OS-299 (4-22)

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DEPARTMENT OF TRANSPORTATION
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TRANSMITTAL LETTER

PUBLICATION:

Publication 100A

DATE:

6/27/2024

11/14/2024 Revision 1

SUBJECT:

Bridge Management System 2 (BMS2)
Coding Manual
Publication 100A, 2024 Edition

INFORMATION AND SPECIAL INSTRUCTIONS:

The attached 2024 Edition of Bridge Management System 2 (BMS2) Coding Manual represents a revised publication incorporating previously issued Strike-Off Letters, editorial changes and changes from clearance transmittal comments

This edition is effective immediately.

Comments or questions concerning this manual may be directed to Jonathan Moses, P.E., Assistant Chief Bridge Engineer - Inspection, at 412-429-4897 or by emailing the Bridge Inspection Section at PD-BridgeInspectSection@pa.gov.

CANCEL AND DESTROY THE FOLLOWING:

This 2024 Edition supersedes the 2022 Edition.

The new edition is not available in hard copy. Electronic format is available through the Department's website under Forms & Publications as well as on the BMS2 homepage (Forms and Templates link).

ADDITIONAL COPIES ARE AVAILABLE FROM:

☒ PennDOT website - www.penndot.pa.gov
Click on Forms, Publications & Maps

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BRIDGE MANAGEMENT SYSTEM 2 (BMS2)

Coding Manual

Pennsylvania
Department of Transportation
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PUB 100A (12-24)

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Summary of Changes - 2024 Edition of Publication 100A

Change #	*Item No.*	*Proposed Change*
1	FC/NSTM	Changed references from FC to NSTM throughout except in legacy fields that are no longer primary coding items.
2	TOC	Updated to include new sections and appendices of Publication 100A.
3	SOL List	Updated to include new SOL's that have been incorporated.
4	Intro	Added definitions.
5	Section 2.2.1	Updated the ECMS web address to reflect the addition of .pa in the site address.
6	Section 2.2.2	Update the location of the internal BMS2 user form to indicate it's available on the Forms and Templates page of BMS2 and removed links to ECMS.
7	Section 2.2.5	Clarified the section to indicate structure groups that an Owner Agent can accept inspections for.
8	Section 2.2.6	Added the site address for BMS3.
9	Section 2.5.4	Added coding examples for notes fields.
10	Section 2.5.6.1	Added notes on determining the need for a new rating set.
11	Section 2.14	Modified the steps within Section 2.14.1.8 to include 5C04 through 5C06.
12	1B05	Revised the coding guidance for scale factors.
13	5B13	Updated the coding conversion for a 6A29 Value = 06.
14	5C35	Revised the coding description for a value of "3".
15	5D04	Updated the procedures and codings to reflect the acutal values available in BMS2.
16	5E22/5E23	Repurposed the fields for P3 Information
17	6A19	Revised the coding description for a value of "3".
18	6B48	Added additional coding procedures for combustible materials to improve the quality of the data recorded in the field.
19	7A19	Revised the coding description.
20	I.11	Added LRS Inventory Route to the Tunnel Inventory Screen.
21	IA02	Referred inspectors to Appendix N for coding guidance on Bridge Railings and Transitions.
22	IC01	Adding missing comment types that are available in BMS2.
23	IC02/IC05	Added coding examples for notes fields.
24	IM Section	Added the SAP Assembly Number to each maintenance item.
25	IM Section	Reworked the introduction of the IM section to improve the commentary regarding the integration with SAP.
26	IM05	Revised the maintenance item examples related to leaking deck joints.
27	IM05	Updated the coding guidace for local bridges when a sign has been ordered.
28	IN16	Updated the procedures for coding the field.
29	IN25	Added a check box to indicate if a sub-unit is within a 500-year flood plain.
30	IR02/IR02a	Modified the location of where the data is stored in the database.
31	IR03	Modified the date to be entered for the laod rating set.
32	IR11a	Added the Culvert condition rating to be considered when applying the SLC in addition to Superstructure and Substructure.
33	IW01/IS01	Removed sign and wall specific inspection types.
34	SP Section	Reworked the introduction to clarify the use of a coding of "X".
35	SS01	Updated the available coding options.
36	SS02	Updated the wording with the coding description.
37	SS09	Updated the wording with the coding description.
38	VD05	Modified the available steel coding options.
39	VP03/VP04/ VP05	Removed references to old BMS codings.
40	VP04/VP05	Modified the procedures to document the proper coding when a posting is recommended.
41	VP05	Modified the procedures to document the proper coding when a value for a combination vehicle is not specified at the bridge site.
42	App. G.	Modified the Footnote #4.
43	Appendix N	Added a new appendix that is to be used as a transition guide for new fields added relating to the SNBI.
44	Various	Incorporated condition rating language guidance from the SNBI for Items B.C.01 through B.C.15.

Summary of Changes - 2024 Edition of Publication 100A (Change #1)

1	IF02	Added additional coding options to allow for the coding of fatigue details on non-NSTM members. (Added to BMS in Release 5.65/BMS3 1.6.0)
2	IF05	Added additional coding options to allow for the coding of fatigue details on non-NSTM members. (Added to BMS in Release 5.65/BMS3 1.6.0)
3	IF08	Revised the automation of the field to take into account coding options changes on IF09. (Added to BMS in Release 5.65/BMS3 1.6.0)
4	IF09	Revised the procedure and coding of this field to account for complex features. (Added to BMS in Release 5.65/BMS3 1.6.0)
5	App. N	Added a new field, B.G.13 - Maximum Bridge Height. (Added to BMS in Release 5.66/BMS3 1.7.0)
6	App. N	Updated the SNBI Coding fields as needed to align with the SNBI Errata released by FHWA.

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Incorporated Strike-Off Letters (SOL)

The coding instructions in this edition of the Coding Guide supersede that contained in the following SOL's:

SOL	Date	Description
483-22-01	11/14/22	Technical Bulletin - Bridge Safety Inspection and Bridge Maintenance Programs
483-23-04	06/06/23	Publication 238 and Publication 100A - Additional functionality and revisions to inspection intervals & load rating policy
483-23-05	06/28/23	Examples of Tunnel Critical Findings
483-23-06	08/15/23	Field VD05 Steel Types
483-23-07	10/02/23	Bridge Inspection Types
483-24-02	02/23/24	Uncoated Weathering Steel

Definitions

APRAS
Automated Permit Routing/Analysis System

BIS
Bridge Inspection Section. The section of the Bridge Office is responsible for administrative and technical support of Pennsylvania bridge inspection and BMS2/BMS3.

BMS2
Bridge Management System 2

BMS3
Bridge Management System 3. Initially a replacement for *i*Forms, and eventually a replacement for BMS2 as well. This web-based system will allow for the collection of data in the field by inspectors and a review of the data by office personnel.

BrM
A bridge management system owned by AASHTO which includes functionality for performing element-level inspections and data collection in addition to extensive planning and programming and predictive modeling functionality.

Bridge
For the purposes of this inventory, a bridge is defined as: 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 usually having a length of 8 feet or more. Note: The terms "bridge" and "structure" are often used interchangeably. See Item 5E01 for the FHWA definition of a bridge.

Data Item
A complete element of data, one or more data fields

Department
The Pennsylvania Department of Transportation (PennDOT)

Direction of Orientation
Determine the right and left sides and near and far ends of the bridge by looking in the direction of increasing offset, stations, or increasing milepoints; see sketch adjacent to the definition for "Left Roadway" on the following page (This is generally the direction of inventory). In the absence of offset, stations, or milepoints, determine orientation in accordance with cardinal direction. If the bridge runs west to east, the direction or orientation should be east. If the bridge runs south to north, the direction of orientation should be north. Reference the sketch on the following page adjacent to the definition for "Left Roadway".

DM2
The Pennsylvania Department of Transportation's Design Manual Part 2

DM4
The Pennsylvania Department of Transportation's Design Manual Part 4

ECMS
The Pennsylvania Department of Transportation's Engineering and Construction Management System

ECS
The Pennsylvania Department of Transportation's Enterprise Content Services

FHWA
Federal Highway Administration

Field

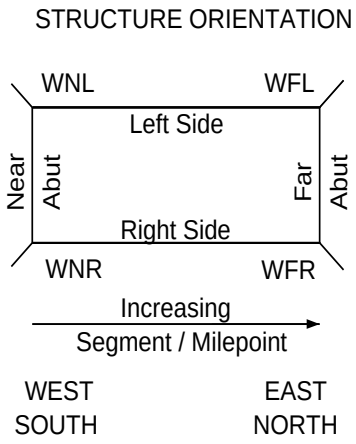
A specific area in which a particular type of information is recorded. A single or multiple digit area used to define or describe an individual characteristic.

Left Edge

This is the left edge of the roadway as defined relative to the direction of traffic. See the sketches at the end of this section. This definition applies only for Minimum Lateral Clearance in Section 4A. (This should not be confused with the "left side" of the bridge as defined under Direction of Orientation which is used for Sidewalk Type and Width in Sections VI and 5B).

Left Roadway

This is used to identify the roadway relative to the direction of inventory (increasing offset, stations, or milepoints). In the absence of offsets, stations, or milepoints, the direction should be south to north, or west to east. Therefore, in the absence of offsets, stations, or milepoints Southbound (SB) and Westbound (WB) roadways are considered "Left Roadways".



MORIS

Maintenance and Operations Resource Information System

MPMS

The Pennsylvania Department of Transportation's Multi-Modal Project Management System

NBIS

National Bridge Inspection Standards

Ordinary High Water

The line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. In streams, these features are typically formed by erosion and/or deposition due to the presence of flowing water.

Right Edge

This is the right edge of the roadway as defined relative to the direction of traffic. See the sketches at the end of this section. This definition applies only for Minimum Lateral Clearance in Section 4A. (This should not be confused with the "right side" of the bridge as defined under Direction of Orientation which is used for Sidewalk Type and Width in Sections VI and 5B).

Right Roadway

This is used to identify the roadway relative to the direction of inventory (increasing offset, stations, or milepoints). In the absence of offsets, stations, or milepoints, the direction should be south to north, or west to east. Therefore, in the absence of offsets, stations or milepoints Northbound (NB) and Eastbound (EB) roadways are considered "Right Roadways". Reference the sketch above adjacent to the definition for "Left Roadway".

RMIS

Roadway Management Information System

RMS

The Pennsylvania Department of Transportation's Roadway Management System

Screen

The established arrangement of data items into fixed sets for viewing, updating, etc., by the user. Each set is viewed separately and individually on a Digital screen or via a paper print. Each set/screen has a 2 digit designation.

Sign Structure Orientation

The Near Side on one directional routes is the side facing traffic. The Near Side on two directional routes is the side facing traffic traveling in the direction of increasing segments, usually over the Northbound or Eastbound lanes. The Right and Left Side are determined by facing the Near Side of the sign.

SNBI

The Specification for the National Bridge Inventory is the coding guide produced by FHWA for coding items that are reported to FHWA on an annual basis by PennDOT and other bridge owners.

Structure

A bridge or facility constructed to support loads or facilities. (Example: an overhead sign support structure, retaining wall, etc.)

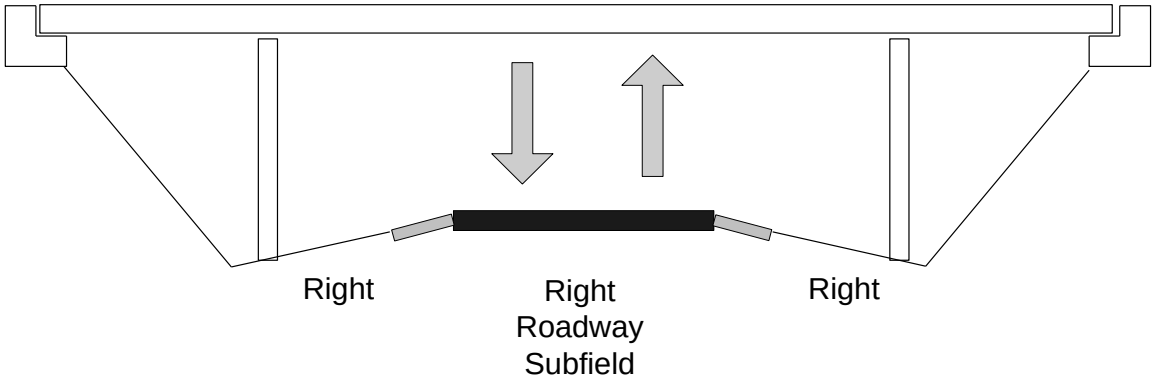
Structure Identification

A 14 digit code used to provide each structure in the system with a unique identification.

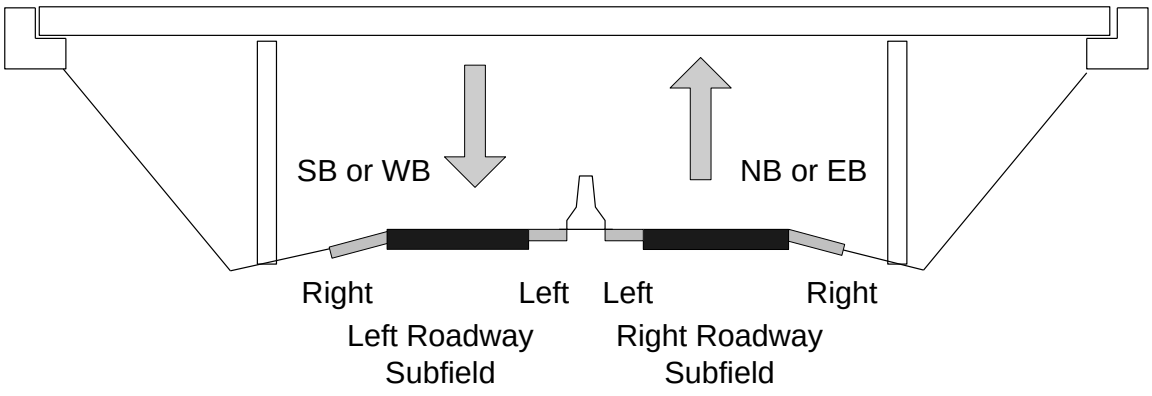
User

A user is a person who enters data, views existing data, and/or requests and obtains information (reports) from the system.

Multi-Directional Highway
Undivided

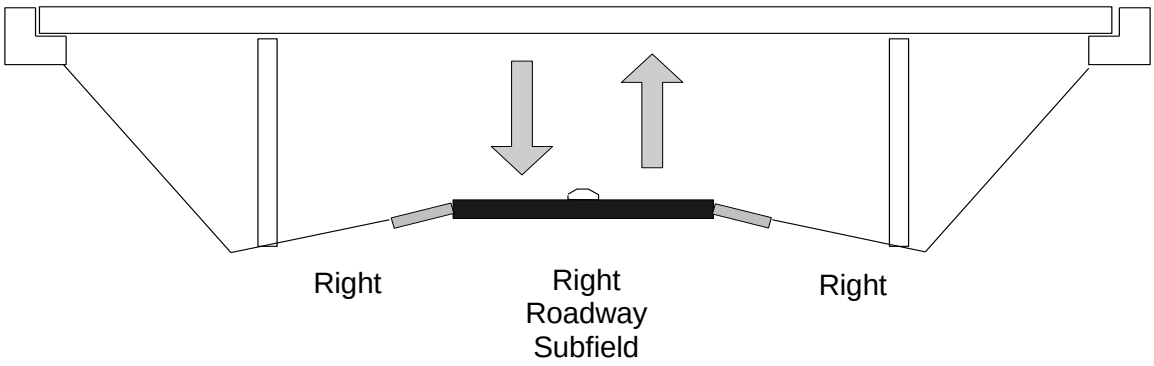


Multi-Directional Highways
Divided by an Obstruction



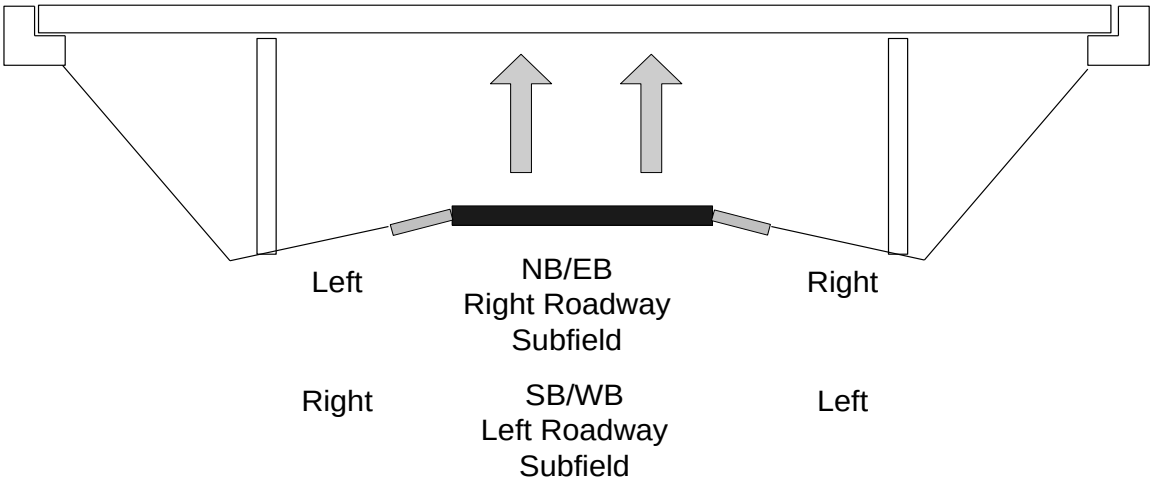
Obstructions may include:
Steel Box Beam, Steel W-Beam, and Concrete Shaped Median Barriers, Grass Medians, Non-Mountable Medians, and Substructure Units

Multi-Direction Highway with
Mountable Median Barrier



Note: Mountable medians have a maximum edge height of 2” and are designed to be driven over if necessary.

One Way Traffic



1.0 INTRODUCTION

1.1 Background

The Bridge Management System 2 (BMS2) is the result of a three-phase project that replaced the original Bridge Management System (BMS). Developed by the Department in 1986, BMS served the Department well. However, limitations of the 1986 BMS made it impossible to go to the next level of modern bridge management needed to ensure the safe and efficient management of these critical assets. Three major business functions whose improvement was emphasized through BMS 2 included:

- Bridge planning – determining bridge needs on a network basis
- Bridge programming – selection of the correct work item for an individual bridge
- Bridge maintenance management – better use of inspection data for determining maintenance needs and priority for planning and operations

Probably most importantly, the original BMS, based on NBI component-level condition data, could not provide planning analyses to accurately predict future deterioration and corrective bridge costs for various maintenance and improvement options. To provide the sufficiently detailed and quantified condition data to the analysis models to support this critical planning function, the Department is adding the collection of AASHTO National Bridge Element data to the NBI component inspection data.

Once the planning module determines the overall bridge needs, the selection and programming of projects for improvement, preservation, and maintenance is critical to a successful bridge program. BMS2 will assist the Districts and bridge owners in programming the right work for the right projects to achieve the desired performance.

These planning and programming models in BMS2 will also support the bridge portion of the enterprise-wide Transportation Asset Management efforts. To that end, the BMS2 has greatly improved data sharing capabilities with other PennDOT management systems (e.g. RMS, MORIS/SAP, APRAS, ECMS, and GIS) to assist management decisions that transcend historical asset categories. BMS2 also allows local bridge owners direct access to the condition data for their bridges along with a set of bridge management tools to assist their decision-making processes.

BMS2 is of critical importance as it allows PennDOT and local bridge owners to prioritize and perform more cost-effective maintenance activities sooner, which will reduce or defer future replacements.

Previously, electronic data collection of bridge inspection occurred in iForms. This system has been replaced by the inspection module of BMS3. BMS3, a web-based system, will eventually be a singular location for all inspection data to be collected and reviewed.

BMS2 is the database to store structure inventory, condition, and appraisal data required by the joint statutory and management needs of the Pennsylvania Department of Transportation and the Federal Highway Administration. The System stores, updates, and reports data on the physical and operating characteristics of all highway structures in Pennsylvania.

Prime system users are the individual District Bridge Units, the Bridge Inspection Section of the Bridge Office and, eventually, local bridge owners. This System is designed to store data on every highway related structure in Pennsylvania. Additionally, data is recorded for highway tunnels, sign structure, high-mast light poles and walls. Because the System was designed to accept a broad spectrum of structures, the number of data fields available is rather large. However, since there are fields not applicable to a given structure type, this has the effect of reducing the amount of data required at individual structures.

1.2 BMS2 Configuration

BMS2 is composed of two major components:

a. BMS2 Web
b. BMS3 Inspection Module (replacement of *i*Forms)

BMS2 Web and BMS3 is available to PennDOT personnel and external Business Partners who have requested access and been approved by the Department. It includes the following functionality:

- View and edit Bridge Inventory and Inspection information
- View and run BMS2 web reports posted by the Department
- View and store electronic documents stored in the Department's Electronic Document Management System (ECS)
- View and edit Bridge Maintenance items
- View and edit Sign Structure, Wall and Other structure inventory and inspection information
- View and edit APRAS bridge data
- Create new structures in BMS2
- View and run Risk Assessment Searches

BMS3 is available to all PennDOT personnel and Business Partners free of charge. All inspections must be entered and submitted through BMS3. It includes the following functionality:

- Enter and store Bridge Inspection data
- Enter and store sign structure, walls tunnel, and other structure inspection data
- Submit bridge inspection data to BMS2

1.3 Purpose of Manual

The objective of the BMS2 Coding Manual is to provide users guidance on coding inventory, inspection, appraisal, and maintenance data for PA structures. This manual provides limited instruction on how to navigate through the various BMS2 screens.

For descriptions of the elements used in BMS2 and instructions coding the inventory of National Bridge Elements on a bridge, refer to Appendices H, I, and J.

It is important that the user study the definitions and instructions contained in the User's Manual before attempting to input data into BMS2. All users should refer questions concerning the use of this System to the Bridge Inspection Section via email at **PD-BridgeInspectSection@pa.gov**.

1.4 Distribution Procedure

Hardcopy versions of the BMS2 Coding Manual (PennDOT Publication 100A) are no longer available from the sales store. An updated digital copy of the manual will be maintained on the BMS2 website.

Each District will be responsible for establishing and maintaining a distribution list and for securing and distributing the Manual and its revisions within a District.

Recommendations for revisions should be transmitted by the District Bridge Engineer through the District Executive to the Director of the Bridge Office. Proposed changes should be specific and justified. Upon receiving the proposed modification, the Director of the Bridge Office will review it and transmit copies to the various Bureau Directors involved for comments. If acceptable, the change will be finalized, FHWA approval obtained if appropriate, and any system modifications implemented by the Bureau of Information Systems.

1.5 BMS2 and BMS3 Security Levels

1.5.1 Security Levels

For BMS2, "security levels" or user roles are defined to help control access to the BMS2 functionality. These levels are described by their general business function. However, these security levels are not necessarily aligned with the work roles for corresponding users in a bridge unit. A user can be assigned to multiple security levels simultaneously – the user is given the total privileges for all assigned security levels. For example, although there is an "Inspector" security level defined, that level may be provided to a user that is not an inspector (e.g., an administrative support person) so that they can create and edit inspection data.

The BMS2/BMS3 process roles, in order of increasing access, are as follows:

- Browser - The Browser role is a "read-everything, change-nothing" kind of access. All of the modules may be accessed, but nothing in the database can be changed. Within BMS2, the security for the Browser role is enforced primarily by database level security constraints – it is not possible to disable many of the functions in BMS2 based on role. Therefore, a user with the Browser role may access buttons and other controls in BMS2. However, when the user attempts to use the buttons/functions they will receive a database error message indicating that they are not authorized to perform that function – the user will know which functionality will not work because he/she does not have the necessary permissions at the database level. These users do not have access to the BMS3 Inspection Module.
- Inspector - The Inspector role allows for reading all inspection and inventory data and using all of the Inventory and Inspection related functionality of BMS2. Inspector users can create and update inspections prior to supervisor review but are prevented from updating approved inspections. These users have access to the inspection module of BMS3.
- InspSuper - The InspSuper (Inspection Supervisor) role builds on the Inspector role with additional abilities to delete and modify structures and to review and approve inspections. In particular, Inspection Supervisors have the privilege to approve inspections and modify data for inspections in "Accepted" status. These users have access to the inspection module of BMS3.
- PowerUser* - The PowerUser role is very similar to the InspSuper role with ability to delete and modify structures and to review and approve inspections as well as modify data for inspections in "Accepted" status. Additionally, the PowerUser role can delete certain inspections records for a structure. This is limited to the most recent inspection in BMS2 for a specific structure not in "Accepted" status. Generally, there is one PowerUser in each District in addition to key positions at Central Office. Other permissions granted to this role include the ability to edit concurrence for Item 7A20 – Extended Inspection Interval Concurrence and editing the status (Item IM07) of maintenance items when in status "3 – Sent to SAP." These users have access to the inspection module of BMS3 if they also have Inspector or Inspector Supervisor roles.
- SuperUser* - The SuperUser role has full authority within BMS2 to perform any action. The SuperUser role provides access to the BMS2 Configuration screen to edit the BMS2 parameter tables, including the definition and modification of structure elements. All BMS2 functionality is available to the SuperUser. SuperUsers are restricted to key personnel within the Bridge Inspection Section at Central Office. These users have access to the inspection module of BMS3 if they also have Inspector or Inspector Supervisor roles.
- AprasBrowser* - The AprasBrowser role is an add-on to Browser, Inspector, InspSuper and PowerUser. This add-on to a user's profile allows the user to view Apras data that is available in BMS2. These users have access to the inspection module of BMS3 if they also have Inspector or Inspector Supervisor roles.
- AprasEdit* - The AprasEdit role is an add-on to the InspSuper and PowerUser roles. This add-on to a user's profile allows the user to view and edit Apras data that is available in BMS2. These users have access to the inspection module of BMS3 if they also have Inspector or Inspector Supervisor roles.

See Section 2.2 BMS2 Security and Login for the different security levels in BMS2 Web. Roles listed above with an asterisk (*) are limited to Department staff.

See Appendix L for guidance on assigning these security levels to users.

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2.0 BMS2

2.1 Introduction

The purpose of the BMS2 section is to provide a reference to each of the BMS2 screens for both internal PennDOT and external non-PennDOT users. This section contains screen images and short descriptions for accessing and using many of the features of the BMS2 screens. As such, this section does not address all of the functional areas of BMS2 outside of the BMS2 application.

2.2 BMS2 Security and Login

2.2.1 BMS2 Security for External Users

The BMS2 security requirements for external users (bridge owners, consultant inspectors, planning partners, etc.) are similar to the requirements for non-PennDOT Business Partners (BP) utilizing the Engineering and Construction Management System (ECMS). In addition, many local bridge owners and inspection consulting firms are already defined as ECMS BP. Therefore, the ECMS BP Registration subsystem is being used to manage external BMS2 users. The ECMS BP Registration functionality provides the following:

- By registering as a BP an organization is provided with a single BP Administrator userid. This administration userid is used to manage and maintain all BMS2 and ECMS userids for that organization's users.
- The BP Administrator user has access only to security and BP information. "Named" userids must be created to gain access to BMS2 and other ECMS Business Partner functions.
- BP Administrator users can Create, Modify, or Delete other users for their company, and reset passwords for their company's users. Therefore, PennDOT is not required to provide user administration support to non-PennDOT users.

Individual business partners, representing all possible external users including inspection consultants, local bridge owners and other organizations such as FHWA, will use ECMS BP Registration to set up their users and associate security groups with each user corresponding to the roles they require within BMS2.

2.2.1.1 Business Partner Registration - Non-PennDOT BMS2 Users

Before establishing BMS2 users, non-PennDOT organizations (e.g., inspection consultants, other agency bridge owners, planning partners) must be registered as business partners using the BP Registration process provided by ECMS. Registered business partners receive an Administrative userid and password that can then be used to create BMS2 users and/or assign BMS2 security groups to existing users.

Please note that non-PennDOT organizations using BMS2 must still be assigned to a structure or group of structures by an authorized PennDOT BMS2 user (or another business partner organization defined as an owner) before users for that business partner will be able to view or maintain structure information in BMS2. For more information about the assignment process, please reference Section 2.8 Assigning Business Partners.

To register as an ECMS/BMS2 BP:

1. Navigate to the ECMS website at https://www.ecms.penndot.pa.gov/ECMS/
2. Under links, click on Register as a PennDOT Business Partner
3. Follow the instructions on the BP Registration screen in ECMS.

Once a business partner is registered and established within ECMS, the provided Administrative userid can then be used to create new BMS2 users or add BMS2 security groups to existing users.

2.2.2 BMS2 Security for PennDOT Users

ECMS user security has been incorporated into the PennDOT J2EE PDFramework that is utilized as the basis for the development of BMS2. The security components provided as part of the PDFramework provide the means to verify that a user is authorized to access an application (in this case BMS2) and determine the security groups to which a user has been assigned, which in turn are then used to provide or limit access to particular BMS2 screens and functions. Therefore, in addition to the use of the ECMS Business Partner Registration

functionality for external users, ECMS Security Administration will also be used to setup and maintain PennDOT BMS2 users. All PennDOT users of BMS2 must have an assigned ECMS userid and password that is distinct from the PennDOT domain userid (CWOPA) and password utilized for security within BMS2 Web. Security administration for PennDOT users of BMS2 will be provided via the ECMS Help Desk. After successfully obtaining ECMS access, BMS2 access can be obtained by filling out the User Authorization Request Form, available directly from the Bridge Inspeciton Section or ECMS Help Desk.

2.2.2.1 Business Partner Registration - PennDOT BMS2 Users

PennDOT BMS2 users must have an ECMS userid and password to log into BMS2. This is because the ECMS Security Administration functionality is being used as the tool for administering BSM2 Web security. If a BMS2 user does not yet have an ECMS userid, they must be assigned one by their Business Partner ECMS Administrator.

2.2.3 BMS2 Security Levels

Within the BMS2 application, the "security levels" or user roles are defined to help control access to structure inventory and inspection information. These security levels are described by their general business function but are not necessarily aligned with the corresponding work roles for a user. A BMS2 user can be assigned to multiple security levels simultaneously – the user is given the total privileges for all assigned security levels.

In general, the BMS2 security roles can be described as follows:

- Browser - The Browser role is a "read-everything, change-nothing" kind of access. All of the modules may be accessed, but nothing in the database can be changed.
- Inspector - The Inspector role allows for reading all inspection and inventory data and using all of the Inventory and Inspection related functionality of BMS2. Within BMS2, users with Inspector authority can access and edit all inventory related screens and all inspection related screens for any inspection that is not in Accepted (approved) status.
- Inspector Supervisor - The Inspector Supervisor role builds on the Inspector role with additional abilities to review and approve inspections. In particular, Inspection Supervisors have the privilege to approve inspections and modify data for inspections in "Approved" status. Within BMS2, users with Inspector Supervisor authority have the ability to edit all inspection data available in BMS2, regardless of the corresponding inspection status.
- Owner – The Owner role has full authority within BMS2 to perform most actions.

2.2.4 BMS2 Security Groups

The following is a list of the specific security groups available for PennDOT and Business Partner users within BMS2. These security groups must be linked to a BMS2 user by an authorized PennDOT or Business Partner Security Administrator using the ECMS Security Administration functionality. In general, external Business Partners have user roles that parallel and are generally equivalent to PennDOT user roles.

- Consultant
    - ADMIN
    - BROWSER
    - BROWSER INVENTORY
    - BROWSER INSPECTION
    - CONSULTANT INSPECTOR
    - CONSULTANT INSPECTOR SUPERVISOR
    - CONSULTANT OWNER AGENT
- Municipality/Agency/Government
    - ADMIN
    - BROWSER
    - BROWSER INVENTORY
    - BROWSER INSPECTION
    - GOVERNMENT INSPECTOR
    - GOVERNMENT INSPECTOR SUPERVISOR
    - GOVERNMENT OWNER AGENT
    - GOVERNMENT STRUCTURE OWNER
- Planning Partners
    - ADMIN
    - BROWSER INVENTORY
- FHWA
    - ADMIN
    - BROWSER
    - BROWSER INVENTORY
    - BROWSER INSPECTION

2.2.5 BMS2 Business Partner Assignment

One of the key requirements for BMS2 is that external users have access to BMS2 for viewing and maintaining structure related data. However, external users will only be given access to data for the structures to which they have been specifically assigned access. For example, consulting firms performing bridge inspections require access to BMS2 for submitting and maintaining inspection data for structures they are assigned to inspect (e.g., upload and download BMS3 inspection data, create, and edit manual inspection data). PennDOT users have access to all structures in BMS2 and therefore do not have to be assigned access to specific structures.

