the State of Washington and six color copies of the report. An electronic copy of the final report in PDF format and an electronic copy of all photographs in jpeg format along with photo logs shall be submitted with the signed final reports on a credit card size USB drive.**

**WASHINGTON STATE**
**DEPARTMENT OF TRANSPORTATION**

**(TYPE) INSPECTION REPORT**
**MONTH, YEAR**

**NAME OF BRIDGE**
**BRIDGE NO. (W/XYZ)**




**PREPARED BY**
**COMPANY NAME**
**CITY, STATE**

5 wirgrev16

TABLE OF CONTENTS


| | Page |
|---|---|
| EXECUTIVE SUMMARY…… | 1 |
| PURPOSE AND SCOPE OF INSPECTION…… | 1 |
| INSPECTION METHODOLOGY…… | 3 |
| INSPECTION FINDINGS…… | 4 |
| SCOPE OF WORK ITEM…….. | 4 |
| SCOPE OF WORK ITEM…….. | 5 |
| CONCLUSIONS…… | 7 |
| RECOMMENDATIONS…… | 8 |
| COST ESTIMATE…… | 8 |

APPENDICES:

| | | |
|---|---|---|
| A) | SCOPE OF WORK……. | Ai |
| B) | CONDENSED (MECH/ELECT) RATING SUMMARY…….. | Bi |
| C) | TABLES……. | Ci |
| D) | PHOTOGRAPHS…… | Di |
| E) | OIL SAMPLE ANALYSIS……. | Ei |

## EXECUTIVE SUMMARY

This report documents the condition of the Bridge Name and Bridge Number, electrical (or mechanical) systems as they existed during the In-Depth Electrical (or Mechanical) Inspection performed Month XX through XX, XXXX.

Overall, the electrical(or mechanical) systems exhibited minor deterioration and operated in an acceptable manner during the inspection.

There were no emergency repairs identified during the inspection.

(Items requiring rehabilitation should be documented in paragraph format. Do not just copy the rehabilitation recommendation list, write a summary.)

The electrical(or mechanical depending on report) systems, in general, require maintenance repairs to improve and maintain safety and operational reliability. Maintenance repair items are listed in the Recommendations section of this report. (Do not include the repair list, the reader can reference that if they are interested.)

## PURPOSE AND SCOPE OF INSPECTION

The purpose of this inspection was to determine the condition of the electrical(mechanical) systems and identify deficiencies.

The inspection was performed from Month XX through Month XX, 20XX by XXXXX.

The Scope of Work for this inspection was provided by the WSDOT and is attached as Appendix A.

## INSPECTION FINDINGS

**POWER DISTRIBUTION**

SERVICE ENTRANCE

The 240-vac service entrance equipment was located at the west approach utility pole.

The service entrance equipment was visually inspected and operationally tested. Utility voltages were measured prior to and during operation. The measurements were tabulated (See Table 1 in Appendix C). The measurements were acceptable in all cases.

The following deficiency was noted and repaired during the inspection:

- There was damaged insulation and part of the conductor was exposed for one of the incoming phases. The exposed conductor had additional insulation and heat shrink added to insulate the exposed conductor and prevent further damage.

Based upon the field survey, the service entrance was observed to have minor deterioration.

GROUNDING SYSTEM

The structure had a ground connection embedded in the west pier. The ground resistance and current of the electrical grounding conductor at the west pier were measured and the results tabulated (See Table 2 in Appendix C). The measurements were acceptable in all cases.

The grounding system was visually inspected.

No deficiencies were noted during this inspection.

Based upon the field survey, the grounding system was observed to have minor deterioration.

ELECTRICAL DISTRIBUTION SYSTEM

The electrical distribution equipment was located in the control house and at the top of the east and west towers. The MCC in the control house distributed power to the roadway equipment and to the east and west towers. The east and west towers also had load centers for distributing power to lights, receptacles, and other ancillary equipment.

The electrical distribution equipment was visually inspected and operationally tested.

Infrared testing was performed on the electrical distribution equipment.

No deficiencies were noted during this inspection.

Based upon the field survey, the electrical distribution equipment was observed to have minor deterioration.

MOTOR STARTERS, CONTACTORS AND DISCONNECTS

The motor starters and contactors were located in the motor control centers. The drive motors, synchrotie motors, and thrustor brakes had disconnect switches located within sight of the equipment they isolated. The traffic gates and traffic barriers had disconnect switches located in their enclosures.

The motor starters, contactors, and disconnects were visually inspected and operationally tested.

No deficiencies were noted during this inspection.

Based upon the field survey, the motor starters, contactors, and disconnects were observed to have minor deterioration.

**MOTORS AND BRAKES**

DRIVE MOTORS AND SYNCHROTIE MOTORS

There were four motors that drove the span, one drive motor and one synchrotie motor in the east tower and one drive motor and one synchrotie motor in the west tower. The motor inspection covers were removed, and the motor interior and brushes were inspected. Insulation resistance measurements were performed on the motors. The measurements were tabulated (See Table 3 in Appendix C). The insulation resistance measurements were acceptable in all cases.

The motor nameplate and current measurements were tabulated (See Table 4 in Appendix C). The current measurements were acceptable in all cases.

The following deficiency was noted and repaired during the inspection:

- Three missing fasteners were replaced on the inspection covers over the motor brushes for the East Drive Motor.

The following deficiencies were noted:

- One motor brush holder was damaged and temporarily repaired with a ziptie in the East Drive Motor (See Photo 1 in Appendix D).
- One motor brush holder was damaged and temporarily repaired with a ziptie in the West Drive Motor (See Photo 2 in Appendix D).

Based upon the field survey and above deficiencies, the drive motors and synchrotie motors were observed to have minor deterioration.

## RECOMMENDATIONS

**EMERGENCY REPAIRS**
There were no emergency repairs.

**MAINTENANCE REPAIRS**

**POWER DISTRIBUTION**
**S**ERVICE ENTRANCE
1. Sample repair number one.
2. Sample repair number two.

**CONTROL SYSTEM**
CONTROL DESK
3. Sample repair number three.

**MOTORS AND BRAKES**
DRIVE MOTORS AND SYNCHROTIE MOTORS
4. Sample repair number four.
5. Sample repair number five.
6. Sample repair number six.

**REHABILITATION RECOMMENDATIONS**
1. Sample recommendation number one.

## COST ESTIMATE

| | |
|---|---|
| 1. Sample recommendation number one. | $100,000 |

The provided cost estimate is for material and installation labor (bridge items only). This cost does not include design engineering, maintenance, traffic control, construction management or administration.

Name of Bridge 8 Type of Inspection
Bridge No. Month, Year

10 wirgrev16

APPENDIX B

CONDENSED ELECTRICAL RATING SUMMARY

Page
NUMERICAL RATING CONDITION DESCRIPTION…….B1
CONDENSED ELECTRICAL RATING SUMMARY……B2

Name of Bridge Bi Type of Inspection
Bridge No. Month, Year

11 wirgrev16

| NUMERICAL RATING CONDITION DESCRIPTION | |
|---|---|
| Rating Condition | Description of Condition |
| 1 | FAILED CONDITION. Item not operational. |
| 2 | POTENTIALLY HAZARDOUS. Deterioration or damage to span drive or stabilizing machinery which could cause movable span to become imminently unstable in any position. Malfunction or deterioration of electrical system which could cause loss of control of the moving span. Deficiency in electrical system design, maintenance, or operational procedure which could cause loss of control of moving span. Inoperable vehicular traffic control device. Also, extreme cases of defects listed under higher rating numbers. Bridge may not be opened to marine traffic. If problem is with stabilizing machinery in the closed position, temporary shoring or support may be necessary to permit safe vehicular traffic over the closed bridge at reduced speed or rating. However, if problem, is with counterweight components of vertical lift bridge stabilizing machinery, bridge may be closed to all traffic until shored or repaired. |
| 3 | VERY SERIOUS DETERIORATION. Deterioration or damage to machinery which will not cause imminent instability of a non-redundant span drive but reduces allowable load on drive and may cause future instability if not corrected. Stabilizing machinery damaged, deteriorated, or improperly operated such that movable structure is not properly supported causing structure not to behave as designed and resulting in structural overstress and movements under vehicular traffic that severely affect quality. Severe misalignment of stabilizing machinery, resulting in overload of electrical system and consequent overstress of span drive machinery. Severe interference between moving span and fixed structure due to substructure movements. Deterioration of electrical control system such that many of the safety interlocks are normally by-passed, inconsistent control of moving span, and inoperable or missing traffic control devices. Operation of movable span may be restricted in terms of opening angle, number of openings, and allowable wind velocity. If problem is with stabilizing machinery, shoring may be necessary to permit vehicular traffic. |
| 4 | SERIOUS DETERIORATION. Severe wear, deterioration or damage to span drive or stabilizing machinery due to overloading, inadequate maintenance, improper operation, or movement of the structure or substructure. Electrical system malfunctions and numerous safety interlocks are by-passed. Results are inconsistent, noisy, and unreliable operation of the movable span. Improper closure, affecting structural action and vehicular ride quality. Electrical system has archaic components for which replacements are no longer available and open bus panelboards that are considered unsafe nowadays. |
| 5 | MODERATE DETERIORATION. Excessive wear, some damage and deterioration of span drive and stabilizing mechanical machinery. Repairs and replacement of some machinery components required. Bearings may need liner adjustment. Machinery may be misaligned due to shifting of structure and substructure but not enough to seriously overload span drive: correctable by adjusting machinery component location using shims, etc. Replacement of corroded machinery fasteners required. Moving span under control but some indicating and safety devices may be inoperable and may be by-passed, and span limit switch may need adjustment. |
| 6 | MINOR DETERIORATION. None of the major mechanical machinery components are worn or damaged to the extent that replacement is now required. Some components of the span drive may need to be replaced, such as flex-couplings grids, brake linings, etc. Span stabilizing machinery functioning except that wear may have caused excessive clearances in lock bar guides, etc. Shimming of lock bar guides, replacement of limit switches and adjustments necessary. Machinery needs cleaning, painting, lubrication and adjustment. Electrical system generally functioning as designed. Replacement of some relays, indicating devices and lights may be required. Traffic control devices need repair or maintenance. |
| 7 | ALMOST NEW CONDITION. No extensive repairs required. Machinery needs cleaning, painting, lubrication, and adjustment. Electrical systems functioning as designed; may need replacement of indicating lights and minor limit switch adjustment, cleaning of relay contacts and housekeeping in panelboard. Traffic control devices functioning but may need replacement of obstruction lights, object markers, painting of housings, lubrication and adjustment of limit switches. |
| 8 | NEW CONDITION. Virtually no repairs required. Mechanical machinery may need cleaning, touch-up painting and lubrication. Electrical system and traffic devices functioning but may need replacement of bulbs and minor housekeeping. |
| 9 | NOT APPLICABLE. This device or equipment is not on the structure being inspected. |
| N/I | NOT INSPECTED. This device or equipment was not included in the inspection. |

Name of Bridge B1 Type of Inspection
Bridge No. Month, Year

12 wirgrev16

| Condensed Electrical Rating Summary | |
|---|---|
| Item | Rating |
| **Power Distribution** | |
| Service Entrance | 6 |
| Grounding System | 5 |
| Emergency Generator | 7 |
| Manual Transfer Switch | 6 |
| Electrical Distribution Equipment | 7 |
| Motor Starters, Contactors, and Disconnects | 6 |
| Hubbell Motor Drive | 7 |
| **Motors and Brakes** | |
| Span Drive Motors | 7 |
| Thrustor Brakes | 7 |
| Endlift Motors | 6 |
| Traffic Gate Motors | 7 |
| Yielding Barrier Motor | 6 |
| **Control System** | |
| Control Desk | 7 |
| Control System | 6 |
| Instrumentation and Control Devices | 5 |
| **Wire, Conduit and Junction Boxes** | |
| Motor and Thrustor Brake Feeders | 6 |
| Aerial Cable | 6 |
| Droop Cables | 6 |
| Conduits and Junction Boxes | 6 |
| **Traffic Control** | |
| Traffic Signals and Signs | 7 |
| Traffic Gates | 6 |
| Yielding Barrier | 6 |
| **Navigation Control** | |
| Navigation Lights | 6 |
| Navigation Horn | 7 |
| **Miscellaneous** | |
| Lighting and Receptacles | 6 |
| Public Address System | 6 |
| Closed Circuit TV System | 5 |
| **Overall Rating** | 6 |

Name of Bridge B2 Type of Inspection
Bridge No. Month, Year

13 wirgrev16

APPENDIX D

PHOTOGRAPHS


| | | Page |
|---|---|---|
| Photo 1 | Control Desk…… | D1 |
| Photo 2 | Broken conduit fitting on NE Thrustor Brake …… | D1 |
| Photo 3 | Photo Title……... | D2 |
| Photo 4 | Photo Title……... | D2 |
| Photo 5 | Photo Title……... | D3 |




Photo 1 Control Desk

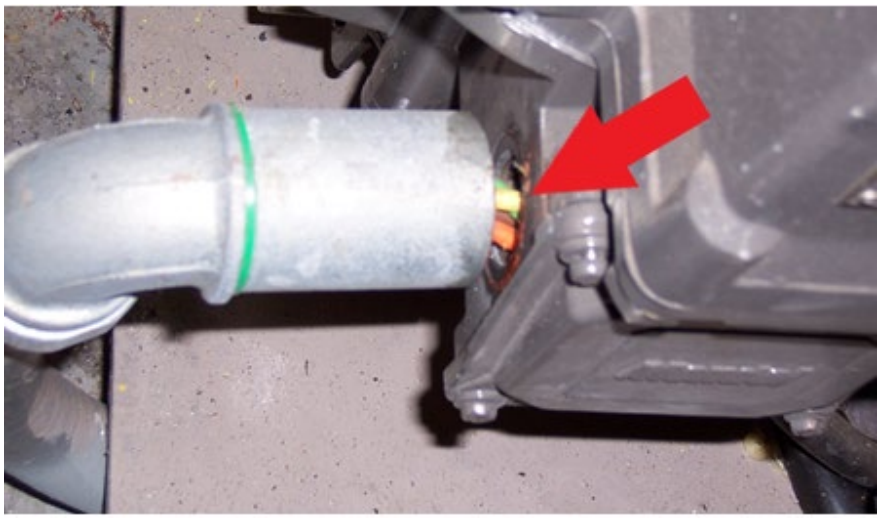


Photo 2 Broken conduit fitting on NE Thrustor Brake

| | | |
|---|---|---|
| Name of Bridge | D1 | Type of Inspection |
| Bridge No. | | Month, Year |

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# *Appendix 8-C Numerical Rating Condition Description*

| NUMERICAL RATING CONDITION DESCRIPTION | |
|---|---|
| Rating Condition | Description of Condition |
| 1 | FAILED CONDITION. Item not operational. |
| 2 | POTENTIALLY HAZARDOUS. Deterioration or damage to span drive or stabilizing machinery which could cause movable span to become imminently unstable in any position. Malfunction or deterioration of electrical system which could cause loss of control of the moving span. Deficiency in electrical system design, maintenance, or operational procedure which could cause loss of control of moving span. Inoperable vehicular traffic control device. Also, extreme cases of defects listed under higher rating numbers. Bridge may not be opened to marine traffic. If problem is with stabilizing machinery in the closed position, temporary shoring or support may be necessary to permit safe vehicular traffic over the closed bridge at reduced speed or rating. However, if problem, is with counterweight components of vertical lift bridge stabilizing machinery, bridge may be closed to all traffic until shored or repaired. |
| 3 | VERY SERIOUS DETERIORATION. Deterioration or damage to machinery which will not cause imminent instability of a non-redundant span drive but reduces allowable load on drive and may cause future instability if not corrected. Stabilizing machinery damaged, deteriorated, or improperly operated such that movable structure is not properly supported causing structure not to behave as designed and resulting in structural overstress and movements under vehicular traffic that severely affect quality. Severe misalignment of stabilizing machinery, resulting in overload of electrical system and consequent overstress of span drive machinery. Severe interference between moving span and fixed structure due to substructure movements. Deterioration of electrical control system such that many of the safety interlocks are normally by-passed, inconsistent control of moving span, and inoperable or missing traffic control devices. Operation of movable span may be restricted in terms of opening angle, number of openings, and allowable wind velocity. If problem is with stabilizing machinery, shoring may be necessary to permit vehicular traffic. |
| 4 | SERIOUS DETERIORATION. Severe wear, deterioration or damage to span drive or stabilizing machinery due to overloading, inadequate maintenance, improper operation, or movement of the structure or substructure. Electrical system malfunctions and numerous safety interlocks are by-passed. Results are inconsistent, noisy, and unreliable operation of the movable span. Improper closure, affecting structural action and vehicular ride quality. Electrical system has archaic components for which replacements are no longer available and open bus panelboards that are considered unsafe nowadays. |
| 5 | MODERATE DETERIORATION. Excessive wear, some damage and deterioration of span drive and stabilizing mechanical machinery. Repairs and replacement of some machinery components required. Bearings may need liner adjustment. Machinery may be misaligned due to shifting of structure and substructure but not enough to seriously overload span drive: correctable by adjusting machinery component location using shims, etc. Replacement of corroded machinery fasteners required. Moving span under control but some indicating and safety devices may be inoperable and may be by-passed, and span limit switch may need adjustment. |
| 6 | MINOR DETERIORATION. None of the major mechanical machinery components are worn or damaged to the extent that replacement is now required. Some components of the span drive may need to be replaced, such as flex-couplings grids, brake linings, etc. Span stabilizing machinery functioning except that wear may have caused excessive clearances in lock bar guides, etc. Shimming of lock bar guides, replacement of limit switches and adjustments necessary. Machinery needs cleaning, painting, lubrication and adjustment. Electrical system generally functioning as designed. Replacement of some relays, indicating devices and lights may be required. Traffic control devices need repair or maintenance. |
| 7 | ALMOST NEW CONDITION. No extensive repairs required. Machinery needs cleaning, painting, lubrication, and adjustment. Electrical systems functioning as designed; may need replacement of indicating lights and minor limit switch adjustment, cleaning of relay contacts and housekeeping in panelboard. Traffic control devices functioning but may need replacement of obstruction lights, object markers, painting of housings, lubrication and adjustment of limit switches. |
| 8 | NEW CONDITION. Virtually no repairs required. Mechanical machinery may need cleaning, touch-up painting and lubrication. Electrical system and traffic devices functioning but may need replacement of bulbs and minor housekeeping. |
| 9 | NOT APPLICABLE. This device or equipment is not on the structure being inspected. |
| N/I | NOT INSPECTED. This device or equipment was not included in the inspection. |

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# *Appendix 8-D Continued Certification of Complex Bridge Inspection Personnel*

A continued certification of complex bridge and tunnel inspection personnel has been established to ensure that all program managers and inspectors are kept up to date with the latest practices and technology in the areas of bridge and tunnel inspections. This continued certification program requires that each Electrical/Mechanical Complex Bridge Lead Inspector (CBLI) and their Delegated Program Manager (DPM) must participate in the following during a 60 month period to maintain certification:

- 30 hours of bridge related continuing education courses and training including WSDOT sponsored bridge training, bridge conferences and other NHI bridge training courses as approved by the delegated program manager.

## Continued Certification Course and Training List

The following is a list of courses that are examples of what would qualify in combination to acquire 30 hours of continuing education hours in the designated five-year period. It is the inspector's responsibility to ensure that the information is given to their manager within the necessary timeframes to ensure continued certification.

| | |
|---|---|
| National Electric Code | 16 hours |
| Grounding and Bonding Training | 16 hours |
| NFPA 70E Arc Flash Electrical Safety | 16 hours |
| Programmable Logic Controller Training | 24 hours |
| AC/DC Motors and Drives Training | 16 hours |
| Cathodic Protection | 40 hours |
| National Fire Alarm and Signaling Code | 24 hours |
| Non-Destructive Testing Training | 24 hours |
| Hydraulics & System Troubleshooting | 16 hours |
| Principles of Bearings and Lubrication | 16 hours |
| Coupling and Shaft Alignment | 16 hours |
| Strain Gage Workshop | 40 hours |
| Pacific NW Bridge Maintenance Conference | 16 hours |
| Pacific NW Bridge Inspection Conference | 16 hours |
| Heavy Movable Structures Conference | 16 hours |
| Western Bridge Engineers' Seminar | 16 hours |
| WSDOT/LTAP – Bridge Condition Inspection Training (BCIT) | 72 hours |
| NHI Bridge Inspection Refresher Training (BCIR) | 16 hours |
| NHI Tunnel Safety Inspection | 16 hours |
| NHI Tunnel Safety Inspection Refresher | 16 hours |

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# *Appendix 8-E Complex Bridge and Tunnel Inspection List*

The following is a list of complex bridges and tunnels that require electrical and mechanical inspections in accordance with the NBIS and NTIS. The regularly scheduled inspections for each structure are listed along with their interval. Special inspections in addition to those listed may be conducted if deemed necessary.

**12/12N – Wishkah River Bridge**

| **Electrical** | **Mechanical** |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**12/12S – Heron Street Bridge**

| **Electrical** | **Mechanical** |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**12/915 – Snake River Clarkston**

| **Electrical** | **Mechanical** |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |
| | Counterweight Rope Inspection (72 months) |
| | Trunnion Bearing Inspection (72 months) |

**16/110E – Tacoma Narrows**

| **Electrical** | **Mechanical** |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**16/110W – Tacoma Narrows**

| **Electrical** | **Mechanical** |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**90/25N – Homer M. Hadley**

**Electrical**

Routine Inspection (12 months)
Blue Ribbon Inspection (24 months)
Blue Ribbon Cathodic Protection Inspection (24 months)
In-Depth Inspection (72 months)
In-Depth Cathodic Protection Inspection (72 months)

**90/25S – Lacey V. Murrow**

**Electrical**

Routine Inspection (12 months)
Blue Ribbon Inspection (24 months)
Blue Ribbon Cathodic Protection Inspection (24 months)
In-Depth Inspection (72 months)
In-Depth Cathodic Protection Inspection (72 months)

**99/530E – Duwamish River Br**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |
| | Trunnion Bearing Inspection (72 months) |

**99/530W – Duwamish River Br**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**101/115 – Chehalis River Bridge**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**101/125E – Hoquiam River - Riverside**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |
| | Counterweight Rope Inspection (72 months) |

**101/125W – Hoquiam River - Simpson**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**104/5.1 – Hood Canal-W.A. Bugge Bridge W**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| Blue Ribbon Inspection (24 months) | Blue Ribbon Inspection (24 months) |
| Blue Ribbon CP Inspection (24 months) | In-Depth Inspection (72 months) |
| In-Depth Inspection (72 months) | |
| In-Depth CP Inspection (72 months) | |

**104/5.2 – Hood Canal-W.A. Bugge Br E**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| Blue Ribbon Inspection (24 months) | Blue Ribbon Inspection (24 months) |
| Blue Ribbon CP Inspection (24 months) | In-Depth Inspection (72 months) |
| In-Depth Inspection (72 months) | |
| In-Depth CP Inspection (72 months) | |

**513/12 – Montlake Bridge**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**520/8 – Albert D. Rosellini Bridge**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| Blue Ribbon Inspection (24 months) | Blue Ribbon Inspection (24 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**529/10E – Snohomish River Bridge**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |
| | Counterweight Rope Inspection (72 months) |

**529/10W – Snohomish River Bridge**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |
| | Counterweight Rope Inspection (72 months) |

**529/20E – Steamboat Slough**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**529/20W – Steamboat Slough**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (12 months) | Routine Inspection (12 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**5/549CNC – Wash St Convention Center**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (24 months) | Routine Inspection (24 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**90/22LID – Martin Luther King LID**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (24 months) | Routine Inspection (24 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**90/24N – Mt Baker Ridge Tunnel**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (24 months) | Routine Inspection (24 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**90/24S – Mt Baker Ridge Tunnel**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (24 months) | Routine Inspection (24 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**90/26LID – First Hill LID**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (24 months) | Routine Inspection (24 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**99/540 – Alaskan Way Tunnel**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (24 months) | Routine Inspection (24 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

**304/9 – Bremerton Tunnel**

| Electrical | Mechanical |
|---|---|
| Routine Inspection (24 months) | Routine Inspection (24 months) |
| In-Depth Inspection (72 months) | In-Depth Inspection (72 months) |

The following is a list of tunnels that require electrical and mechanical inspections in accordance with NTIS. All of these tunnels have relatively small electrical and mechanical systems. They all receive routine inspections on a 2 year cycle.

**5/546REN – 5th EXP TUNNEL**

**5/548PN – I-5 Under N Park Plaza**

**5/548PS – I-5 Under S Park Plaza**

**5/553R – Express Lanes Tunnel**

**5/555E-S – E-S Ramp Tunnel**

**5/555N-W – N-W Ramp Tunnel**

**5/568S-E – I-5 Over S-E Ramp Tunnel**

**5/577E-S – Ravenna-S Ramp Tunnel**

**20/316 – Tunnel**

**90/16S-E – S-E Ramp Tunnel**

**90/33E-S – E-S Ramp Tunnel**

**90/33N-W – N-W Ramp Tunnel**

**90/55 – SE 35th ST Tunnel Under I-90**

**90/112.8N – Wildlife Crossing Tunnel**

**90/563 – Perry St Tunnel Under I-90**

**97/359ALT – Knapps Hill Tunnel**

**101/3 – Fort Columbia Tunnel**

**405/22A – Houser Way Tunnel**

**405/35N-W – I-90 Over N-W Ramp Tunnel**

**405/35S-E – I-90 Over S-E Ramp Tunnel**

**520/9LID – Evergreen Point Road LID**

**520/11LID – 84th Ave NE Over SR 520**

**520/12LID – 92nd Ave NE Over SR 520**

**522/15 – Roosevelt Way Tunnel**

**525/1S-S – S-E Ramp Tunnel Under S-S Ramp**

**526/12 – SR 526 Over E-N Ramp Tunnel**

**526/22E-N – SR 526 Over E-N Ramp Tun**

# *Appendix 8-F Operations, Inspections, and Maintenance Manual List*

The following is a tabulated listing of all of the OIM manuals generated by the BPO. They are updated as necessary when rehabilitations of bridge systems occur or major components are changed.

| Bridge # | Bridge Name | Manual Date | Revision Date | Document Number |
|---|---|---|---|---|
| 12/12N | Wishkah River | Jun-03 | Aug-08 | M 23-25 |
| 12/12S | Wishkah River - Heron | Jun-03 | Dec-07 | M 23-19 |
| 12/915 | Snake River - Clarkston | Jun-96 | Feb-16 | M 23-26 |
| 16/110E | Tacoma Narrows | Jun-95 | -- | * |
| 90/25N | Homer M. Hadley | Jul-06 | Sept-18 | * |
| 90/25S | Lacey V. Murrow | Jul-06 | -- | * |
| 99/530E | Duwamish River | Jun-01 | Jun-08 | M 23-31 |
| 99/530W | Duwamish River | Jun-01 | Jun-07 | * |
| 101/115 | Chehalis River | Oct-99 | Aug-16 | M 23-23 |
| 101/125E | Hoquiam River - Riverside | Jun-97 | Mar-13 | M 23-22 |
| 101/125W | Hoquiam River - Simpson | Jan-12 | -- | M 23-33 |
| 104/5.1 & 5.2 | Hood Canal | Jan-15 | Feb-16 | M 23-12 |
| 513/12 | Montlake Bridge | Nov-02 | Jan-23 | M 23-30 |
| 520/8 | Albert D. Rosellini Bridge | Jun-22 | Jan-23 | * |
| 529/10E & W | Snohomish River | Mar-01 | Jun-07 | M 23-21 |
| 529/20E & W | Steamboat Slough | Jan-05 | -- | M 23-28 |

*Document number not yet assigned.

No OIM manuals have been developed for complex tunnels yet.

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# *Appendix 8-G Guideline for Writing Tunnel Electrical and Mechanical Inspection Reports*

**GUIDELINE FOR WRITING TUNNEL ELECTRICAL AND MECHANICAL INSPECTION REPORTS FOR WSDOT**

**General - Format and fonts used in the electrical and mechanical inspection reports must be the same. The reports shall be written in the past tense. Single side print. The body of the text shall be left-justified. Condition descriptions shall be consistent with the verbiage in the Numerical Rating Condition Description in Appendix B.**

**See page 5 of 16 for a sample cover page.**

**The first submittal received by WSDOT shall be an unsigned final report. This submittal shall consist of 2 copies of each report and an electronic copy of both reports. Unsigned final reports shall be signed and dated by person(s) who conducted internal quality control review. The stamp shall remain unsigned.**

**The title of the report and the tunnel name and tunnel number will be indicated exactly as spelled out in the scope of work for the inspection.**

**A photograph of the tunnel portal will appear on the cover of the reports.**

**The Consultant's Company name will appear under the photograph.**

**The PE Seal shall be placed below the photograph on the first submittal but not signed. When the final submittal is ready for the PE Seal, it shall be placed on the original report and signed by the Consultant. Color copies will then be made of the original report.**

**The Table of Contents page shall be page number i. Each page of the report will be numbered sequentially and will agree with the page numbers listed in the Table of Contents. Font size shall be No. 12.**

**See page 6 of 16 for a sample Table of Contents.**

**The footer for each report page and appendices shall have the tunnel name and number on two lines on the bottom left, the page number in the bottom center and the type of inspection and month and year on two lines on the bottom right. The font shall be No. 10.**

**The font for the report titles and text shall be No. 12. Heading shall be capitalized and bold.**

**The report shall include the following sections in the order listed:**

**The Executive Summary should be brief but give a general assessment of the condition of the tunnel systems and major conclusions.**

1 v1.10

**The Purpose and Scope of Inspection should state that the purpose of the inspection is to determine the condition of the tunnel equipment and identify any deficiencies. The dates of the inspection and the Consultant's Company name should also be indicated. Reference shall be made to the Scope of Work provided by WSDOT in the inspection request for proposal and it shall be attached to the report in Appendix A.**

**See page 7 of 16 for a sample of the Executive Summary and the Purpose and Scope of Inspection.**

**Any deviations from the Scope of Work should be identified with an explanation of why the deviations occurred.**

**Inspection Methodology should briefly describe the type of inspections, tests or measurements performed. The following text shall be included in the Inspection Methodology: "The ratings in this report are based upon the field conditions. These ratings may be low due to conditions that cannot be repaired or do not require immediate rehabilitation. Listed deficiencies are used to identify repair or rehabilitation items. If a component has a Condensed Mechanical/Electrical Rating of minor or moderate deterioration, there may be no associated deficiency or repair item for that component."**

**A general description of the tunnel is not required. We know where the tunnel is and how it operates.**

**Inspection Findings shall identify the condition of the systems in the order that they are listed in the Scope of Work. Inspection findings that are not considered repair or rehabilitation items shall be included as observations in paragraph format. All deficiencies shall be identified and reference shall be made to any corresponding photograph. Deficiencies shall be listed in bullet format. Deficiencies that were repaired during the inspection shall be listed in bullet format. The condition statement for each Scope of Work item shall be the last sentence of its respective Inspection Findings section. The photographs shall be the last Appendix in the report except when additional data such as oil sample analysis or other sub-consultant reports are attached. The photos shall be referenced in the body of the report as follows: (See Photo ___ in Appendix ___). Data such as motor currents, insulation resistance, gear tooth measurements, etc. shall be tabulated and included in the Appendices. The tabulated data shall be referenced in the body of the report as follows: (See Table ____ in Appendix ___).**

**See pages 8 and 9 of 16 for a sample of the Inspection Findings section.**

**Conclusions shall summarize major findings and condition of the structure. The conclusion is intended to be brief. Major findings shall be listed in the order in which they appear in the Scope of Work. The Conclusions and Executive Summary should not be identical.**

**Recommendations shall include Emergency Repairs, Maintenance Repairs or Rehabilitation Recommendations. Emergency Repair recommendations which are not addressed during the inspection shall be made in writing within 48 hours of the finding from the Consultant to the Bridge Preservation Engineer. Recommendations for Maintenance Repairs must be within the capabilities of the available maintenance forces. The order of the Maintenance Repairs shall match the order of the deficiencies in the body of the report. Rehabilitation recommendations should be made for conditions which will provide 20+ years of extended service. The order of the rehabilitation recommendations shall match the order of the deficiencies in the body of the report. See page 10 of 16 for an example Recommendations section.**

**Cost estimates shall be listed for each rehabilitation recommendation in the order that the system appears in the Scope of Work. (Service Entrance; Power Distribution; Motors and Brakes; Control System; Wire and Conduit; etc.) Do not say Electrical and Mechanical Rehabilitation and give a lump sum figure. Beneath the cost estimate a note shall indicate that cost estimates are for material and installation labor (tunnel items only). They do not include cost for design engineering, maintenance, traffic control, construction management or administration. See page 10 of 16 for an example cost estimate section.**

**Appendices shall be attached in the following order:**

**Appendix A – Scope of Work**

**Appendix B – Combined Mechanical & Electrical NTIS Rating Summary**

**Tabulated condition state data on FHWA reportable elements relevant to Tunnel Mechanical Systems, Electrical Systems, Fire/Life Safety/Security Systems and Signs as defined in the Specifications for the National Tunnel Inventory.**

**This table is to be identical in both disciplines' reports. The ratings are based off the coordinated efforts of the mechanical and electrical inspection teams.**

**See page 11 of 16 for an example of the Combined Mechanical & Electrical NTIS Rating Summary table.**

**Appendix C – Condensed Mech/Elect Rating Summary**

**C1 Numerical Rating Condition Description (WSDOT provided with Scope of Work)**
**C2 Condensed Mech/Elect Rating Summary per Scope of Work item**

**This rating summary is unique to each discipline based off the Scope of Work.**

**See pages 12 through 14 of 16 for an example of Appendix C.**

**Appendix D, E, etc – tabulated data, schematics, tables of measurements etc.**

**The last Appendix should be photographs unless there are Co-Consultant documents like oil analysis in which case the photographs are the next to last and the Co-Consultant data is last. There shall be two photographs on each page.**

**Appendices shall have a cover page with a Table of Contents.**

**See page 15 of 16 for a sample Appendix Table of Contents**
**Appendices sheets shall have the same footer as the report but the page number will be prefaced with the letter of the Appendix**

**Data sheets and measurements sheets shall be arranged in the order that the subject appears in the Scope of Work.**

**See page 16 of 16 for a sample photograph page.**

**All reports are to be comb-bound with clear plastic front covers and black plastic rear covers. The unsigned final report submittal shall consist of 2 copies of each report and an electronic copy of both reports. The final submittal shall consist of one bound final report with original photographs which shall be stamped and signed by an Engineer of the appropriate discipline, licensed in the State of Washington, and shall also have a current NTIS tunnel inspection certification. Six stamped and signed color copies of the report shall be included with the final report. An electronic copy of the final report in PDF format and an electronic copy of all photographs in jpeg format, along with photo logs, shall be submitted with the signed final reports on a credit card size USB drive.**

**WASHINGTON STATE**
**DEPARTMENT OF TRANSPORTATION**

**(TYPE) INSPECTION REPORT**
**MONTH, YEAR**

**NAME OF TUNNEL**
**TUNNEL NO. (W/XYZ)**



**PREPARED BY**
**COMPANY NAME**
**CITY, STATE**

5 v1.10

TABLE OF CONTENTS


| | Page |
|---|---|
| EXECUTIVE SUMMARY……. | 1 |
| PURPOSE AND SCOPE OF INSPECTION……. | 1 |
| INSPECTION METHODOLOGY……. | 3 |
| INSPECTION FINDINGS……. | 4 |
| SCOPE OF WORK ITEM…….. | 4 |
| SCOPE OF WORK ITEM…….. | 5 |
| CONCLUSIONS…… | 7 |
| RECOMMENDATIONS…… | 8 |
| COST ESTIMATE……. | 8 |

APPENDICES:

| | | |
|---|---|---|
| A) | SCOPE OF WORK……. | Ai |
| B) | COMBINED MECHANICAL & ELECTRICAL RATING SUMMARY…… | Bi |
| C) | CONDENSED (MECH/ELECT) RATING SUMMARY…….. | Ci |
| D) | TABLES……. | Di |
| E) | PHOTOGRAPHS…… | Ei |
| F) | FOAM SAMPLE ANALYSIS…… | Fi |

## EXECUTIVE SUMMARY

This report documents the condition of the Tunnel Name and Tunnel Number, electrical (or mechanical) systems as they existed during the In-Depth Electrical (or Mechanical) Inspection performed Month XX through XX, XXXX.