To facilitate the assignment process for external users, BMS2 provides screens and components for Business Partner Assignment as described in Section 2.8 Assigning Business Partners. In general, an external user can be assigned access to a particular structure or set of structures using one of the following assignment types:

- Owner - An Owner has full access to edit and maintain all structure related data provided via BMS2. In addition, an Owner has the ability to assign or revoke the access of other business partners for their structures, including the ability to designate an Owner Agent. An Owner cannot prohibit PennDOT access to structure data.
- Owner Agent - An Owner Agent is an external business partner that can act on behalf of an Owner for a structure. Owner Agents have the same level of access to structure data as the corresponding owner, including the ability to assign or revoke the assignment of other business partners for a structure. An Owner Agent cannot prohibit PennDOT access to structure data. An Owner Agent can also accept inspections for L2, L3, A2, A3 and O2 reporting group structures.
- Inspector - An Inspector Business Partner is allowed to create and maintain inspections for a structure and view inventory data.

- Planning Partner - A Planning Partner can view inventory data for a particular structure but cannot edit data. In addition, a planning partner is restricted from editing and viewing inspection data.

In all cases, a particular structure can have multiple business partners assigned with the same assignment type simultaneously. For example, multiple consultant business partners can be assigned as Inspectors at the same time, supporting the turnover of inspection responsibility from one business partner to another or providing access to a regular inspection firm and an underwater inspection firm.

These assignment types only provide access to structure data for a particular organization; users within that organization must still be assigned the necessary security groups to access the corresponding functionality. For example, a Browser user for a consultant business partner that has been defined as an Inspector for a structure can still only view inspection data for that structure; they must be assigned the Inspector or Inspector Supervisor security group to maintain and/or submit inspection data.

Structure assignments are automatically incorporated into BMS2; there is no additional action that an external user must take to gain access nor are separate screens provided. The selection criteria on the BMS2 Structure Search screen automatically includes the assignment criteria in addition to any selection criteria entered by the user. If an external user enters no selection criteria on the Structure Search screen and clicks the Search button, the list of all structures to which the user's organization is assigned is displayed.

2.2.6 BMS2 Application Login

To sign on to the BMS2 or BMS3 systems, external users will navigate to the following web addresses:

https://bms.penndot.pa.gov/BMS2Web/

https://bms3.penndot.pa.gov/

This address supports PennDOT internal users and external users (e.g., local bridge owners, planning partners and consultants). To improve performance, PennDOT users attached to the PennDOT network will also have access to the BMS2 application at the following internal web address:

https://bmsint.penndot.pa.gov/BMS2Web/

Figure 2.2.6-1 BMS2 Login Screen

To login to BMS2:

1. Access the BMS2 application using either the internal or external address, **https://bms.penndot.pa.gov/BMS2Web/** (external) or **https://bmsint.penndot.pa.gov/BMS2Web/** (internal)
2. Enter your assigned User ID and the corresponding password in the appropriate fields and click the 'Login' button.
3. Accept confidentiality statement in order to enter into BMS2.
4. The Structure Search screen is displayed.

2.2.7 BMS2 Access to Risk Score

Only authorized Department users will be able to see screen fields or access data for Risk Score through BMS2. As such, Business Partners will not be able to see any of the Risk Score screen fields. Also, generation of risk sore reports is limited to Department users with access to Crystal Reports and login security access to BMS2. Risk Score information for local owners can be obtained by request through the Bridge Asset Management Section Chief. Responses will be provided to the respective District Bridge Engineer.

2.2.8 Structure Plan Number

Refer to guidance in Publication 15M (DM-4).

2.3 System Basics

This section provides information about some of the general characteristics of the BMS2 application. It describes how a user will navigate through various screens.

2.3.1 Things You Can't Do In BMS2

While providing increased flexibility for accessing and maintaining BMS2 data for both internal and external users, there are also some limitations as to what functions can be performed in BMS2 in comparison to other components of BMS2. The following functions cannot be performed directly in BMS2:

- **Create Inspections** – Users must use the BMS3 inspection module to create a new inspection for completion and submission into BMS2.

2.3.2 Field Label Prefixes

These four-character prefixes appear in front of the textual field label on each screen. The format of the field labels is XXNN. The first two characters (XX) correspond to the BMS2 screen-specific Label Prefix (see table below), while the third and fourth characters (NN) provide a two-digit sequence number (with a leading zero for single digits). The numbers are sequenced by the field position on the screen, within group boxes, left to right, top to bottom.

Table 2.3.2-1 is a high-level cross reference of Web Links screens to BMS2 screens and corresponding label prefixes. At the end of the table, there is a brief introduction to coding fields from the SNBI that are being incorporated into BMS2/BMS3 in the coming months:

Web Links	BMS2 Screens
Structure Home	2A - Inspection Notes 5A - Inspection Inventory - ID/Admin 5B - Inspection Inventory - Design 5E - Inspection Inventory – Classification LB – Local Bridge Inspection App VM - Inventory - Maintenance Responsibility
Agency Bridge	6A - Agency Bridge
Features (and associated Detail screens)	4A - Inspection Appraisal - Other Ratings 5C - Inspection Inventory - Roads 6C - Agency - Roadway FW - Feature Intersected - Waterway FR - Feature Intersected - Railroad FT - Feature Intersected - Utility
Structure Units (and associated Detail screens)	5B - Inspection Inventory - Design 5D - Inspection Inventory - Structure Units SP - APRAS Span – Span
Drawing Notes (and associated Detail screens)	VN - Inventory - Drawings and Notes
Structure Group	SG - Structure Group
Posting (and associated Detail screens)	VP - Inventory - Posting
Inspection Planning (and associated Detail screens)	VI - Inventory - Inspection Planning
Paint (and associated Detail screens)	VA - Inventory - Paint
Design (and associated Detail screens)	VD - Inventory - Design
Inventory – Signs and Lights	2A - Inspection Notes 5A - Inspection Inventory - ID/Admin 6A - Agency Bridge 6C - Agency - Roadway VS - Inventory - Signs and Lights

Table 2.3.2-1 Web Links vs. BMS2 Screens

Inventory – Walls	2A - Inspection Notes 5A - Inspection Inventory - ID/Admin 6A - Agency Bridge VW - Inventory - Walls
Inventory – Tunnel	I (VT) - Identification S (VT) - Structure Type and Material N (VT) - Navigation A (VT) - Age and Service C (VT) - Classification
Risk Assessment Detail	5A - Inspection Inventory - ID/Admin 6A - Agency Bridge
Preservation and Rehab	VB – Preservation and Rehab
Ratings & Schedule	1A - Inspection Condition 4A - Inspection Appraisal - Other Ratings 7A - Inspection Schedule
Agency Inspection	6B - Agency Inspection 7A - Inspection Schedule
Notes & Comments (and associated Detail screens)	2A - Inspection Notes IC - Inspection - Comments
Element Condition (and associated Detail screens)	1A - Inspection Condition 1B - Create / Edit Element
Non-Redundant Steel Tension Member (NSTM)/Fatigue (and associated Detail screens)	6A - Agency Bridge 7A - Inspection Schedule IF - Inspection – NSTM/Fatigue
Signing Details (and associated Detail screens)	ID - Inspection - Signing Details
Safety Features (and associated Detail screens)	IA - Inspection - Safety Features
Load Ratings (and associated Detail screens)	4B - Inspection Appraisal - Load Ratings IR - Inspection - Load Rating L (IT) - Inspection - Load Rating - Tunnels
Underwater (and associated Detail screens)	1A - Inspection Condition 7A - Inspection Schedule 4A - Inspection Appraisal - Other Ratings IU - Inspection - Underwater / OSA IN - Inspection - Underwater / Sub Units IL - Inspection - Underwater / Other
Joints & Bearings (and associated Detail screens)	IB - Inspection - Bearings IJ - Inspection - Joints IC - Inspection - Comments
Inspection – Signs and Lights	7A - Inspection Schedule IS - Inspection - Signs
Inspection – Walls	6A - Agency Bridge IW - Inspection - Walls
Proposed Maintenance (and associated Detail screens)	3A - Inspection Work 3B - NBI Project Data IM - Inspection – Maintenance
Completed Maintenance (and associated Detail screens)	3A - Inspection Work IM - Inspection - Maintenance

Table 2.3.2-1 Web Links vs. BMS2 Screens (continued)

APRAS Data	5C - Inspection Inventory - Roads SP - APRAS Span - Span SS - APRAS Span - Apras Span SL - APRAS Span - Load Capacity SC - APRAS Span - Clearance
Bridge Identification	B.ID – Identification B.L – Location B.CL – Classification
Bridge Material and Type	B.SP – Span Material and Type B.SB – Substructure Material and Type B.RH – Roadside Hardware
Bridge Geometry	B.G – Bridge Geometry
Features	B.F – Feature Identification B.RT – Routes B.H – Highways B.RR – Railroads B.N – Waterways
Loads, Load Rating and Posting	B.LR – Loads and Load Rating B.PS – Load Posting Status B.EP – Load Evaluation and Posting
Inspections	B.IR – Inspection Requirements B.IE – Inspection Events
Bridge Condition	B.C – Component Condition Rating B.E – Element Identification B.CS – Element Conditions B.AP – Appraisal B.W – Work Events

Table 2.3.2-1 Web Links vs. BMS2 Screens (continued)

2.3.3 Common Functions and Navigation

BMS2 screens include a common header and footer that are consistent across most screens. The common header and footer is not a separate screen but a set of common fields/functions that allow the user to quickly navigate between different screens and different structures within BMS2.

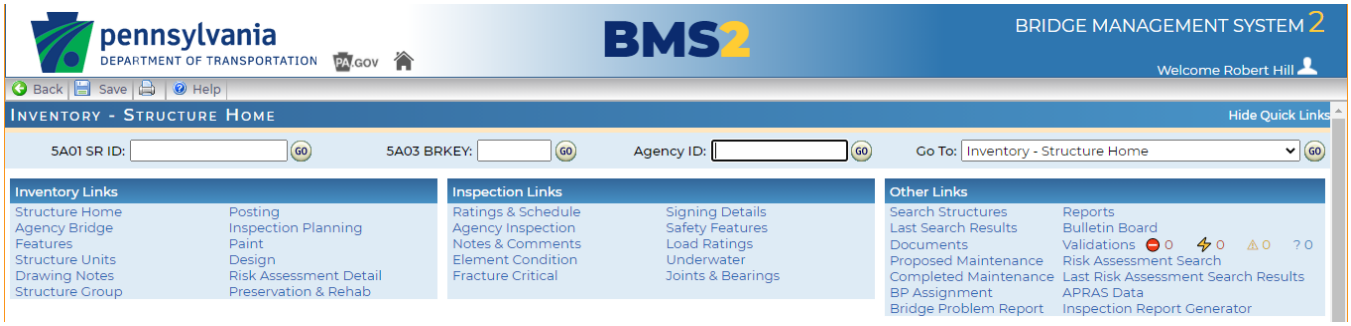


Figure 2.3.3-1 BMS2 Navigation Header

When the user is viewing a screen and modifies data on the screen and the Save button is not pressed before using one of the common navigation links/buttons described below, the modified data is lost. Users are not automatically prompted to save changes on all screens before leaving the screen with unsaved changes.

2.3.3.1 Header and Footer Links

The common header and footer contain several static links that allow the user to navigate to other systems outside of BMS2 and/or to return to the BMS2 login screen. Specifically, the following static links are included in the header and footer for each BMS2 screen:

- Common Header Links
  - PA.GOV – Takes user to the Commonwealth of Pennsylvania web page (www.pa.gov).
  - pennsylvania DEPARTMENT OF TRANSPORTATION – Takes user to the external PennDOT homepage (www.penndot.pa.gov).
  - - Takes user to the BMS2 login screen (https://bms.penndot.pa.gov/BMS2Web/).
  - Logout – Returns users to the BMS2 login screen.
- Common Footer Links
  - PennDOT – Takes user to the external PennDOT home page (www.penndot.pa.gov).
  - Pennsylvania – Takes user to the Commonwealth of Pennsylvania web page (www.pa.gov).
  - PennDOT Privacy Policy – Takes user to the Commonwealth of Pennsylvania Privacy Policy and Disclaimers web page (http://www.pa.gov/privacy-policy).
  - Release Notes – Takes the user to a web page that displays the updates made to BMS2 and/or BMS3 sorted by release date.

2.3.3.2 Common Header Go Buttons

The common header contains enterable fields for Structure ID (SR ID), BRKEY, and Agency ID, as well as a Go To dropdown list. The BRKEY is the unique identifier of a structure in BMS2. Structure ID is the 14-character numeric identifier for a structure, which may not be unique in some cases. For state-owned bridges, the Structure ID consists of the two-digit PA County, the four-character State Route ID, the four-character Segment and the four-character Offset. The Agency ID is a new field that allows local and agency owners to uniquely identify a structure using their own identifier. The Go To field contains a pre-defined list of BMS2 screens to which the user can navigate to or from the current screen.

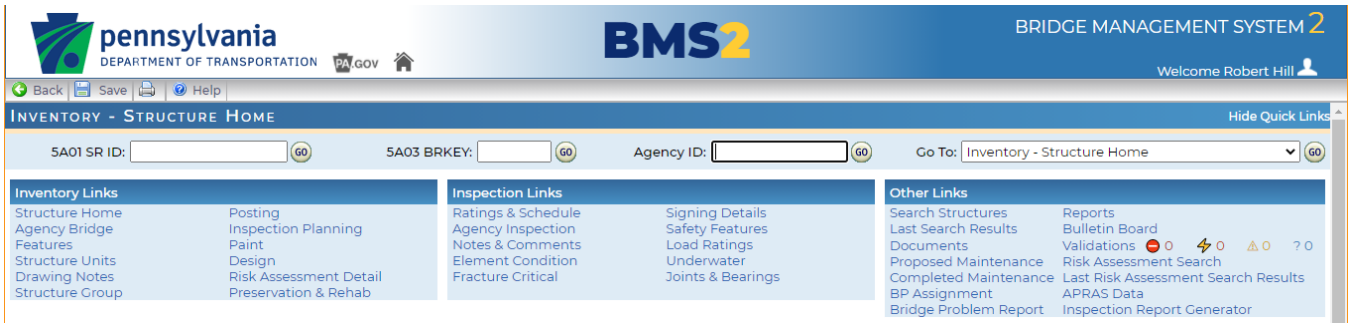


Figure 2.3.3.2-1 Header "Go" Buttons

When a BMS2 screen is first displayed, the BRKEY, Structure ID, and Agency ID fields display values for the currently displayed structure. However, these fields also give users the ability to change one of these key fields; press the "Go" button associated with the field and navigate to the screen that is selected in the Go To field. The Go To field defaults to the current screen, so by default the user will go to the same screen for the newly specified structure key. If the user wants to navigate to a different screen, the user may change the selection in the Go To field before clicking the Go button. These navigation fields are not linked – the user is only required to change one field and click the corresponding Go button to access the new structure/screen.

Note: When utilizing the Common Header Go buttons from a BMS2 Detail screen (e.g., a selected item from the Features Intersected List screen), screen control is transferred to the corresponding parent list screen for the new structure key. This is because a particular detail record may not exist for the new structure to be displayed and proceeding to the parent list screen helps to avoid a "record not found" condition.

2.3.3.3 Quick Links

On most BMS2 screens the common header includes static links to every other BMS2 screen. These "Quick Links" are provided to allow the user to open another screen for the same structure that is currently being viewed. When the user clicks a link to navigate to another Inventory screen, the user remains in that structure. When navigating to an Inspection screen for the first time for that structure the most recent inspection for that structure is displayed by default. However, if the user opens a prior inspection by changing the selected

Inspection Date and then clicks the quick link for another Inspection screen, the selected Inspection Date remains as the inspection date for the new screen (i.e., the user continues to view data for the selected inspection). However, when the user selects a different inspection, navigates to an Inventory screen and then clicks a quick link for an Inspection screen, the inspection date is again defaulted to the most recent inspection information.

These static Quick Links operate independently from the key fields associated with the Common Header Go buttons. When using the static links, the user cannot enter a different structure key value to access.

The Quick Links are grouped into three sections:

- Inventory Screen Links – Links to other Inventory-related screens for the current structure.
- Inspection Screen Links – Links to other Inspection-related screens for the current structure. As noted above, when linking from one inspection screen to another the currently displayed inspection date remains selected. However, when linking to an inventory screen the selected inspection date (if not the most recent inspection) is "lost" so that when the user selects another subsequent inspection screen the date is defaulted back to the most recent inspection.
- Other Links – Includes links to other screens that are not specific to inventory or inspection data; includes Search Structures, ECS Documents, Proposed and Completed Maintenance, Reports, Bulletin Board, Validations, Risk Assessment Search, APRAS Data, Inspection Report Generator and Business Partner (BP) Assignment (used to assign Business Partners with access to specific structures).

The common header includes a Hide Quick Links option that closes the Quick Links portion of the screen to allow for more room for data to be displayed. When the Quick Links section is hidden a Show Quick Links option is made available to re-open the Quick Links section.

2.3.3.4 Common Screen Buttons

Buttons for screen functions are always displayed in a "button row" in the common header immediately below the system title area. This button row remains displayed regardless of whether the user scrolls to another area of the screen. Some common buttons that are displayed on most of the BMS2 screens include the following:

- Back – Returns the user to the previous screen. When using the Next and Previous buttons to scroll within the detail records for a particular list of items (e.g., highway features, load ratings, etc.), the Back button returns the user to the prior list screen and not the next or previous detail record.
- Next and Previous – "Scrolling" buttons that take the user to the next or previous detail record within a list of items. Next and Previous buttons are only displayed on certain detail screens.
- Save – (Edit mode only) When displayed for an authorized user, saves changes made on the current screen to the BMS2 database.
- Save & Exit – (Edit mode only) When displayed for an authorized user, saves changes made on the current screen to the BMS2 database and then returns the user to the previous screen. This button provides a short-cut to pressing the Save button and then pressing the Back button.
- Print – Opens the current screen in a printer-formatted window that can then be printed using the normal browser Print function.
- Help – In the future, this will open a screen with a detailed guide on the use of BMS2.

2.3.3.5 Required Entry Fields

There are few required fields within BMS2. All required fields are distinguished with a yellow field background and a yellow flag icon displayed to the right of the entry field itself:

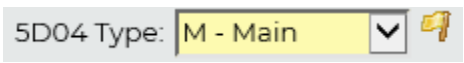
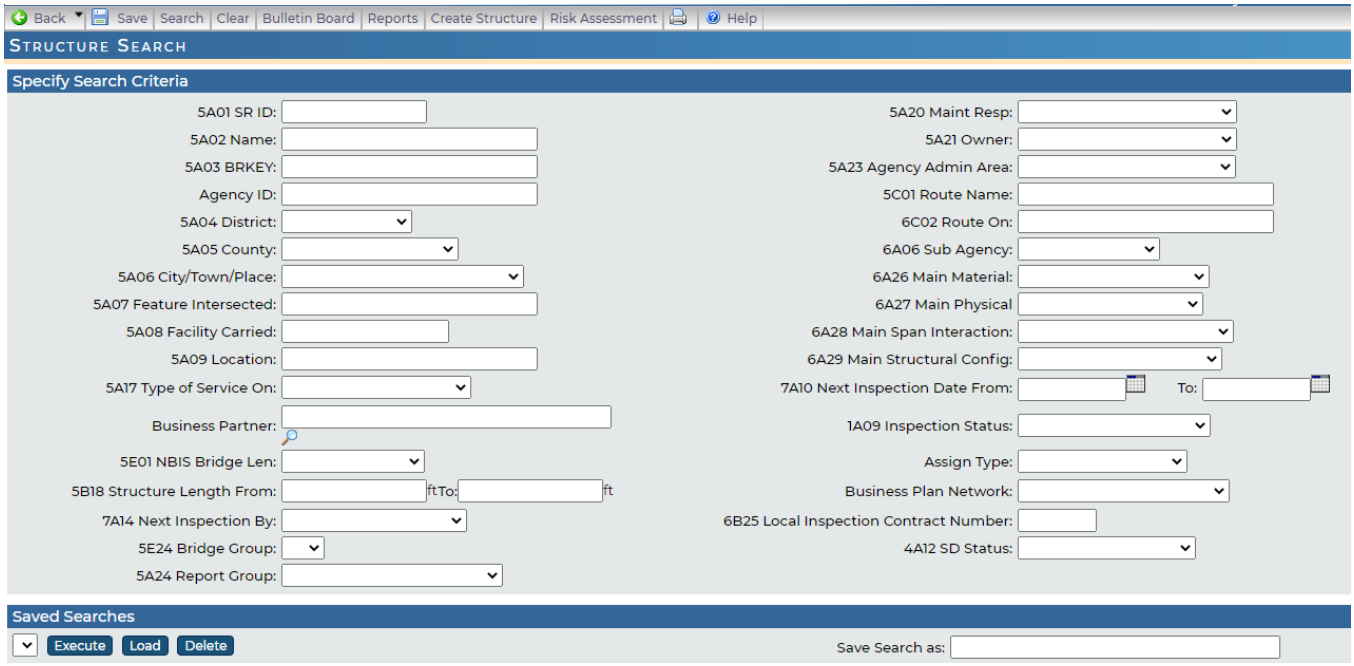


Figure 2.3.3.5-1 A Required Entry Field

2.3.4 Structure Search

Upon login the BMS2 application first displays the Quick Search and Links screen. Next to the Quick Search fields the Search Screen button will take the user to the Structure Search screen. The Structure Search screen provides the primary method for listing and selecting a structure in BMS2. Using the Go To functionality in the common header is another.



2.3.4-1 Structure Search Screen

To use the Structure Search to list one or more structures, the user performs the following steps:

1. Enter or select search criteria in at least one field.
2. Click the Search button in the header. A list of all structures available to the user that meet the entered search criteria is then displayed on the Structure List screen.
3. Click on the Clear button to clear the search fields.

2.3.4.1 Saved Searches

If you have a frequently requested search (e.g., District, Turnpike bridges in your District, a high-profile bridge, etc.), use the Saved Searches functionality to retain the search criteria for future use.

1. Complete the relevant fields in the Specify Search Criteria section as for a "normal" search.
2. Type a name for the search in the "Save Search as" field in the bottom right.
3. Click the Save button.
4. The search criteria is saved under the specified name in the Saved Searches dropdown list.

To invoke a saved search:

5. Select the desired search name from the Saved Searches dropdown list.
6. Click the Execute button. The user is taken to the Structure List to display the results for the selected saved search.
7. To refine the search criteria, highlight the saved search from the dropdown list and click the Load button. The criteria used in the selected named search is used to populate the Search Criteria fields. The criteria can then be modified for a single search or modified and saved to overlay the existing saved search.

To delete a saved search, select the search name in the Saved Searches dropdown list and click the Delete button.

2.3.5 Structure List

BMS2 users access the Structure List screen by executing an adhoc or saved search on the Structure Search screen. The Structure List displays the list of all structures available to the user that meet the specified search criteria.

For non-PennDOT users, the list of structures displayed on the Structure List screen only includes those structures to which the user's organization is assigned that meet the search criteria. For example, if a consultant user specifies Adams county (01) as the search criteria and the consultant Business Partner is only assigned as the Inspector for one structure in Adams county, only that one structure is displayed on the Structure List even though there is more than one structure in Adams county.

STRUCTURE LIST

Filter | SR ID | Go

Records 1 to 25 of 699 << < 1 2 3 4 5 6 7 8 9 10 ... 28 > >> Records Per Page: 25

BRKEY	SR ID	Structure Name	Structure Type	Service Type	Structure Length (ft)	Feature Intersected	Last Inspection
47147	01001500101955	VMS CENTERMOUNT	19948	S1	0	US 15 South	03/27/2018
2	01001500300000	1.25M N. MARYLAND LINE	42204	15	103	MIDDLE CREEK	11/12/2020
3	01001500310000	1.25 MI.N. OF MD.LINE	42206	15	101	MIDDLE CREEK	11/10/2020
4	01001500500000	2 MI N OF MARYLAND LINE	42406	15	149	MARSH CREEK	12/27/2018
5	01001500510000	2 MI. N. OF MARYLAND LINE	42204	15	150	MARSH CREEK	12/27/2018
6	01001500700986	3.5 MI. N. MARYLAND LINE	21931	15	16	TRIB MARSH CREEK	01/17/2017
7	01001501001849	S OF GETTYSBURG	21932	15	22	PLUM RUN	07/07/2020
9	01001501302809	2.5 MI S OF GETTYSBURG	31931	15	11	TRIB TO ROCK CREEK	02/21/2017
11	01001501312846	2.5 MI.S. OF GETTYSBURG	21932	15	11	TRIB ROCK CREEK	03/04/2019
12	01001501500000	SOUTH OF GETTYSBURG	42206	15	156	ROCK CREEK	02/19/2019
13	01001501510000	S OF GETTYSBURG	42204	15	154	ROCK CREEK	01/16/2019
14	01001501900000	US15 & PA 116 INTERCHANGE	42206	11	43	PA 116; SR 0116	01/14/2019
15	01001501910000	2 MI. E. OF GETTYSBURG	42206	11	43	PA 116; SR 0116	01/14/2019
16	01001502100000	2 MILES S.GETTYSBURG	31931	15	12	BRANCH OF ROCK CREEK	04/09/2019
17	01001502110000	2 MI. S. OF GETTYSBURG	21931	15	14	TRIB TO ROCK CREEK	04/09/2019
18	01001502300000	US 15 NB OVER RR	42204	12	92	CSX	05/25/2019
19	01001502310000	2 MI. N.E. GETTYSBURG	42207	12	88	CSX	05/25/2019
20	01001502403671	NE OF GETTYSBURG	21932	15	23	BRANCH ROCK CREEK	04/23/2019
21	01001502503319	1 1/2 MI. S. HUNTERSTOWN	21932	15	16	TRIB ROCK CREEK	04/23/2019
23	01001503101310	2 MI.N. OF PA 394	21931	15	16	TRIB CONEWAGO CREEK	06/20/2019
24	01001503300975	S OF HEIDLERSBURG	42206	15	167	CONEWAGO CREEK	06/11/2019
25	01001503311440	2 MI. S. OF HEIDLERSBURG	42206	15	167	CONEWAGO CREEK	06/11/2019
26	01001503401799	1.5 MI.S. OF HEIDLERSBURG	21931	15	11	TRIB CONEWAGO CREEK	06/14/2019
27	01001503900985	2 MI N OF HEIDLERSBURG	42206	15	104	BERMUDIAN CREEK	06/21/2019
28	01001503911269	N OF HEIDLERSBURG	42206	15	109	BERMUDIAN CREEK	06/21/2019

Records 1 to 25 of 699 << < 1 2 3 4 5 6 7 8 9 10 ... 28 > >> Records Per Page: 25

Figure 2.3.5-1 Structure List

To access the Structure Home page from the Structure List screen:

1. Click on the BRKEY or SR ID number links in the first or second column for the structure to be accessed.
2. User is taken to the Structure Home screen for that structure.

The Structure List screen includes several functions that allow the user to customize the displayed list:

- Column Sort – The column headings for each column are active links that allow the user to sort the displayed list by the corresponding column values. Simply click the column header link to sort the list in ascending or descending order; click the link again to sort the opposite direction.
- Number of Records per Page – The user can adjust the number of records displayed on each page by changing the selected value in the Records Per Page dropdown.
- Jump to a Particular Page – In the header and footer bands for the Structure List itself the screen displays links corresponding to the total number of pages for the list. Click any of the specific page numbers to jump directly to that page.
- Filter – To filter the displayed list beyond the criteria specified on the Structure Search screen, select Filter in the first dropdown below the screen title, select the column to be used as the filter in the second dropdown, and enter the filter criteria in the field provided. Note that for a filter the entered field value must be an exact match – partial filter values are not supported. Click the Reset button to return to the full list.
- Search – To search the structure list for a particular field value, select Search in the first dropdown below the screen title, select the column to be used for the search in the second dropdown, and enter the search

text in the field provided. This search function takes the user to the first Structure List page on which the search string is found (it does not scroll to the exact record).

2.4 Inventory Screens

2.4.1 Structure Home

The Structure Home screen serves as the "home page" for a structure. The Structure Home screen is the first screen accessed using the BRKEY link on the Structure List screen. In addition to providing links to all of the inventory and inspection screens and data for a structure, this screen is also used to view and maintain the NBI structure inventory information.

This screen presents structure inventory information from the ID/Admin, Design and Classification fields. This screen also displays the structure-level Notes field.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

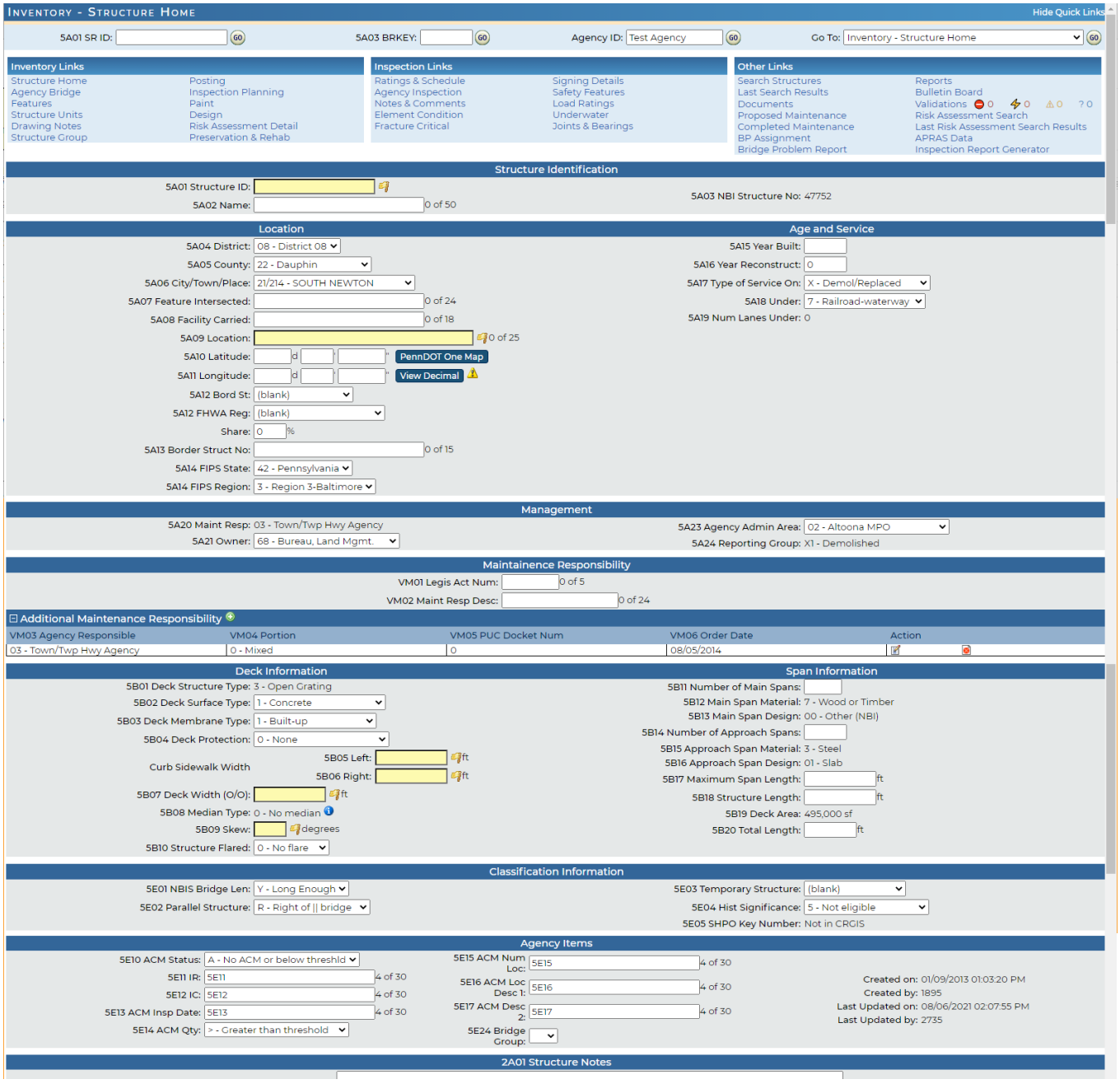


Figure 2.4.1-1 Structure Home Screen

2.4.1.1 Local Bridge Inventory Application

The Local Bridge Inventory Application (LBI) is an iOS application used to inventory and inspect locally owned non-NBIS by Department Staff. The application is available through the App Store on PennDOT iOS devices. Similar to BMS3, users download bridges to their device and then complete an inspection of the bridge. Within the app, users can add photographs and captions as well as narrative notes. Coding guidance for the narrative fields is provided in Chapter 3, Section LB.

On the Structure Home screen, the narrative fields that are used by the LBI appear near the bottom of the screen between the Agency Items and 2A01 Structure Notes sections. These fields will only appear on structures that are locally owned and marked as non-NBIS. Each of these fields can be edited within the LBI or in BMS2. While changes made in the LBI can be sent to BMS2 and viewed immediately, changes made in BMS2 require the overnight batch process to occur before the changes will be visible within the App.