Overall, the electrical(or mechanical) systems exhibited minor deterioration and operated in an acceptable manner during the inspection.

There were no emergency repairs identified during the inspection.

(Items requiring rehabilitation should be documented in paragraph format. Do not just copy the rehabilitation recommendation list, write a summary.)

The electrical(or mechanical depending on report) systems, in general, require maintenance repairs to improve and maintain safety and operational reliability. Maintenance repair items are listed in the Recommendations section of this report. (Do not include the repair list, the reader can reference that if they are interested.)

## PURPOSE AND SCOPE OF INSPECTION

The purpose of this inspection was to determine the condition of the electrical(mechanical) systems and identify deficiencies.

The inspection was performed from Month XX through Month XX, 20XX by XXXXX.

The Scope of Work for this inspection was provided by the WSDOT and is attached as Appendix A.

## INSPECTION FINDINGS

**POWER DISTRIBUTION**

SERVICE ENTRANCE

The three phase, 480-vac service entrance equipment was located outside the Puget Sound Naval Shipyard Museum.

The service entrance equipment was visually inspected and operationally tested. Utility voltages were measured under no load and under load at the Motor Control Center. The measurements were tabulated (See Table 1 in Appendix D). The measurements were acceptable in all cases.

No deficiencies were noted during this inspection.

Based upon the field survey, the service entrance was observed to have minor deterioration.

GROUNDING SYSTEM

The grounding system had a ground rod at the incoming service and two no. 1/0 AWG conductors routed to the service panel.

The ground resistance and current were measured at the ground conductor in the Automatic Transfer Switch (ATS) and the measurements were tabulated (See Table 2 in Appendix D). The measurements were acceptable in all cases.

The grounding system was visually inspected.

No deficiencies were noted during this inspection.

Based upon the field survey, the grounding system was observed to have minor deterioration.

EMERGENCY GENERATOR

A generator was located adjacent to the tunnel electrical room.

The generator was visually inspected and operationally tested. Voltage readings were measured under no load and under load at the Motor Control Center. The measurements were tabulated (See Table 1 in Appendix D). The measurements were acceptable in all cases.

No deficiencies were noted during the inspection.

Based upon the field survey, the emergency generator was observed to have minor deterioration.

Name of Tunnel 4 Type of Inspection
Tunnel No. Month, Year

8 v1.10

AUTOMATIC TRANSFER SWITCH
An ATS was in the tunnel electrical room. The ATS was a Kohler Model rated for 800A.

The ATS was visually inspected and operationally tested.

No deficiencies were noted during the inspection.

Based upon the field survey, the automatic transfer switch was observed to have minor deterioration.

ELECTRICAL DISTRIBUTION SYSTEM
The tunnel electrical room had one Motor Control Center (MCC), eight panelboards, two step down transformers and circuit breakers to distribute power to the electrical equipment.

Each transformer's nameplate data and measured surface temperature were tabulated (See Table 3 in Appendix D). All measurements were acceptable and within the nameplate rating.

The electrical distribution equipment was visually inspected and operationally tested.

Infrared testing was performed on the electrical distribution equipment.

The following deficiency was noted and repaired during the inspection:

- Transformer LP-E was not equipped with a nameplate to identify the transformer. A nameplate was generated and installed on the transformer.

The following deficiency was noted:

- Panelboard LP-D was missing a plastic cover for a space in the panelboard that had no circuit breaker. The space was temporary covered with electric tape (See Photo 1 in Appendix E).

Based upon the field survey and above deficiency, the electrical distribution equipment was observed to have minor deterioration.

## RECOMMENDATIONS

**EMERGENCY REPAIRS**
There were no emergency repairs.

**MAINTENANCE REPAIRS**

**POWER DISTRIBUTION**
ELECTRICAL DISTRIBUTION SYSTEM
1. Sample repair number one.

**MOTORS**
SUMP PUMP MOTORS
2. Sample repair number two.

**WIRE, CONDUIT AND JUNCTION BOXES**
CONDUIT, CABLE TRAY AND JUNCTION BOXES
3. Sample repair number three.
4. Sample repair number four.
5. Sample repair number five.

**REHABILITATION RECOMMENDATIONS**
1. Sample recommendation number one.

## COST ESTIMATE

| | |
|---|---|
| 1. Sample recommendation number one. | $100,000 |

The provided cost estimate is for material and installation labor (tunnel items only). This cost does not include design engineering, maintenance, traffic control, construction management or administration.

| | | |
|---|---|---|
| Name of Tunnel<br>Tunnel No. | 8 | Type of Inspection<br>Month, Year |

10 v1.10

COMBINED MECHANICAL & ELECTRICAL NTIS RATING SUMMARY

| Element Number | Element Name | Unit | Quantity | Condition State 1 | Condition State 2 | Condition State 3 | Condition State 4 |
|---|---|---|---|---|---|---|---|
| 10200 | Ventilation System | each | 1 | 1 | 0 | 0 | 0 |
| 10201 | Fans | each | 6 | 6 | 0 | 0 | 0 |
| 10300 | Drainage and Pumping System | each | 1 | 1 | 0 | 0 | 0 |
| 10301 | Pumps | each | 2 | 2 | 0 | 0 | 0 |
| 10400 | Emergency Generator System | each | 1 | 1 | 0 | 0 | 0 |
| 10475 | Flood Gate | each | 0 | 0 | 0 | 0 | 0 |
| 10500 | Electrical Distribution System | each | 1 | 1 | 0 | 0 | 0 |
| 10550 | Emergency Distribution System | each | 1 | 1 | 0 | 0 | 0 |
| 10600 | Tunnel Lighting Systems | each | 1 | 1 | 0 | 0 | 0 |
| 10601 | Tunnel Lighting Fixtures | each | 172 | 172 | 0 | 0 | 0 |
| 10620 | Emergency Lighting Systems | each | 0 | 0 | 0 | 0 | 0 |
| 10621 | Emergency Lighting Fixtures | each | 0 | 0 | 0 | 0 | 0 |
| 10650 | Fire Detection System | each | 1 | 1 | 0 | 0 | 0 |
| 10700 | Fire Protection System | each | 1 | 1 | 0 | 0 | 0 |
| 10750 | Emergency Communications System | each | 1 | 0 | 0 | 1 | 0 |
| 10800 | Tunnel Operations and Security System | each | 1 | 0 | 1 | 0 | 0 |
| 10850 | Traffic Sign | each | 5 | 5 | 0 | 0 | 0 |
| 10870 | Egress Sign | each | 0 | 0 | 0 | 0 | 0 |
| 10890 | Variable Message Board | each | 0 | 0 | 0 | 0 | 0 |
| 10910 | Lane Signal | each | 6 | 6 | 0 | 0 | 0 |
| 10911 | Lane Signal Fixture | each | 6 | 6 | 0 | 0 | 0 |

Name of Tunnel B1 Type of Inspection
Tunnel No. Month, Year

11 v1.10

APPENDIX C

CONDENSED ELECTRICAL RATING SUMMARY

Page
NUMERICAL RATING CONDITION DESCRIPTION……C1
CONDENSED ELECTRICAL RATING SUMMARY……C2

Name of Tunnel Ci Type of Inspection
Tunnel No. Month, Year

12 v1.10

| NUMERICAL RATING CONDITION DESCRIPTION | |
|---|---|
| Rating Condition | Description of Condition |
| 1 | FAILED CONDITION. Item not operational. |
| 2 | POTENTIALLY HAZARDOUS. Deterioration or damage to span drive or stabilizing machinery which could cause movable span to become imminently unstable in any position. Malfunction or deterioration of electrical system which could cause loss of control of the moving span. Deficiency in electrical system design, maintenance, or operational procedure which could cause loss of control of moving span. Inoperable vehicular traffic control device. Also, extreme cases of defects listed under higher rating numbers. Bridge may not be opened to marine traffic. If problem is with stabilizing machinery in the closed position, temporary shoring or support may be necessary to permit safe vehicular traffic over the closed bridge at reduced speed or rating. However, if problem, is with counterweight components of vertical lift bridge stabilizing machinery, bridge may be closed to all traffic until shored or repaired. |
| 3 | VERY SERIOUS DETERIORATION. Deterioration or damage to machinery which will not cause imminent instability of a non-redundant span drive but reduces allowable load on drive and may cause future instability if not corrected. Stabilizing machinery damaged, deteriorated, or improperly operated such that movable structure is not properly supported causing structure not to behave as designed and resulting in structural overstress and movements under vehicular traffic that severely affect quality. Severe misalignment of stabilizing machinery, resulting in overload of electrical system and consequent overstress of span drive machinery. Severe interference between moving span and fixed structure due to substructure movements. Deterioration of electrical control system such that many of the safety interlocks are normally by-passed, inconsistent control of moving span, and inoperable or missing traffic control devices. Operation of movable span may be restricted in terms of opening angle, number of openings, and allowable wind velocity. If problem is with stabilizing machinery, shoring may be necessary to permit vehicular traffic. |
| 4 | SERIOUS DETERIORATION. Severe wear, deterioration or damage to span drive or stabilizing machinery due to overloading, inadequate maintenance, improper operation, or movement of the structure or substructure. Electrical system malfunctions and numerous safety interlocks are by-passed. Results are inconsistent, noisy, and unreliable operation of the movable span. Improper closure, affecting structural action and vehicular ride quality. Electrical system has archaic components for which replacements are no longer available and open bus panelboards that are considered unsafe nowadays. |
| 5 | MODERATE DETERIORATION. Excessive wear, some damage and deterioration of span drive and stabilizing mechanical machinery. Repairs and replacement of some machinery components required. Bearings may need liner adjustment. Machinery may be misaligned due to shifting of structure and substructure but not enough to seriously overload span drive: correctable by adjusting machinery component location using shims, etc. Replacement of corroded machinery fasteners required. Moving span under control but some indicating and safety devices may be inoperable and may be by-passed, and span limit switch may need adjustment. |
| 6 | MINOR DETERIORATION. None of the major mechanical machinery components are worn or damaged to the extent that replacement is now required. Some components of the span drive may need to be replaced, such as flex-couplings grids, brake linings, etc. Span stabilizing machinery functioning except that wear may have caused excessive clearances in lock bar guides, etc. Shimming of lock bar guides, replacement of limit switches and adjustments necessary. Machinery needs cleaning, painting, lubrication and adjustment. Electrical system generally functioning as designed. Replacement of some relays, indicating devices and lights may be required. Traffic control devices need repair or maintenance. |
| 7 | ALMOST NEW CONDITION. No extensive repairs required. Machinery needs cleaning, painting, lubrication, and adjustment. Electrical systems functioning as designed; may need replacement of indicating lights and minor limit switch adjustment, cleaning of relay contacts and housekeeping in panelboard. Traffic control devices functioning but may need replacement of obstruction lights, object markers, painting of housings, lubrication and adjustment of limit switches. |
| 8 | NEW CONDITION. Virtually no repairs required. Mechanical machinery may need cleaning, touch-up painting and lubrication. Electrical system and traffic devices functioning but may need replacement of bulbs and minor housekeeping. |
| 9 | NOT APPLICABLE. This device or equipment is not on the structure being inspected. |
| N/I | NOT INSPECTED. This device or equipment was not included in the inspection. |

Name of Tunnel C1 Type of Inspection
Tunnel No. Month, Year

13 v1.10

| Condensed Electrical Rating Summary | |
|---|---|
| Item | Rating |
| **Power Distribution** | |
| Incoming Service | 6 |
| Grounding System | 6 |
| Emergency Generator | 6 |
| Automatic Transfer Switch | 6 |
| Electrical Distribution Equipment | 6 |
| Motor Starters, Contactors, and Disconnects | 6 |
| Tunnel Fan Motor Soft Starts | 6 |
| **Motors** | |
| Tunnel Fan Motors | 6 |
| Sump Pump Motors | 6 |
| **Control System** | |
| Control Consoles | 5 |
| Control System | 6 |
| Alarm Auto-dialer | 6 |
| Sump Pump and Hydrocarbon Detection Controls | 6 |
| Uninterruptible Power Supplies | 6 |
| Limit Switches, Photo Electrics, Relays, Contactors, Solenoids and other control devices | 6 |
| **Wire, Conduit and Junction Boxes** | |
| Motor Feeders | 6 |
| Power Feeders | 6 |
| Conduits, Cable Tray and Junction Boxes | 5 |
| **Traffic Control** | |
| Traffic Signals, Lane Control Lights and Signs | 5 |
| Traffic Detection Loops | 6 |
| **Fire Detection System and Emergency Service Cabinets** | |
| Fire Detection System | 6 |
| Emergency Service Cabinets | 6 |
| **Miscellaneous** | |
| Lighting and Receptacles | 6 |
| Public Address System | 3 |
| Closed Circuit TV System | 5 |
| Tunnel Lighting | 6 |
| **Overall Rating** | 6 |

Name of Tunnel C2 Type of Inspection
Tunnel No. Month, Year

APPENDIX E

PHOTOGRAPHS


| | | Page |
|---|---|---|
| Photo 1 | Exhaust Fan Shaft – paint peeling and blistering (typical)..… | E1 |
| Photo 2 | Standpipe Labels – non-compliant with ANSI/ASME A13.1 | E1 |
| Photo 3 | Photo Title…… | E2 |
| Photo 4 | Photo Title…… | E2 |
| Photo 5 | Photo Title…… | E3 |



Photo 1 Exhaust Fan Shaft – paint peeling and blistering (typical)




Photo 2 Standpipe Labels – non-compliant with ANSI/ASME A13.1

# Chapter 9 Tunnels

## 9-1 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 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 tunnel records to the Washington State Bridge Inventory System (WSBIS).

### 9-1.1 *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 1-1.1 for additional definitions used in this manual.

## 9-2 Description of Tunnel Inspection Organization

In accordance with the description of the Bridge Inspection Organization offered in Section 1-2, 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.

## 9-3 Tunnel Inspection Programs

In accordance with the description of the Bridge Inspection Programs offered in Section 1-3, 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.

## 9-4 Tunnel Inspection Organization Roles and Responsibilities

In accordance with the description of the Bridge Inspection Organization Roles and Responsibilities offered in Section 1-4, 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.

### 9-4.1 *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 federal policy. The certification process is described in detail in Section 1-5.

## 9-5 Tunnel Inspection Certification

Certification for tunnel inspection work within the state of Washington is in accordance with the requirements described in Section 1-5 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.

## 9-6 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 are identical to that of Bridge Inspectors as described in Section 1-6.

## 9-7 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.

## 9-8 Tunnel Elements

Tunnels elements are listed in Appendix 9-A SNTI condition definitions are consolidated in Appendix 9-A for inspector use, but the guidance therein is intended to be identical in practice to that of the SNTI. In any instance of disagreement in coding definition, SNTI takes precedent.

WSDOT divides inspection responsibility and reporting based on functional systems within the tunnels. For State owned structures, division of labor and reporting is as follows.

Structural Inspectors cover the following element Sections of the SNTI:

- 3.2 – Structural
- 3.3 – Civil
- 3.8 – Protective Systems

Mechanical and Electrical Inspectors are jointly responsible for the following element sections of the SNTI:

- 3.4 – Mechanical Systems
- 3.5 – Electrical and Lighting Systems
- 3.6 – Fire/Life Safety/Security Systems
- 3.7 – Signs

In cases where the tunnel contains no elements from SNTI Sections 3.4-6, and any signs present have no associated mechanical or electrical functionality, any signs present under SNTI Section 3.7-Signs are the responsibility of the Structural Inspectors to inventory and inspect.

## 9-9 Tunnel QC/QA Program

In accordance with the description of the WSDOT Bridge Preservation Office Quality Control Program offered in Section 7-2, 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 8-4.

## 9-10 Tunnel Records

### 9-10.1 *SNTI Coding Guide*

In accordance with the description of the WSDOT Bridge Preservation Office Bridge Files and Documentation offered in Section 2-1, 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-C. A summary of the SNTI codes with associated WSBIS codes are in Appendix 9-C.

## 9-11 Use of Bridge Elements

For elements of a tunnel or LID structure for which there is an applicable element from Chapter 4 of the WSBIM and no equivalent or overlapping SNTI element, inspector shall code the applicable bridge element into the tunnel inspection report for inventory and inspection. These may typically include bearing elements, pier caps, and elements which would be associated with bridge decks and pedestrian features which may be present above the tunnel. Defects in a tunnel liner which is also serving as a bridge deck shall be coded in both liner and bridge deck elements. Individual element usage is at discretion of inspector and subject to review and approval by the Special Structures Engineer.