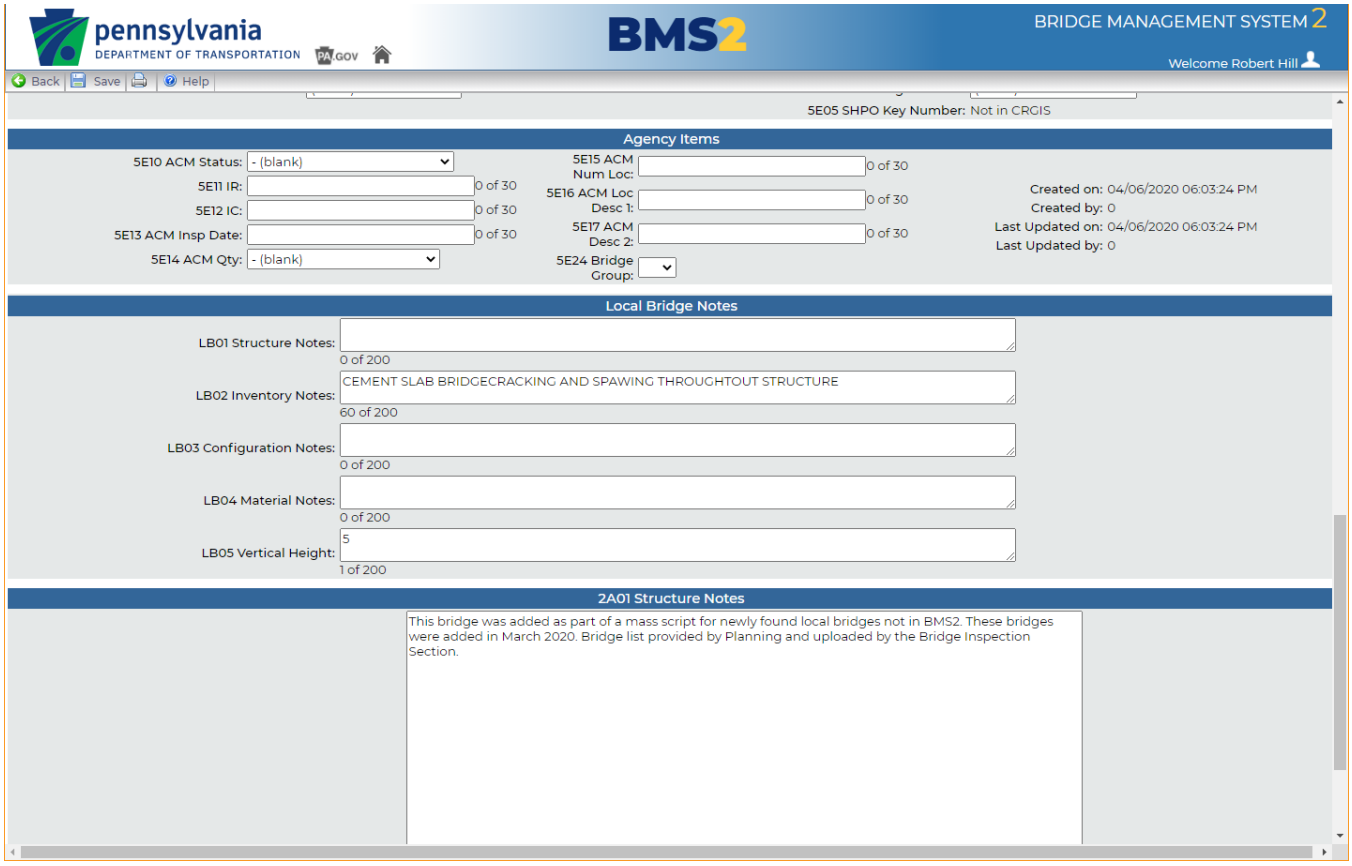


Figure 2.4.1.1-1 Local Bridge Inventory Fields

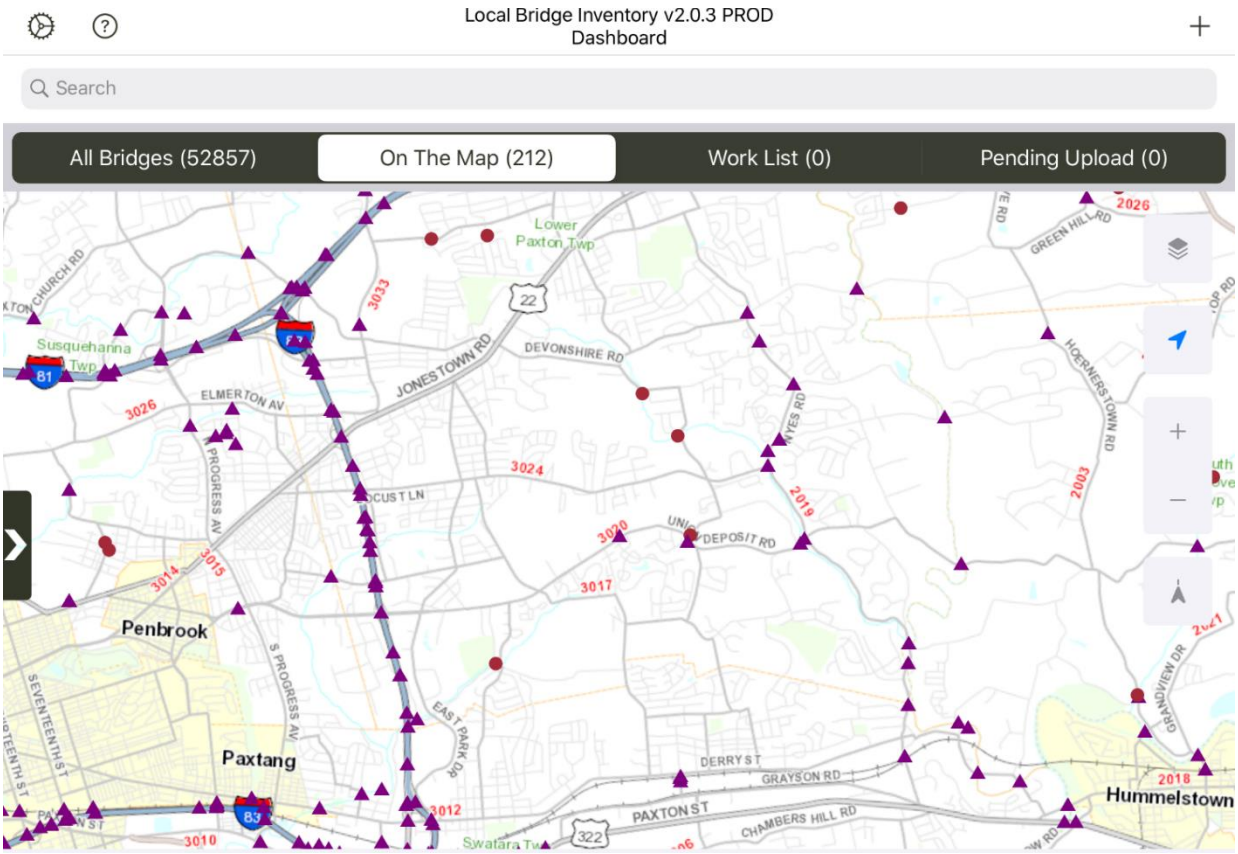


Figure 2.4.1.1-2 Local Bridge Inventory Landing Screen

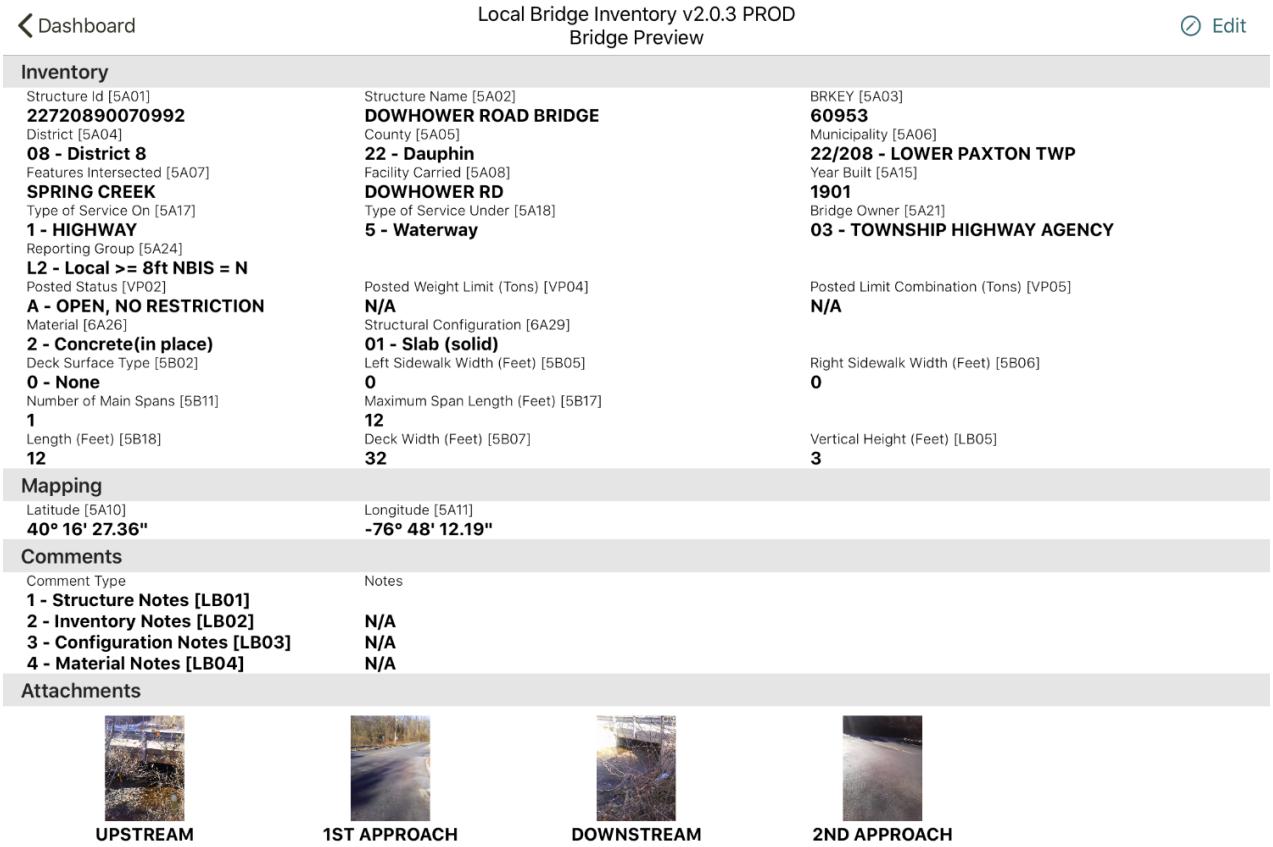


Figure 2.4.1.1-3 Local Bridge Inventory Input Screen

2.4.2 Agency Bridge

The Agency Bridge screen is used to view and maintain structure inventory information from the Agency/Bridge fields. These fields are PennDOT-specific inventory fields.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

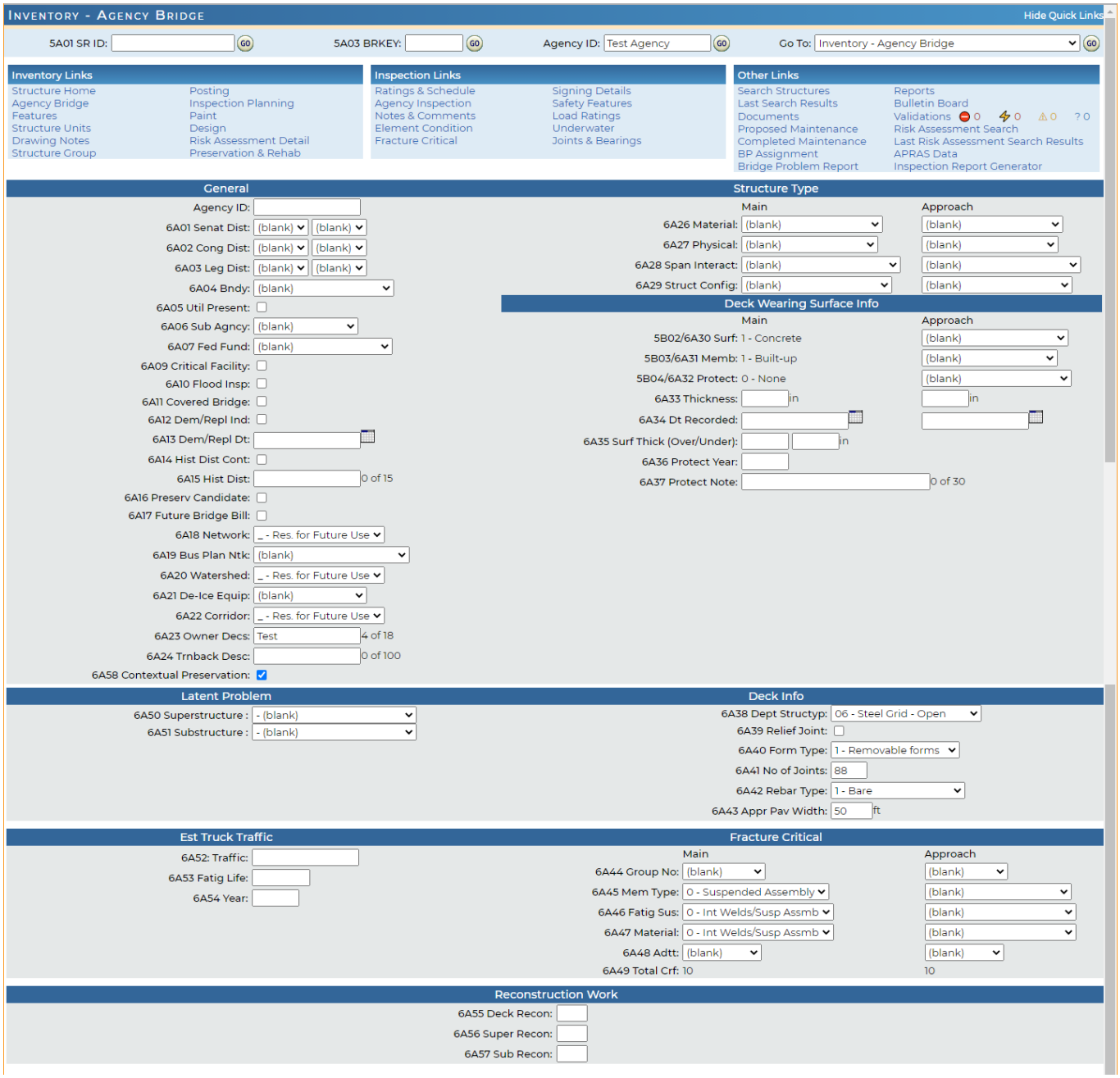


Figure 2.4.2-1 Agency Bridge Screen

2.4.3 Features Intersected

2.4.3.1 Features Intersected List

The Features Intersected List screen lists all of the intersecting features – highways, waterways, railroads, other features, and utilities – for a specific structure. The Features Intersected screen combines the display of highway and non-highway features in a single list separated by feature type.

Each list section on this screen displays data characteristics of the corresponding feature type. Feature data cannot be directly edited on this screen – the user must select one of the displayed features and proceed to a corresponding detail screen to edit data (assuming the user has the necessary security authorization).

In edit mode, the header for each feature list contains a Create link. Clicking on the link allows users to create a new feature of the corresponding type (highway, waterway, etc.). Each feature in the list also has two links, Edit and Remove, which allow users to view and edit the feature detail data or remove the feature, respectively.

In view mode, each includes a single View link to access the corresponding detail screen.

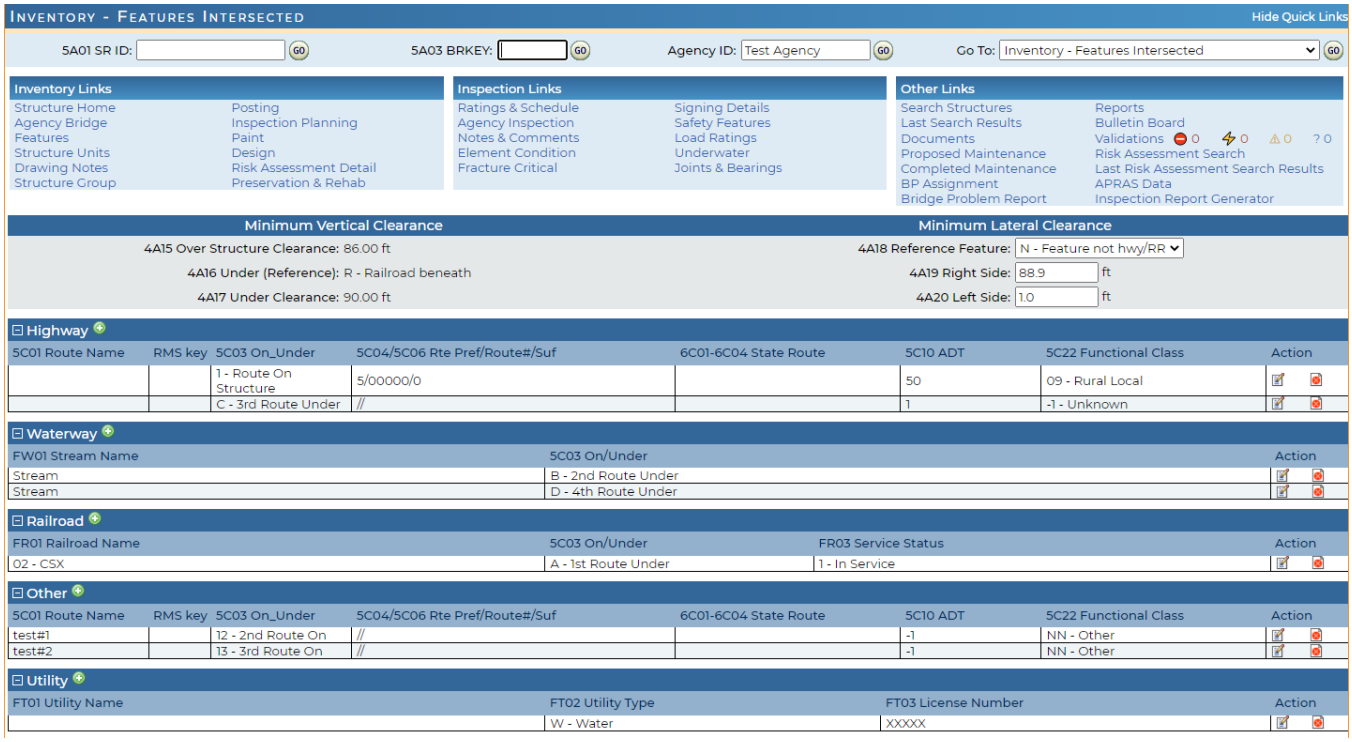


Figure 2.4.3.1-1 Features Intersected List

2.4.3.2 Highway Detail

The Highway Detail screen allows users to view and maintain detail information about a specific highway associated with a structure. This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

In addition to the standard Back, Save, and Save & Exit buttons, this screen also provides a Delete button to remove the currently displayed highway, a New button to create a new highway, and Previous and Next buttons that allow the user to display the previous or next highway in the list.

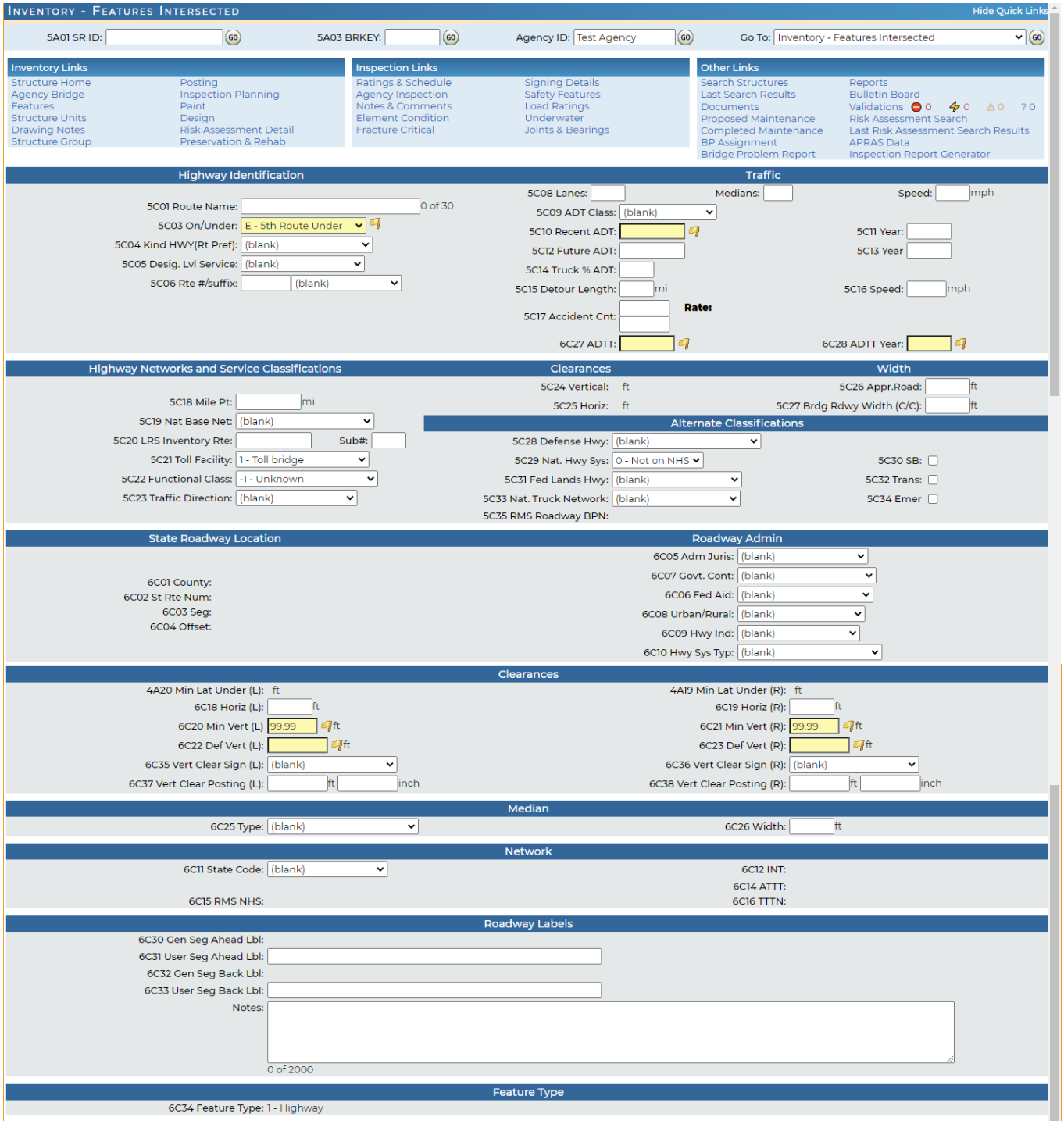


Figure 2.4.3.2-1 Highway Detail Screen

2.4.3.3 Waterway Detail

The Waterway Detail screen allows users to view and maintain detail information about a specific waterway associated with a structure. This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

In addition to the standard Back, Save, and Save & Exit buttons, this screen also provides a Delete button to remove the currently displayed waterway, a New button to create a new waterway, and Previous and Next buttons that allow the user to display the previous or next waterway in the list.

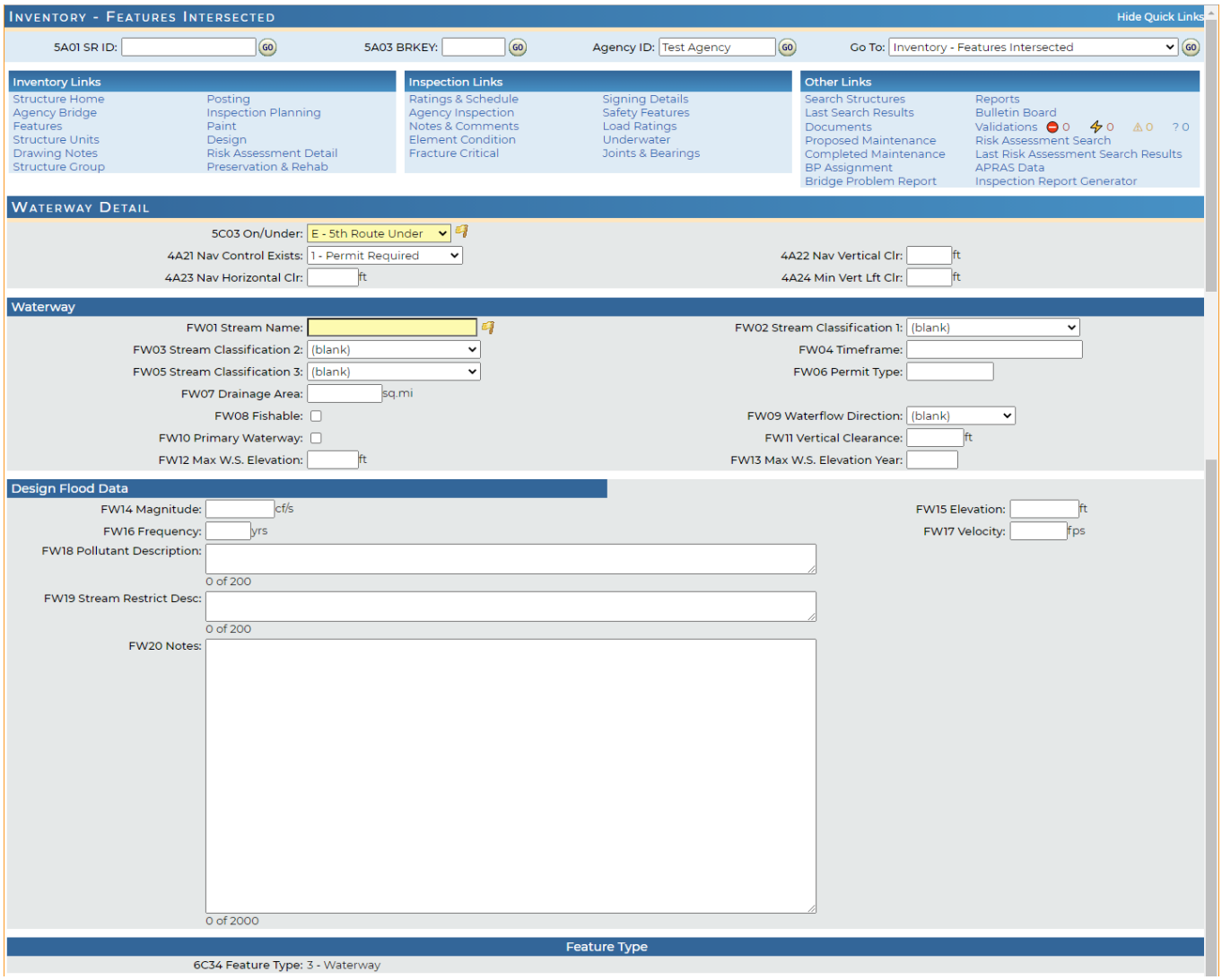


Figure 2.4.3.3-1 Waterway Detail Screen

2.4.3.4 Railroad Detail

The Railroad Detail screen allows users to view and maintain detail information about a specific railroad associated with a structure. This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

In addition to the standard Back, Save, and Save & Exit buttons, this screen also provides a Delete button to remove the currently displayed railroad, a New button to create a new railroad, and Previous and Next buttons that allow the user to display the previous or next railroad in the list.

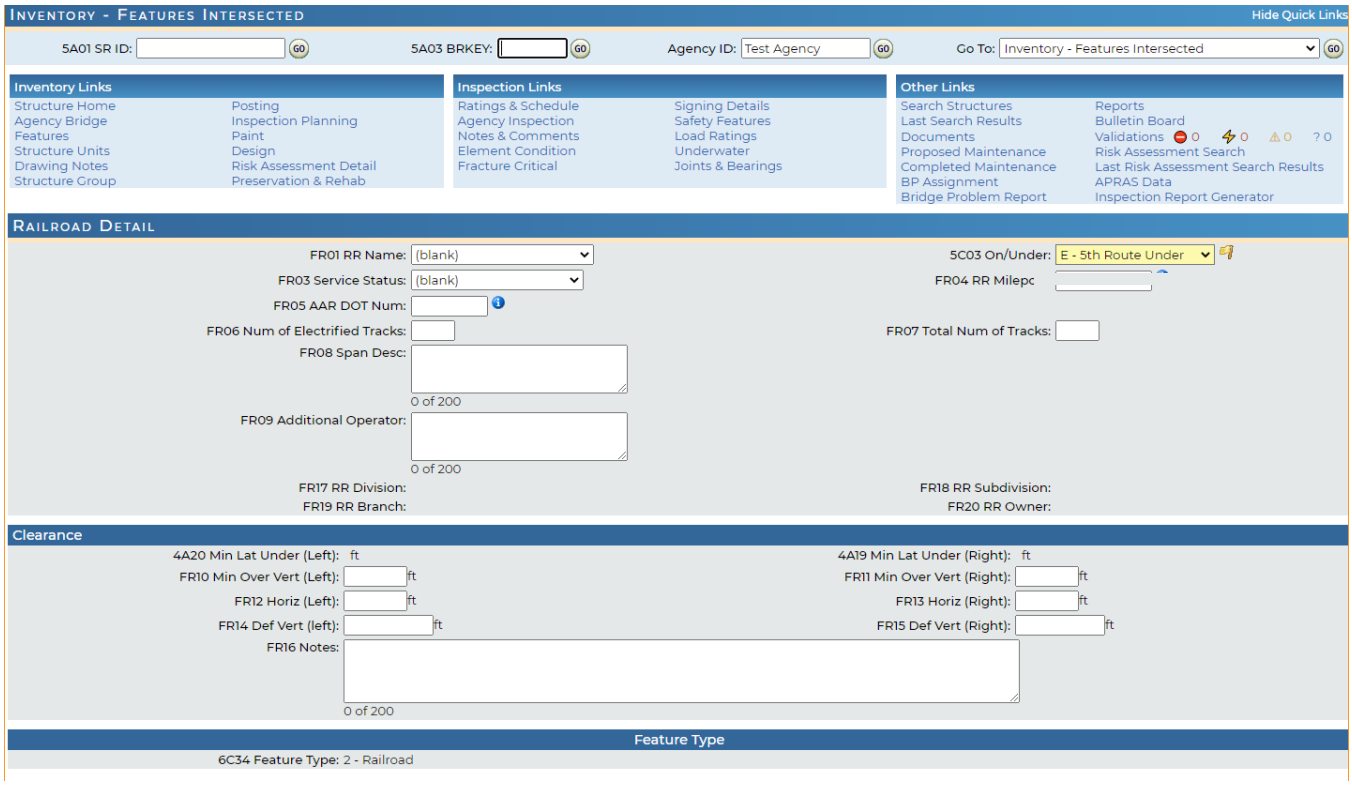


Figure 2.4.3.4-1 Railroad Detail Screen

2.4.3.5 Utility Detail

The Utility Detail screen allows users to view and maintain detail information about a specific utility associated with a structure. This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

In addition to the standard Back, Save, and Save & Exit buttons, this screen also provides a Delete button to remove the currently displayed utility, a New button to create a new utility, and Previous and Next buttons that allow the user to display the previous or next utility in the list.

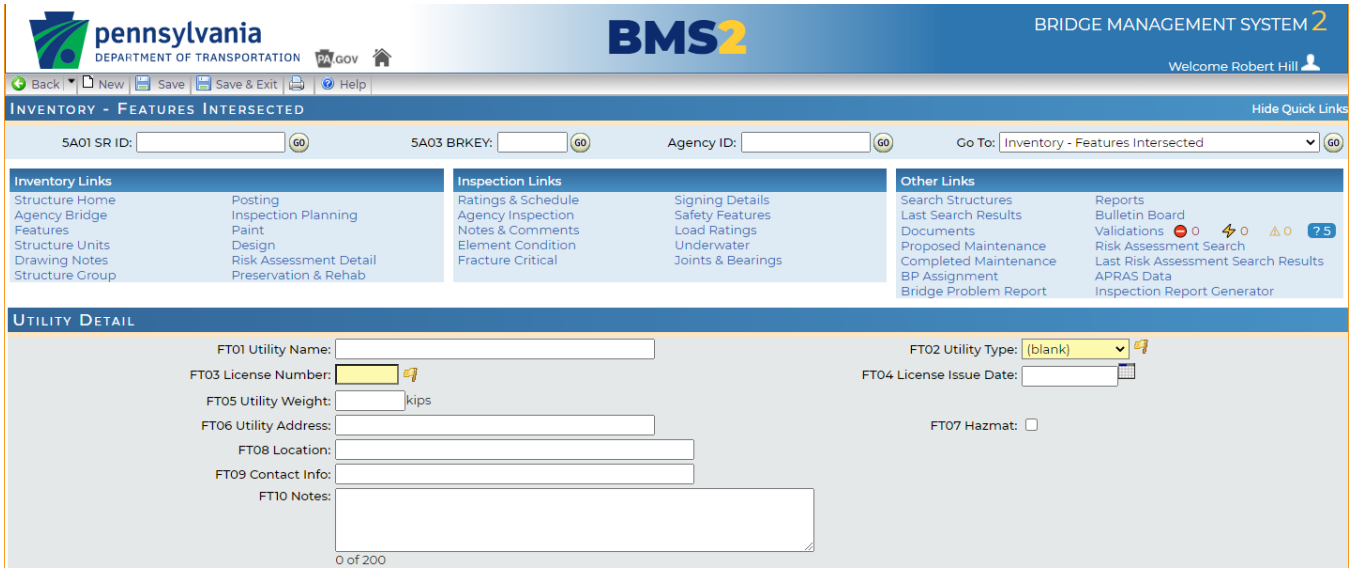


Figure 2.4.3.5-1 Utility Detail Screen

2.4.3.6 Other Detail

The Other Detail screen allows users to view and maintain detail information about a feature other than a highway, railroad, and waterways that are not open to public traffic should be coded as "Other." Examples of these features include private roads, pedestrian/bike routes, trails, canal towpaths, golf cart paths, airport runway, parking lot, conveyors, wildlife underpasses, wharfs, bluffs, etc. This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

In addition to the standard Back, Save, and Save & Exit buttons, this screen also provides a Delete button to remove the currently displayed highway, a New button to create a new highway, and Previous and Next buttons that allow the user to display the previous or next highway in the list.