## 9-12 Tunnel Deck and Roadway Condition Coding

For the purpose of Asset Management, inspector shall code the overall condition of any roadway deck over the tunnel where deck is integrally supported by the structure (functioning in same fashion as a bridge deck). Two codes are in place for this area to serve Asset Management, and both shall be coded. FWHA Deck Overall for Roadway Above Tunnel shall be coded in accordance with the guidance of SNBI Table 20. WSDOT Deck Overall for Roadway Above Tunnel shall be coded in accordance with the guidance of WSBIM Exhibit 4-2.

When a roadway deck over the tunnel is present, also enter the total deck area for which the condition codes apply. This deck area is available in the geometry tab in bridgeworks. If there is no deck area over the tunnel, code the deck area 0.

## 9-13 Appendices

Appendix 9-A Tunnel BMS Elements

Appendix 9-B Vacant

Appendix 9-C WSDOT/NTI Tunnel Inventory Codes

# Appendix 9-A Tunnel BMS Elements

## Tunnel BMS Element Listing

| Element Type | Element Number | Element Description | Unit | Page |
|---|---|---|---|---|
| Liners | 10000 | Steel Tunnel Liner | SF | 9-A-1 |
| | 10001 | Cast-In-Place Tunnel Liner | SF | 9-A-4 |
| | 10002 | Precast Concrete Tunnel Liner | SF | 9-A-4 |
| | 10003 | Shotcrete Tunnel Liner | SF | 9-A-5 |
| | 10004 | Timber Tunnel Liner | SF | 9-A-5 |
| | 10005 | Masonry Tunnel Liner | SF | 9-A-7 |
| | 10006 | Unlined Rock Tunnel | SF | 9-A-7 |
| | 10007 | Rock Bolt/Dowel | EA | 9-A-7 |
| | 10009 | Other Tunnel Liner | SF | 9-A-8 |
| Tunnel Roof Girders | 10010 | Steel Tunnel Roof Girders | LF | 9-A-8 |
| | 10011 | Concrete Tunnel Roof Girders | LF | 9-A-9 |
| | 10012 | Prestressed Concrete Tunnel Roof Girders | LF | 9-A-9 |
| | 10019 | Other Tunnel Roof Girders | LF | 9-A-10 |
| Columns / Piles | 10020 | Steel Column / Piles | EA | 9-A-10 |
| | 10021 | Concrete Column / Piles | EA | 9-A-11 |
| | 10029 | Other Column / Piles | EA | 9-A-11 |
| Cross Passageway | 10030 | Steel Cross Passageway | LF | 9-A-12 |
| | 10031 | Concrete Cross Passageway | LF | 9-A-13 |
| | 10033 | Shotcrete Cross Passageway | LF | 9-A-13 |
| | 10034 | Timber Cross Passageway | LF | 9-A-14 |
| | 10035 | Masonry Cross Passageway | LF | 9-A-15 |
| | 10036 | Unlined Rock Cross Passageway | LF | 9-A-16 |
| | 10039 | Other Cross Passageway | LF | 9-A-16 |
| Interior Walls | 10041 | Concrete Interior Walls | SF | 9-A-17 |
| | 10049 | Other Interior Walls | SF | 9-A-17 |
| Portals | 10051 | Concrete Portal | SF | 9-A-18 |
| | 10055 | Masonry Portal | SF | 9-A-19 |
| | 10059 | Other Portal | SF | 9-A-19 |
| Ceiling Slab | 10061 | Concrete Ceiling Slab | SF | 9-A-20 |
| | 10069 | Other Ceiling Slab | SF | 9-A-20 |
| Ceiling Girder | 10070 | Steel Ceiling Girder | LF | 9-A-21 |
| | 10071 | Concrete Ceiling Girder | LF | 9-A-21 |
| | 10072 | Prestressed Concrete Ceiling Girder | LF | 9-A-22 |
| | 10079 | Other Ceiling Girder | LF | 9-A-22 |
| Hangers and Anchorages | 10080 | Steel Hangers and Anchorages | EA | 9-A-23 |
| | 10089 | Other Hangers and Anchorages | EA | 9-A-24 |
| Ceiling Panels | 10090 | Steel Ceiling Panels | SF | 9-A-25 |
| | 10091 | Concrete Ceiling Panels | SF | 9-A-25 |
| | 10099 | Other Ceiling Panels | SF | 9-A-26 |
| Invert Slab | 10101 | Concrete Invert Slab | SF | 9-A-27 |
| | 10109 | Other Invert Slab | SF | 9-A-27 |
| Slab-on-Grade | 10111 | Concrete Slab-on-Grade | SF | 9-A-28 |
| | 10119 | Other Slab-on-Grade | SF | 9-A-28 |

## Tunnel BMS Element Listing

| Element Type | Element Number | Element Description | Unit | Page |
|---|---|---|---|---|
| Invert Girder | 10120 | Steel Invert Girder | LF | 9-A-29 |
| | 10121 | Concrete Invert Girder | LF | 9-A-29 |
| | 10122 | Prestressed Concrete Invert Girder | LF | 9-A-30 |
| | 10129 | Other Invert Girder | LF | 9-A-30 |
| Joints | 10130 | Strip Seal Expansion Joint | LF | 9-A-31 |
| | 10131 | Pourable Joint Seal | LF | 9-A-32 |
| | 10132 | Compression Joint Seal | LF | 9-A-33 |
| | 10133 | Assembly Joint With Seal | LF | 9-A-34 |
| | 10134 | Open Expansion Joint | LF | 9-A-34 |
| | 10135 | Assembly Joint Without Seal | LF | 9-A-35 |
| | 10139 | Other Joint | LF | 9-A-35 |
| Gaskets | 10140 | Gaskets | LF | 9-A-36 |
| Wearing Surface | 10151 | Concrete Wearing Surface | SF | 9-A-37 |
| | 10158 | Asphalt Wearing Surface | SF | 9-A-37 |
| | 10159 | Other Wearing Surface | SF | 9-A-38 |
| Traffic Barrier<br>Pedestrian Railing | 10160 | Steel Traffic Barrier | LF | 9-A-38 |
| | 10161 | Concrete Traffic Barrier | LF | 9-A-39 |
| | 10169 | Other Traffic Barrier | LF | 9-A-39 |
| | 10170 | Steel Pedestrian Railing | LF | 9-A-40 |
| | 10171 | Concrete Pedestrian Railing | LF | 9-A-40 |
| | 10179 | Other Pedestrian Railing | LF | 9-A-41 |
| Ventilation System | 10200 | Ventilation System | EA | 9-A-41 |
| | 10201 | Fans | EA | 9-A-42 |
| Drainage and Pumping System | 10300 | Drainage and Pumping System | EA | 9-A-42 |
| | 10301 | Pumps | EA | 9-A-43 |
| Emergency Generator System | 10400 | Emergency Generator System | EA | 9-A-44 |
| Electrical Distribution System | 10500 | Electrical Distribution System | EA | 9-A-45 |
| Emergency Distribution System | 10550 | Emergency Distribution System | EA | 9-A-45 |
| Tunnel Lighting | 10601 | Tunnel Lighting Fixtures | EA | 9-A-46 |
| Emergency Lighting | 10620 | Emergency Lighting Systems | EA | 9-A-47 |
| | 10621 | Emergency Lighting Fixtures | EA | 9-A-47 |
| Fire Detection | 10650 | Fire Detection System | EA | 9-A-48 |
| Fire Protection | 10700 | Fire Protection System | EA | 9-A-48 |
| Emergency Communications | 10750 | Emergency Communications System | EA | 9-A-49 |
| Operations and Security | 10800 | Tunnel Operations and Security System | EA | 9-A-49 |
| Traffic Guidance | 10850 | Traffic Sign | EA | 9-A-50 |
| Egress Signs | 10870 | Egress Sign | EA | 9-A-50 |

**Tunnel BMS Element Listing**

| Element Type | Element Number | Element Description | Unit | Page |
|---|---|---|---|---|
| Variable Message Boards | 10890 | Variable Message Board | EA | 9-A-51 |
| Lane Signal | 10910 | Lane Signal | EA | 9-A-51 |
| | 10911 | Lane Signal Fixture | EA | 9-A-52 |
| Protective Systems | 10950 | Steel Corrosion Protective Coating | SF | 9-A-53 |
| | 10951 | Concrete Corrosion Protective Coating | SF | 9-A-53 |
| | 10952 | Fire Protective Coating | SF | 9-A-54 |
| | 10955 | Reflective Tunnel Tile | SF | 9-A-54 |

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.

1. Defects are superficial and have no effect on the structural capacity of the tunnel.
2. Tunnel Liner area corrosion of steel has initiated and there may be areas of freckled rust. Cracking that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar may exist in the liner. Connections have loose fasteners or pack rust without distortion, but the connections are in place and functioning as intended. Distortion in the liner is present and has received a structural review and has been mitigated. Liner surfaces are saturated indicating seepage may be present or evidence of past seepage.
3. Tunnel Liner area with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Areas of corrosion may exist where section loss is evident, or pack rust is present. Cracks may exist and have not been arrested. Connections may have missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion. Liner surfaces may have areas that are fully saturated with seepage.
4. Tunnel liner area condition warrants a structural review to determine the effect of strength or serviceability of the liner, OR a structural review has been completed and the defects impact strength and serviceability of the liner. Liner surfaces may have areas with seepage that ranges from dripping to flowing.

## 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.

1. Defects are superficial and have no effect on the structural capacity of the tunnel liner. Cracking may exist with widths less than 0.012 in. or spacing greater than 5.0 ft.
2. Tunnel Liner area delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.012 – 0.10 in. or spacing between 1.0 – 5.0 ft. Distortion of liner has received structural review and has been mitigated. Liner surfaces are saturated indicating seepage may be present or evidence of past seepage.
3. Tunnel Liner area with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.10 in. below the spring line or greater than 0.012 in. above the spring line or spacing less than 1.0 ft. Liner surfaces may have areas that are fully saturated with seepage.
4. Tunnel Liner area condition warrants a structural review to determine the effect of strength or serviceability of the liner, OR a structural review has been completed and the defects impact strength and serviceability of the liner. Liner surfaces may have areas with seepage that ranges from dripping to flowing.

## 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.

See Cast-in-Place Concrete Tunnel Liner (10001) for condition state specifications.

## 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.

See Cast-in-Place Concrete Tunnel Liner (10001) for condition state specifications.

## 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.

1. Defects are superficial and have no effect on the structural capacity of the tunnel.
2. Tunnel Liner area with decay that has started in the timber sets or lagging, no fungus growth or discoloration is present. Small voids may exist in the annular space behind the lagging. Cracks, splits, or checks may exist in the timber sets or lagging. Distortion or misalignment between timber members may exist but is 0.125 in. or less. Insect infestation has started in the timber sets or lagging. Connections have loose bolts, or fasteners are present, but the connections are in place and functioning as intended. Timber surfaces are saturated indicating seepage may be present or evidence of past seepage.
3. Tunnel Liner area with structural defects. Decay has resulted in loss of strength, deflection, or crushing of the element but not of a sufficient magnitude to affect the strength and serviceability of the tunnel. Fungus growth and discoloration is present. Large voids may exist in the annular space behind the lagging. Cracks, splits or checks exist in the timber sets or lagging and has impacted strength and/or serviceability but does not warrant a structural review. Distortion or misalignment between timber members may exist and is between 0.125 in. and 0.25 in. Insect infestation exists in the timber sets or lagging and has produced loss of strength or deflection of the element but not of a sufficient magnitude to affect the strength and/or serviceability of the tunnel. Connections have missing bolts or fasteners but does not require a structural review. Timber surfaces are fully saturated with seepage.
4. Tunnel liner area condition warrants a structural review to determine the effect of strength or serviceability of the liner, OR a structural review has been completed and the defects impact strength and serviceability of the liner. Liner surfaces may have areas with seepage that ranges from dripping to flowing.

## 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.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. Surface is dry.
2. Tunnel liner area with cracking or voids in less than 10% of joints. Efflorescence may include white surfaces without build-up or leaching without rust staining. Block or stone has split or spalled with no shifting and all patching is sound. Block or stone has only shifted slightly out of alignment. Distortion has received structural review and has been mitigated. Saturated surface indicating seepage may be present or evidence of past seepage.
3. Tunnel liner areas of efflorescence may exist with heavy build-up and rust staining. There is cracking or voids in 10% or more of the joints. Block and stone have split or spalled with shifting but does not warrant a structural review or patching is unsound. Block or stone has shifted significantly out of alignment or is missing but does not warrant structural review. Distortion has received structural review and does not require mitigation. Surface is fully saturated with seepage.
4. Tunnel liner area condition warrants a structural review to determine the effect of strength or serviceability of the liner, OR a structural review has been completed and the defects impact strength and serviceability of the liner. Liner surfaces may have areas with seepage that ranges from dripping to flowing.

## 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.

1. Tunnel has no drummy rock, blocks, or slabs apparent, and no shear zones are in evidence. There are no displacements visible along joints and cracks, and the surface is dry.
2. Tunnel has rockfall with any blocks or slabs that are tightly interlocked with the surrounding rock and are not in danger of separating from the parent rock mass. Any displacements along shear zones, joints, or cracks appear to be old, i.e., to have come about prior to the existence of the tunnel. The drummy areas are less than or equal to 1.0 ft. in diameter. All patches are sound. Saturated surface indicating seepage may be present or evidence of past seepage.
3. Tunnel has rockfall with any blocks or slabs that are not tightly interlocked with the surrounding rock that are less than 1 ft. in diameter. Displacements along shear zones, joints, or cracks have occurred since construction. The drummy areas are greater than 1.0 ft in diameter. Patches are unsound. Surface is fully saturated with seepage.
4. Tunnel condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel. Tunnel may have areas with seepage that ranges from dripping to flowing.

## 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. There are loose or missing nuts, but the bolt/dowel is in alignment and functioning as intended. There is deformation or cracking of liner or supported rock.
3. There are loose or missing nuts; the bolt/dowel is out of alignment or loose. There is deformation or crackling and spalling of liner or supported rock.
4. The condition warrants a structural review to determine the effect on strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 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. There are cracks are present but they have not allowed the rock to shift.
2. Tunnel liners may have cracks present and rock has minor shifting. Distortion has received structural review and has been mitigated, and all patches are sound. Saturated surface indicating seepage may be present or evidence of past seepage.
3. Tunnel liner may have rocks that are cracked with face deformation. There are rocks missing. Distortion has received structural review and does not require mitigation. Unsound patches. Surface is fully saturated with seepage.
4. Tunnel liner area condition warrants a structural review to determine the effect of strength or serviceability of the liner, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel. Liner surfaces may have areas with seepage that ranges from dripping to flowing.

## 10010 Steel Tunnel Roof Girders — Units – LF

Record this element for all steel tunnel roof girders. Tunnel roof girders support the tunnel roof liner or exposed rock which constitutes the tunnel roof.

The total length of tunnel roof girder is the sum of all the lengths of each tunnel roof girder.

1. Defects are superficial and have no effect on the structural capacity of the tunnel.
2. Roof Girder length where corrosion of steel has initiated and there may be areas of freckled rust. Cracking that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar may exist in the element or tunnel. Connections have loose fasteners or pack rust without distortion, but the connections are in place and functioning as intended. Distortion is present and has received a structural review and has been mitigated. Surfaces are saturated indicating seepage may be present or evidence of past seepage.
3. Roof Girder length with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Areas of corrosion may exist along the length of the girder where section loss is evident, or pack rust is present. Cracks may exist and have not been arrested. Connections may have missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion. Surfaces may have areas that are fully saturated with seepage.
4. Roof Girder condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel. Surfaces may have areas with seepage that ranges from dripping to flowing.

## 10011 Concrete Tunnel Roof Girders Units – LF

Record this element for all concrete tunnel roof girders. Tunnel roof girders support the tunnel roof liner or exposed rock which constitutes the tunnel roof.

The total length of tunnel roof girder is the sum of all the lengths of each tunnel roof girder.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. Cracking may exist with widths less than 0.012 in. or spacing greater than 3.0 ft.
2. Roof Girder length with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.012 – 0.05 in. or spacing between 1.0 – 3.0 ft.
3. Roof Girder length with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.05 in. or spacing less than 1.0 ft.
4. Roof Girder condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10012 Prestressed Concrete Tunnel Roof Girders Units – LF

Record this element for all prestressed concrete tunnel roof girders. Tunnel roof girders support the tunnel roof liner or exposed rock which constitutes the tunnel roof.

The total length of tunnel roof girder is the sum of all the lengths of each tunnel roof girder.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. Cracking may exist with widths less than 0.004 in. or spacing greater than 3.0 ft.
2. Roof Girder length with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.004 – 0.009 in. or spacing between 1.0 – 3.0 ft. Exposed prestressing is present without section loss.
3. Roof Girder length with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.009 in. or spacing less than 1.0 ft. Exposed prestressing is present with section loss but does not warrant a structural review.
4. Roof Girder condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

**10019 Other Tunnel Roof Girders** **Units – LF**

Record this element for all tunnel roof girders composed of other materials. Tunnel roof girders support the tunnel roof liner or exposed rock which constitutes the tunnel roof.

The total length of tunnel roof girder is the sum of all the lengths of each tunnel roof girder.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. Roof Girders are in good condition with no notable distress.
2. Roof Girder lengths are in fair condition with isolated breakdowns or deterioration.
3. Roof Girder lengths are in poor condition with widespread deterioration or breakdowns without reducing load capacity
4. Roof Girder condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## Tunnel Column/Piles

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

Record this element for all steel columns/piles. Tunnel columns support the tunnel roof girders, tunnel ceiling girders and/or tunnel invert girders. Tunnel piles provide support for the tunnel columns.