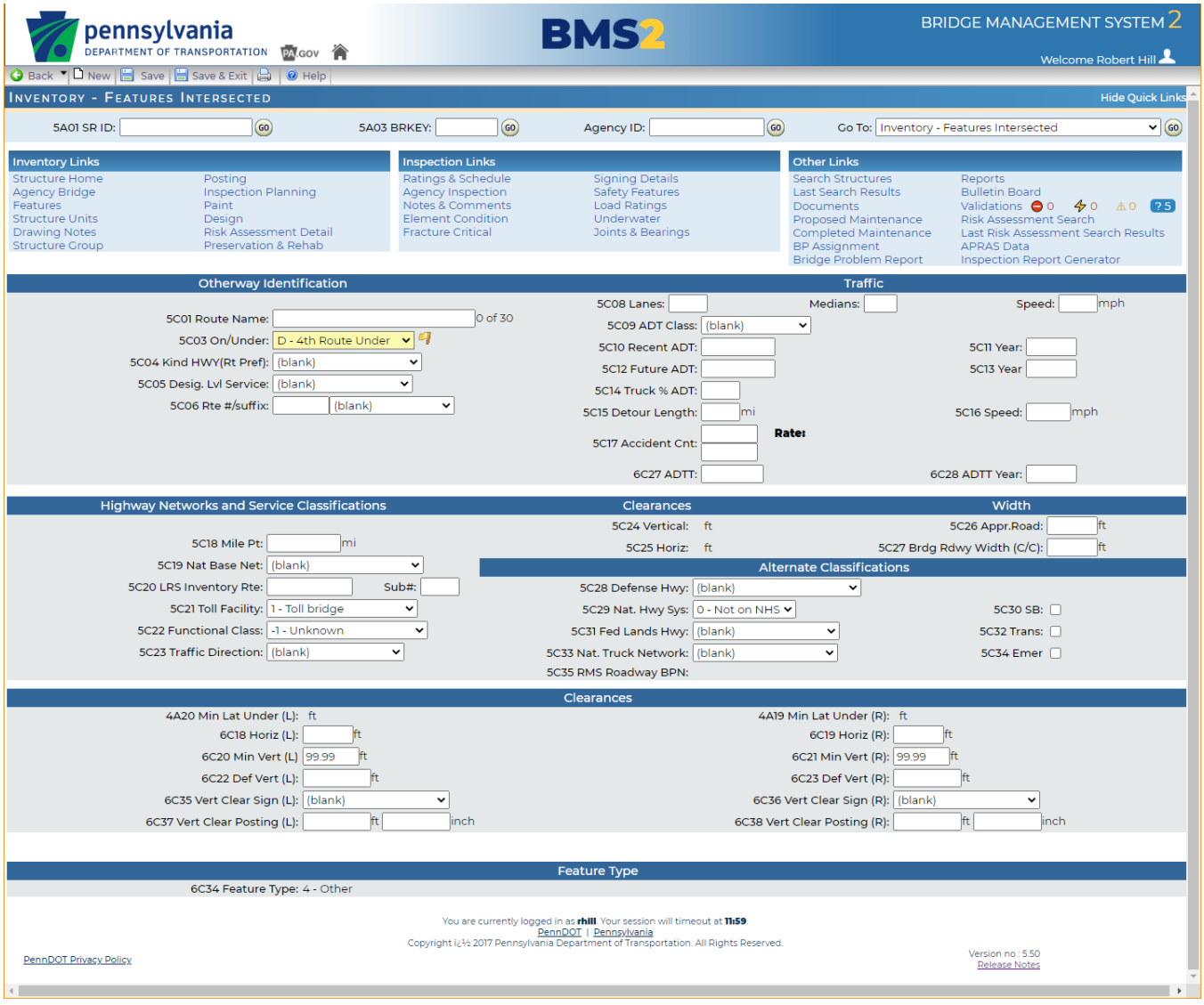


Figure 2.4.3.6-1 Other Detail Screen

2.4.4 Structure Units

2.4.4.1 Structure Unit / Span List

The Structure Unit / Span List screen allows users to view and maintain the individual structure units for a structure. This screen displays a list of structure units for the current structure sorted by structure unit type.

Structure units are typically main and approach spans, piers, abutments, wing walls, etc. Previously, structures in BMS2 also had a Frame structure unit that represents the composite of all main and approach spans. During an BMS3 inspection, the element condition data was automatically rolled up to the Frame. **This screen does not allow a Frame structure unit to be deleted.**

This screen can be accessed in Edit mode by authorized users. In Edit mode, an Add link is provided for users to create a new structure unit. Each structure unit in the list also has two links, Edit and Remove, which allow users to view and edit the structure unit detail data or remove the structure unit, respectively.

In view mode, each item includes a single View link to access the corresponding Detail screen.

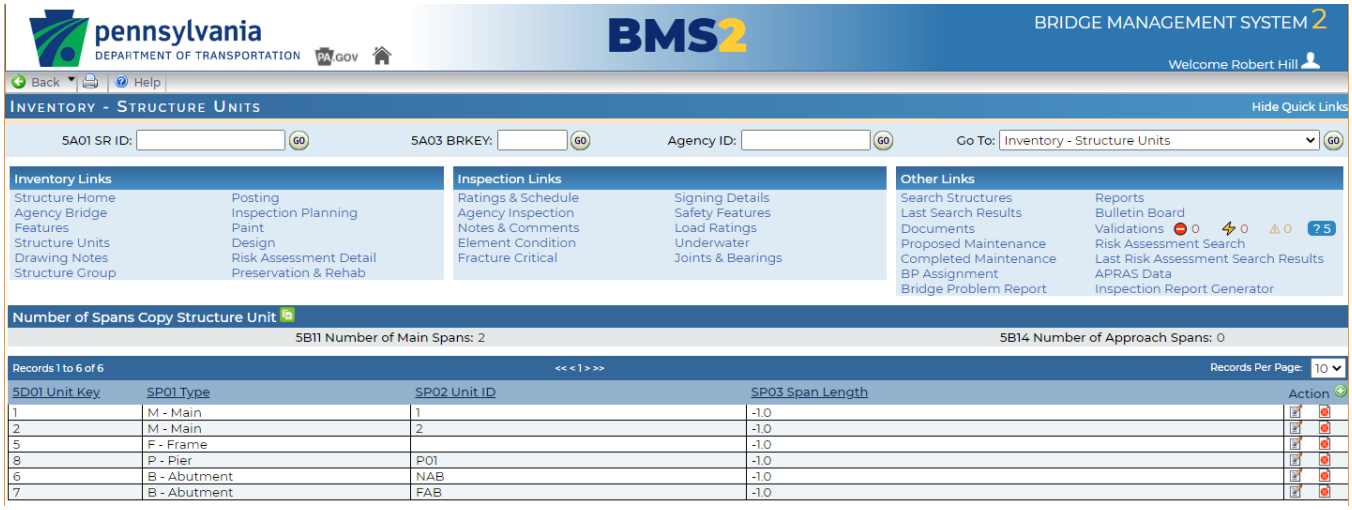


Figure 2.4.4.1-1 Structure Unit / Span List Screen

2.4.4.2 Structure Unit / Span Detail

The Structure Unit / Span Detail screen allows users to view and edit detailed information for a structure unit and to enter information for new structure units. Most of the fields apply only to Main and Approach span structure units. If the user attempts to enter Items SP03 – SP10 or Item 5D05 and the selected structure unit type is not Main Span or Approach Span, an error message is displayed.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

In addition to the standard Back, Save, and Save & Exit buttons, this screen also provides a Delete button to remove the currently displayed structure unit, a New button to create a new structure unit, and Previous and Next buttons that allow the user to display the previous or next structure unit in the list.

Users cannot create additional main or approach span structure units if the resulting number of spans will exceed the sum of the main and approach span values entered on the Structure Home screen (the sum of the SPANS and APRASPANS in the BRIDGE table). Also, users cannot create or remove Frame or APRAS Span structure unit types.

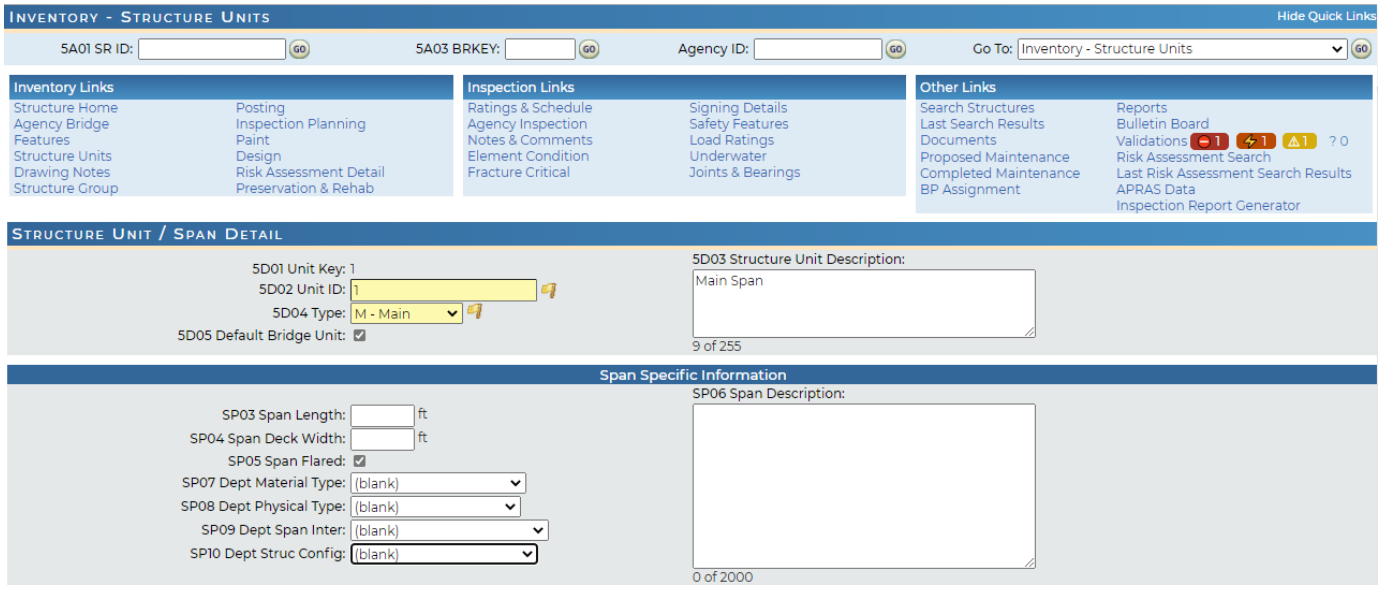


Figure 2.4.4.2-1 Structure Unit / Span Detail Screen

2.4.5 Drawing Notes

2.4.5.1 Drawing General Information and List

The Drawing Notes screen allows users to view and maintain detailed information for drawings and high-level design information. Items VN01 - VN04 can be modified directly on the screen and saved to the BMS2 Database using the Save button.

This screen also provides a list of drawings associated with the structure. Although displayed as separate Design, Shop, and Repair drawings previously, this screen now displays all drawing types together in a single Items VN05 - VN07 Drawing Type list. Detail data for these drawing list items cannot be directly edited on this screen – the user must select one of the displayed items and proceed to a corresponding Detail screen to edit data (assuming the user has the necessary security authorization).

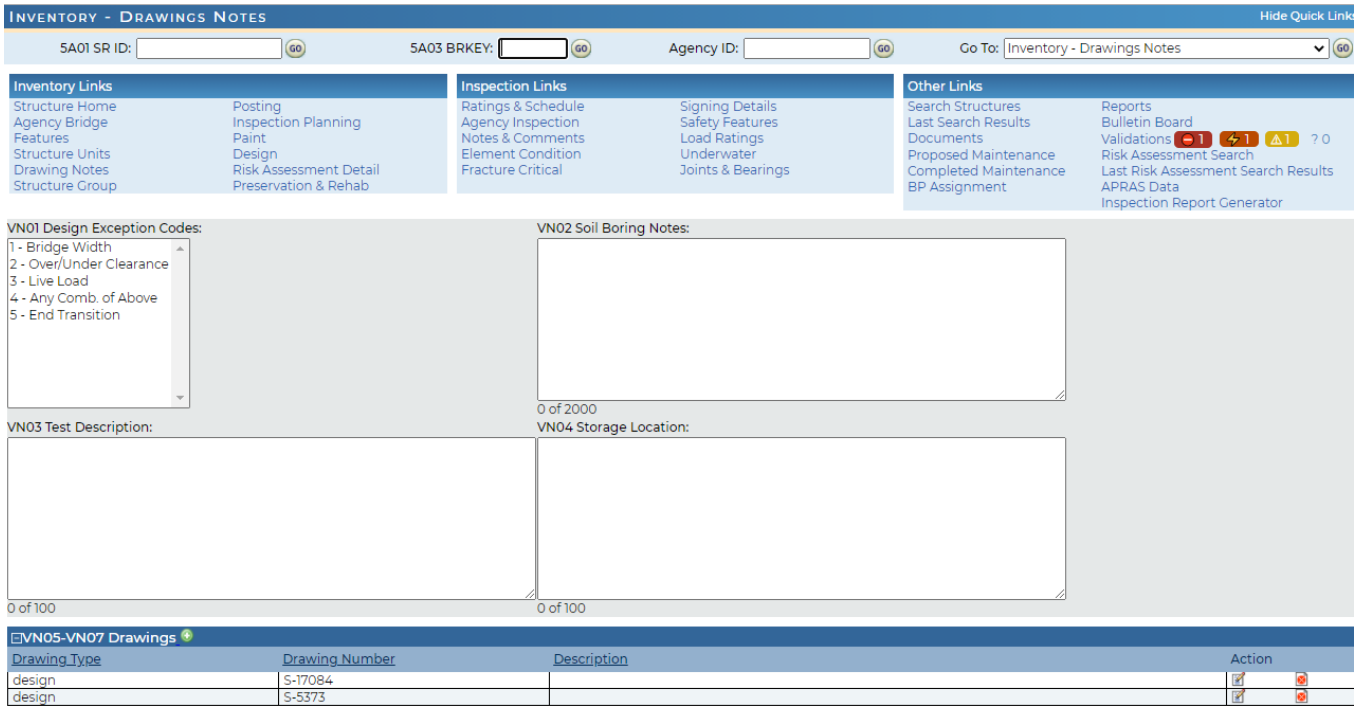


Figure 2.4.5.1-1 Drawing Notes Screen

In edit mode, an Add link is provided for users to create a new design, shop, or repair drawing. Each drawing in the list also has two links, Edit and Remove, which allow users to view and edit the drawing detail data or remove the drawing, respectively.

In view mode, each item includes a single View link to access the corresponding Detail screen.

2.4.5.2 Drawing Detail

The Drawing Detail screen allows users to view and maintain detailed information about design, repair, and shop drawings for a structure.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next drawing in the list. The Save button saves any modified fields to the BMS2 database. The New and Delete buttons are used to add a new drawing record or remove the current drawing, respectively.

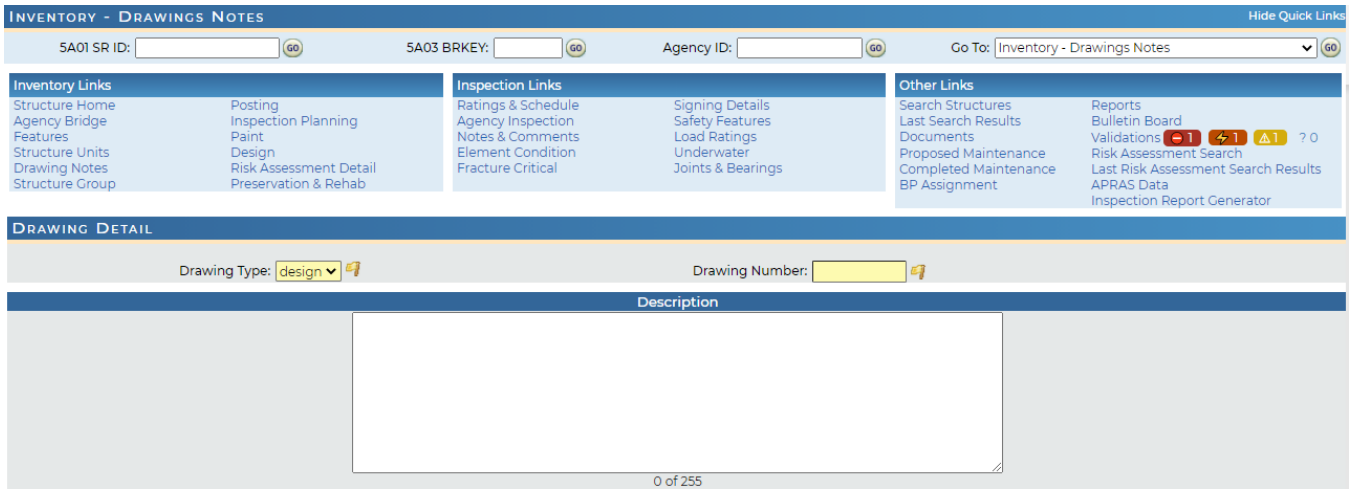


Figure 2.4.5.2-1 Drawing Detail Screen

2.4.6 Posting

2.4.6.1 Posting List

The Posting screen allows users to view the current active posting information for a structure. A "posting history" record list is maintained on this screen for each time the user adds a new posting status that has a different Status Date, Posting Status, Special Restrictive Posting, any of the Posted Weight Limits, or other Posting field (Items VP01 through VP10) and saves the information. After a posting record is added to BMS2 and saved, it cannot be edited.

This screen can be accessed in Edit mode by authorized users. In Edit mode, an Add link is provided for users to create a new posting status. Each posting status in the list also has two links, View and Remove, which allow users to view the posting status detail data or remove the posting status (only by authorized users), respectively.

In view mode, each item includes a single View link to access the corresponding Detail screen.

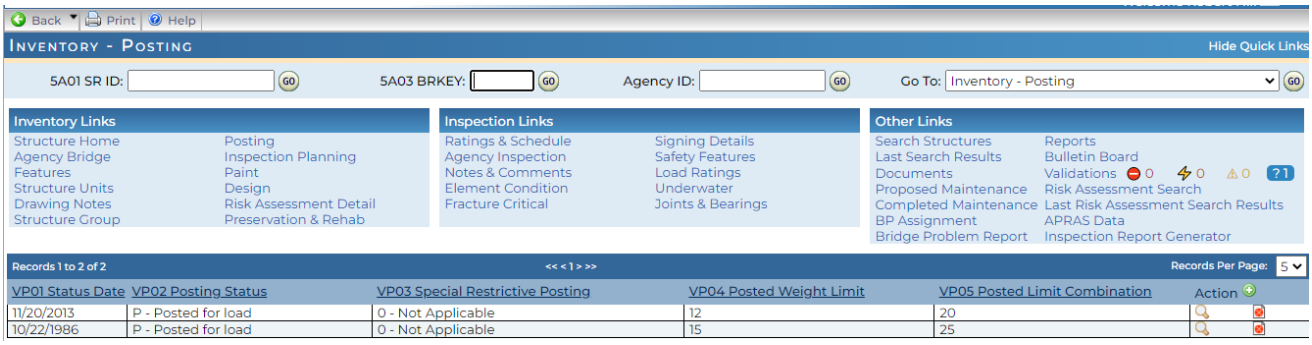


Figure 2.4.6.1-1 Posting Screen

2.4.6.2 Posting Detail

The Posting Detail screen allows users to view detail information about a specific posting status of the bridge. Users can view both past and current posting statuses.

This screen can be accessed in Edit mode by authorized users. Data on this screen cannot be edited by the user, only viewed.

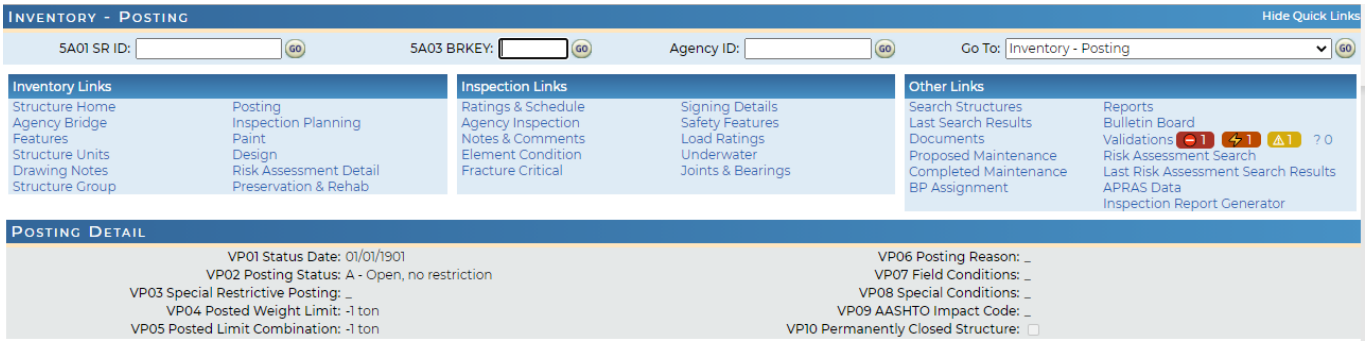


Figure 2.4.6.2-1 Posting Detail Screen

2.4.7 Inspection Planning

2.4.7.1 General Information and Lists

The Inspection Planning screen allows users to view and maintain information that is useful for planning the inspections for a structure. This screen presents general inspection planning information corresponding to the inspection planning Items VI01 – VI11.

Below the general inspection planning information are two list sections, one for Equipment and one for Permits. Detail data for these list items cannot be directly edited on this screen – the user must select one of the displayed items and proceed to a corresponding Detail screen to edit data (assuming the user has the necessary security authorization).

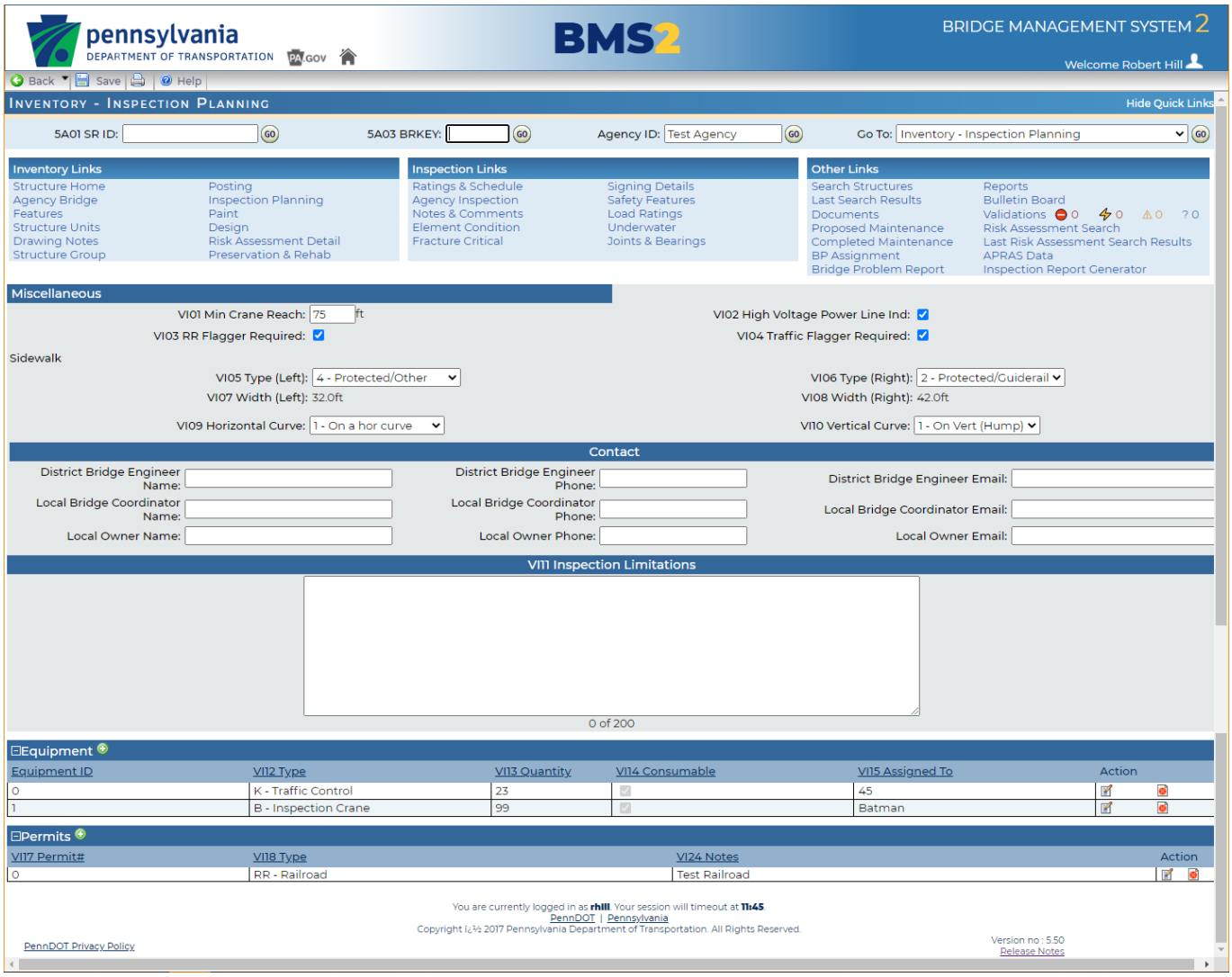


Figure 2.4.7.1-1 Inspection Planning Screen

In edit mode, the header for each list section contains a Create link. Clicking on the link allows users to create a new equipment or permit item. Each list item also has two links, Edit and Remove, which allow users to view and edit the corresponding detail data or remove the item, respectively. In view mode, each list item includes a single View link to access the corresponding Detail screen.

2.4.7.2 Equipment Detail

The Equipment Detail screen allows users to maintain detail information about equipment used for inspection of the structure.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next equipment record in the list. The Save button saves any modified fields to the BMS2 database. The New and Delete buttons are used to add a new equipment record or remove the current equipment record, respectively.

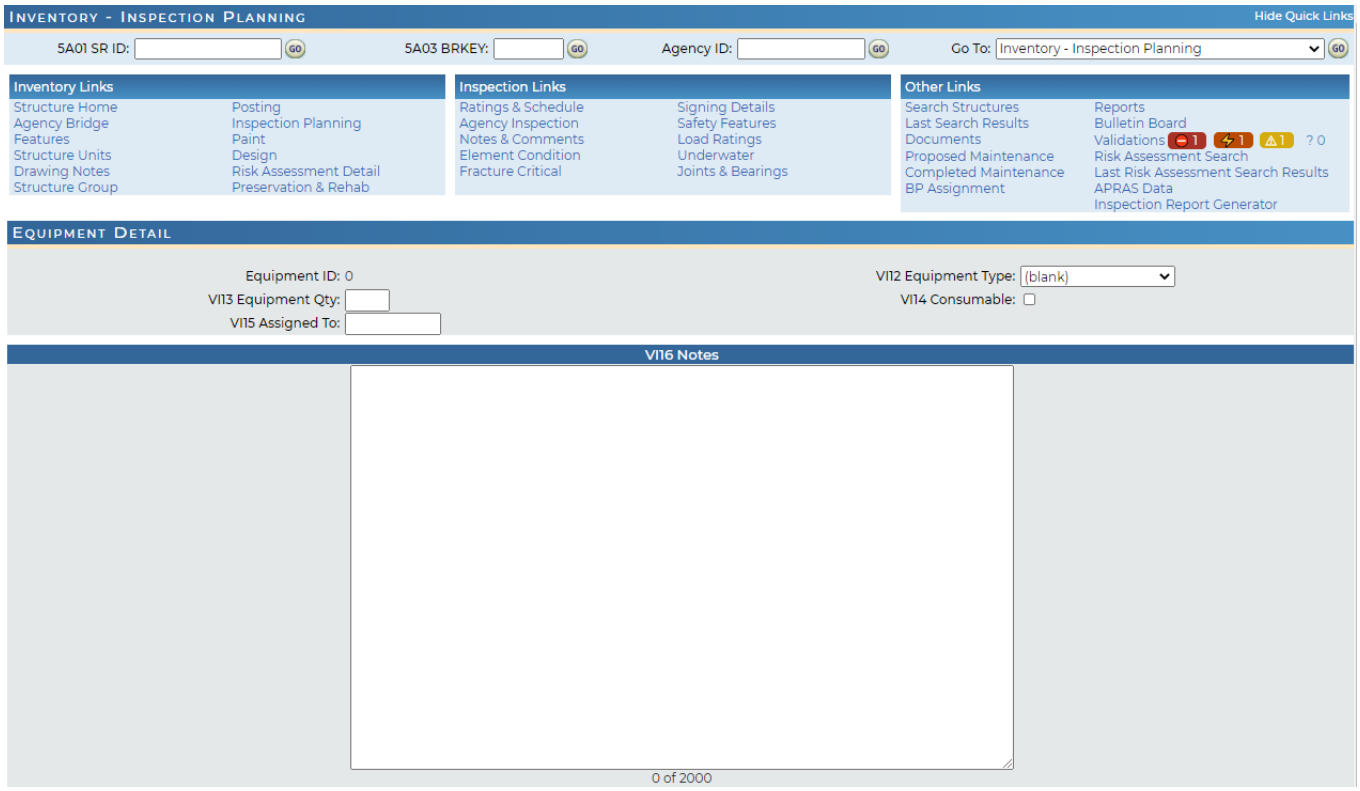


Figure 2.4.7.2-1 Equipment Detail Screen

2.4.7.3 Permit Detail

The Permit Detail screen allows users to maintain detail information about permits that may be required for inspection of the structure.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next permit record in the list. The Save button saves any modified fields to the BMS2 database. The New and Delete buttons are used to add a new permit record or remove the current permit record, respectively.

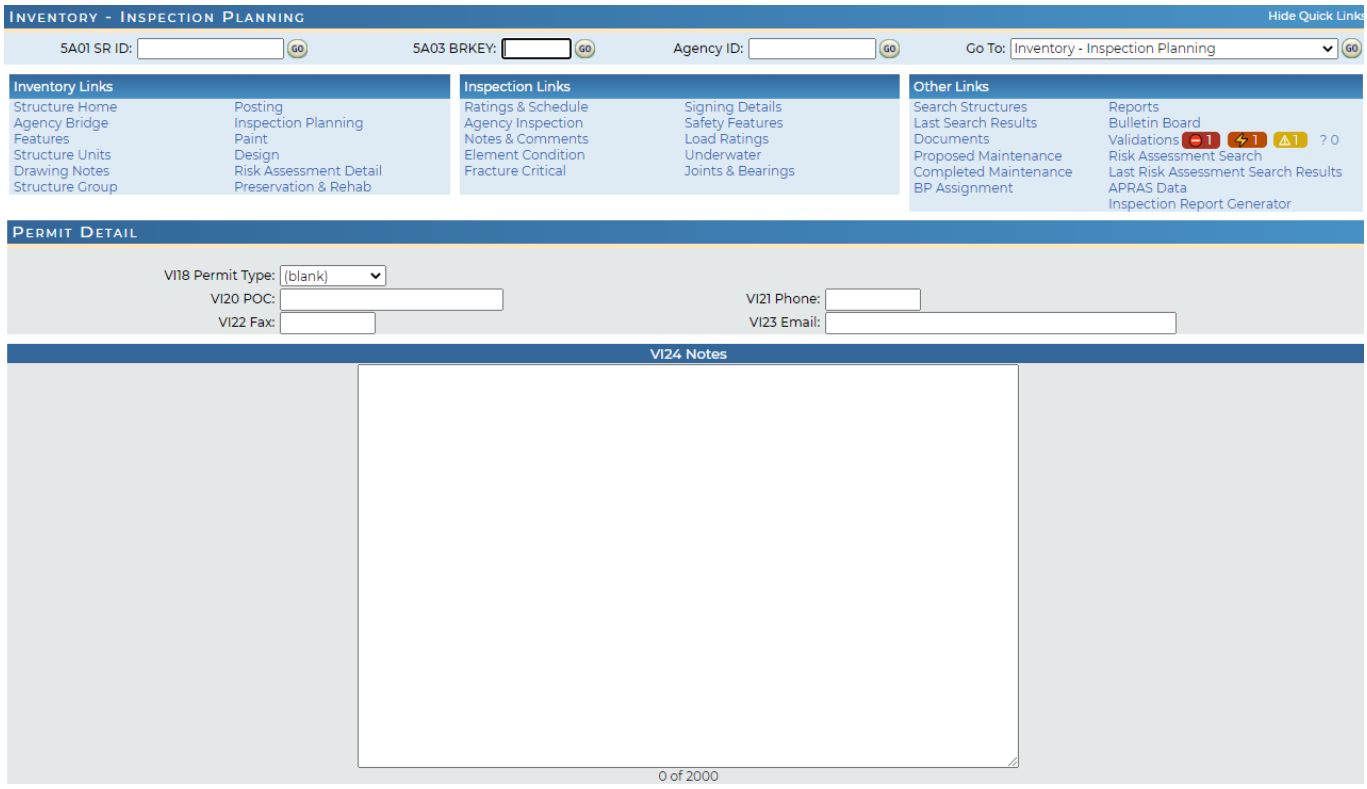


Figure 2.4.7.3-1 Permit Detail Screen

2.4.8 Design

2.4.8.1 Design Information and Lists

The Design screen allows users to view and maintain design-related information for a structure.