The total number of columns/piles is the sum of all the number of columns and piles.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. The connection is in place and is functioning as intended.
2. Column/Pile area where corrosion of steel has initiated and there may be areas of freckled rust. Cracking that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar may exist in the columns/piles. Connections have loose fasteners or pack rust without distortion, but the connections are in place and functioning as intended. Distortion in the columns/piles is present and has received a structural review and has been mitigated.
3. Column/Pile area with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Areas of corrosion may exist where section loss is evident, or pack rust is present. Cracks may exist and have not been arrested. Connections may have missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion.
4. Column/Pile area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10021 Concrete Columns/Piles Units – EA

Record this element for all concrete columns/piles. Tunnel columns support the tunnel roof girders, tunnel ceiling girders and/or tunnel invert girders. Tunnel piles provide support for the tunnel columns.

The total number of columns/piles is the sum of all the number of columns and piles.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. Cracking may exist with widths less than 0.012 in. or spacing greater than 3.0 ft.
2. Column/Pile area with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.012 – 0.05 in. or spacing between 1.0 – 3.0 ft.
3. Column/Pile area with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.05 in. or spacing less than 1.0 ft.
4. Column/Pile area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10029 Other Columns/Piles Units – EA

Record this element for all columns/piles composed of other materials. Tunnel columns support the tunnel roof girders, tunnel ceiling girders and/or tunnel invert girders. Tunnel piles provide support for the tunnel columns.

The total number of columns/piles is the sum of all the number of columns and piles.

1. Column/Pile is in good condition with no notable distress.
2. Column/Pile is in fair condition with isolated breakdowns or deterioration.
3. Column/Pile is in poor condition with widespread deterioration or breakdowns without reducing load capacity.
4. Column/Pile condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## Tunnel Passageway

### 10030 Steel Cross Passageway — Units – LF

Record this element for all steel cross passageways. Cross passageways are typically oriented transverse to the tunnel bores and are comprised of doors to allow egress between separated tunnel bores.

The total length of cross passageways is the sum of all the lengths of each cross passageway.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. Connection is in place and functioning as intended.
2. Cross Passageway length where corrosion of steel has initiated and there may be areas of freckled rust. Cracking that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar may exist in the element or tunnel. Connections have loose fasteners or pack rust without distortion, but the connections are in place and functioning as intended. Distortion is present and has received a structural review and has been mitigated. Surfaces are saturated indicating seepage may be present or evidence of past seepage.
3. Cross Passageway length with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Areas of corrosion may exist where section loss is evident, or pack rust is present. Cracks may exist and have not been arrested. Connections may have missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion. Surfaces may have areas that are fully saturated with seepage.
4. Cross Passageway condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel. Surfaces may have areas with seepage that ranges from dripping to flowing.

## 10031 Concrete Cross Passageway Units – LF

Record this element for all concrete cross passageways. Cross passageways are typically oriented transverse to the tunnel bores and are comprised of doors to allow egress between separated tunnel bores.

The total length of cross passageways is the sum of all the lengths of each cross passageway.

1. Defects are superficial and have no effect on the structural capacity of the tunnel liner. Cracking may exist with widths less than 0.012 in. or spacing greater than 5.0 ft.
2. Cross Passageway length with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.012 – 0.10 in. or spacing between 1.0 – 5.0 ft. Distortion of passageway has received structural review and has been mitigated. Surfaces are saturated indicating seepage may be present or evidence of past seepage.
3. Cross Passageway length with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.10 in. below the spring line or greater than 0.012 in. above the spring line or spacing less than 1.0 ft. Surfaces may have areas that are fully saturated with seepage.
4. Cross Passageway condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel. Surfaces may have areas with seepage that ranges from dripping to flowing.

## 10033 Shotcrete Cross Passageway Units – LF

Record this element for all shotcrete cross passageways. Cross passageways are typically oriented transverse to the tunnel bores and are comprised of doors to allow egress between separated tunnel bores.

The total length of cross passageways is the sum of all the lengths of each cross passageway.

See Concrete Cross Passageway (10031) for condition state specifications.

## 10034 Timber Cross Passageway Units – LF

Record this element for all timber cross passageways. Cross passageways are typically oriented transverse to the tunnel bores and are comprised of doors to allow egress between separated tunnel bores.

The total length of cross passageways is the sum of all the lengths of each cross passageway.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. Timber distortion has no off-set or misalignment between the timber members with good compression fit.
2. Cross Passageway length with decay that has started in the timber sets or lagging, no fungus growth or discoloration is present. Small voids may exist in the annular space behind the lagging. Cracks, splits, or checks may exist in the timber sets or lagging. Distortion or misalignment between timber members may exist but is 0.125 in. or less. Insect infestation has started in the timber sets or lagging. Connections have loose bolts, or fasteners are present, but the connections are in place and functioning as intended. Timber surfaces are saturated indicating seepage may be present or evidence of past seepage.
3. Cross Passageway length with structural defects. Decay has resulted in loss of strength, deflection, or crushing of the element but not of a sufficient magnitude to affect the strength and serviceability of the tunnel. Fungus growth and discoloration is present. Large voids may exist in the annular space behind the lagging. Cracks, splits or checks exist in the timber sets or lagging and has impacted strength and/or serviceability but does not warrant a structural review. Distortion or misalignment between timber members may exist and is between 0.125 in. and 0.25 in. Insect infestation exists in the timber sets or lagging and has produced loss of strength or deflection of the element but not of a sufficient magnitude to affect the strength and/or serviceability of the tunnel. Connections have missing bolts or fasteners but does not require a structural review. Timber surfaces are fully saturated with seepage.
4. Cross Passageway condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel. Surfaces may have areas with seepage that ranges from dripping to flowing.

## 10035 Masonry Cross Passageway Units – LF

Record this element for all masonry cross passageways. Cross passageways are typically oriented transverse to the tunnel bores and are comprised of doors to allow egress between separated tunnel bores.

The total length of cross passageways is the sum of all the lengths of each cross passageway.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. Surface is dry.
2. Cross Passageway length with cracking or voids in less than 10% of joints. Efflorescence may include white surfaces without build-up or leaching without rust staining. Block or stone has split or spalled with no shifting and all patching is sound. Block or stone has only shifted slightly out of alignment. Distortion has received structural review and has been mitigated. Saturated surface indicating seepage may be present or evidence of past seepage.
3. Cross Passageway length of efflorescence may exist with heavy build-up and rust staining. There is cracking or voids in 10% or more of the joints. Block and stone have split or spalled with shifting but does not warrant a structural review and/or patching is unsound. Block or stone has shifted significantly out of alignment or is missing but does not warrant structural review. Distortion has received structural review and does not require mitigation. Surface is fully saturated with seepage.
4. Cross Passageway condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel. Surfaces may have areas with seepage that ranges from dripping to flowing.

## 10036 Unlined/Rock Cross Passageway Units – LF

Record this element for all unlined rock cross passageways. Cross passageways are typically oriented transverse to the tunnel bores and are comprised of doors to allow egress between separated tunnel bores.

The total length of cross passageways is the sum of all the lengths of each cross passageway.

1. Passageway has no drummy rock, blocks, or slabs apparent, and no shear zones are in evidence. There are no displacements visible along joints and cracks, and the surface is dry.
2. Passageway length has rockfall with any blocks or slabs that are tightly interlocked with the surrounding rock and are not in danger of separating from the parent rock mass. Any displacements along shear zones, joints, or cracks appear to be old, i.e., to have come about prior to the existence of the tunnel. The drummy areas are less than or equal to 1.0 ft. in diameter. All patches are sound. Saturated surface indicating seepage may be present or evidence of past seepage.
3. Passageway length has rockfall with any blocks or slabs that are not tightly interlocked with the surrounding rock that are less than 1 ft. in diameter. Displacements along shear zones, joints, or cracks have occurred since construction. The drummy areas are greater than 1.0 ft in diameter. Patches are unsound. Surface is fully saturated with seepage.
4. Passageway condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel. Passageway may have areas with seepage that ranges from dripping to flowing.

## 10039 Other Cross Passageway Units – LF

Record this element for all other cross passageways. Cross passageways are typically oriented transverse to the tunnel bores and are comprised of doors to allow egress between separated tunnel bores.

The total length of cross passageways is the sum of all the lengths of each cross passageway.

1. Defects are superficial and have no effect on structural capacity. Cracks may be present but they have not allowed for the rock to shift. Surfaces are dry.
2. Cross Passageway length where cracks are present and rock has minor shifting and all patches are sound. Distortion has received structural review and has been mitigated. A saturated surface may indicate present or previous seepage.
3. Cross Passageway length where rocks are cracked with face deformation and rocks are missing and patches are unsound. Distortion has received structural review and does not need mitigation. Surface is fully saturated with seepage.
4. Cross Passageway condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel. Seepage could range from dripping to flowing.

# Tunnel Interior Walls

## 10041 Concrete Interior Walls — Units – SF

Record this element for all concrete interior walls. This element defines those internal walls in tunnels which are usually placed to separate traffic travelling in opposite directions. The internal wall also serves as a barrier between tunnel segments in an emergency to protect evacuees from smoke inhalation, fire or hazardous conditions.

The area of the interior wall is the product of the length (along the centerline) of the tunnel and the height.

1. Defects are superficial and have no effect on the structural capacity of the interior wall. Cracking may exist with widths less than 0.012 in. or spacing greater than 5.0 ft.
2. Interior Wall area with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking in liners may exist with widths 0.012 – 0.10 in. or spacing between 1.0 – 5.0 ft.
3. Interior Wall area with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.10 in. below the spring line or greater than 0.012 in. above the spring line or spacing less than 1.0 ft.
4. Interior Wall area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10049 Other Interior Walls — Units – SF

Record this element for all interior walls composed of other materials. This element defines those internal walls in tunnels which are usually placed to separate traffic travelling in opposite directions. The internal wall also serves as a barrier between tunnel segments in an emergency to protect evacuees from smoke inhalation, fire or hazardous conditions.

The area of the interior wall is the product of the length (along the centerline) of the tunnel and the height.

1. Interior Wall is in good condition with no notable distress.
2. Interior Wall is in fair condition with isolated breakdowns or deterioration.
3. Interior Wall is in poor condition with widespread deterioration or breakdowns without reducing load capacity.
4. Interior Wall area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

# Tunnel Portal

## 10051 Concrete Portal — Units – SF

Record this element for all concrete portals. This element defines the portal façade, which comprise the architectural/structural that are above the roadway at the opening of the tunnel bore.

The area of the portal is the product of the width and height of the portal minus the area of the roadway opening. The area may include wingwalls which retain soil and rock near the portal but does not include walls leading up to the portal.

1. Defects are superficial and have no effect on the structural capacity of the portal. Cracking may exist with widths less than 0.012 in. or spacing greater than 5.0 ft.
2. Portal area with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.012 – 0.10 in. or spacing between 1.0 – 5.0 ft. Settlement exists within tolerable limits or is arrested with no observed structural distress.
3. Portal area with structural defects that do not require a structural review. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.10 in. below the spring line or greater than 0.012 in. above the spring line or spacing less than 1.0 ft. Settlement exceeds tolerable limits but does not warrant structural review.
4. Portal area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10055 Masonry Portal Units – SF

Record this element for all masonry portals. This element defines the portal façade, which comprise the architectural/structural that are above the roadway at the opening of the tunnel bore.

The area of the portal is the product of the width and height of the portal minus the area of the roadway opening. The area may include wingwalls which retain soil and rock near the portal but does not include walls leading up to the portal.

1. Defects are superficial and have no effect on the structural capacity of the portal.
2. Portal area with cracking or voids in less than 10% of joints. Efflorescence may include white surfaces without build-up or leaching without rust staining. Block or stone has split or spalled with no shifting and all patching is sound. Block or stone has only shifted slightly out of alignment. Settlement exists within tolerable limits or is arrested with no observed structural distress.
3. Portal areas of efflorescence may exist with heavy build-up and rust staining. There is cracking or voids in 10% or more of the joints. Block and stone have split or spalled with shifting but does not warrant a structural review or patching is unsound. Block or stone has shifted significantly out of alignment or is missing but does not warrant structural review. Settlement exceeds tolerable limits but does not warrant structural review.
4. Portal area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10059 Other Portal Units – SF

Record this element for all portals composed of other materials. This element defines the portal façade, which comprise the architectural/structural that are above the roadway at the opening of the tunnel bore.

The area of the portal is the product of the width and height of the portal minus the area of the roadway opening. The area may include wingwalls which retain soil and rock near the portal but does not include walls leading up to the portal.

1. Portal is in good condition with no notable distress.
2. Portal is in fair condition with isolated breakdowns or deterioration. Settlement exists within tolerable limits or arrested with no observed structural distress.
3. Portal is in poor condition with widespread deterioration or breakdowns without reducing load capacity. Settlement exceeds tolerable limits but does not warrant a structural review.
4. Portal area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## Tunnel Ceiling Slab

### 10061 Concrete Ceiling Slab — Units – SF

Record this element for all concrete ceiling slabs. This element defines those structural slabs which separate the space above the roadway from the upper plenum.

The area of the ceiling slab is the product of the width and the length of the slab.

1. Defects are superficial and have no effect on the structural capacity of the ceiling slab. Cracking may exist with widths less than 0.012 in. or spacing greater than 3.0 ft.
2. Ceiling Slab area with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.012 – 0.05 in. or spacing between 1.0 – 3.0 ft.
3. Ceiling Slab area with structural defects that do not require a structural review. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.05 in. or spacing less than 1.0 ft.
4. Ceiling Slab area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

### 10069 Other Ceiling Slab — Units – SF

Record this element for all ceiling slabs composed of other materials. This element defines those structural slabs which separate the space above the roadway from the upper plenum.

The area of the ceiling slab is the product of the width and the length of the slab.

1. Ceiling Slab is in good condition with no notable distress.
2. Ceiling Slab is in fair condition with isolated breakdowns or deterioration.
3. Ceiling Slab is in poor condition with widespread deterioration or breakdowns without reducing load capacity.
4. Ceiling Slab area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## Tunnel Ceiling Girder

### 10070 Steel Ceiling Girder — Units – LF

Record this element for all steel ceiling girders. This element defines the girders that support the structural ceiling slabs which separate the space above the roadway from the upper plenum.

The total quantity for ceiling girder is the sum of all the lengths of each tunnel ceiling girder.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. Connection is in place and functioning as intended.
2. Ceiling Girder length where corrosion of steel has initiated and there may be areas of freckled rust. Cracking that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar may exist in the liner. Connections have loose fasteners or pack rust without distortion, but the connections are in place and functioning as intended. Distortion is present and has received a structural review and has been mitigated.
3. Ceiling Girder length with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Areas of corrosion may exist where section loss is evident, or pack rust is present. Cracks may exist and have not been arrested. Connections may have missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion.
4. Ceiling Girder condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

### 10071 Concrete Ceiling Girder — Units – LF

Record this element for all concrete ceiling girders. This element defines the girders that support the structural ceiling slabs which separate the space above the roadway from the upper plenum.

The total quantity for ceiling girder is the sum of all the lengths of each tunnel ceiling girder.

1. Defects are superficial and have no effect on the structural capacity of the ceiling slab. Cracking may exist with widths less than 0.012 in. or spacing greater than 3.0 ft.
2. Ceiling Girder length with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.012 – 0.05 in. or spacing between 1.0 – 3.0 ft.
3. Ceiling Girder length with structural defects that do not require a structural review. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.05 in. or spacing less than 1.0 ft.
4. Ceiling Girder condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10072 Prestressed Concrete Ceiling Girder Units – LF

Record this element for all prestressed concrete ceiling girders. This element defines the girders that support the structural ceiling slabs which separate the space above the roadway from the upper plenum.

The total quantity for ceiling girder is the sum of all the lengths of each tunnel ceiling girder.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. Cracking may exist with widths less than 0.004 in. or spacing greater than 3.0 ft.
2. Ceiling Girder length with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.004 – 0.009 in. or spacing between 1.0 – 3.0 ft. Exposed prestressing is present without section loss.
3. Ceiling Girder length with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.009 in. or spacing less than 1.0 ft. Exposed prestressing is present with section loss but does not warrant a structural review.
4. Ceiling Girder condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10079 Other Ceiling Girder Units – LF

Record this element for all ceiling girders composed of other materials. This element defines the girders that support the structural ceiling slabs which separate the space above the roadway from the upper plenum.

The total quantity for ceiling girder is the sum of all the lengths of each tunnel ceiling girder.

1. Ceiling Girder is in good condition with no notable distress.
2. Ceiling Girder is in fair condition with isolated breakdowns or deterioration.
3. Ceiling Girder is in poor condition with widespread deterioration or breakdowns without reducing load capacity.
4. Ceiling Girder area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

# Tunnel Hangers/Anchors

## 10080 Steel Hangers and Anchorages Units – EA

Record this element for all steel hangers and anchorages. Hangers are tension members that support ceiling girders or ceiling panels. The anchorages of the hangers are typically attached to the tunnel roof and ceiling panels.

The total quantity for hangers and anchorages is the sum of all the number of hanger and anchorage units.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. Connection is in place and functioning as intended.
2. Steel Hanger and Anchorages where corrosion of steel has initiated and there may be areas of freckled rust. There may be cracking that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar may exist in the liner. Connections have loose fasteners or pack rust without distortion, but the connections are in place and functioning as intended. Isolated hangers are bowed or elongated. Creep displacement is visible and anchorage has received a structural review and has been mitigated. There is cracking around the anchorage areas, but concrete is sound.
3. Steel Hanger and Anchorages with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Areas of corrosion may exist where section loss is evident, or pack rust is present. Cracks may exist and have not been arrested. Connections may have missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion. Multiple adjacent hangers are bowed and elongated and anchors has a gap greater than 0.125 in or are visibly elongated. Creep displacement is visible and anchorage has received a structural review and does not require mitigation. There is cracking and/or spalling around the anchorage areas and concrete is not sound
4. Steel Hanger and Anchorage condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10089 Other Hangers and Anchorages Units – EA

Record this element for all hangers and anchorages composed of other materials. Hangers are tension members that support ceiling girders or ceiling panels. The anchorages of the hangers are typically attached to the tunnel roof and ceiling panels.