This screen presents information related to different aspects of the structure design such as superstructure, substructure, culvert, etc. All information on this screen, with the exception of the substructure pier type, culvert, and expansion joint list sections, can be edited and saved to the BMS2 database using the Save button.

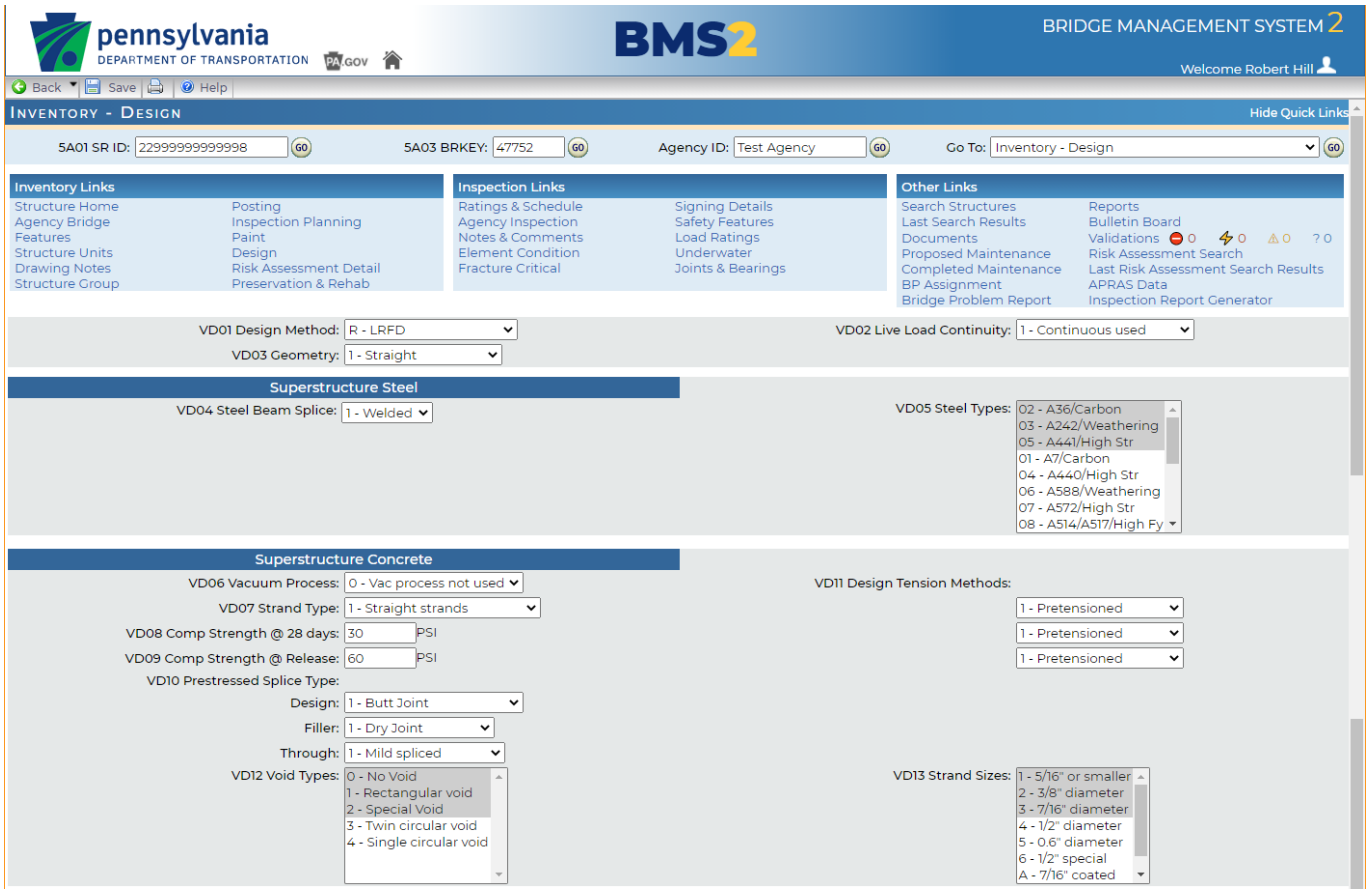


Figure 2.4.8.1-1 Inventory Design Screen – Part 1

The Inventory Design screen includes list sections for Substructure Pier Type, Culvert, and Expansion Joint, which each have corresponding detail screens for editing. Each list section displays data characteristics of the corresponding list item. Detail data for these list items cannot be directly edited on this screen – the user must select one of the displayed items and proceed to a corresponding Detail screen to edit data (assuming the user has the necessary security authorization).

In edit mode, the header for each list section contains a Create link. Clicking on the link allows users to create a new item of the corresponding type (pier type, culvert opening, etc.). Each list item also has two links, Edit and Remove, which allow users to view and edit the corresponding detail data or remove the item, respectively.

In view mode, each list item includes a single View link to access the corresponding Detail screen.

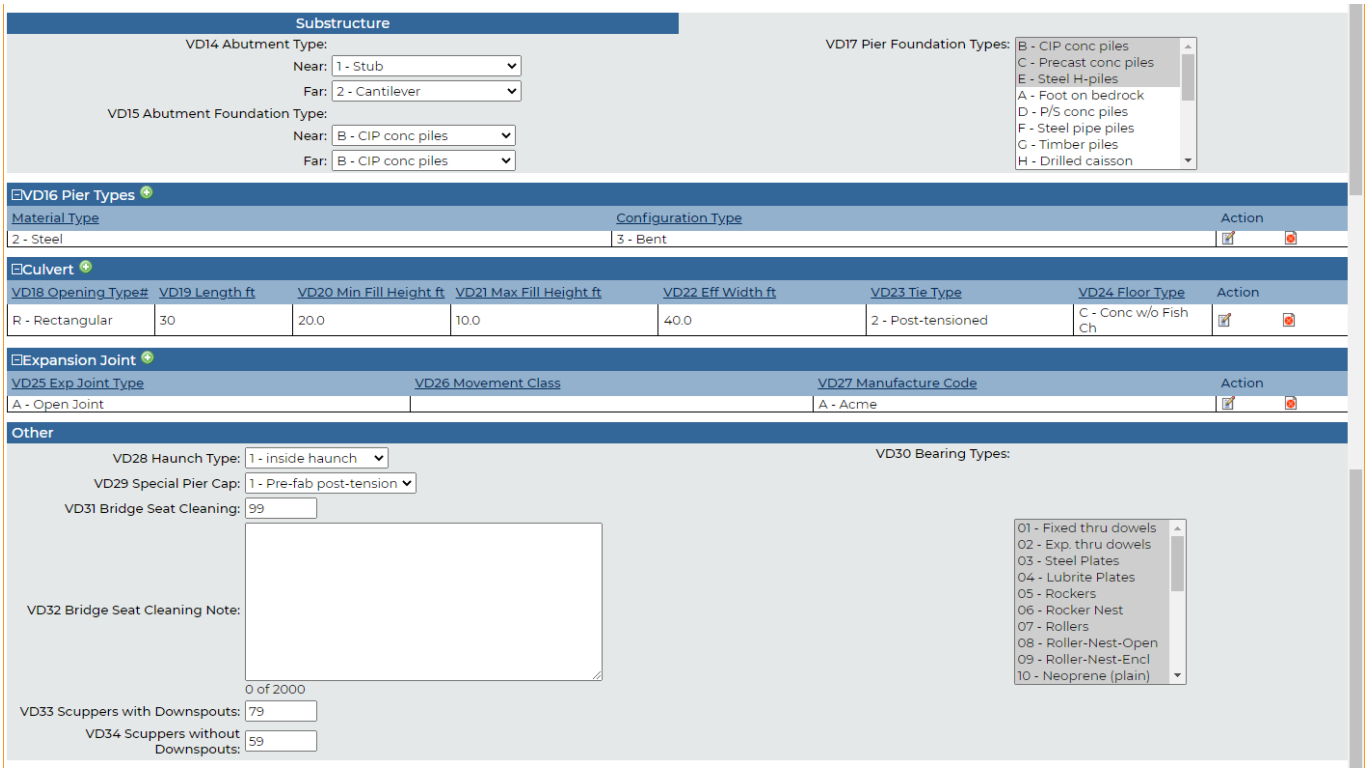


Figure 2.4.8.1-1 Inventory Design Screen – Part 2

Multi-Select Fields

The Design screen provides multi-selection fields that allow users to choose more than one selection in a drop down. Multi-selection fields are provided for Items VD05, VD12, VD13, VD17, and VD30. To highlight multiple items in the Multi-Select fields use the standard Windows procedure for multi-selection:

1. Hold down the Ctrl Key while clicking on your desired selections in the list using the left mouse button.
2. When complete, click Save at the top of the screen.
3. When saved the chosen selections are highlighted and displayed at the top of the dropdown list, out of sequence with the remainder of the selection items.

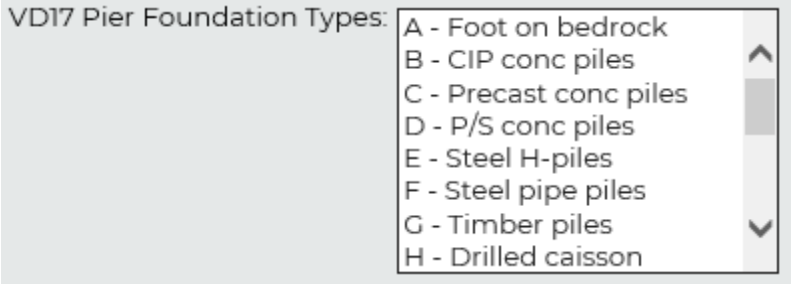


Figure 2.4.8.1-3 A Multi-Select Field

2.4.8.2 Design - Pier Type Detail

The Pier Type Detail screen allows users to view and maintain detailed information about substructure pier types associated with a structure.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next pier type in the list. The Save button saves any modified fields to the BMS2 database. The New and Delete buttons are used to add a new pier type record or remove the current pier type record, respectively.

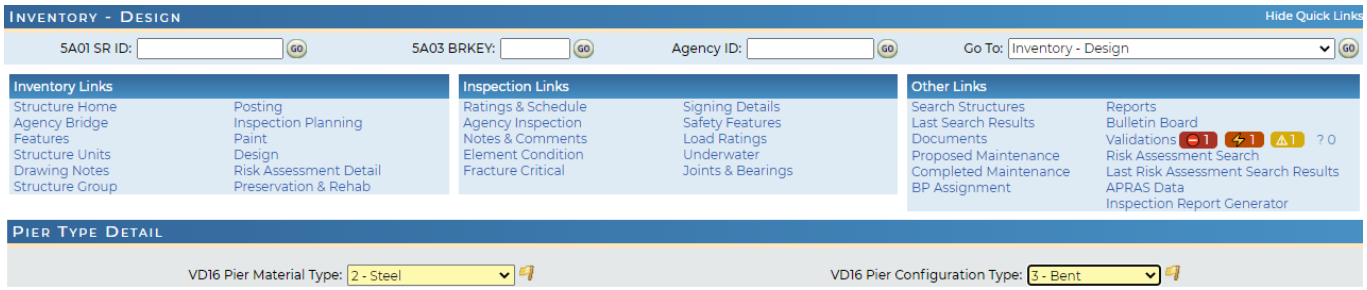


Figure 2.4.8.2-1 Pier Type Detail Screen

2.4.8.3 Design - Culvert Detail

The Culvert Detail screen allows users to view and maintain detailed information about culvert openings associated with the structure.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next culvert opening in the list. The Save button saves any modified fields to the BMS2 database. The New and Delete buttons are used to add a new culvert opening record or remove the current culvert opening record, respectively.

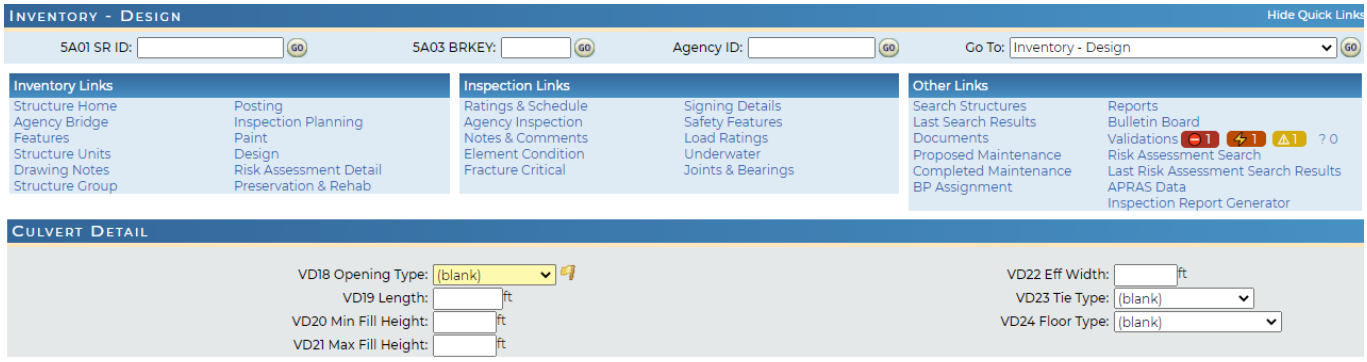


Figure 2.4.8.3-1 Culvert Detail Screen

2.4.8.4 Design - Expansion Joint Detail

The Expansion Joint Detail screen allows users to view and maintain detailed information about expansion joints associated with a structure.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next expansion ioint in the list. The Save button saves any modified fields to the BMS2 database. The New and Delete buttons are used to add a new expansion joint record or remove the current expansion joint record, respectively.

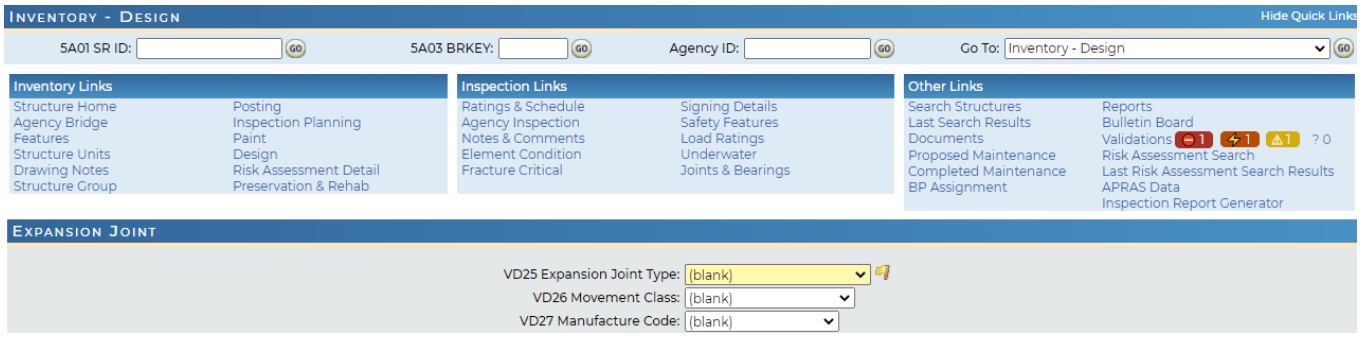


Figure 2.4.8.4-1 Design - Expansion Joint Detail Screen

2.4.9 Inventory – Signs and Lights

The Inventory – Signs and Lights screen serves as the summary page for sign and light structures. This screen presents both display only and editable fields relating to sign and light structures. The display only fields are editable on other inventory screens such as Structure Home, Agency Bridge, and Features. This screen is only accessible if the structure is coded as a sign or high mast light in Item 5A17. When coded as a sign or high mast light in Item 5A17, a link to this screen will appear in the top left under Inventory Links.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

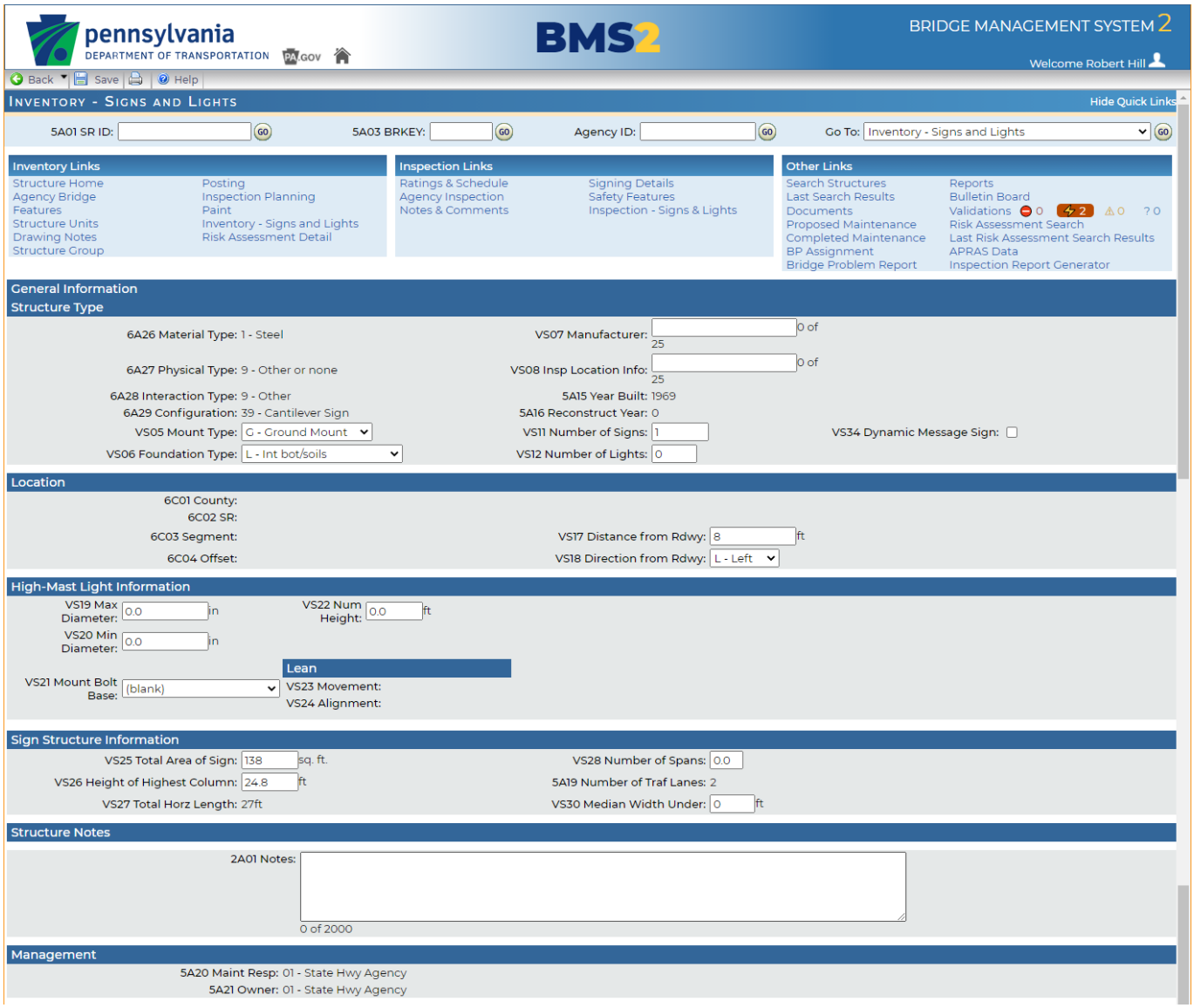


Figure 2.4.9-1 Inventory – Signs and Lights Screen

2.4.10 Inventory - Walls

The Inventory – Walls screen serves as the summary page for wall structures. This screen presents both display only and editable fields relating to wall structures. The display only fields are editable on other inventory screens such as Structure Home, Agency Bridge, and Features. This screen is only accessible if the structure is coded as a noise wall or retaining wall in Item 5A17. When coded as a wall in Item 5A17, a link to this screen will appear in the top left under Inventory Links.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

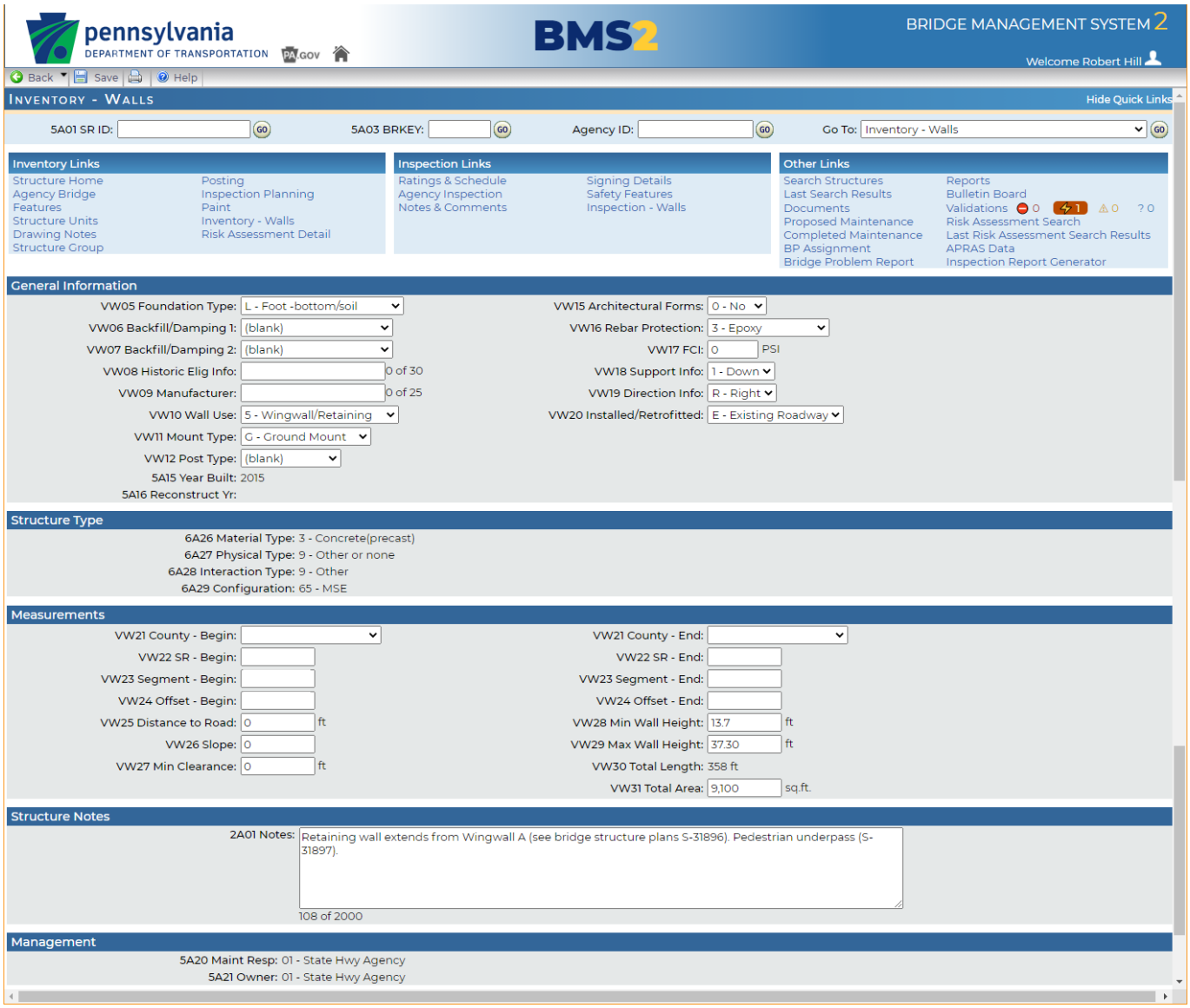


Figure 2.4.10-1 Inventory - Walls Screen

2.4.11 Paint

2.4.11.1 Paint History

The Paint screen allows users to maintain detail information about the paint history of the structure. Detail data for the paint history list items cannot be directly edited on this screen – the user must select one of the displayed items and proceed to a corresponding Detail screen to edit data (assuming the user has the necessary security authorization).

In edit mode, the header for the list section contains a Create link. Clicking on the link allows users to create a new paint record. Each list record also has two links, Edit and Remove, which allow users to view and edit the corresponding detail data or remove the record, respectively.

In view mode, each list item includes a single View link to access the corresponding Detail screen.

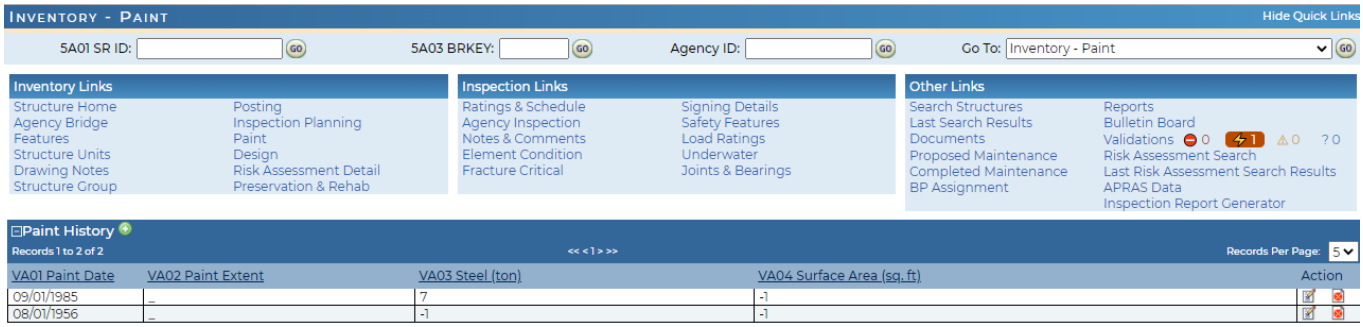


Figure 2.4.11.1-1 Paint Screen

2.4.11.2 Paint Detail

The Paint Detail screen allows users to maintain detailed information about the paint history of the structure. The screen displays details of a specific painting history record of the structure. Each painting detail is its own record.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next paint record in the list. The Save button saves any modified fields to the BMS2 database. The New and Delete buttons are used to add a new paint record or remove the current paint record, respectively.

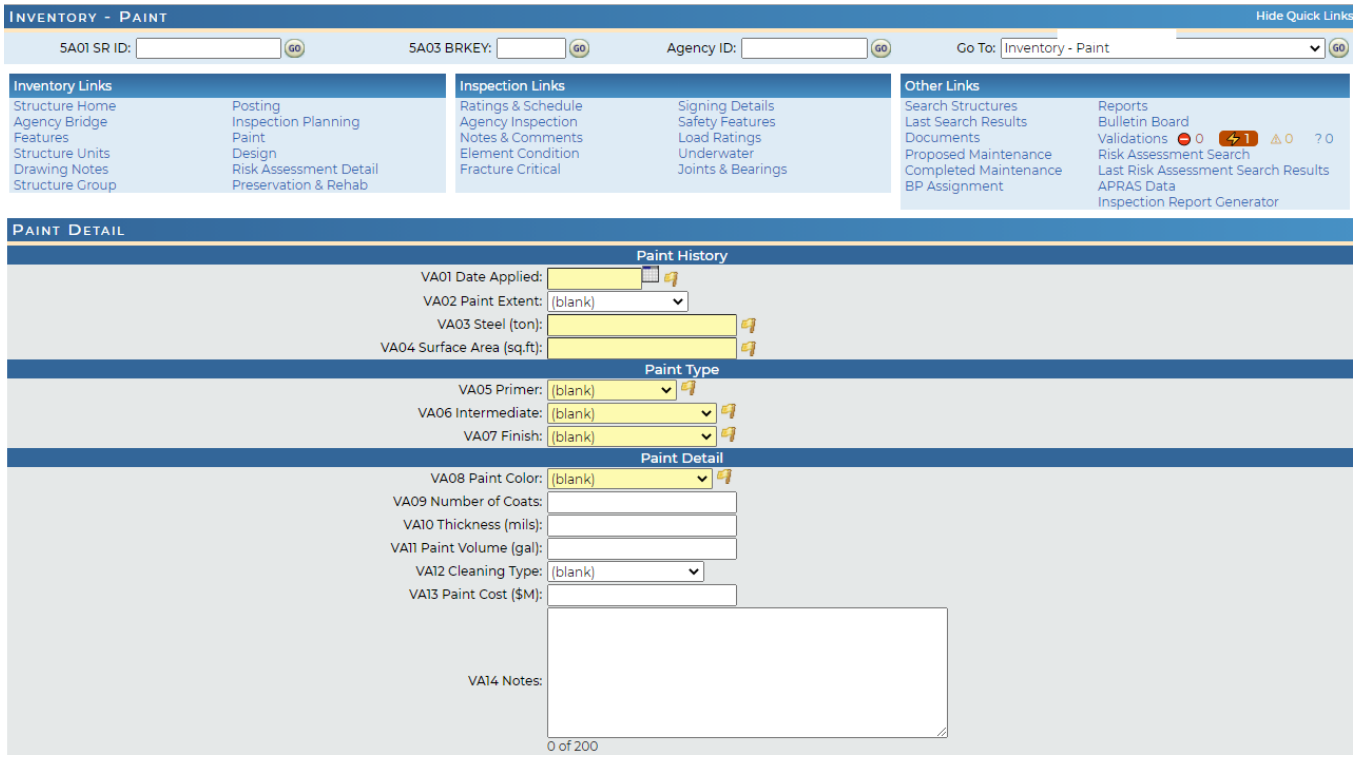


Figure 2.4.11.2-1 Paint Detail Screen

2.4.12 Inventory - Tunnels

The Inventory – Tunnel screen serves as the summary page for tunnel structures. This screen presents both display only and editable fields relating to tunnel structures. The display only fields are not editable because there are no tunnel structures within Pennsylvania that would require different coding values. Only tunnel inventory items from the Specification for the National Tunnel Inventory (SNTI) that are not duplicates of fields used on other screens throughout BMS2 are shown on this screen. For coding guidance, refer to the SNTI as the detailed field descriptions do not appear within this publication. A table of all SNTI items and their corresponding BMS2 fields is provided in Appendix D. This screen is only accessible if the structure is coded as a tunnel in Item 5A17. When coded as a tunnel in Item 5A17, a link to this screen will appear in the top left under Inventory Links.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

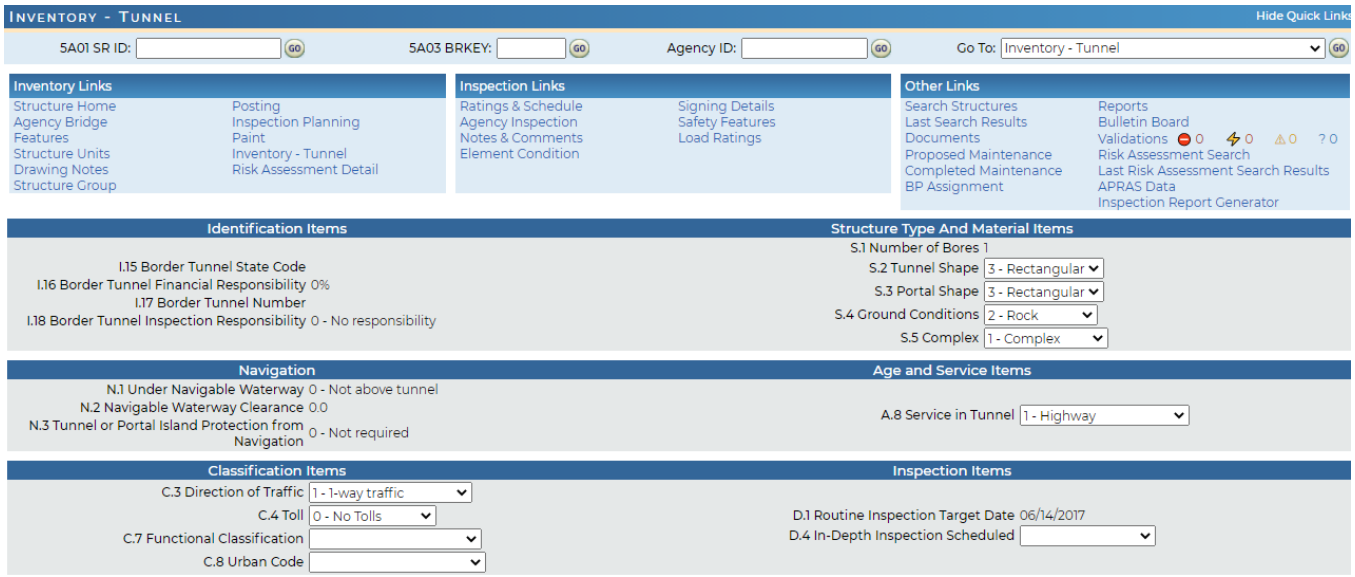


Figure 2.4.12-1 Inventory - Tunnel Screen

2.4.13 Risk Assessment

2.4.13.1 Risk Assessment Detail

The Risk Assessment Detail Screen provides the scoring, ranking, and MPMS data for the selected structure in multicolumn format. Comments pertaining to Risk Assessment can be entered in the block provided. The comment block is the only editable field on this screen.

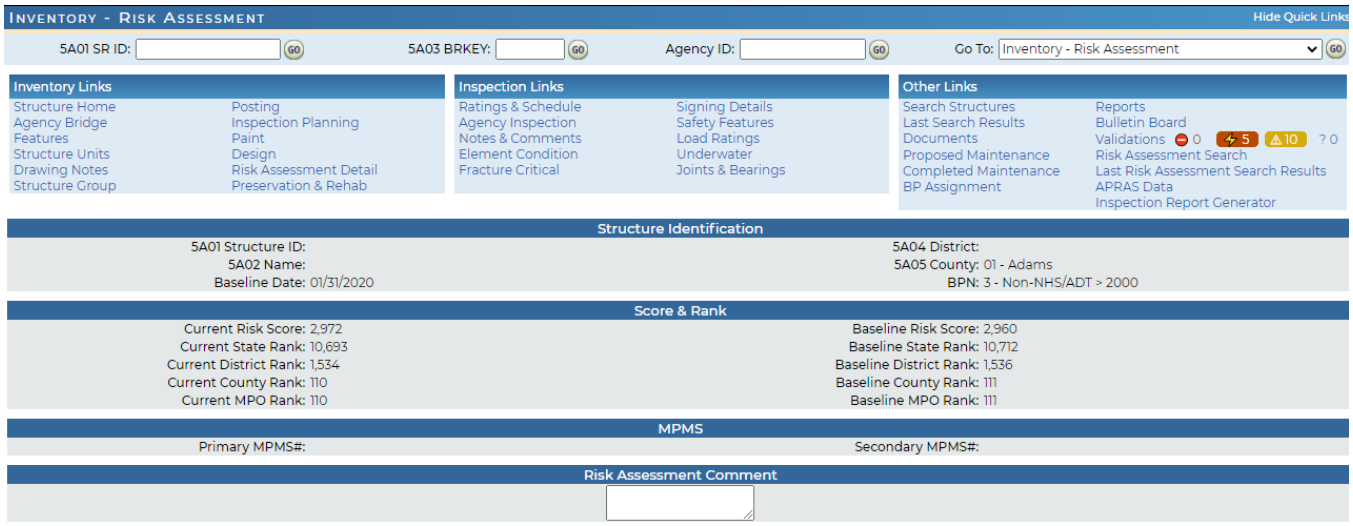


Figure 2.4.13.1-1 Risk Assessment Detail Screen

The MPMS field data cannot be changed by the user. The MPMS numbers returned for the structure are selected using algorithms based on current date and future or past let dates. Secondary numbers will only be generated if there is more than one record existing for the bridge. A null value in that field indicates there is one only one record available. The Risk Score Crystal Report will also show the MPMS data.

2.4.14 Structure Group

The Structure Group screen is used to provide links between structures within BMS2. These groups fall into specific categories: predecessor/successor, interchange, border, adjacent, duplicate, and test groups with groups being entered into the system by department staff and viewable by all users of BMS2. The screen displays the Section SG items as well as other basic identifiers from Sections 5A and 7A.

The predecessor/successor relationship is used to identify bridges that have been replaced by a new bridge. This relationship can be created during the "Create Structure" process or via this screen. Interchange groups are used to identify a series of bridges that make up an interchange such as the Eisenhower Interchange in Harrisburg or the Mount Nittany Interchange in State College. In these instances, it may be helpful for the District to be able to create a group for inspectors to identify all the bridges in a close area. The border bridges group is simply an identifier of a bridge that either borders two counties within PA or spans between Pennsylvania and another state. The adjacent group is used for adjacent structures that carry the same route (NB vs. SB) but are separate structures. The duplicate group can be used to link a mistakenly created structure that already had a record in BMS2. The test structure group is used by Central Office to identify bridges used during the implementation of changes into the production database. Detail data for the Structure Group list items cannot be directly edited on this screen – the user must select one of the displayed items and proceed to a corresponding Detail screen to edit data (assuming the user has the necessary security authorization).

In edit mode, the header for the list section contains four links: view, create, edit, and remove. The view link allows the user to view the description of the group of structures. The create link allows the user to add a new structure to the currently displayed structure group. The edit link allows the user to change information about the currently displayed structure group. The remove link allows the user to delete the currently displayed structure group. Each list record also has two links, Edit and Remove, which allow users to view and edit the corresponding detail data or remove the record, respectively. The first column of the list also provides a BRKEY link that will navigate to the associated structure in BMS2.

Within the header, there are two functions additional functions available for select Department Users, "Duplicate BRKEY" and "Delete BRKEY". The "Duplicate BRKEY" function allows an entire bridge record to be duplicated with a new BRKEY. In addition to a new BRKEY, new unique identifiers are also established for each proposed maintenance item. This functionally exists for the purpose of splitting up a single BRKEY into two or more structures with the desire to maintain the historical information. For example, if two bridges are built with a longitudinal joint between the median barriers and they share a BRKEY, they should be split into individual structures. By duplicating the BRKEY, all historic inspection records are replicated for the new BRKEY. If a District or bridge owner would like to use this functionality, they must contact the Bridge Inspection Section for assistance as there are time-sensitive actions that must be taken after the duplication is complete (i.e., coordinating with RMS and APRAS). The "Delete BRKEY" function can only be used for newer structures that were duplicated. This function essentially eliminates the BRKEY and all associated data from each table in the database. This functionality should only be used if BRKEY is created in error.

Above the header is another green link to create a structure group. This allows the user to create a new structure group to link structures together.

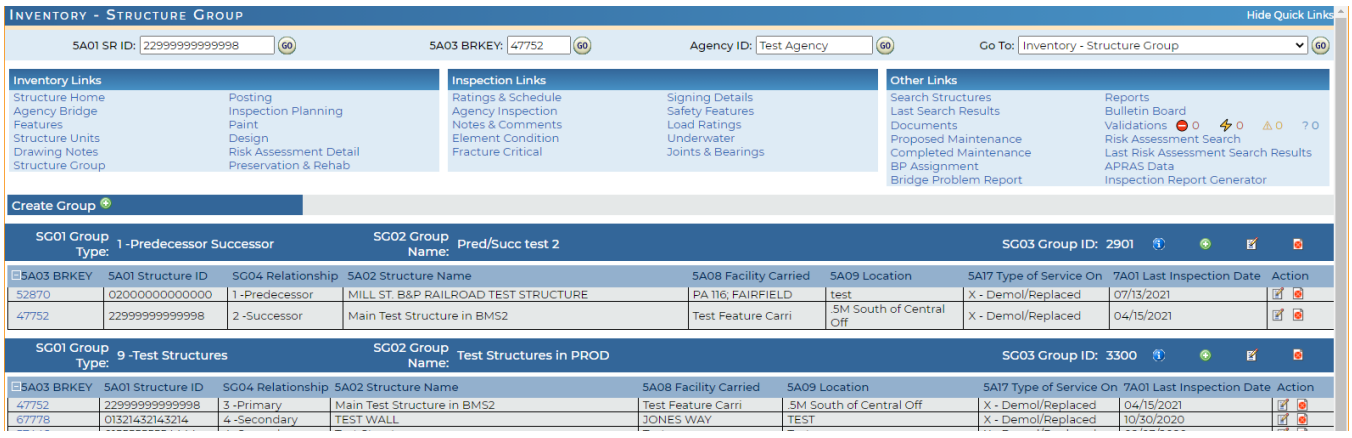


Figure 2.4.14 Structure Group Screen

2.4.15 Preservation and Rehab

The Preservation and Rehab screen was created to provide a uniform location for bridge owners to document work completed on a bridge via a project as well as to assist with asset management requirements set forth by FHWA. Before the creation of this screen, only individual maintenance items for specific actions were documented to indicate work required to be completed on a structure and subsequently moved to completed maintenance after the work was finished. However, it may be more efficient to complete additional work on a structure when maintenance is completed, and all of this work is wrapped up into a singular project that extends the service life of the given structure.

This screen is available to all bridge owners if they choose to use it. For PennDOT owned structures where the work is completed through an ECMS construction project, users can enter the ECMS number within the Preservation and Rehab detail screen to sync data such as costs, dates and contractor information in BMS2 from ECMS. Projects should only be entered when they have a Let Date. This will ensure that projects are entered in the correct order within the screen. Some bridges across the state may fall under numerous MPMS or ECMS numbers and it's not abundantly clear which is the next project to be completed on a given structure. By holding off on entering a project until a let date has been assigned, the system will contain better data for the end user.

While the option exists to enter a ECMS number to bring information into BMS2, the lack of an ECMS number does not preclude the bridge owner or their designee from entering a project in BMS2. All fields will remain editable instead of a few being read-only because they were linked to ECMS.

Previously, information that is now able to be stored within BMS2 was tracked via spreadsheets and databases outside of BMS2. Users may elect to enter past projects to establish a more robust bridge record within the system. Per the previously issued SOL 495-21-01, all PennDOT construction projects that include bridge work with a let date after January 1, 2021, should be entered onto this screen. Users may notice that field numbering for this screen leaves gaps between sections. While the initial development of these screens was completed in 2020, we recognize that as users begin to use the fields, additional fields may be required in the future and room was left to allow for future growth.

2.4.15.1 Preservation and Rehab Screen

The Preservation and Rehab screen provides an overview of documented projects that have been completed on the specific bridge. By default, projects are displayed in the order of which they are entered, the most recent at the top of the list. Users have the ability to sort the projects by any of the columns displayed. Some data may appear as if it is missing on the screen, however these fields may not be imported into BMS2 based on the status of the project if linked to ECMS. In particular, users may see this for completion date, total amount tendered cost and total structure cost at final.

To enter a new project for the given bridge, click the green "+" sign to the right of the "Action" header. Similarly, to view a project detail after it's already displayed on the landing screen, click the edit button beneath the "Action" header. Also, beside the edit button is a red and white icon to delete a project record. Users will be asked to confirm if they want to delete the action before it is deleted.

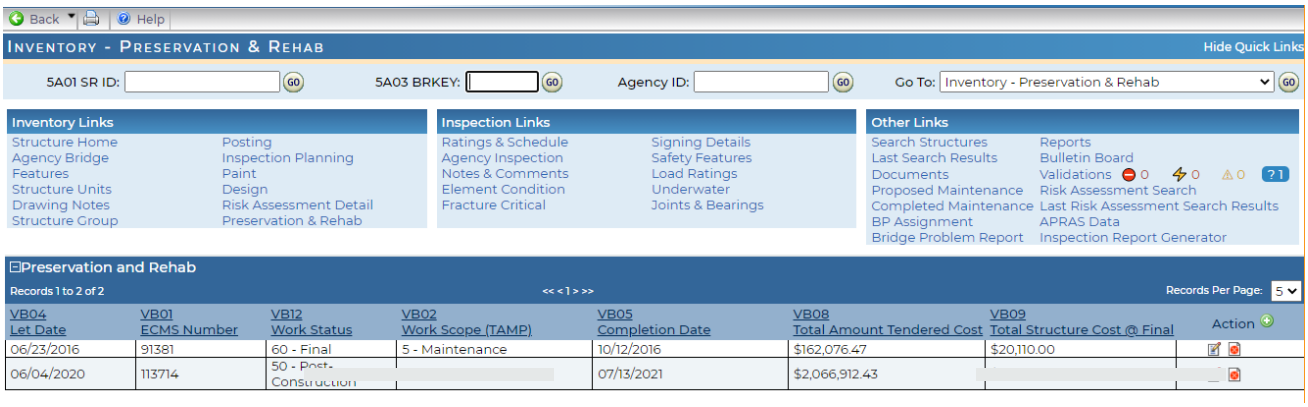


Figure 2.4.15.1-1 Preservation and Rehab Screen

2.4.15.2 Preservation and Rehab Detail Screen

The Preservation and Rehab Detail screen allows users to enter project specific information into BMS2 for the given bridge. When a project has an ECMS number associated with it and is entered into BMS2, some of the fields will automatically be filled in. The screen is broken into eight (8) sections and is grouped based on the relationships of individual fields.

2.4.15.2.1 General Project Information and Contractor Information

The first section is labeled "General Project Information" and provides for a general overview of the project being inventoried. This section also allows the user to enter an ECMS number to load specific fields from ECMS. Also, within this section, the user must select a work scope and at least one work type. This information is critical for future analysis of the data being gathered. The second section of the screen displays contractor information. If the project is linked to ECMS, all contractors will be synced into BMS2 and the prime contractor will be identified from the linked group. Otherwise, users can manually enter contractors and select one as the prime.

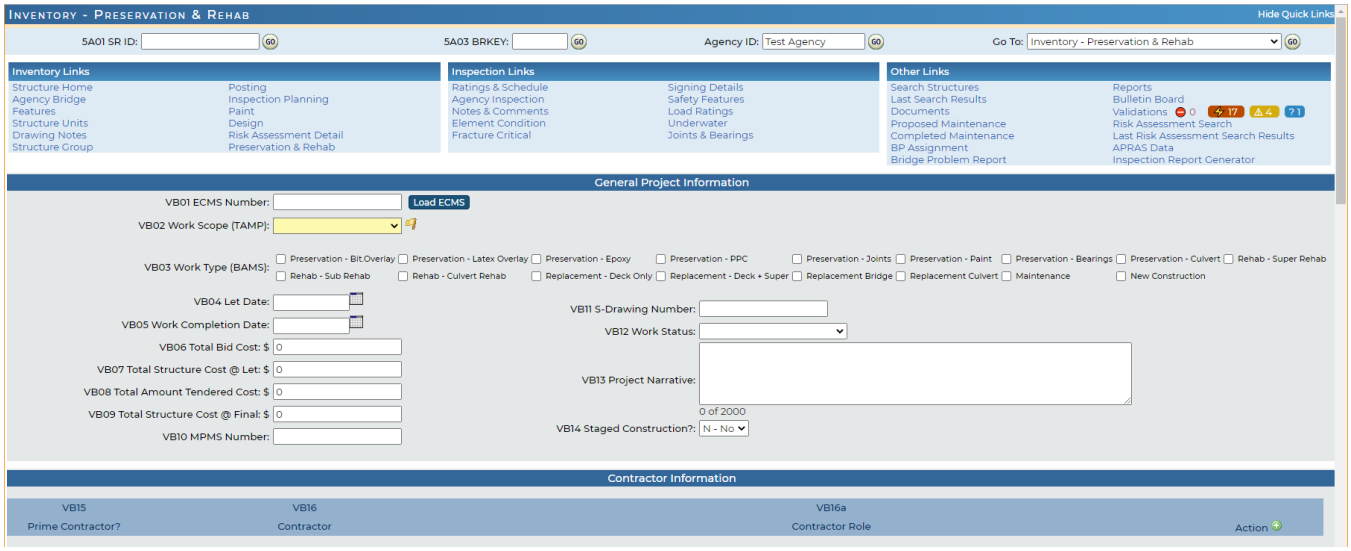


Figure 2.4.15.2.1-1 General Project Information and Contractor Information

2.4.15.2.2 Inspection Information and Deck/Overlay Information

The "Inspection Information" section allows the user to select an inspection date/record before the work is started on a project as well as after the project is completed. By selecting these records, the user can import condition ratings to see the improvement associated with the project that was completed. After selecting the desired records, the user should click the "Populate" button to complete the data pull into the before and/or after columns from the respective inspection records. Each time the "Populate" button is clicked, the data within the before and/or after columns is overwritten with the data from the inspection record selected. The fields updated are always shown as read-only, regardless if the fields are populated.

The "Deck/Overlay Information" section focuses on bridge decks and the associated wearing surfaces (if applicable). Within the section, there is an overview of the "Before & After Conditions" to record the deck and wearing surface properties for the main and approach spans of a bridge if the coding change with the project. The before sections will be populated when the record is created with the current values from BMS2. The values remain editable in the event the information is incorrect or if the user wishes to enter historic information from a previous project. The after column is editable and should be filled in to represent the conditions when the project is completed. To assist BMS2 users, the "Export" button below the section will allow the user to export the data from the project record to the applicable fields on the other inventory screens after the job is completed.

Also under the "Deck/Overlay Information" is a section focused on rehab/repair information related to the project. This area allows the user to document the area of the deck/overlay repairs, the cost, the duration to install an overlay, and other related information. Some of these fields will help establish actual historical data for future planning.

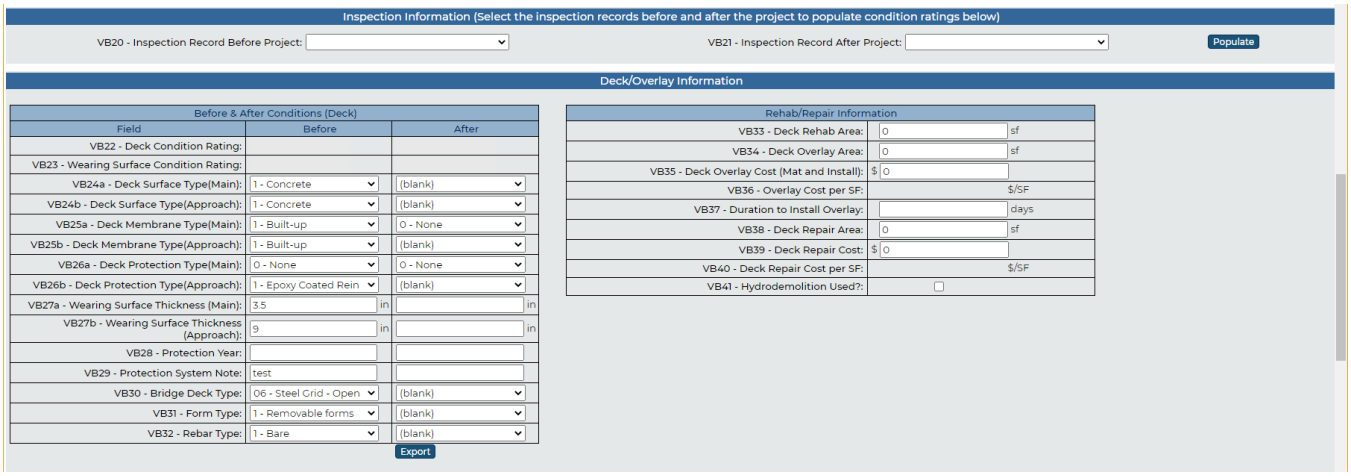


Figure 2.4.15.2.2-1 Inspection Information and Deck/Overlay Information

2.4.15.2.3 Joint Information and Bearing Information

The "Joint Information" and "Bearing Information" sections have similar functionality. Both the joint and bearing sections will display the condition ratings for the before and/or after the date of the preservation project if inspection dates were selected under the "Inspection Information" section and the populate button is clicked. Both sections also allow users to input the work completed on the joints and bearings as part of the project. Each different scope of work for either bearings or joints should have its own record if the remaining properties are different. If not, users can group similar work scopes into a single line. For example, if a bridge has three tooth dams on a bridge and they all have the same movement class, group all three items together and show the combined length of all three joints in the single record. However, if there are varying movement classes or types, they should be split apart and entered as separated records. The same applies to bearings.

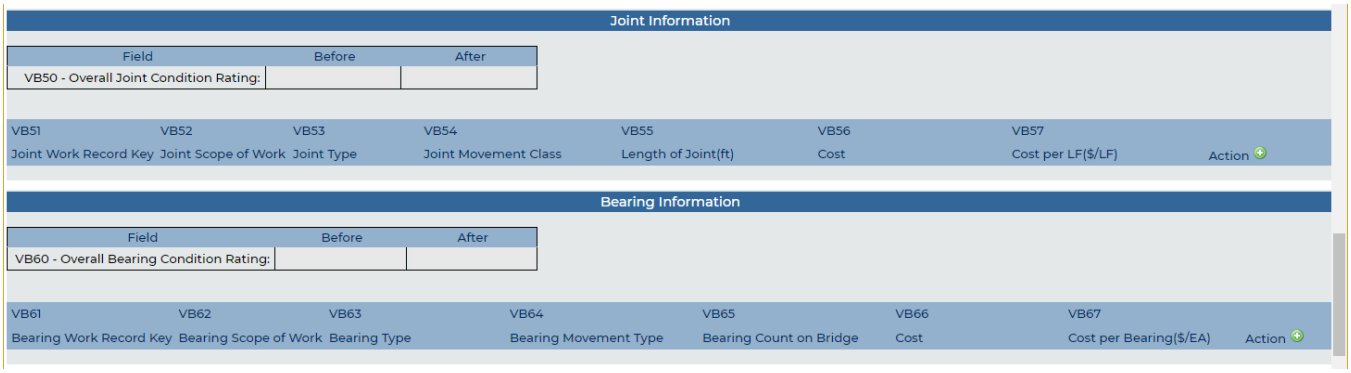


Figure 2.4.15.2.3-1 Joint Information and Bearing Information

2.4.15.2.4 Superstructure/Culvert/Paint Information and Substructure Information

If the scope of the project included superstructure work, at least one scope should be selected from the options provided. The before and after condition ratings for superstructure, culvert and paint will also be populated if the inspection dates were selected upon and the data imported. Below the condition ratings, the structure configuration before and after the project are shown. Similar to other sections, the before data is pulled from BMS2 when the record is created but remain editable on the this screen. Users have the option to input the after structural configuration data and export it to the Agency Bridge screen using the "Export" button below the table. There is also a table that records valuable information about paint work within this section.

Similar to the "Superstructure/Culvert/Paint" section, if the substructure had work performed, at least one scope of work should be selected. Besides the scope of work, only the before and after condition rating is recorded. Additional fields relating to substructure work may be added in future updates to BMS2.

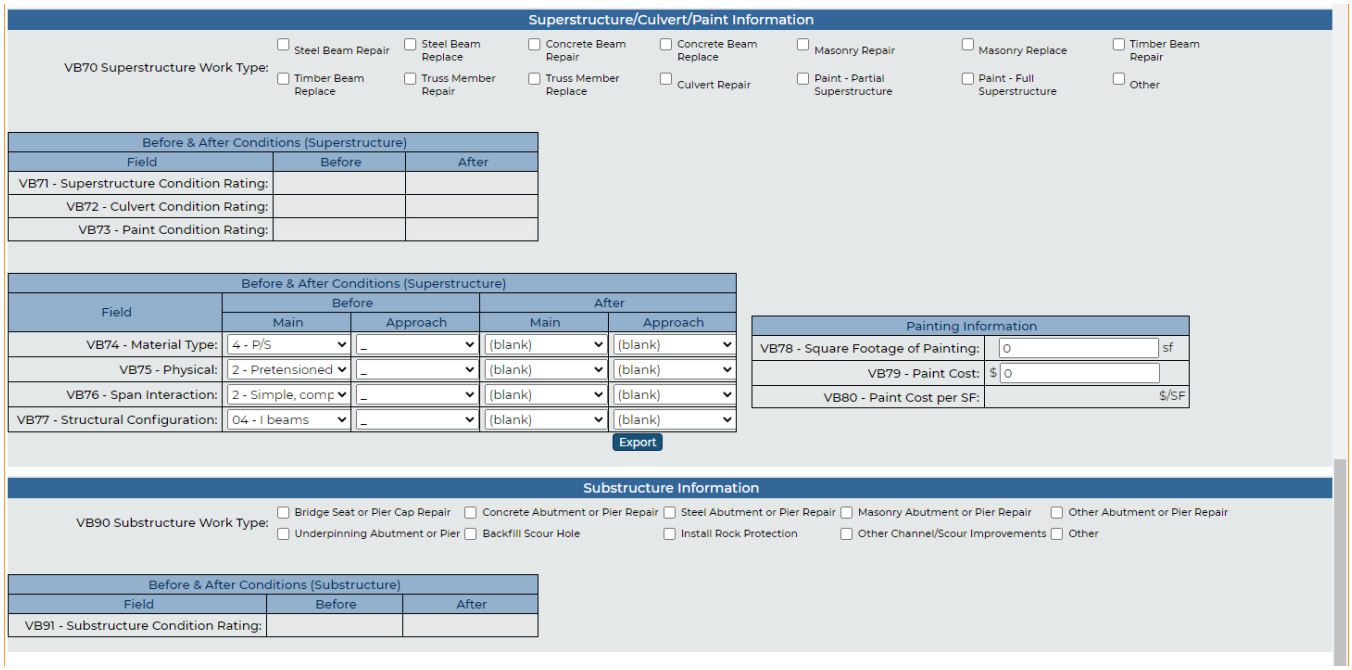


Figure 2.4.15.2.4-1 Superstructure/Culvert Paint Information and Substructure Information

2.5 Inspection Screens

2.5.1 Selecting an Inspection

Every Inspection-related screen in BMS2 Web includes a dropdown list in the screen header that provides the list of inspection dates for the structure.

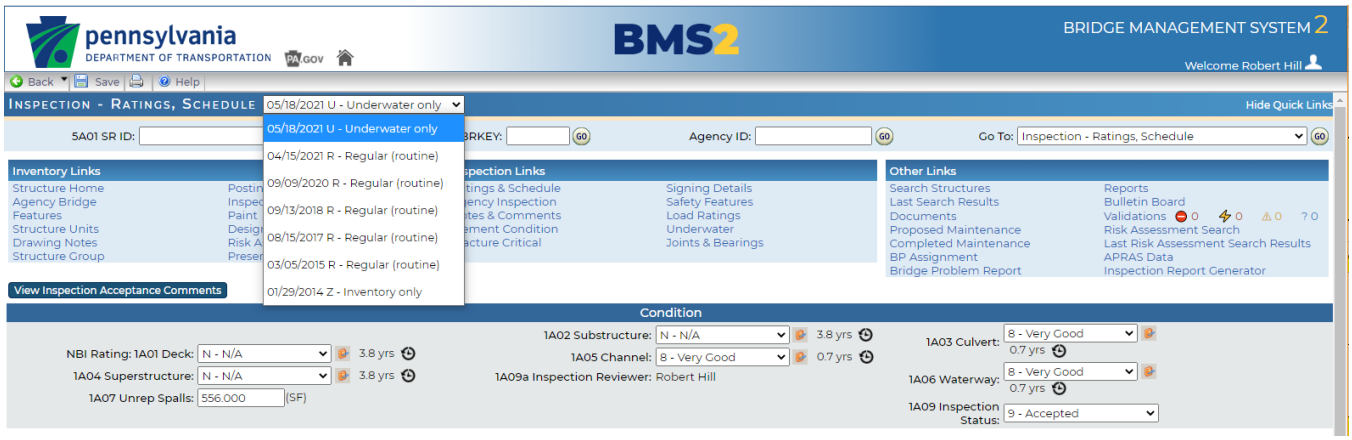


Figure 2.5.1-1 Inspection Date Drop Down Expanded

By default, Inspection-related BMS2 Web screens display the most recent inspection for the structure. The current inspection remains as the displayed inspection as the user navigates to other Inspection screens. However, if the user selects a prior inspection for display, BMS2 Web will continue to display data from that prior inspection information on other Inspection-related screens as long as the user directly navigates to those other Inspection-related screens.

If the user selects a prior inspection for display and navigates "outside" of the Inspection-related screens (e.g., to an Inventory screen such as Agency Bridge), if the user then returns to an Inspection screen BMS2 Web will again default back to displaying the most recent inspection information.

2.5.2 Ratings & Schedule

2.5.2.1 Ratings & Schedule Screen

The purpose of this screen to is to allow users to view and maintain basic NBI inspection condition and schedule data for a structure. This screen displays component level condition ratings and other rating and inspection scheduling information for the structure.

This screen can be accessed in Edit mode by authorized users. The Save button saves modified fields to the production BMS2 database.

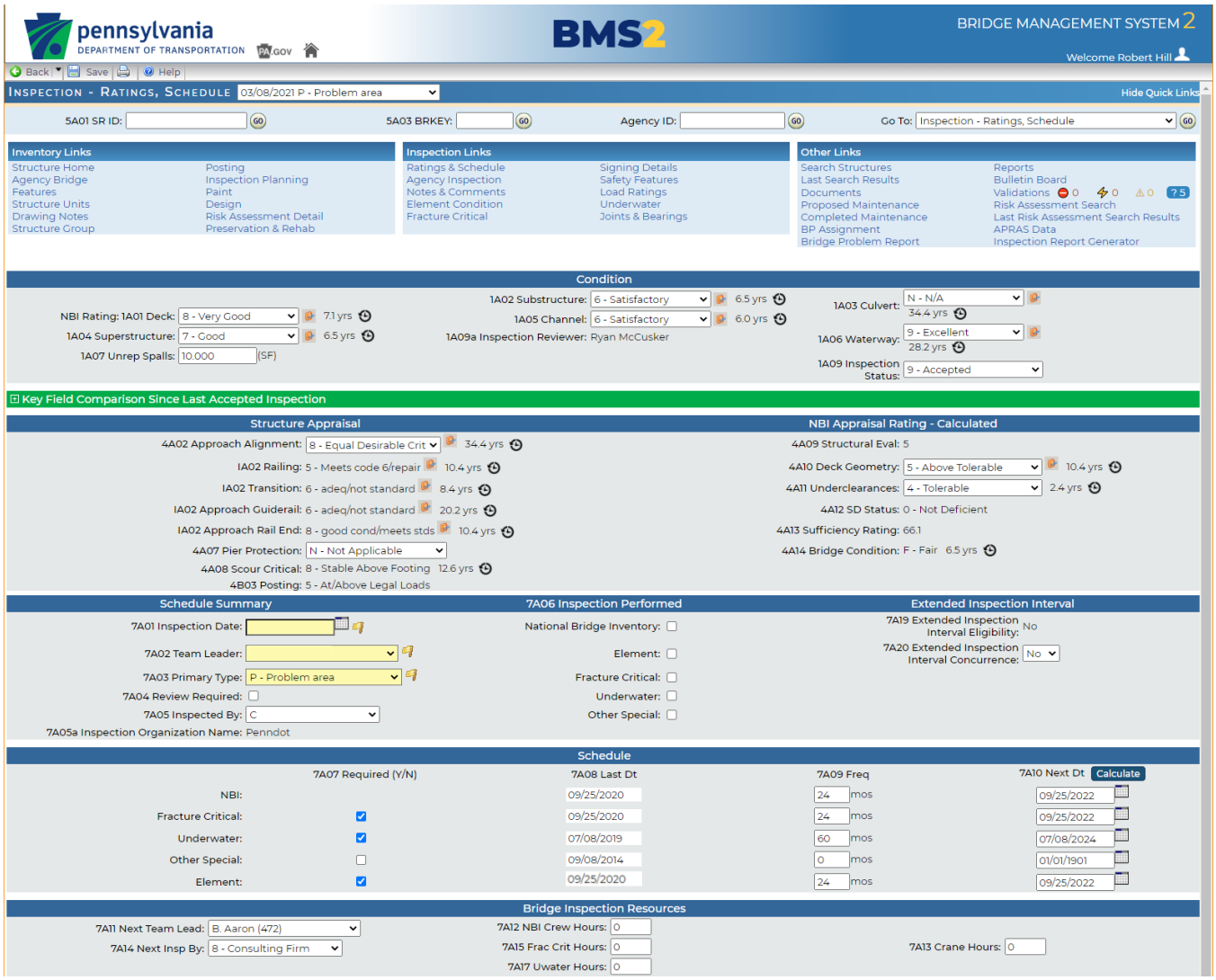


Figure 2.5.2.1-1 Ratings & Schedule Screen

This screen includes a direct link to the Inspection Comments screen for each of the condition rating fields. When one of the detailed comments links is clicked, the Inspection Comment List screen is displayed showing only those comments that apply to the corresponding condition rating. This is the view a user will see after clicking the screen link when the bridge is in "9 – Accepted" status (Item 1A09).

2.5.2.2 Key Field Comparison

The purpose of this portion of the screen is to alert the reviewer of a bridge not in "9 – Accepted" status to the potential changes from the last accepted inspection to the current inspection. When there is a difference in the specified fields, both the field name, the current inspection value, and the last accepted inspection value are highlighted in yellow. The key fields listed on the screen include the condition ratings for deck, substructure, culvert, superstructure, channel, and waterway as well as the scour critical bridge indicator and associated scour critical category, structural deficiency status, and the structural evaluation rating. The comparison also evaluates the required inspection types and inspection intervals for NBI, NSTM, Underwater, Other Special, and Element inspection types.