The total quantity for hangers and anchorages is the sum of all the number of hanger and anchorage units.

1. Hanger and Anchorage are in good condition with no notable distress and connections and anchorage area are sound.
2. Hanger and Anchorages are in fair condition with isolated breakdowns or deterioration. Isolated fasteners are loose at their connections. Isolated hangers are bowed or elongated. Displacement is visible and anchorage has received structural review and has been mitigated. There is cracking around the anchorage areas, but the concrete is sound.
3. Hanger and Anchorages are in poor condition with widespread deterioration or breakdowns without reducing load capacity. Adjacent hangers are loose and/or fasteners are missing from the connections at isolated locations. Multiple adjacent hangers are bowed or elongated, and/or anchors have a gap greater than 0.125 inches or are visible elongated. Displacement is visible and anchorage has received a structural review and does not require mitigation. There is cracking or spalling around the anchorage area and the concrete is not sound.
4. Hanger and Anchorage condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

# Tunnel Ceiling Panels

## 10090 Steel Ceiling Panels — Units – SF

Record this element for all steel ceiling panels. Ceiling panels separate the upper plenum from space above the tunnel roadway. Ceiling panels are typically supported by hangers.

The area of the ceiling panel is the product of the width and length of the panel.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. Connection is in place and function as needed.
2. Ceiling Panel area where corrosion of steel has initiated and there may be areas of freckled rust. Cracking that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar may exist in the liner. Connections have loose fasteners or pack rust without distortion, but the connections are in place and functioning as intended. Distortion is present and has received a structural review and has been mitigated.
3. Ceiling Panel area with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Areas of corrosion may exist where section loss is evident, or pack rust is present. Cracks may exist and have not been arrested. Connections may have missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion.
4. Ceiling Panel area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10091 Concrete Ceiling Panels — Units – SF

Record this element for all concrete ceiling panels. Ceiling panels separate the upper plenum from space above the tunnel roadway. Ceiling panels are typically supported by hangers.

The area of the ceiling panel is the product of the width and length of the panel.

1. Defects are superficial and have no effect on the structural capacity of the ceiling panel. Cracking may exist with widths less than 0.012 in. or spacing greater than 3.0 ft.
2. Ceiling Panel area with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.012 – 0.05 in. or spacing between 1.0 – 3.0 ft.
3. Ceiling Panel area with structural defects that do not require a structural review. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.05 in. or spacing less than 1.0 ft.
4. Ceiling Panel area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10099 Other Ceiling Panels Units – SF

Record this element for all ceiling panels composed of other materials. Ceiling panels separate the upper plenum from space above the tunnel roadway. Ceiling panels are typically supported by hangers.

The area of the ceiling panel is the product of the width and length of the panel.

1. Ceiling Panel is in good condition with no notable distress.
2. Ceiling Panel is in fair condition with isolated breakdowns or deterioration.
3. Ceiling Panel is in poor condition with widespread deterioration or breakdowns without reducing load capacity.
4. Ceiling Panel area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

# Tunnel Invert Slab

## 10101 Concrete Invert Slab — Units – SF

Record this element for all concrete invert slabs. This element defines those structural slabs which support the roadway and traffic loads.

The total area of the invert slab is the product of the width and length of the slab.

1. Defects are superficial and have no effect on the structural capacity of the invert slab. Cracking may exist with widths less than 0.012 in. or spacing greater than 3.0 ft.
2. Invert Slab area with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.012 – 0.05 in. or spacing between 1.0 – 3.0 ft.
3. Invert Slab area with structural defects that do not require a structural review. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.05 in. or spacing less than 1.0 ft.
4. Invert Slab area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10109 Other Invert Slab — Units – SF

Record this element for all invert slabs composed of other materials. This element defines those structural slabs which support the roadway and traffic loads.

The total area of the invert slab is the product of the width and length of the slab.

1. Invert Slab is in good condition with no notable distress.
2. Invert Slab is in fair condition with isolated breakdowns or deterioration.
3. Invert Slab is in poor condition with widespread deterioration or breakdowns without reducing load capacity.
4. Invert Slab area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## Tunnel Slab on Grade

### 10111 Concrete Slab on Grade — Units – SF

Record this element for all concrete slabs-on-grade. This element defines a slab that is supported continuously on a subbase material.

The area of the slab-on-grade is the product of the width and length of the slab.

1. Defects are superficial and have no effect on the structural capacity of the slab-on-grade. Cracking may exist with widths less than 0.012 in. or spacing greater than 3.0 ft.
2. Slab-on-Grade area with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Settlement exists with tolerable limits or is arrested with no observed structural distress. Cracking may exist with widths 0.012 – 0.05 in. or spacing between 1.0 – 3.0 ft.
3. Slab-on-Grade area with structural defects that do not require a structural review. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Settlement exceeds tolerable limits but does not require a structural review. Cracking may exist with widths greater than 0.05 in. or spacing less than 1.0 ft.
4. Slab-on-Grade area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

### 10119 Other Slab on Grade — Units – SF

Record this element for all slabs-on-grade composed of other materials. This element defines a slab that is supported continuously on a subbase material.

The area of the slab-on-grade is the product of the width and length of the slab.

1. Slab-on-Grade is in good condition with no notable distress.
2. Slab-on-Grade is in fair condition with isolated breakdowns or deterioration. Settlement exists within tolerable limits or arrested with no observed structural distress.
3. Slab-on-Grade is in poor condition with widespread deterioration or breakdowns without reducing load capacity. Settlement exceeds tolerable limits but does not warrant a structural review.
4. Slab-on-Grade area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## Tunnel Invert Girder

### 10120 Steel Invert Girder — Units – LF

Record this element for all steel invert girders. This element defines the invert girders which support the invert slabs.

The total quantity for invert girder is the sum of all the lengths of each invert girder.

1. Defects are superficial and have no effect on the structural capacity of the invert girder. Connection is in place and function as needed.
2. Invert Girder length where corrosion of steel has initiated and there may be areas of freckled rust. Cracking that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar may exist in the liner. Connections have loose fasteners or pack rust without distortion, but the connections are in place and functioning as intended. Distortion is present and has received a structural review and has been mitigated.
3. Invert Girder length with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Areas of corrosion may exist where section loss is evident, or pack rust is present. Cracks may exist and have not been arrested. Connections may have missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion.
4. Invert Girder condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

### 10121 Concrete Invert Girder — Units – LF

Record this element for all concrete invert girders. This element defines the invert girders which support the invert slabs.

The total quantity for invert girder is the sum of all the lengths of each invert girder.

1. Defects are superficial and have no effect on the structural capacity of the invert girder. Cracking may exist with widths less than 0.012 in. or spacing greater than 3.0 ft.
2. Invert Girder length with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.012 – 0.05 in. or spacing between 1.0 – 3.0 ft.
3. Invert Girder length with structural defects that do not require a structural review. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.05 in. or spacing less than 1.0 ft.
4. Invert Girder condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10122 Prestressed Concrete Invert Girder Units – LF

Record this element for all prestressed concrete invert girders. This element defines the invert girders which support the invert slabs. The total quantity for invert girder is the sum of all the lengths of each invert girder.

1. Defects are superficial and have no effect on the structural capacity of the tunnel. Cracking may exist with widths less than 0.004 in. or spacing greater than 3.0 ft.
2. Invert Girder length with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.004 – 0.009 in. or spacing between 1.0 – 3.0 ft. Exposed prestressing is present without section loss.
3. Invert Girder length with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.009 in. or spacing less than 1.0 ft. Exposed prestressing is present with section loss but does not warrant a structural review.
4. Invert Girder condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10129 Other Invert Girder Units – LF

Record this element for all invert girders composed of other materials. This element defines the invert girders which support the invert slabs. The total quantity for invert girder is the sum of all the lengths of each invert girder.

1. Invert Girder is in good condition with no notable distress.
2. Invert Girder is in fair condition with isolated breakdowns or deterioration.
3. Invert Girder is in poor condition with widespread deterioration or breakdowns without reducing load capacity.
4. Invert Girder area condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

# Tunnel Joints

## 10130 Tunnel Strip Seal Joint — Units – LF

Record this element for all strip seal expansion joints. This element defines those roadway and tunnel expansion joint devices which utilize a neoprene type waterproof gland with some type of metal extrusion or other system to anchor the gland.

The total quantity for expansion joints is the sum of all the lengths of each joint.

1. Seal adhesion is fully adhered. No debris to a shallow cover of loose debris may be evident but does not affect the performance of the joint. Adjacent deck or header is sound with no spalling, delamination or unsound patch.
2. Seal joint has minimal leakage with minor dripping through the joint. The seal is adhered for more than 50% of the joint height and there are no punctures with only surface cracks. Debris is only partially filled with hard-packed material, but still allows free movement. Adjacent deck or header has edge delamination or spalling 1 in or less deep or 6 in or less in diameter with no exposed rebar and patching that is sound. Metal has freckled rust, no cracks, or impact damage and may be loose but functioning as usual.
3. Leakage is moderate with more than a drip but less than free flow of water. The seal is adhered 50% or less of the joint height but there is still some adhesion, punctured, ripped, or partially pulled out, and/or has cracks that partially penetrate the seal. Debris is filled completely and impacts joint movement. Adjacent deck or header has edge delamination or spalling greater than 1 in deep or 6 in or more in diameter with exposed rebar and patching that is unsound, making the joint loose. Metal has section loss, missing or broken fasteners, cracking, or impact damage but the joint is still functioning.
4. There is a free flow of water through the joint. The seal has a complete loss of adhesion, is punctured through completely, pulled out, or missing, and/or a crack has fully penetrated the seal. Debris is filled completely and prevents joint movement. Spall, delamination, unsound patched area or loose joint anchor that prevents the joint from functioning as intended on the adjacent deck or header. The metal is cracking with section loss, damage, or connection failure that prevents the joint from functioning as intended.

## 10131 Tunnel Pourable Joint Seal Units – LF

Record this element for all pourable joint seals. This element defines those roadway and tunnel joints filled with a pourable seal with or without a backer.

The total quantity for expansion joints is the sum of all the lengths of each joint.

1. Seal adhesion is fully adhered. No debris to a shallow cover of loose debris may be evident but does not affect the performance of the joint. Adjacent deck or header is sound with no spalling, delamination or unsound patch.
2. Seal joint has minimal leakage with minor dripping through the joint. The seal is adhered for more than 50% of the joint height and there are no punctures with only surface cracks. Debris is only partially filled with hard-packed material, but still allows free movement. Adjacent deck or header has edge delamination or spalling 1 in or less deep or 6 in or less in diameter with no exposed rebar and patching that is sound.
3. Leakage is moderate with more than a drip but less than free flow of water. The seal is adhered 50% or less of the joint height but there is still some adhesion, punctured, ripped, or partially pulled out, and/or has cracks that partially penetrate the seal. Debris is filled completely and impacts joint movement. Adjacent deck or header has edge delamination or spalling greater than 1 in deep or 6 in or more in diameter with exposed rebar and patching that is unsound, making the joint loose.
4. There is a free flow of water through the joint. The seal has a complete loss of adhesion, is punctured through completely, pulled out, or missing, and/or a crack has fully penetrated the seal. Debris is filled completely and prevents joint movement. Spall, delamination, unsound patched area or loose joint anchor that prevents the joint from functioning as intended on the adjacent deck or header.

## 10132 Tunnel Compression Seal Units – LF

Record this element for all compression joint seals. This element defines those roadway and tunnel joints filled with a preformed compression type seal. This joint does not have an anchor system to confine the seal.

The total quantity for expansion joints is the sum of all the lengths of each joint.

1. Seal adhesion is fully adhered. No debris to a shallow cover of loose debris may be evident but does not affect the performance of the joint. Adjacent deck or header is sound with no spalling, delamination or unsound patch.
2. Seal joint has minimal leakage with minor dripping through the joint. The seal is adhered for more than 50% of the joint height and there are no punctures with only surface cracks. Debris is only partially filled with hard-packed material, but still allows free movement. Adjacent deck or header has edge delamination or spalling 1 in or less deep or 6 in or less in diameter with no exposed rebar and patching that is sound.
3. Leakage is moderate with more than a drip but less than free flow of water. The seal is adhered 50% or less of the joint height but there is still some adhesion, punctured, ripped, or partially pulled out, and/or has cracks that partially penetrate the seal. Debris is filled completely and impacts joint movement. Adjacent deck or header has edge delamination or spalling greater than 1 in deep or 6 in or more in diameter with exposed rebar and patching that is unsound, making the joint loose.
4. There is a free flow of water through the joint. The seal has a complete loss of adhesion, is punctured through completely, pulled out, or missing, and/or a crack has fully penetrated the seal. Debris is filled completely and prevents joint movement. Spall, delamination, unsound patched area or loose joint anchor that prevents the joint from functioning as intended on the adjacent deck or header.

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

Record this element for all assembly joints with seals. This element defines only those roadway and tunnel joints filled with an assembly mechanism that have a seal.

The total quantity for expansion joints is the sum of all the lengths of each joint.

1. Seal adhesion is fully adhered. No debris to a shallow cover of loose debris may be evident but does not affect the performance of the joint. Adjacent deck or header is sound with no spalling, delamination or unsound patch.
2. Seal joint has minimal leakage with minor dripping through the joint. The seal is adhered for more than 50% of the joint height and there are no punctures with only surface cracks. Debris is only partially filled with hard-packed material, but still allows free movement. Adjacent deck or header has edge delamination or spalling 1 in or less deep or 6 in or less in diameter with no exposed rebar and patching that is sound. Metal has freckled rust, no cracks, or impact damage and may be loose but functioning as usual.
3. Leakage is moderate with more than a drip but less than free flow of water. The seal is adhered 50% or less of the joint height but there is still some adhesion, punctured, ripped, or partially pulled out, and/or has cracks that partially penetrate the seal. Debris is filled completely and impacts joint movement. Adjacent deck or header has edge delamination or spalling greater than 1 in deep or 6 in or more in diameter with exposed rebar and patching that is unsound, making the joint loose. Metal has section loss, missing or broken fasteners, cracking, or impact damage but the joint is still functioning.
4. There is a free flow of water through the joint. The seal has a complete loss of adhesion, is punctured through completely, pulled out, or missing, and/or a crack has fully penetrated the seal. Debris is filled completely and prevents joint movement. Spall, delamination, unsound patched area or loose joint anchor that prevents the joint from functioning as intended on the adjacent deck or header. The metal is cracking with section loss, damage, or connection failure that prevents the joint from functioning as intended.

## 10134 Tunnel Open Expansion Joint Units – LF

Record this element for all open expansion joints. This element defines only those roadway and tunnel joints that are open and not sealed.

The total quantity for expansion joints is the sum of all the lengths of each joint.

1. No debris to a shallow cover of loose debris may be evident but does not affect the performance of the joint. Adjacent deck or header is sound with no spalling, delamination or unsound patch.
2. Debris is only partially filled with hard-packed material, but still allows free movement. Adjacent deck or header has edge delamination or spalling 1 in or less deep or 6 in or less in diameter with no exposed rebar and patching that is sound.
3. Debris is filled completely and impacts joint movement. Adjacent deck or header has edge delamination or spalling greater than 1 in deep or 6 in or more in diameter with exposed rebar and patching that is unsound, making the joint loose.
4. Debris is filled completely and prevents joint movement. Spall, delamination, unsound patched area or loose joint anchor that prevents the joint from functioning as intended on the adjacent deck or header.

## 10135 Tunnel Assembly Joint without Seal — Units – LF

Record this element for all assembly joints without seals. This element defines only those roadway and tunnel assembly joints that are open and not sealed. These joints include finger and sliding plate joints.

The total quantity for expansion joints is the sum of all the lengths of each joint.

1. No debris to a shallow cover of loose debris may be evident but does not affect the performance of the joint. Adjacent deck or header is sound with no spalling, delamination or unsound patch.
2. Debris is only partially filled with hard-packed material, but still allows free movement. Adjacent deck or header has edge delamination or spalling 1 in or less deep or 6 in or less in diameter with no exposed rebar and patching that is sound. Metal has freckled rust, no cracks, or impact damage and may be loose but functioning as usual.
3. Debris is filled completely and impacts joint movement. Adjacent deck or header has edge delamination or spalling greater than 1 in deep or 6 in or more in diameter with exposed rebar and patching that is unsound, making the joint loose. Metal has section loss, missing or broken fasteners, cracking, or impact damage but the joint is still functioning.
4. Debris is filled completely and prevents joint movement. Spall, delamination, unsound patched area or loose joint anchor that prevents the joint from functioning as intended on the adjacent deck or header. The metal is cracking with section loss, damage, or connection failure that prevents the joint from functioning as intended.

## 10139 Other Tunnel Joint — Units – LF

Record this element for all other expansion joints. This element defines those roadway and tunnel expansion joint devices which utilize a neoprene type waterproof gland with some type of metal extrusion or other system to anchor the gland.

The total quantity for expansion joints is the sum of all the lengths of each joint.

1. No debris to a shallow cover of loose debris may be evident but does not affect the performance of the joint. Adjacent deck or header is sound with no spalling, delamination or unsound patch.
2. Seal joint has minimal leakage with minor dripping through the joint. Debris is only partially filled with hard-packed material, but still allows free movement. Adjacent deck or header has edge delamination or spalling 1 in or less deep or 6 in or less in diameter with no exposed rebar and patching that is sound. Metal has freckled rust, no cracks, or impact damage and may be loose but functioning as usual.
3. Leakage is moderate with more than a drip but less than free flow of water. Debris is filled completely and impacts joint movement. Adjacent deck or header has edge delamination or spalling greater than 1 in deep or 6 in or more in diameter with exposed rebar and patching that is unsound, making the joint loose. Metal has section loss, missing or broken fasteners, cracking, or impact damage but the joint is still functioning.
4. There is a free flow of water through the joint. Debris is filled completely and prevents joint movement. Spall, delamination, unsound patched area or loose joint anchor that prevents the joint from functioning as intended on the adjacent deck or header. The metal is cracking with section loss, damage, or connection failure that prevents the joint from functioning as intended.

## 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. Seal adhesion is fully adhered. No debris to a shallow cover of loose debris may be evident but does not affect the performance of the joint. Adjacent deck or header is sound with no spalling, delamination or unsound patch.
2. Seal joint has minimal leakage with minor dripping through the joint. The seal is adhered for more than 50% of the joint height and there are no punctures with only surface cracks. Debris is only partially filled with hard-packed material, but still allows free movement. Adjacent deck or header has edge delamination or spalling 1 in or less deep or 6 in or less in diameter with no exposed rebar and patching that is sound. Metal has freckled rust, no cracks, or impact damage and may be loose but functioning as usual.
3. Leakage is moderate with more than a drip but less than free flow of water. The seal is adhered 50% or less of the joint height but there is still some adhesion, punctured, ripped, or partially pulled out, and/or has cracks that partially penetrate the seal. Debris is filled completely and impacts joint movement. Adjacent deck or header has edge delamination or spalling greater than 1 in deep or 6 in or more in diameter with exposed rebar and patching that is unsound, making the joint loose. Metal has section loss, missing or broken fasteners, cracking, or impact damage but the joint is still functioning.
4. There is a free flow of water through the joint. The seal has a complete loss of adhesion, is punctured through completely, pulled out, or missing, and/or a crack has fully penetrated the seal. Debris is filled completely and prevents joint movement. Spall, delamination, unsound patched area or loose joint anchor that prevents the joint from functioning as intended on the adjacent deck or header. The metal is cracking with section loss, damage, or connection failure that prevents the joint from functioning as intended.

# 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 and have no effect on the structural capacity of the wearing surface. Cracking may exist with widths less than 0.012 in. or spacing greater than 3.0 ft.
2. Wearing surface area with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Cracking may exist with widths 0.012 – 0.05 in. or spacing between 1.0 – 3.0 ft. The wearing surface is substantially effective and deterioration of the protected element has slowed.
3. Wearing surface area with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress or a full depth pothole. Cracking may exist with widths greater than 0.05 in. or spacing less than 1.0 ft. The wearing surface has limited effectiveness and deterioration of the protected element has progressed.
4. The concrete wearing surface is no longer effective.

## 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 currently. The quantity should equal the overlay's width times the length.

1. Wearing surface is in good condition and is fully effective with no evidence of leakage or further deterioration of the protected element.
2. Wearing surface is in fair condition with isolated breakdowns or deterioration and is substantially effective. Deterioration has slowed.
3. Wearing surface is in poor condition with widespread deterioration or breakdowns without reducing load capacity and has limited effectiveness. Deterioration has progressed.
4. The wearing surface is no longer effective.

### 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. Wearing Surface is in good condition with no notable distress. It is fully effective with no evidence of leakage or furth deterioration of the protected element.
2. Wearing Surface is in fair condition with isolated breakdowns or deterioration. It is substantially effective and deterioration of the protected element has slowed.
3. Wearing Surface is in poor condition with widespread deterioration or breakdowns without reducing load capacity. It has limited effectiveness and deterioration of the protected element has progressed.
4. The wearing surface is no longer effective.

## Tunnel Traffic Barrier

### 10160 Steel Traffic Barrier Units – LF

Record this element for all steel traffic barriers. This element defines those tunnel barriers adjacent to a roadway. Horizontal members must be steel; however, posts may be made of steel, timber, concrete or other materials.

The total quantity for traffic barrier is the sum of all the lengths of each traffic barrier.

1. Defects are superficial and have no effect on the structural capacity of the barrier. Connection is in place and function as needed.
2. Traffic Barrier length where corrosion of steel has initiated and there may be areas of freckled rust. Cracking that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar may exist in the liner. Connections have loose fasteners or pack rust without distortion, but the connections are in place and functioning as intended. Distortion is present and has received a structural review and has been mitigated.
3. Traffic Barrier length with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Areas of corrosion may exist where section loss is evident, or pack rust is present. Cracks may exist and have not been arrested. Connections may have missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion.
4. Traffic Barrier condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10161 Concrete Traffic Barrier Units – LF

Record this element for all concrete traffic barriers. This element defines those tunnel barriers adjacent to a roadway. All element of the barrier must be concrete.

The total quantity for traffic barrier is the sum of all the lengths of each traffic barrier.

1. Defects are superficial and have no effect on the structural capacity of the barrier. Cracking may exist with widths less than 0.012 in. or spacing greater than 3.0 ft.
2. Traffic Barrier length with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.012 – 0.05 in. or spacing between 1.0 – 3.0 ft.
3. Traffic Barrier length with structural defects that do not require a structural review. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.05 in. or spacing less than 1.0 ft.
4. Traffic Barrier condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## 10169 Other Traffic Barrier Units – LF

Record this element for all traffic barriers composed of other materials. This element defines those tunnel barriers adjacent to a roadway.

The total quantity for traffic barrier is the sum of all the lengths of each traffic barrier.

1. Traffic Barrier is in good condition with no notable distress.
2. Traffic Barrier is in fair condition with isolated breakdowns or deterioration.
3. Traffic Barrier is in poor condition with widespread deterioration or breakdowns without reducing load capacity.
4. Traffic Barrier condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## Tunnel Pedestrian Barrier

### 10170 Steel Pedestrian Railing Units – LF

Record this element for all steel pedestrian railing. This element defines those tunnel railings adjacent to a walkway.

The total quantity for pedestrian railing is the sum of all the lengths of each pedestrian railing.

1. Defects are superficial and have no effect on the structural capacity of the railing. Connection is in place and function as needed.
2. Pedestrian Railing length where corrosion of steel has initiated and there may be areas of freckled rust. Cracking that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar may exist in the liner. Connections have loose fasteners or pack rust without distortion, but the connections are in place and functioning as intended. Distortion is present and has received a structural review and has been mitigated. Out-of-Plumb has minor tilt which is barely noticeable.
3. Pedestrian Railing length with structural defects that do not require a structural review or may require a structural review but does not require mitigation. Areas of corrosion may exist where section loss is evident, or pack rust is present. Cracks may exist and have not been arrested. Connections may have missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion. Out-of-Plumb has excessive tilt that affects operations or causes near failure.
4. Pedestrian Railing condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

### 10171 Concrete Pedestrian Railing Units – LF

Record this element for all concrete pedestrian railing. This element defines those tunnel railings adjacent to a walkway.

The total quantity for pedestrian railing is the sum of all the lengths of each pedestrian railing.

1. Defects are superficial and have no effect on the structural capacity of the railing. Cracking may exist with widths less than 0.012 in. or spacing greater than 3.0 ft.
2. Pedestrian Railing length with delamination's, spalls 1 in. or less deep or 6 in. or less diameter, and/or patched areas that are sound. Areas of exposed rebar may be present but without measurable section loss. Efflorescence may include white surfaces without build-up or leaching without rust staining. Cracking may exist with widths 0.012 – 0.05 in. or spacing between 1.0 – 3.0 ft. Out-of-Plumb has minor tilt which is barely noticeable.
3. Pedestrian Railing length with structural defects that do not require a structural review. Spalls greater than 1.0 in. deep or greater than 6 in. diameter may exist, patched areas are unsound or showing distress. Areas of exposed rebar are present with measurable section loss. Areas of efflorescence may exist with heavy build-up and rust staining. Cracking may exist with widths greater than 0.05 in. or spacing less than 1.0 ft. Out-of-Plumb has excessive tilt that affects operations or causes near failure.
4. Pedestrian Railing condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

**10179 Other Pedestrian Railing** **Units – LF**

Record this element for all pedestrian railing composed of other materials. This element defines those tunnel railings adjacent to a walkway.

The total quantity for pedestrian railing is the sum of all the lengths of each pedestrian railing.

1. Pedestrian Railing is in good condition with no notable distress.
2. Pedestrian Railing is in fair condition with isolated breakdowns or deterioration. Out-of-Plumb has a minor tilt that is barely noticeable.
3. Pedestrian Railing is in poor condition with widespread deterioration or breakdowns without reducing load capacity. Out-of-Plumb has an excessive tilt that affects operations or induces near failure.
4. Pedestrian Railing condition warrants a structural review to determine the effect of strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel.

## Tunnel Mechanical Systems

**10200 Ventilation System** **Units – EA**

Record this element for all tunnel lighting fixtures. This element describes the components that provide the supply of fresh air to the tunnel while removing stale air and contaminants. The ventilation system may include the following subcomponents: Fans - Fan Motors, Fan Controller, Airways, Sound Attenuators, Dampers, Damper Motor, Damper Controller, Air Quality Monitoring Equipment (CO), Control Panels and Conduit. For this element, a separate ventilation system is one system. Tunnels with twin bores may have separate ventilation systems and would be considered as two. Some tunnels may have a ventilation system at each portal that work independently and would also be considered as two.

The total quantity for ventilation system is the sum of all the ventilation systems.

1. The system is in good condition with no notable distress.
2. The system is in fair condition with isolated breakdowns or deterioration.
3. The system is in poor condition – widespread deterioration or breakdowns reducing operational capacity, without impacting the serviceability of the element or tunnel.
4. The condition warrants evaluation to determine the effect on serviceability of the element or tunnel or the evaluation has determined there is an impact on the serviceability of the element or tunnel.

## 10201 Fans Units – EA

Record this element for all fans. This element describes the components that produce a current of air which provides the supply of fresh air to the tunnel while removing stale air and contaminants. The fans may include the following subcomponents: Fan Motors, Fan Controller, etc.

The total quantity for fans is the sum of all the fans.

1. The fan is in good condition with no notable distress. Fan operates on all speeds and in all modes with no noticeable temperature rise.
2. The fan is in fair condition with isolated breakdowns or deterioration. Fan requires manual restart or manual control to operates on all speeds and in all modes. Drive(s) require some adjustment. More than normal play observed, and/or belt has minor wear/deterioration. Less than 40-degree Fahrenheit temperature rise form ambient temperatures during operation.
3. The fan is in poor condition with widespread deterioration or breakdowns without reducing load capacity. Fan operates on at least one speed or only operates in manual mode. Drive(s) require major adjustment. Severe play and/or belt/chain noise is observed, and/or belt has moderate wear/deterioration. Between 40-degree Fahrenheit and 80-degree Fahrenheit temperature rise form ambient temperatures during operation.
4. The fan condition warrants evaluation to determine the effect on serviceability of the element or tunnel or the evaluation has determined there is an impact on the serviceability of the element or tunnel. Fan will not operate on any speed and/or there is over an 80-degree Fahrenheit temperature rise for ambient temperatures during operation.

## 10300 Drainage and Pumping System Units – EA

Record this element for all drainage and pumping systems. This element includes storm drains, piping, pumps and water treatment equipment for the removal of water that may enter the tunnel from the portals, vent shafts, and cracks in the tunnel lining. Drainage at the tunnel facility also handles the drippings from vehicles traversing the tunnel and potential spills from trucks hauling liquid materials. The drainage and pumping system may include the following subcomponents: Pumps – Sump Pumps, Pump Motors, Pump Controller, Piping, Drains and Water Treatment Equipment. For this element, a separate drainage and pumping system is one system. Tunnels with twin bores may have separate draining and pumping systems and would be considered as two. Some tunnels may have a draining and pumping system at each portal that work independently and would also be considered as two.

The total quantity for drainage and pumping system is the sum of all the draining and pumping systems.

1. The system is in good condition with no notable distress.
2. The system is in fair condition with isolated breakdowns or deterioration.
3. The system is in poor condition – widespread deterioration or breakdowns reducing operational capacity, without impacting the serviceability of the element or tunnel.
4. The condition warrants evaluation to determine the effect on serviceability of the element or tunnel or the evaluation has determined there is an impact on the serviceability of the element or tunnel.

## 10301 Pumps Units – EA

Record this element for all pumps. This element includes the component that moves water that may enter the tunnel from the portals, vent shafts, and crack in the tunnel lining. The pumps may include the following subcomponents: Sump Pumps, Pump Motors, Pump Controller, etc.

The total quantity for pumps is the sum of all the pumps.

1. Pump operates at all speeds and in all modes. The shut-off valves operate freely and without binding. There is a fair amount of noise and vibration velocity has a value of 100 in/s or less. No oil leakage, leakage is observed at pump seal, or water leakage noted in immediate piping and valves in observed. Motor temperature is within expected limits.
2. Pump operates at all speeds and in all modes in a reduced capacity. The shut-off valves operate with some resistance and binding but do appear to fully open/seal. There is some slightly rough noise and vibration velocity between 100 and 300 in/s. There is limited exterior staining from oil seepage at seals and limited water seepage from seals with seals appearing wet. Motor temperature is slightly increased during motor operation.
3. Pump operates intermittently or haltingly. The shut-off valves are difficult or impossible to operate. There is a rough noise and vibration velocity exceeds 300 in/s. There is extensive exterior staining from oil seepage around seals and measurable water seepage around seals that can be quantified in drips per minute. Motor temperature is moderately above what is expected and/or hot spots of temperature exist.
4. Pump will not operate. There is pooling of oil on exterior surfaces of seals or significant reduction of interior lubricant level. There is a visible stream of water on exterior surfaces of seals or significant reduction of pump performance. Motor temperature is drastically increased and motor function is influenced.

## 10400 Emergency Generator System Units – EA

Record this element for all emergency generator systems. These elements are the mechanical components of an emergency generator and power system which consist of fuel delivery, fuel storage, an engine cooling and exhaust systems. The emergency generator provides a back-up power source in the event of utility service failure to the tunnel. The mechanical systems support the proper operation of the generator to provide back-up power. The emergency generator system may include the following subcomponents: Fuel Main Storage Tank, Fuel Day Tanks, Circulating Fuel Pumps, Fuel Tank Venting, Fuel Tank Sensors, Coolant Systems, Exhaust Manifold Insulation and Lagging, Exhaust Air Louver and Damper Actuator, Supply Air Louver and Damper Actuator, Generator, Generator Control Equipment, Control Panels and Conduit. For this element, a separate emergency generator system is one system. Tunnels with twin bores may have separate emergency generator systems and would be considered as two.

The total quantity for emergency generator is the sum of all the emergency generator systems.

1. The system is in good condition with no notable distress.
2. The system is in fair condition with isolated breakdowns or deterioration.
3. The system is in poor condition – widespread deterioration or breakdowns reducing operational capacity, without impacting the serviceability of the element or tunnel.
4. The condition warrants evaluation to determine the effect on serviceability of the element or tunnel or the evaluation has determined there is an impact on the serviceability of the element or tunnel.

## 10400 Emergency Generator System Units – EA

Record this element for all flood gates. These elements are the actual gates, seals, mechanical components, and power supply of a flood gate system. The flood gates are typically located at each portal for each bore. The flood gates are usually used when the tunnel roadway is closed and the bores are threatened with taking on water at the portals. For this element, a separate flood gate is one gate. Some tunnels may have a flood gate at each portal that work independently and would be considered as two.

The total quantity for flood gate is the sum of all the flood gates.

1. The system is in good condition with no notable distress.
2. The system is in fair condition with isolated breakdowns or deterioration.
3. The system is in poor condition – widespread deterioration or breakdowns reducing operational capacity, without impacting the serviceability of the element or tunnel.
4. The condition warrants evaluation to determine the effect on serviceability of the element or tunnel or the evaluation has determined there is an impact on the serviceability of the element or tunnel.

# Tunnel Electrical Systems

## 10500 Electrical Distribution System Units – EA

Record this element for all electrical distribution systems. The electrical distribution system consists of the electrical equipment, wiring, conduit, and cable used for distributing electrical energy from the utility supply (service entrance) to the line terminals of utilization equipment. The electrical distribution system may include the following subcomponents: Switchgear, Unit Substations, Switchboard, Motor Control Centers, Starters, Transformers, Transfer Switches, Panelboards, Conduits and Raceways, and Electrical Outlets/Receptacles For this element, a separate electrical distribution system is one system. Tunnels with twin bores may have separate electrical distribution systems and would be considered as two.

The total quantity for electrical distribution system is the sum of all the electrical distribution systems.

1. The system is in good condition with no notable distress.
2. The system is in fair condition with isolated breakdowns or deterioration.
3. The system is in poor condition – widespread deterioration or breakdowns reducing operational capacity, without impacting the serviceability of the element or tunnel.
4. The condition warrants evaluation to determine the effect on serviceability of the element or tunnel or the evaluation has determined there is an impact on the serviceability of the element or tunnel.

## 10550 Emergency Distribution System Units – EA

Record this element for all emergency distribution systems. This system consists of the electrical equipment, wiring, conduit, and cable used for providing electrical power in case of utility service failure. Equipment included in this system consists of emergency generators and/or uninterruptible power supply (UPS) systems, transfer switches, and other equipment supplying emergency power. The emergency distribution system may include the following subcomponents: Uninterruptable Power Supply (UPS), batteries and battery charging equipment. For this element, a separate emergency distribution system is one system. Tunnels with twin bores may have separate emergency distribution systems and would be considered as two.