The Key Field Comparison portion of the Ratings and Schedules screen is visible to all users and is read-only.

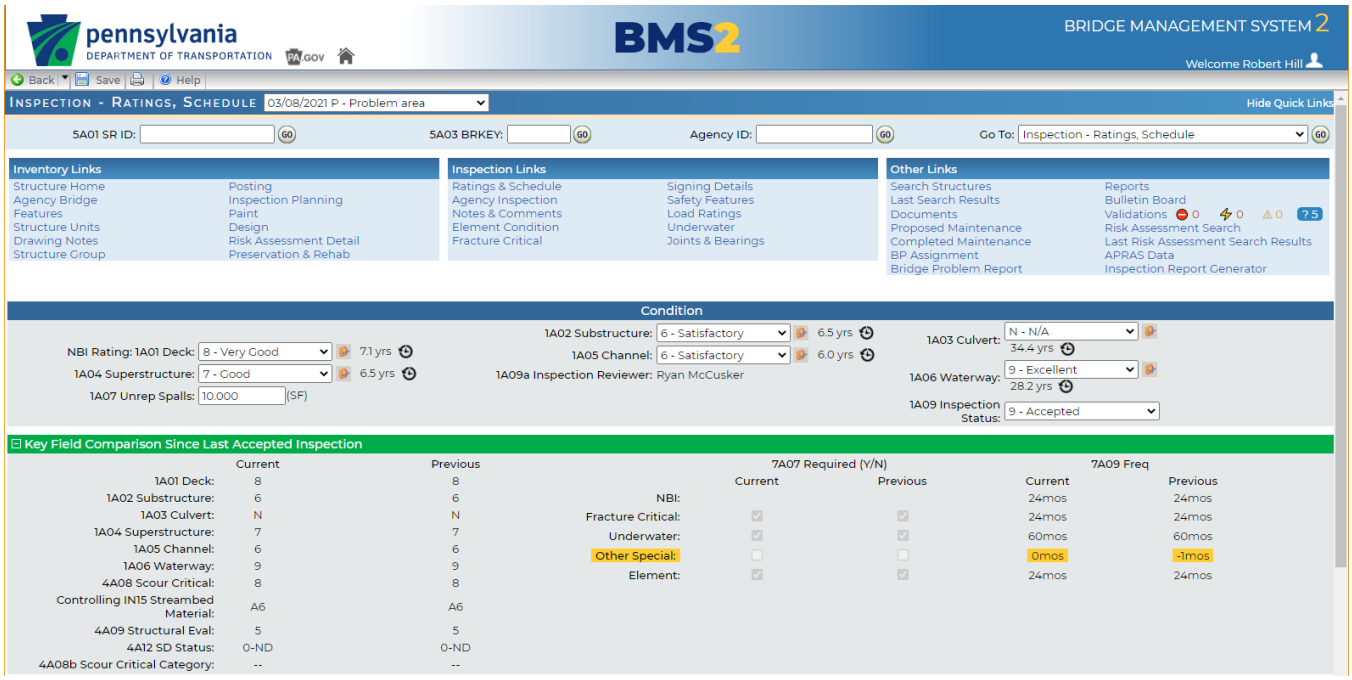


Figure 2.5.2.2-1 Key Field Comparison on the Ratings & Schedule Screen

This view will be open by default when a user clicks on the Ratings and Schedule screen for a structure with a status other than "9 – Accepted" status (Item 1A09). A user can show or hide the Key Field Comparison by clicking the + or – link on the left of the green header, respectively.

2.5.2.3 Condition State Duration

On the Ratings and Schedule screen as well as the Agency Inspection screen (See Section 2.5.3), specific fields in BMS2 have a time in years displayed to the right of the condition rating as well as a ⏲ symbol. The time duration displayed is the length of time that specific condition rating has been in that condition state, relative to the inspection record being viewed. For example, if the bridge was placed into condition state "5" on February 1, 2017 and the inspection recorded being viewed is dated on January 2, 2020, the time displayed would 2.9 years. The duration displayed is calculated based on the date the user is viewing the screen. When a user clicks on the ⏲ symbol, a pop-up box will display the entire condition rating history for the BRKEY and that specific condition rating. Within BMS3, only the current condition state duration is displayed. Below is an example of the pop-up box that would be displayed.

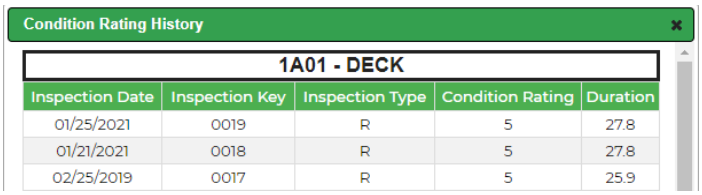


Figure 2.5.2.3-1 Condition State History on the Ratings & Schedule Screen

2.5.3 Agency Inspection

The purpose of this screen is to allow users to view and maintain PennDOT-specific inspection information.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

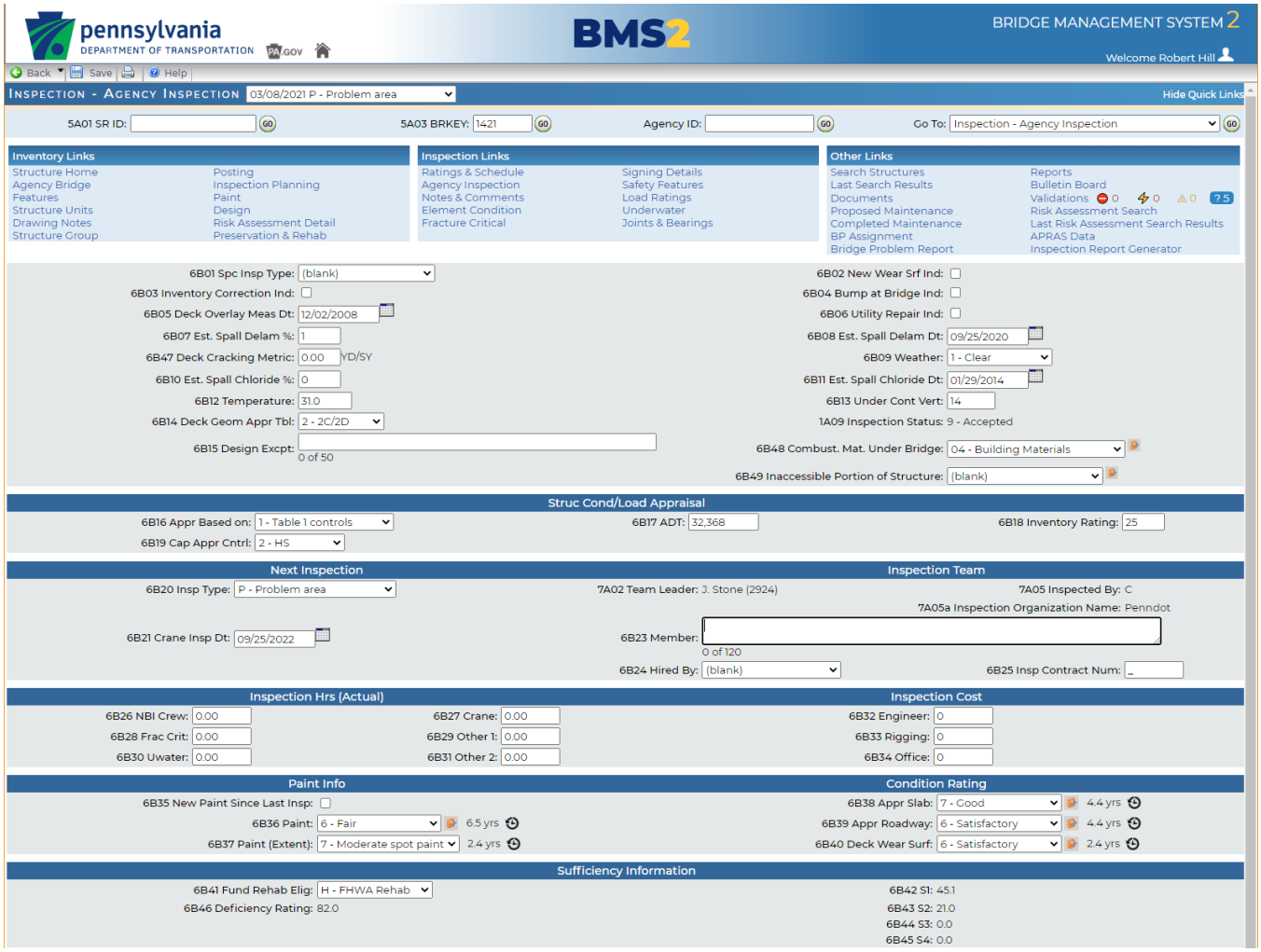


Figure 2.5.3-1 Agency Inspection Screen

This screen includes a direct link to the Inspection Comments screen for each of the condition rating fields. When one of the detailed comments links is clicked, the Inspection Comment List screen is displayed showing only those comments that apply to the corresponding condition rating.

2.5.4 Notes & Comments

2.5.4.1 Comment Lists and Notes

The Inspection Comments List screen allows users to view and maintain inspection comments submitted from BMS3. The user is also provided the ability to edit the overall notes for an inspection, corresponding to the Inspection Notes field. When the user edits the overall inspection notes and clicks the Save button, the modified data is saved to the production BMS2 database.

This screen displays two lists of inspection comments, one for structure-level inspection comments and the other for structure unit-level comments. The detailed comment for each of the comment list items cannot be directly edited on this screen – the user must select one of the displayed items and proceed to a corresponding Detail screen to edit data (assuming the user has the necessary security authorization).

In edit mode, the header for each list section contains a Create link. Clicking on the link allows users to create a new structure-level or structure unit-level comment. Each list item also has two links, Edit and Remove, which allow users to view and edit the corresponding comment or remove the comment, respectively.

In view mode, each comment list item includes a single View link to access the corresponding Detail screen.

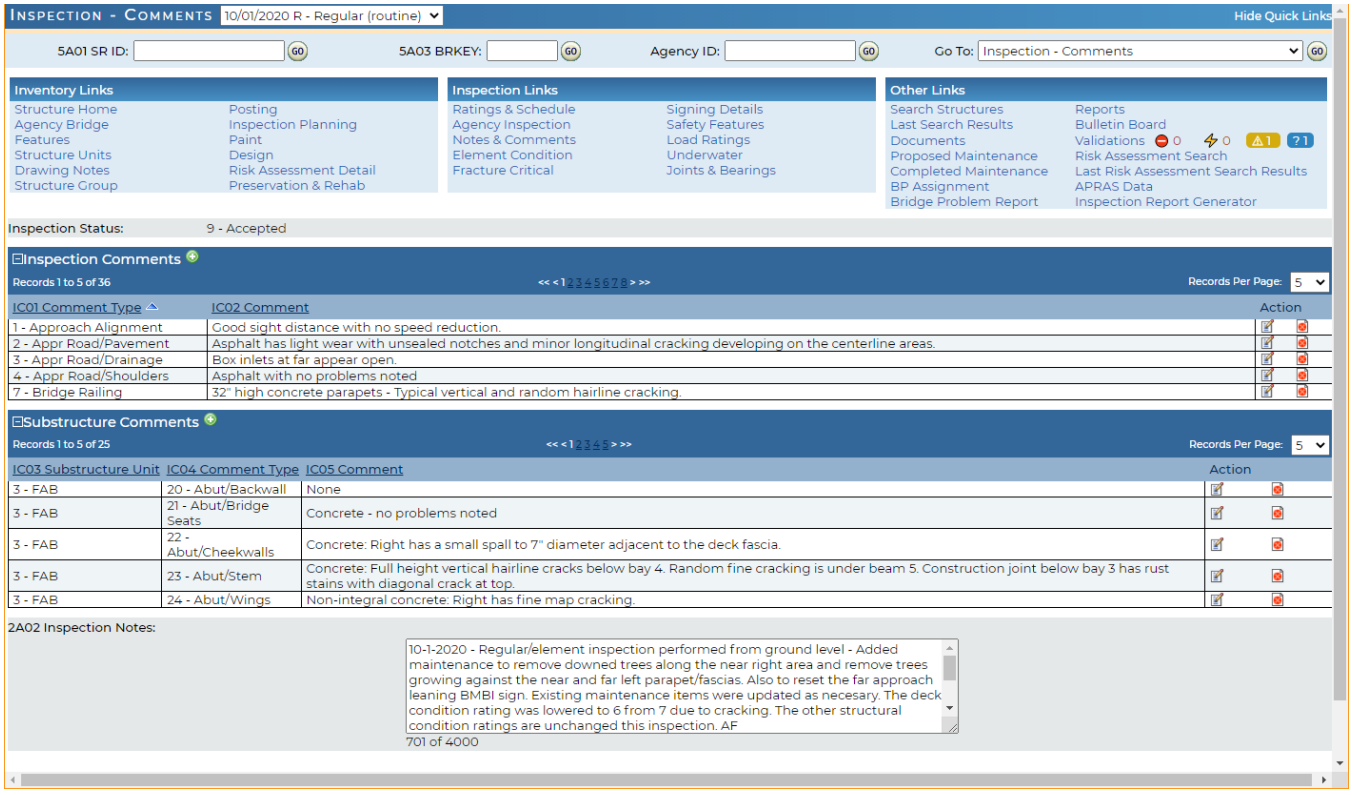


Figure 2.5.4.1-1 Inspection Comments List Screen

2.5.4.2 Inspection Structure Comment Detail

The Inspection Structure Comment Detail screen allows users to view and maintain detailed structure-level inspection comments.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next structure-level comment in the list. The Save button saves the modified comment to the BMS2 database. The New and Delete buttons are used to add a new structure-level comment or remove the current comment, respectively.

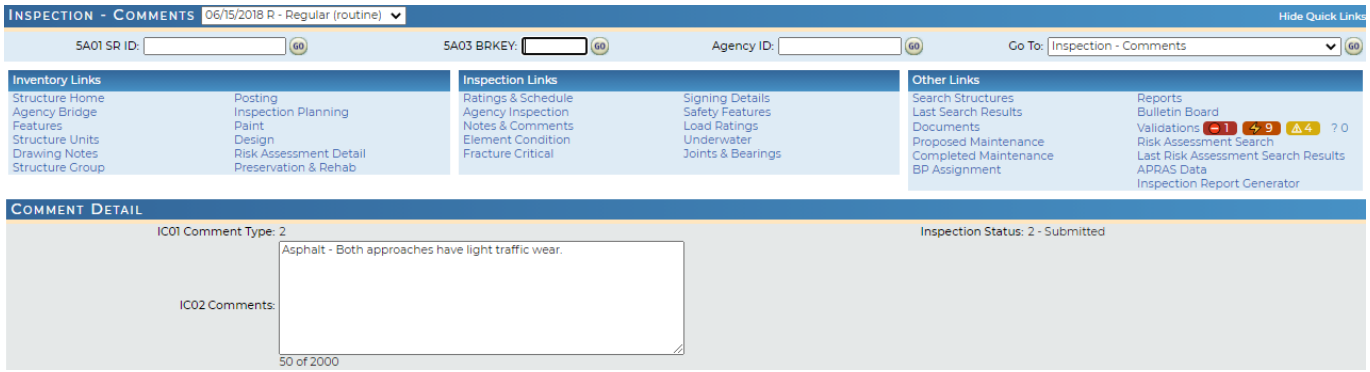


Figure 2.5.4.2-1 Inspection Structure Comment Detail Screen

2.5.4.3 Inspection Structure Unit Comment Detail

The Inspection Structure Unit Comment Detail screen allows users to view and maintain detailed structure unit-level inspection comments.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next structure unit-level comment in the list. The Save button saves the modified comment to the BMS2 database. The New and Delete buttons are used to add a new structure unit-level comment or remove the current comment, respectively.

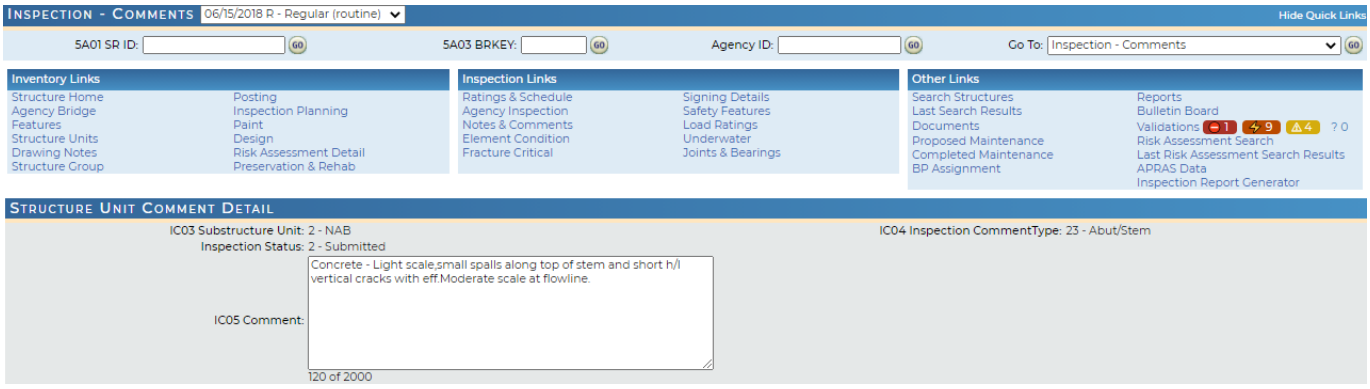


Figure 2.5.4.3-1 Inspection Structure Unit Comment Detail Screen

2.5.5 Element Condition

2.5.5.1 Element List

The Element Condition screen allows users to view and edit the structure elements and condition states for a structure. This screen displays element level condition state ratings.

This screen can be accessed in Edit mode by authorized users. The Save button saves modified fields to the production BMS2 database.

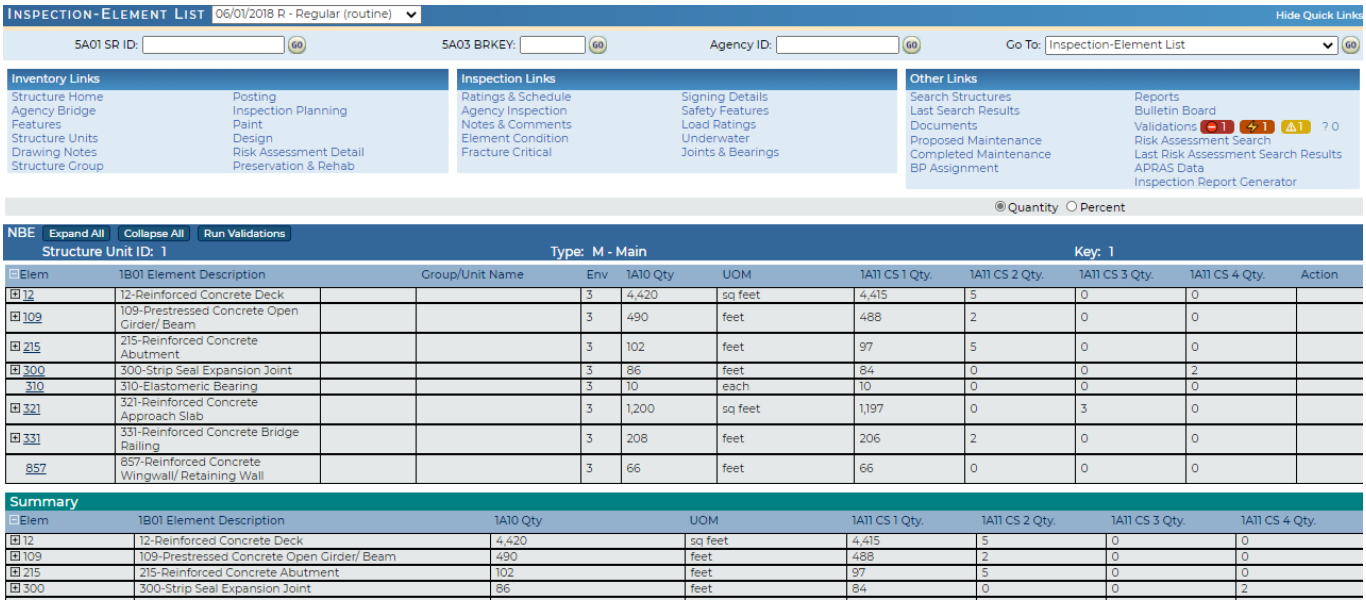


Figure 2.5.5.1-1 Element Condition Screen

2.5.5.2 Element Detail

The Element Detail screen allows users to maintain detail information about the elements of the bridge.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Save button saves any modified fields to the BMS2 database. The New button is used to add a new element record.

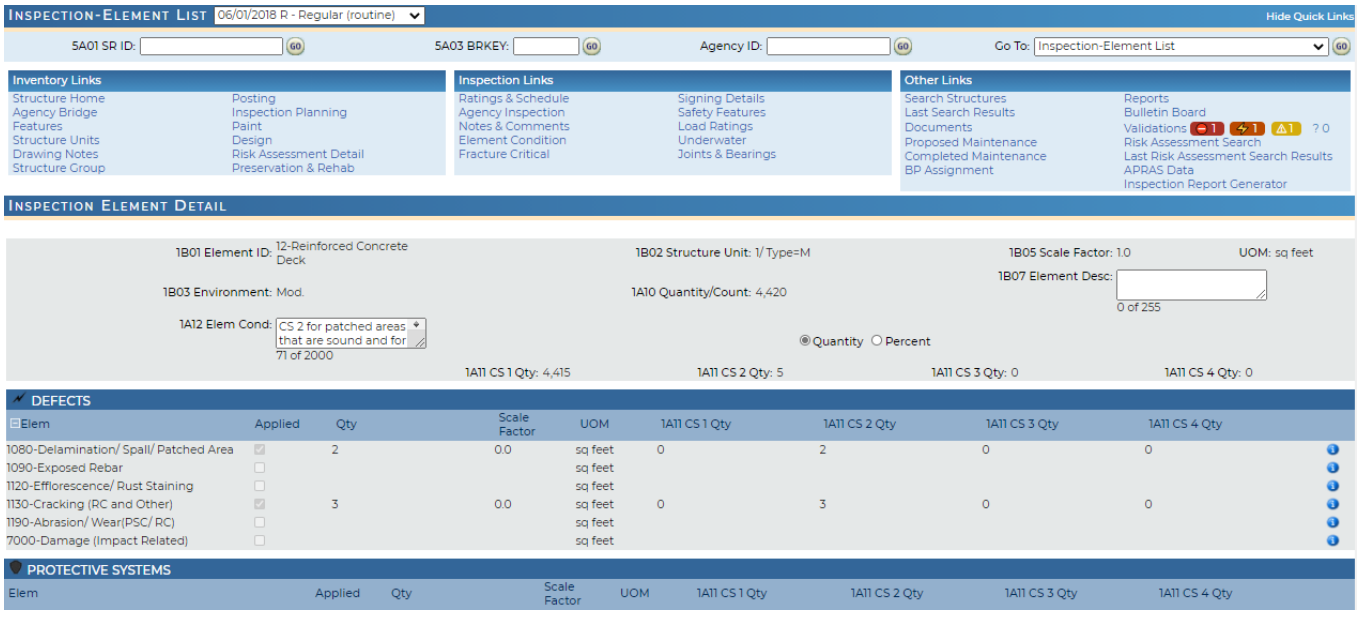


Figure 2.5.5.2-1 Element Detail Screen

2.5.6 Load Rating

2.5.6.1 General Information and List

The Load Rating List screen allows users to view, maintain, and assign load ratings. By default, this screen displays the load rating data set assigned to the inspection currently being displayed. However, other rating sets can also be displayed by changing the selection in the Calc Date dropdown list. The rating set assigned to the currently displayed inspection is indicated in the Calc Date dropdown with an asterisk (*).

Note: Only the latest load rating set can be edited; all previous rating sets are display only.

This screen displays the list of load ratings associated with the displayed rating set. The detailed load rating data for each of the list items cannot be directly edited on this screen – the user must select one of the displayed load ratings and proceed to the Load Rating Detail screen to edit data (assuming the user has the necessary security authorization).

In edit mode, the header in the load rating list section contains a Create link. Clicking on the link allows users to create a new load rating for the rating set. Each list item also has two links, Edit and Remove, which allow users to view and edit the corresponding load rating or remove the load rating, respectively.

In view mode, each load rating list item includes a single View link to access the Detail screen.

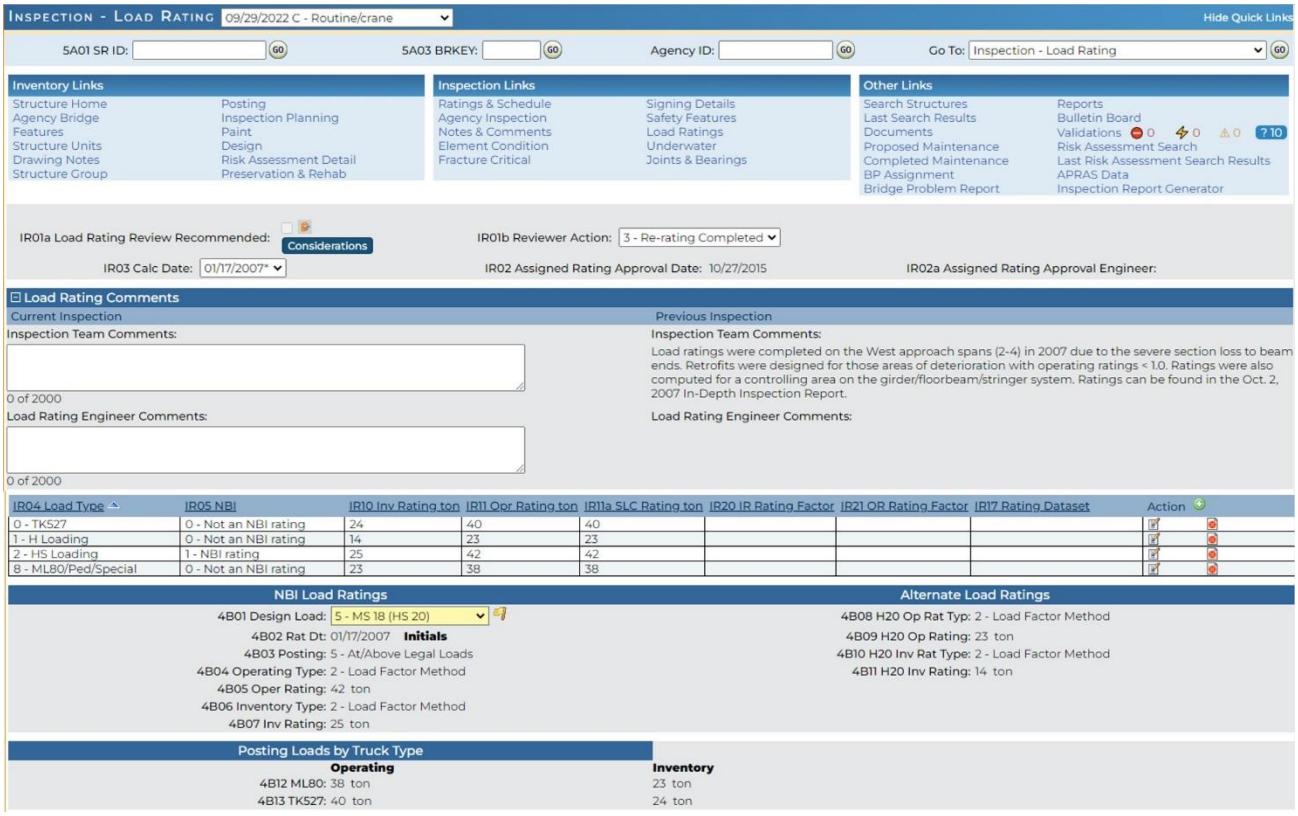


Figure 2.5.6.1-1 Load Rating List Screen

Determining the need for a New Rating Set

To assist inspectors and office staff with determining if a new load rating is required following the inspection of a structure, PennDOT has developed a list of considerations to be evaluated. Inspectors and load rating engineers will use these questions to answer why or why not a new load rating is required. These considerations include:

- Has the dead load increased (e.g., additional wearing surface has been placed)?
- Has there been new or additional section loss to the main load carrying members in critical areas?[1]
- Has the existing capacity of the bridge been increased (e.g., bridge has been rehabilitated)?

- Has there been a change in the Live Load configuration (e.g., barriers have been installed to restrict vehicles from certain areas)?[2]
- Has the superstructure configuration changed (e.g., the bridge has been widened)?
- Has the substructure or superstructure deteriorated to a condition that may limit or further limit the load carrying capacity of the bridge (e.g., a substructure unit exhibits advanced section loss)?
- Has the condition code or distress level changed on a bridge load rated with the engineering judgement load rating method?[3]
- Has the deck deteriorated to a condition that may limit or further limit the load carrying capacity of the bridge?
- Has there been a change in the condition code of the superstructure or substructure, which would result in the need to apply an SLC factor? Apply 0.8 factor when Super/Sub = 4 (ADTT >= 500) or <= 3, 0.9 factor when Super/Sub = 4 (ADTT < 500).
- If the controlling super/culvert condition rating is = 5 for 15 years or more, is the current load rating >= 15 years old?[4]
- If the controlling super/culvert condition rating is <= 4, is the current load rating >= 10 years old?[3]

[1] This includes section loss to strands and/or reinforcing bars.

[2] This includes ensuring the temporary barrier is capable of restricting live load from the deteriorated sections of the bridge as modeled in the load rating for the bridge.

[3] This includes ensuring Engineering Judgment is an acceptable load rating method for the structure type.

[4] The elements associated with these condition ratings may result in a quantity in Condition State 4. An element in Condition State 4 requires a strength or serviceability check to determine if it should remain in that condition state. After the check is completed, notes about the check (i.e., the reason it moved to Condition State 3 or remained in Condition State 4) should be added to the elements 1A12 comment for reference by future inspectors.

As part of the inspection process, the inspection team shall provide a general answer to the considerations in the "Inspection Team Comments" field and the Load Rating Engineer will provide a review of the inspection team's comments in the "Load Rating Engineer Comments" field. The comments from the past inspection are provided as reference.

Generate a New Rating Set

An authorized user can create a new load rating set by clicking on New Rating Set button located underneath the PennDOT link at the top left of the page. When the New Rating Set button is clicked, the load ratings for the current displayed rating set are copied to a new rating set and the Calc Date field is open for entry. The user can only enter/change the Calc Date value for a new rating set before the Save button is pressed to save the new rating set to the database. Once the rating set is saved to the database the Calc Date cannot be changed. Once the Save button is pressed, the user can modify the new rating set, if necessary, by using the Create, Edit, and Delete links buttons.

If this screen is accessed for a new structure that does not yet have a rating set, the New Rating Set button creates a single, "empty" load rating detail item to establish the new rating set. The user can then edit the "empty" load rating and/or create new load ratings for the set using the Create and Edit links.

When a new rating set is generated, the corresponding Reviewer Action (stored at the inspection level) is automatically set to 0 – Not Reviewed.

Discard Rating Set

When the user clicks the New Rating set button to create a new rating set the Drop New Rating Set button is enabled. The Drop New Rating Set button can be used to stop the new rating set process and return the rating set display back to the prior rating set. The Drop New Rating Set button is only available until the user presses the Save button for the new rating set; once a new rating set is saved it cannot be deleted.

Assigning a New Rating Set

When the user wishes to assign a new rating set to the current inspection, it can be done by clicking the Assign Rating Set button. However, the new assignment is not committed to the BMS2 database until the Save button is pressed.

2.5.6.2 Load Rating Detail

The Load Rating Detail screen allows users to view and maintain detailed load rating data.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next load rating detail record in the rating set. The Save button saves the modified rating to the BMS2 database. The New and Delete buttons are used to add a new load rating item or remove the load rating item, respectively.

Only one load rating within a rating set can be designated as the NBI rating. When Item IR05 is set to "1 – NBI Rating" on the Load Rating Detail screen, the NBI rating field for the prior load rating within the current rating set that was designated as the NBI rating is reset to "0 – Not an NBI Rating". This helps to ensure that only a single rating in each rating set is designated as the NBI rating.