The total quantity for emergency distribution system is the sum of all the emergency distribution systems.

1. The system is in good condition with no notable distress.
2. The system is in fair condition with isolated breakdowns or deterioration.
3. The system is in poor condition – widespread deterioration or breakdowns reducing operational capacity, without impacting the serviceability of the element or tunnel.
4. The condition warrants evaluation to determine the effect on serviceability of the element or tunnel or the evaluation has determined there is an impact on the serviceability of the element or tunnel.

## 10600 Tunnel Lighting System Units – EA

Record this element for all tunnel lighting systems. These systems consist of the light fixtures, supports, bulb housings, lenses, light switches, junction boxes, wiring, conduit, cable, sensors, and controllers used to provide lighting for the tunnel. The tunnel lighting system may also include the following subcomponents: photo controls, and remote ballasts. For this element, a separate tunnel lighting system is one system. Tunnels with twin bores may have separate tunnel lighting systems and would be considered as two.

The total quantity for tunnel lighting system is the sum of all the tunnel lighting systems.

1. The system is in good condition with no notable distress.
2. The system is in fair condition with isolated breakdowns or deterioration.
3. The system is in poor condition – widespread deterioration or breakdowns reducing operational capacity, without impacting the serviceability of the element or tunnel.
4. The condition warrants evaluation to determine the effect on serviceability of the element or tunnel or the evaluation has determined there is an impact on the serviceability of the element or tunnel.

## 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. The system is in good condition with no notable distress. There are no deficient support conditions.
2. The component supports have loose anchorage or component housing connection hardware. There is freckled rust, and/or corrosion of the steel has initiated. The component housing or enclosure has a single crack.
3. The component supports have missing anchorage or component housing connection hardware which does not result in an unstable situation. There is section loss evident or pack rust is present but does not warrant structural review. The component housing or enclosure has multiple cracks.
4. The condition warrants a structural review to determine the effect on strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel. The component supports have failed anchorage or component connection hardware which results in an unstable situation. Holes are present in the component housing or enclosure.

## 10620 Emergency Lighting System Units – EA

Record this element for all emergency lighting systems. These systems consist of the light fixtures, supports, bulb housings, lenses, light switches, junction boxes, wiring, conduit, cable, sensors, and controllers used to provide emergency lighting for the facility. The emergency lighting system may also include the following subcomponents: exit signs, batteries; and support space sighting, and remote ballasts. For this element, a separate emergency lighting system is one system. Tunnels with twin bores may have separate emergency lighting systems and would be considered as two.

The total quantity for emergency lighting system is the sum of all the emergency lighting systems.

1. The system is in good condition with no notable distress.
2. The system is in fair condition with isolated breakdowns or deterioration.
3. The system is in poor condition – widespread deterioration or breakdowns reducing operational capacity, without impacting the serviceability of the element or tunnel.
4. The condition warrants evaluation to determine the effect on serviceability of the element or tunnel or the evaluation has determined there is an impact on the serviceability of the element or tunnel.

## 10621 Emergency Lighting Fixture Units – EA

Record this element for all emergency lighting fixtures. This element includes the physical housing of the emergency lights and their connections to the tunnel. Component supports include anchorage to the supporting member and connecting hardware for the component housing. 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 emergency lighting fixture is the sum of all the emergency lighting fixtures.

1. The system is in good condition with no notable distress. There are no deficient support conditions.
2. The component supports have loose anchorage or component housing connection hardware. There is freckled rust, and/or corrosion of the steel has initiated. The component housing or enclosure has a single crack.
3. The component supports have missing anchorage or component housing connection hardware which does not result in an unstable situation. There is section loss evident or pack rust is present but does not warrant structural review. The component housing or enclosure has multiple cracks.
4. The condition warrants a structural review to determine the effect on strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel. The component supports have failed anchorage or component connection hardware which results in an unstable situation. Holes are present in the component housing or enclosure.

## Fire/Life Safety/Signs/Security Systems

### 10650 Fire Detection System Units – EA

Record this element for all fire detection systems. These systems consist of control panels, initiating devices (heat and smoke detectors, pull-stations, etc.), notification appliances (strobes, horns, etc.), wiring, conduit, and cable used to detect a fire in the tunnel. The fire detection system may also include the following subcomponents: sensors, controls, and alarms. For this element, a separate fire detection system is one system. Tunnels with twin bores may have separate fire detection systems and would be considered as two.

The total quantity for fire detection system is the sum of all the fire detection systems.

1. The system is in good condition with no notable distress. All detection sensors are operational.
2. The system is in fair condition with isolated breakdowns or deterioration.
3. The system is in poor condition – widespread deterioration or breakdowns reducing operational capacity, without impacting the serviceability of the element or tunnel. Detection sensors are not operational in one zone.
4. The condition warrants evaluation to determine the effect on serviceability of the element or tunnel or the evaluation has determined there is an impact on the serviceability of the element or tunnel. Detection sensors are not operational in multiple zones.

### 10700 Fire Protection System Units – EA

Record this element for all fire protection systems. These systems consist of fire extinguishers, hose connections, storage tanks, fire hydrants, building sprinklers, pumping systems, piping, circulating pumps, and hose reels used as fire protection in the tunnel. The fire protection system may include the following subcomponents: main fire pump, pressure maintenance/jockey pump, dry pipe valve, valves and tamper switches, storage tanks, tunnel standpipe, pressure relief and air release valves, backflow prevention, hose stations, hose reels, building sprinklers, fire department connections and fire hydrants. For this element, a separate fire protection system is one system. Tunnels with twin bores may have separate fire protection systems and would be considered as two.

The total quantity for fire protection system is the sum of all the fire protection systems.

1. The system is in good condition with no notable distress.
2. The system is in fair condition with isolated breakdowns or deterioration.
3. The system is in poor condition – widespread deterioration or breakdowns reducing operational capacity, without impacting the serviceability of the element or tunnel.
4. The condition warrants evaluation to determine the effect on serviceability of the element or tunnel or the evaluation has determined there is an impact on the serviceability of the element or tunnel.

## 10750 Emergency Communication System Units – EA

Record this element for all emergency communication systems. The components of the emergency communication system include the communication device itself (i.e., intercom, radios, cellphone), receivers, wiring, exchange devices, etc. The emergency communications system may also include the following subcomponents: signs, controllers, speakers and audio input equipment. For this element, a separate emergency communication system is one system. Tunnels with twin bores may have separate emergency communication systems and would be considered as two.

The total quantity for emergency communication system is the sum of all the emergency communication systems.

1. The system is in good condition with no notable distress.
2. The system is in fair condition with isolated breakdowns or deterioration.
3. The system is in poor condition – widespread deterioration or breakdowns reducing operational capacity, without impacting the serviceability of the element or tunnel.
4. The condition warrants evaluation to determine the effect on serviceability of the element or tunnel or the evaluation has determined there is an impact on the serviceability of the element or tunnel.

## 10800 Tunnel Operations and Security System Units – EA

Record this element for all tunnel operations and security systems. These systems consist of the communication equipment (CCTV cameras, telephones, radios, etc.) used to provide communication within and from the tunnel. The tunnel operations and security system may also include the following subcomponents: closed-circuit camera system, cell phone antennas, door access, controller and radio. For this element, a separate tunnel operation and security system is one system. Tunnels with twin bores may have separate tunnel operations and security systems and would be considered as two.

The total quantity for tunnel operations and security system is the sum of all the tunnel operations and security systems.

1. The system is in good condition with no notable distress.
2. The system is in fair condition with isolated breakdowns or deterioration.
3. The system is in poor condition – widespread deterioration or breakdowns reducing operational capacity, without impacting the serviceability of the element or tunnel.
4. The condition warrants evaluation to determine the effect on serviceability of the element or tunnel or the evaluation has determined there is an impact on the serviceability of the element or tunnel.

## 10850 Traffic Sign Units – EA

Record this element for all traffic signs. These elements consist of the traffic sign and supports. Signs for pedestrians, variable message signs and lane signals are not covered under this element. The MUTCD Chapter 2 contains the requirements for the shape and wording of regulatory, warning and guide signs on a highway or road. It also contains requirements for maintaining minimum retro reflectivity of signs.

The total quantity for traffic signs is the sum of all the traffic signs.

1. The system is in good condition with no notable distress. There are no deficient support conditions.
2. The component supports have loose anchorage or component housing connection hardware.
3. The component supports have missing anchorage or component housing connection hardware which does not result in an unstable situation.
4. The component supports have failed anchorage or component connection hardware which results in an unstable situation.

## 10870 Egress Sign Units – EA

Record this element for all egress signs. This element consists of egress signs and their supports that are not related to the emergency lighting system. The MUTCD Chapter 2 contains the requirements for the shape and wording of regulatory, warning and guide signs on a highway or road. It also contains requirements for maintaining minimum retro reflectivity of signs.

The total quantity for egress sign is the sum of all the egress signs.

1. There are no deficient support conditions.
2. The component supports have loose anchorage or component housing connection hardware.
3. The component supports have missing anchorage or component housing connection hardware which does not result in an unstable situation.
4. The component supports have failed anchorage or component connection hardware which results in an unstable situation.

## 10890 Variable Message Board Units – EA

Record this element for all variable message boards. This element consists of the variable message board, supports and associated electrical connections. The MUTCD Chapter 2 contains the requirements for the shape and wording of regulatory, warning and guide signs on a highway or road. It also contains requirements for maintaining minimum retro reflectivity of signs.

The total quantity for variable message board is the sum of all the variable message boards.

1. The sign is functional and operates when tested. There are no deficient support conditions.
2. The sign operates with minor decrease in light output, flicker, or reduced display area. The component supports have loose anchorage or component housing connection hardware.
3. The sign operates with significant decrease in light output, flicker, and/or reduced display area. The component supports have missing anchorage or component housing connection hardware which does not result in an unstable situation.
4. The sign is not operational. The component supports have failed anchorage or component connection hardware which results in an unstable situation.

## 10910 Lane Signal Units – EA

Record this element for all lane signals. The components of the tunnel lane signal system include the lane signals themselves, their supports and the control system.

The lane signals may include the following subcomponents: signals/fixtures, control station, control cabinets and conduit. The MUTCD Chapter 2 contains the requirements for the shape and wording of regulatory, warning and guide signs on a highway or road. It also contains requirements for maintaining minimum retro reflectivity of signs.

The total quantity for lane signal is the sum of all the lane signals.

1. The sign is functional and operates when tested. There are no deficient support conditions.
2. The sign operates with minor decrease in light output, flicker, or reduced display area. The component supports have loose anchorage or component housing connection hardware.
3. The sign operates with significant decrease in light output, flicker, and/or reduced display area. The component supports have missing anchorage or component housing connection hardware which does not result in an unstable situation.
4. The sign is not operational. The component supports have failed anchorage or component connection hardware which results in an unstable situation.

## 10911 Lane Signal Fixture Units – EA

Record this element for all lane signal fixtures. The components of the tunnel lane signal fixtures include the fixtures themselves, the supports and the wiring. The lane signal fixtures may also include the following subcomponents: fixtures and conduits. The MUTCD Chapter 2 contains the requirements for the shape and wording of regulatory, warning and guide signs on a highway or road. It also contains requirements for maintaining minimum retro reflectivity of signs.

The total quantity for lane signal fixture is the sum of all the lane signal fixtures.

1. The system is in good condition with no notable distress. There are no deficient support conditions.
2. The component supports have loose anchorage or component housing connection hardware. There is freckled rust, and/or corrosion of the steel has initiated. The component housing or enclosure has a single crack.
3. The component supports have missing anchorage or component housing connection hardware which does not result in an unstable situation. There is section loss evident or pack rust is present but does not warrant structural review. The component housing or enclosure has multiple cracks.
4. The condition warrants a structural review to determine the effect on strength or serviceability of the element or tunnel, OR a structural review has been completed and the defects impact strength and serviceability of the element or tunnel. The component supports have failed anchorage or component connection hardware which results in an unstable situation. Holes are present in the component housing or enclosure.

# Protective Systems

## 10950 Steel Corrosion Protective Coating — Units – SF

Record this element for all steel corrosion protective coating used in the tunnel. The element is for steel elements that have a protective coating system such as paint, galvanization, or other topcoat steel corrosion inhibitor. Effectiveness is an evaluation made by the inspector to classify the degree to which the protection system is functioning to protect the steel beneath. Protective coatings only apply to those elements listed under the structural and civil sections.

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

1. Coating is fully effective. Oxide film degradation color is yellow-orange or light brown for early development, chocolate-brown to purple-brown for fully developed. Texture is tightly adhered, capable of withstanding hammering or vigorous wire brushing.
2. Coating surface is dulling and only substantially effective. The texture is granular and the finishing coat is peel, bubbling, and/or cracking.
3. The coating has a loss of pigment and has limited effectiveness. The finishing and primer coats have peeling, bubbling, and/or cracking. The texture adherence has small flakes that are less than ½ inch in diameter.
4. The coating has an exposure of bare metal and has failed with no protection of the underlying metal. The oxide film degradation color is dark black. The texture adherence has large flakes that are ½ inch in diameter or greater or has laminar sheets or nodules.

## 10951 Concrete Corrosion Protective Coating — Units – SF

Record this element for all concrete corrosion protective coating used in the tunnel. This element is for concrete elements that have a protective coating applied to them. These coatings include silane/siloxane water proofers, crack sealers such as High Molecular Weight Methacrylate (HMWM), or any topcoat barrier that protects concrete from deterioration and reinforcing steel from corrosion. Effectiveness is an evaluation made by the inspector to classify the degree to which the protection system is functioning. Protective coatings only apply to those elements listed under the structural and civil sections.

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

1. Underlying concrete is not exposed and coating is fully effective.
2. Coating is substantially effective. Underlying concrete is not exposed, coating is showing signs of wear from UV exposure, and/or friction course is missing.
3. The coating has limited effectiveness. The underlying concrete is not exposed, but thickness of coating is reduced.
4. The coating has failed with no protection. The underlying concrete is exposed.

## 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 is substantially effective.
3. Fire protective coating area that has limited effectiveness.
4. Fire protective coating area that has failed and is no longer protecting the underlying material.

## 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 delamination's based on soundings, is completely missing, or has major section loss warranting replacement.

# Appendix 9-B Vacant

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# Appendix 9-C WSDOT/NTI Tunnel Inventory Codes

| WSBIS | NTI Item ID | NTI Inventory Item Name | Comments |
|---|---|---|---|
| BID01 | I.1 | Tunnel Number | |
| BID02 | I.2 | Tunnel Name | |
| n/a | I.3 | State Code | Autogenerated for the NTI submittal |
| BL02 | I.4 | County Code | |
| BL03 | I.5 | Place Code | |
| BL04 | I.6 | Highway Agency District | |
| BRT02 | I.7 | Route Number | |
| BRT03 | I.8 | Route Direction | |
| BRT04 | I.9 | Route Type | |
| BF03 | I.10 | Facility Carried | |
| BH06 | I.11 | LRS Route ID | |
| BH07 | I.12 | LRS Mile Point | |
| BL05 | I.13 | Tunnel Portal's Latitude | |
| BL06 | 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 |
| BW01 | A.1 | Year Built | |
| TA2 | A.2 | Year Rehabilitated | |
| TA3 | A.3 | Total Number of Lanes | |
| BH09 | A.4 | Average Daily Traffic | |
| BH10 | A.5 | Average Daily Truck Traffic | |
| BH11 | A.6 | Year of Average Daily Traffic | |
| BH17 | A.7 | Detour Length | |
| TA8 | A.8 | Service in Tunnel | |
| BCL01 | C.1 | Owner | |
| BCL02 | C.2 | Operator | |
| TC3 | C.3 | Direction of Traffic | |
| BCL05 | C.4 | Toll | |
| BH03 | C.5 | NHS Designation | |
| BH05 | C.6 | STRAHNET Designation | |
| BH01 | C.7 | Functional Classification | |
| BH02 | C.8 | Urban Code | |
| BG02 | G.1 | Tunnel Length | |
| TG2 | G.2 | Minimum Vertical Clearance over Tunnel Roadway | |
| BG06 | G.3 | Roadway Width, Curb-to-Curb | |
| BG07 | G.4 | Left Sidewalk Width | |
| BG08 | G.5 | Right Sidewalk Width | |
| TD1 | D.1 | Routine Inspection Target Date | |

| WSBIS | NTI Item ID | NTI Inventory Item Name | Comments |
|---|---|---|---|
| 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 dates 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. |
| BLR04 | L.1 | Load Rating Method | |
| BLR05 | L.2 | Inventory Load Rating Factor | |
| BLR06 | L.3 | Operating Load Rating Factor | |
| BPS01 | L.4 | Tunnel Load Posting Status | |
| BEP03 | L.5 | Posting Load – Gross | |
| BEP03 | L.6 | Posting Load – Axle | |
| BEP04 | L.7 | Posting Load – Type 3 | |
| BEP04 | L.8 | Posting Load – Type 3S2 | |
| BEP04 | L.9 | Posting Load – Type 3-3 | |
| TL10 | L.10 | Height Restriction | |
| TL11 | L.11 | Hazardous Material Restriction | |
| TL12 | 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. |
| TS1 | S.1 | Number of Bores | |
| TS2 | S.2 | Tunnel Shape | |
| TS3 | S.3 | Portal Shapes | |
| TS4 | S.4 | Ground Conditions | |
| TS5 | S.5 | Complex | |
| 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 | |

| WSBIS | NTI Item ID | NTI Inventory Item Name | Comments |
|---|---|---|---|
| 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 | |
| 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 | |

| WSBIS | NTI Item ID | NTI Inventory Item Name | Comments |
|---|---|---|---|
| 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 | |