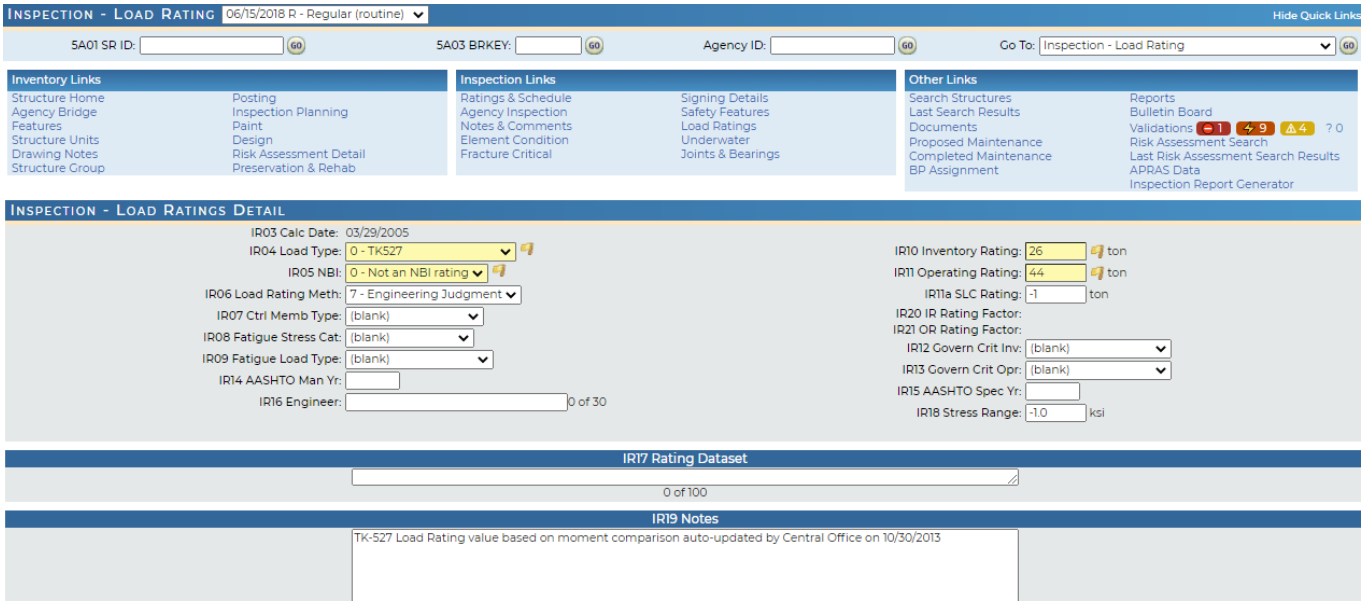


Figure 2.5.6.2-1 Load Rating Detail Screen

2.5.7 Non-Redundant Steel Tension Member/Fatigue

2.5.7.1 General Information and List

The Non-Redundant Steel Tension Member (NSTM)/Fatigue screen allows users to view and maintain NSTM/Fatigue inspection data. The screen also displays view-only inspection info and main and approach span NSTM/Fatigue inventory information for convenient reference.

The detailed data for the listed NSTM/fatigue items cannot be directly edited on this screen – the user must select one of the displayed items and proceed to the NSTM/Fatigue Detail screen to edit data (assuming the user has the necessary security authorization).

In edit mode, the header in the list section contains a Create link. Clicking on the link allows users to create a new NSTM/fatigue inspection item. Each list item also has two links, Edit and Remove, which allow users to view and edit the corresponding NSTM/Fatigue inspection item or remove the item, respectively.

In view mode, each NSTM/Fatigue inspection item includes a single View link to access the corresponding Detail screen.

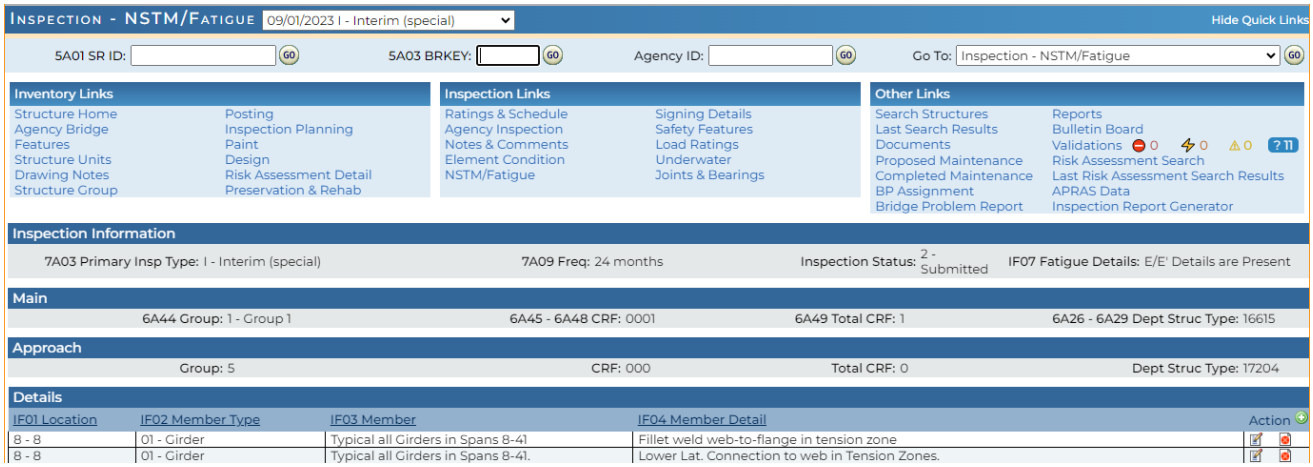


Figure 2.5.7.1-1 NSTM/Fatigue List Screen

2.5.7.2 NSTM/Fatigue Detail

The NSTM/Fatigue Detail screen allows users to view and maintain NSTM/Fatigue inspection data.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next NSTM/Fatigue inspection item in the list. The Save button saves the modified data to the BMS2 database. The New and Delete buttons are used to add a new NSTM/fatigue inspection item or remove the current inspection item, respectively.

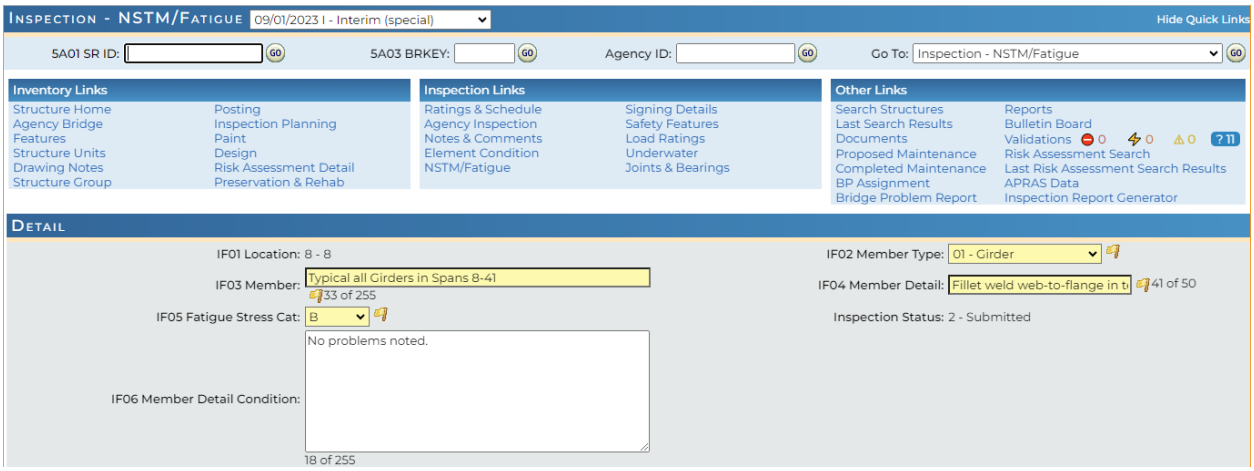


Figure 2.5.7.2-1 NSTM/Fatigue Detail Screen

2.5.8 Underwater

2.5.8.1 General Information and List

The Underwater Inspection screen allows users to view and maintain the detailed data related to an underwater inspection. The Save button saves any changes to this screen to the production BMS2 database. This screen has three sub screens associated with it: SCBI (IU Items), Sub Units (IN Items), and Other (IL Items). Each provides detailed data related to underwater inspection.

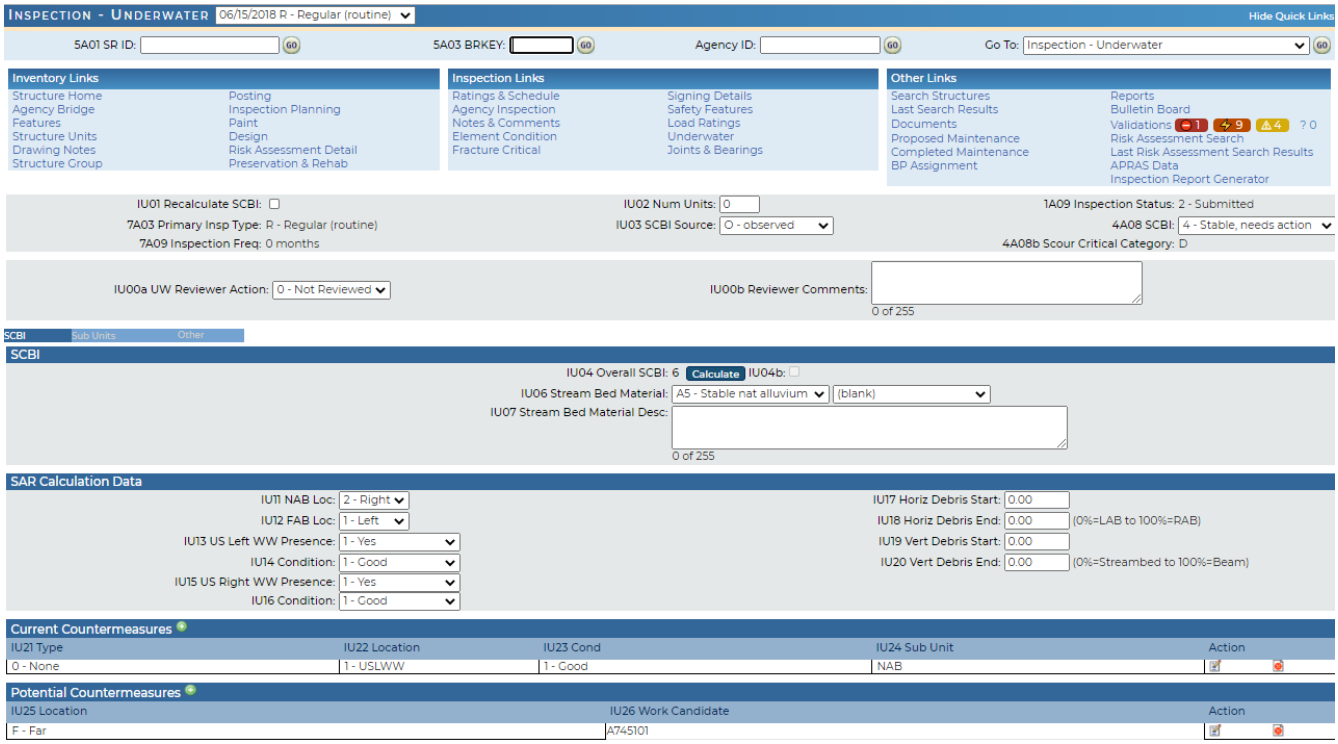


Figure 2.5.8.1-1 Underwater Inspection Screen

The Underwater screen includes direct links to the Inspection Comments screen for the 1A06 Waterway Condition rating and the IL05 Elevation (High Water Mark) fields. When one of the detailed comments links is clicked, the Inspection Comment List screen is displayed showing only those comments that apply to the corresponding condition rating.

2.5.8.2 Underwater Sub Unit List

The Underwater Sub Unit List screen allows users to view the list of sub units for a structure related to an underwater inspection. Only substructure units within the 500-year flood plain should be listed on the screen. If the sub unit is listed on the screen, the required fields on the Sub Unit Detail screen must be completed.

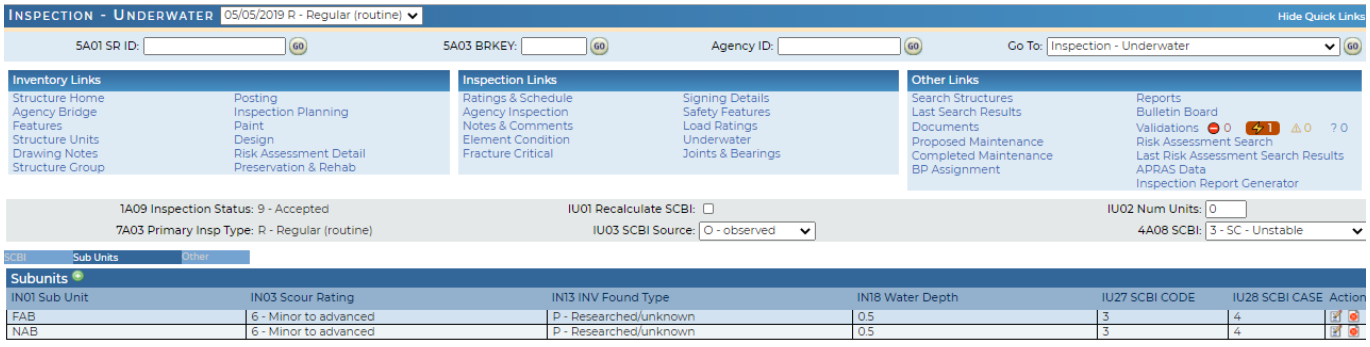


Figure 2.5.8.2-1 Underwater Sub Unit List Screen

2.5.8.3 Underwater Sub Unit Details

The Underwater Sub Unit Details screen allows users to view and edit the detailed underwater inspection data related to a sub unit as recorded or verified during an underwater inspection. The Previous and Next buttons allow the user to display the previous or next sub unit inspection item in the list. The New and Delete buttons are used to add a new sub unit or remove the sub unit, respectively.

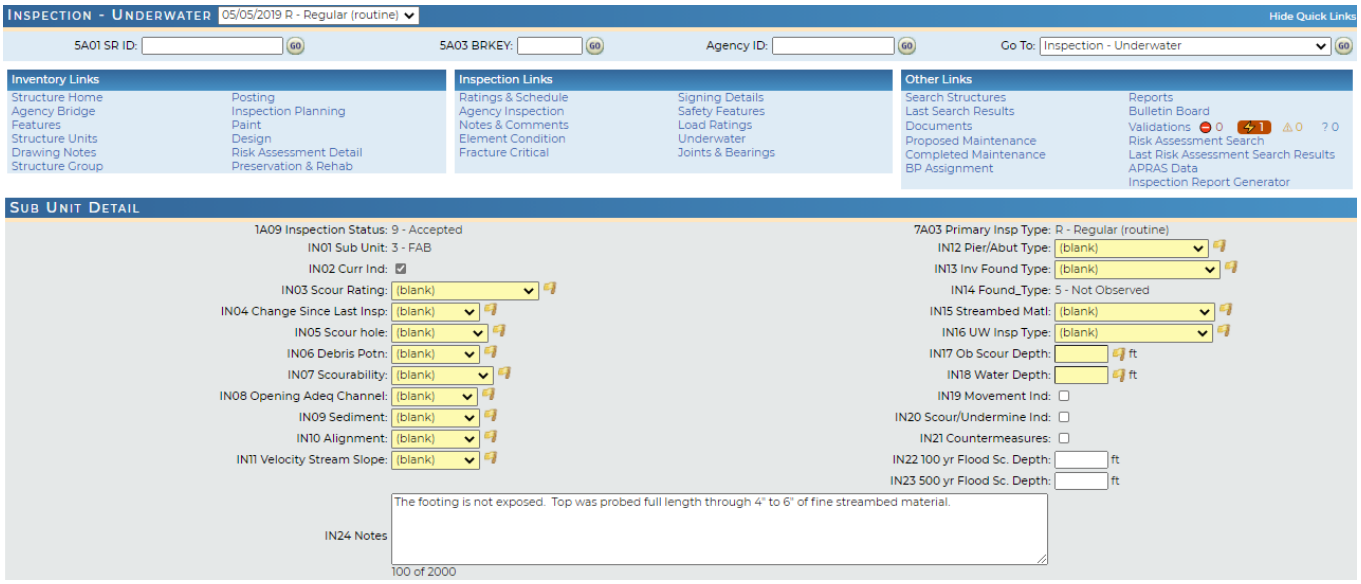


Figure 2.5.8.3-1 Underwater Sub Unit Details Screen

2.5.8.4 Underwater Other Details Screen

The Underwater Other Details screen allows users to view and edit the other underwater inspection data such as high water notes and underclearances.

The Underwater Other Details screen includes direct links to the Inspection Comments screen for Item 1A06 and Item IL05. When one of the detailed comments links is clicked, the Inspection Comment List screen is displayed showing only those comments that apply to the corresponding condition rating.

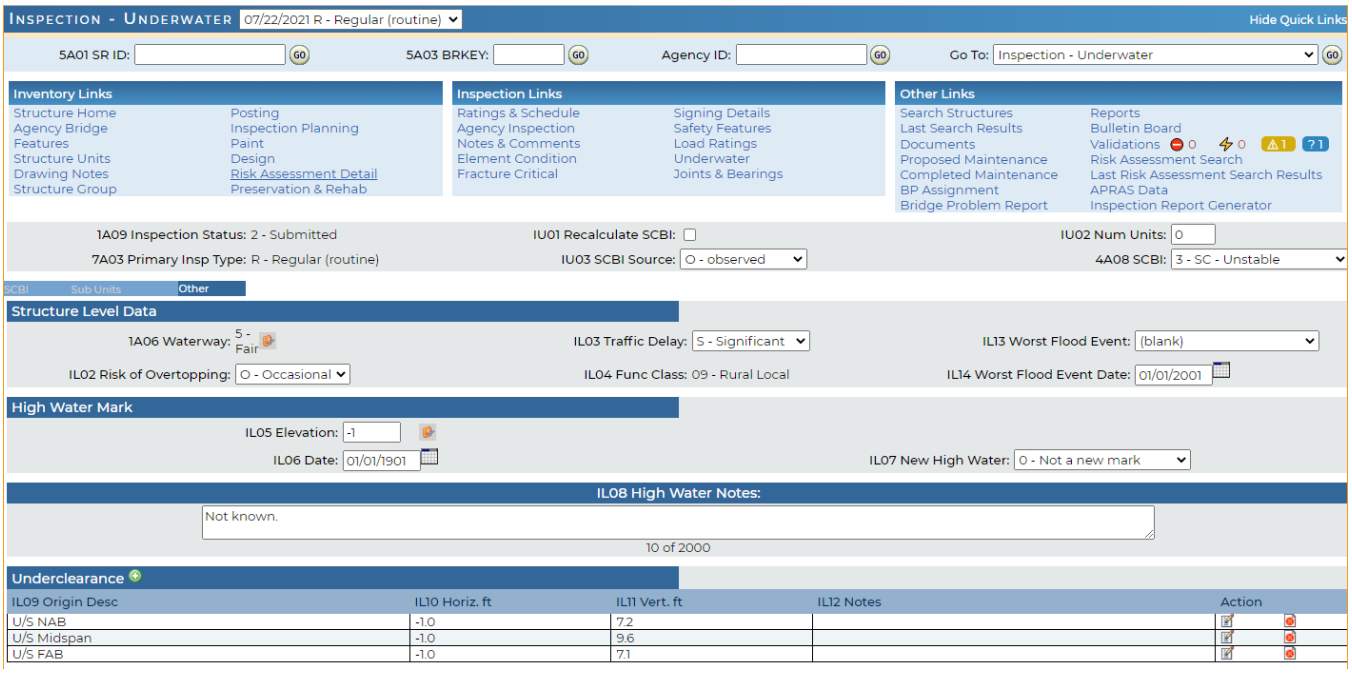


Figure 2.5.8.4-1 Underwater Other Details Screen

2.5.9 Inspection – Signs & Lights

The purpose of this screen to is to allow users to view and maintain basic inspection condition and schedule data for a sign or light structure. This screen displays component level condition ratings, and other rating and inspection scheduling information for the structure. This screen is only accessible if the structure is coded as a sign or high mast light in Item 5A17. When coded as a sign or high mast light in Item 5A17, a link to this screen will appear in the top center under Inspection Links.

This screen can be accessed in Edit mode by authorized users. The Save button saves modified fields to the production BMS2 database.

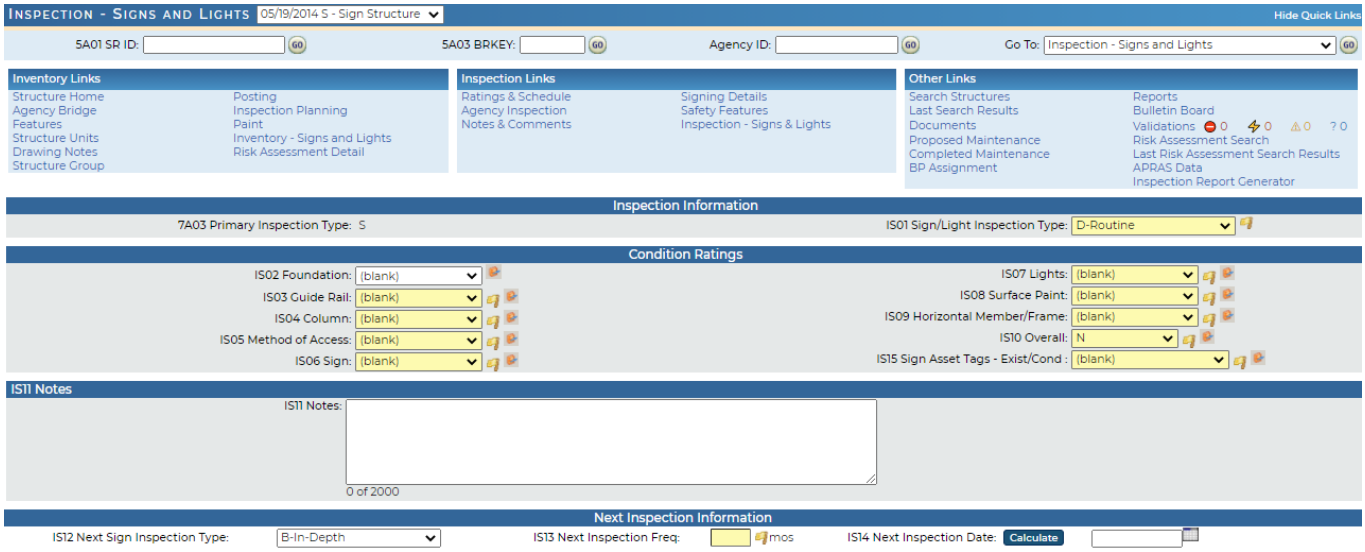


Figure 2.5.9-1 Signs & Lights Inspection Screen

This screen includes a direct link to the Inspection Comments screen for each of the condition rating fields. When one of the detailed comments links is clicked, the Inspection Comment List screen is displayed showing only those comments that apply to the corresponding condition rating.

2.5.10 Inspection – Walls

The purpose of this screen to is to allow users to view and maintain basic inspection condition and schedule data for a wall structure. This screen displays component level condition ratings, and other rating and inspection scheduling information for the structure. This screen is only accessible if the structure is coded as a noise wall or retaining wall in Item 5A17. When coded as a wall in Item 5A17, a link to this screen will appear in the top center under Inspection Links.

This screen can be accessed in Edit mode by authorized users. The Save button saves modified fields to the production BMS2 database.

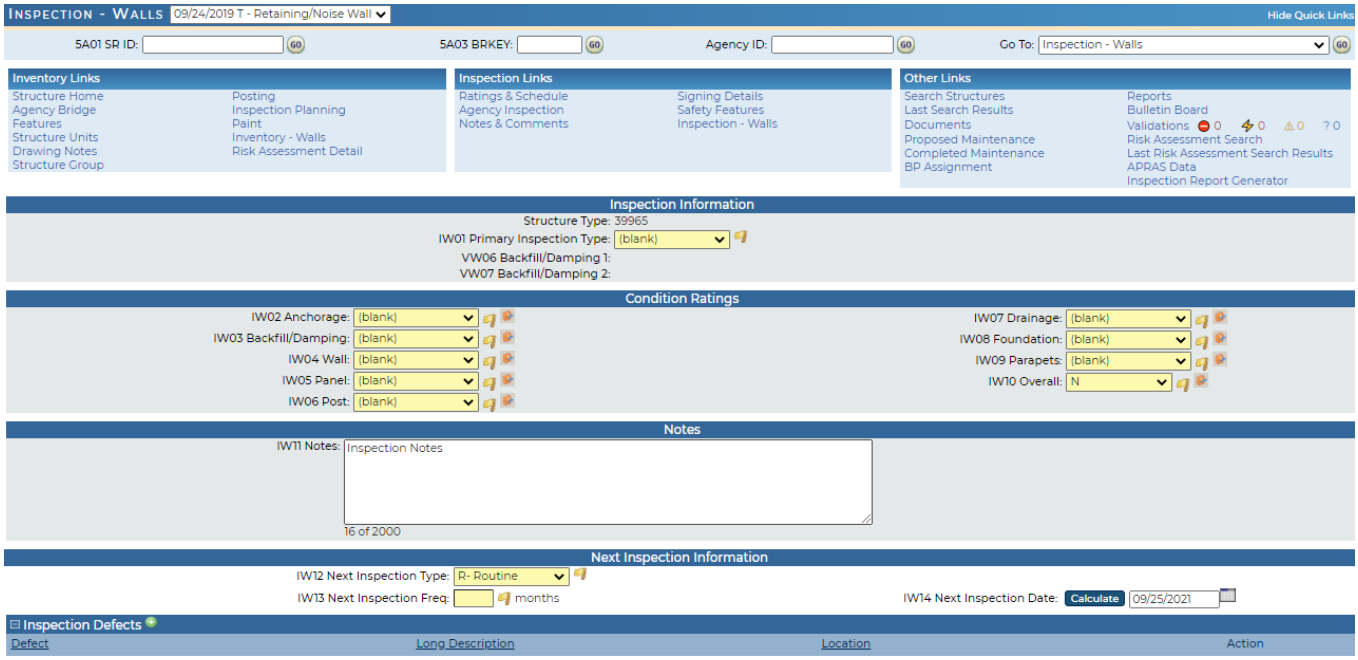


Figure 2.5.10-1 Walls Inspection Screen

This screen includes a direct link to the Inspection Comments screen for each of the condition rating fields. When one of the detailed comments links is clicked, the Inspection Comment List screen is displayed showing only those comments that apply to the corresponding condition rating.

2.5.11 Signing Details

2.5.11.1 Signing Lists and Notes

The Signing Detail screen allows users to view and maintain signing inspection data submitted from BMS3.

This screen displays the ten types of signs shown in BMS3, if the sign is needed, the sign message, the sign location, and whether the sign is missing, damaged, or in good condition. The detailed signing information for each of the sign types cannot be directly edited on this screen – the user must select one of the displayed items and proceed to a corresponding Signing Detail screen to edit data (assuming the user has the necessary security authorization).

In edit mode, the header for the signing section contains a Create link. Clicking on the link allows users to create a new sign type. Each list item also has two links, Edit and Remove, which allow users to view and edit the corresponding sign type or remove the sign type, respectively.

In view mode, each sign type list item includes a single View link to access the corresponding Detail screen.

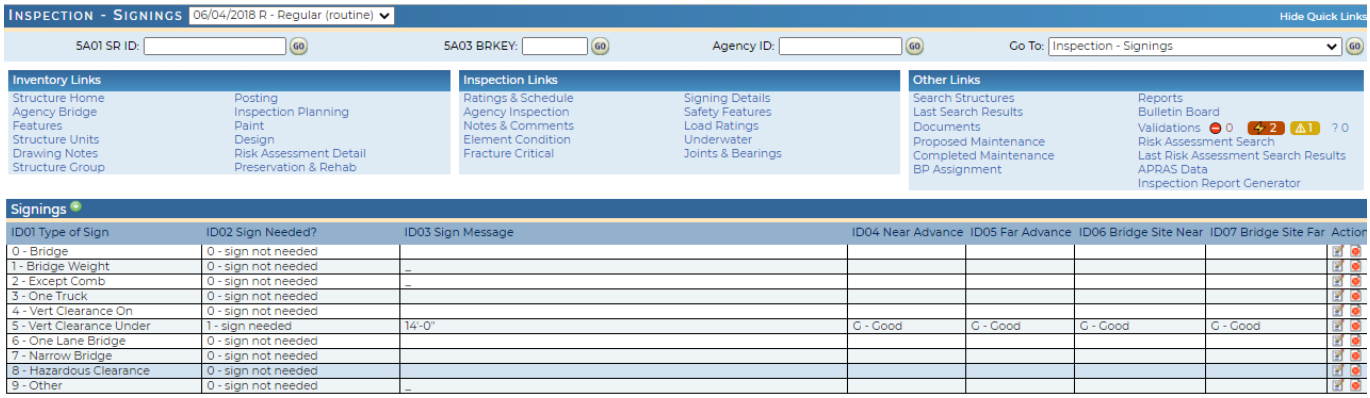


Figure 2.5.11.1-1 Signings Screen

2.5.11.2 Signing Detail Comment Detail

The Signing Detail Comment Detail screen allows users to view and maintain detailed sign types, locations, and comments.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next signing detail in the list. The Save button saves any modified data to the BMS2 database. The New and Delete buttons are used to add a new sign type or remove the current sign type, respectively.

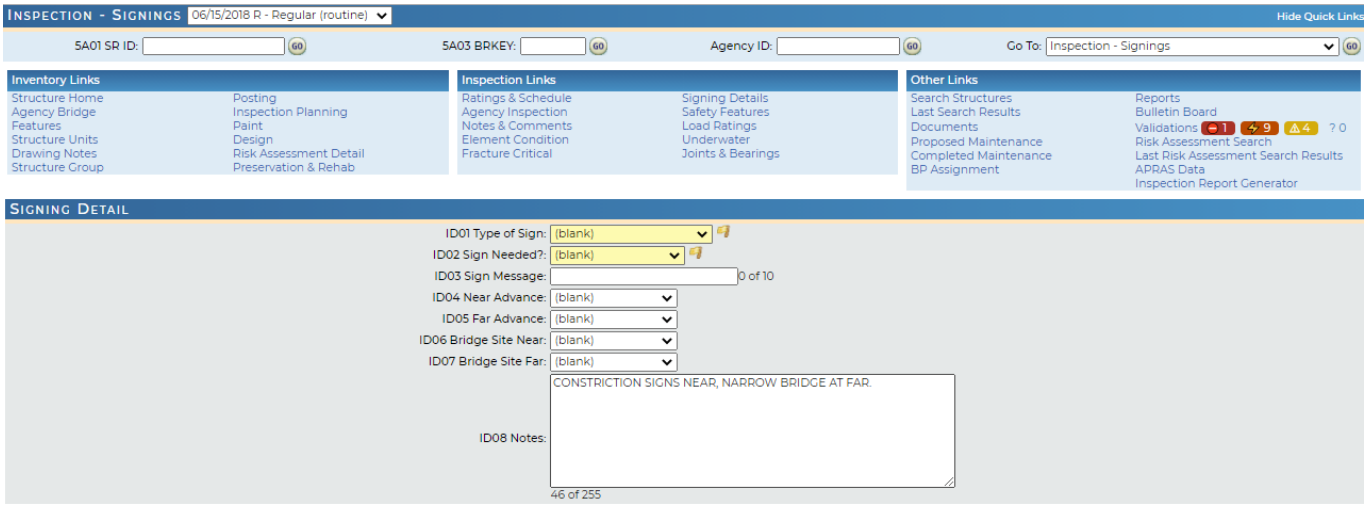


Figure 2.5.11.2-1 Signing Detail Comment Detail Screen

2.5.12 Safety Features

2.5.12.1 Safety Features List

The Safety Features screen allows users to view and maintain safety feature inspection data submitted from BMS3.

This screen displays the four safety features types, controlling location, adequacy rating, and description of the feature. The detailed information for each of the safety features cannot be directly edited on this screen – the user must select one of the displayed items and proceed to a corresponding Detail screen to edit data (assuming the user has the necessary security authorization).

Each list item also has an Edit link, which allow users to view and edit the corresponding safety feature.

In view mode, each safety feature list item includes a single View link to access the corresponding Detail screen.

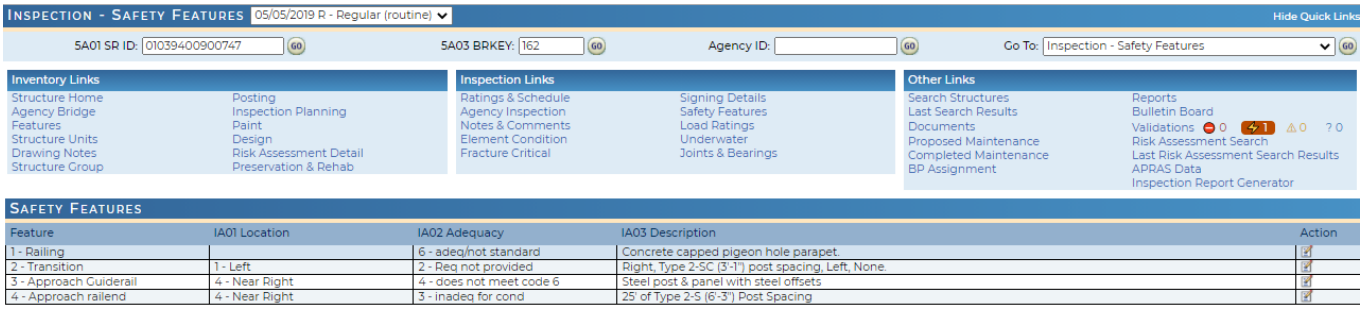


Figure 2.5.12.1-1 Safety Feature Screen

2.5.12.2 Safety Feature Comment Detail

The Safety Feature Comment Detail screen allows users to view and maintain detailed information about the safety feature.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next safety feature in the list. The Save button saves any modified data to the BMS2 database.

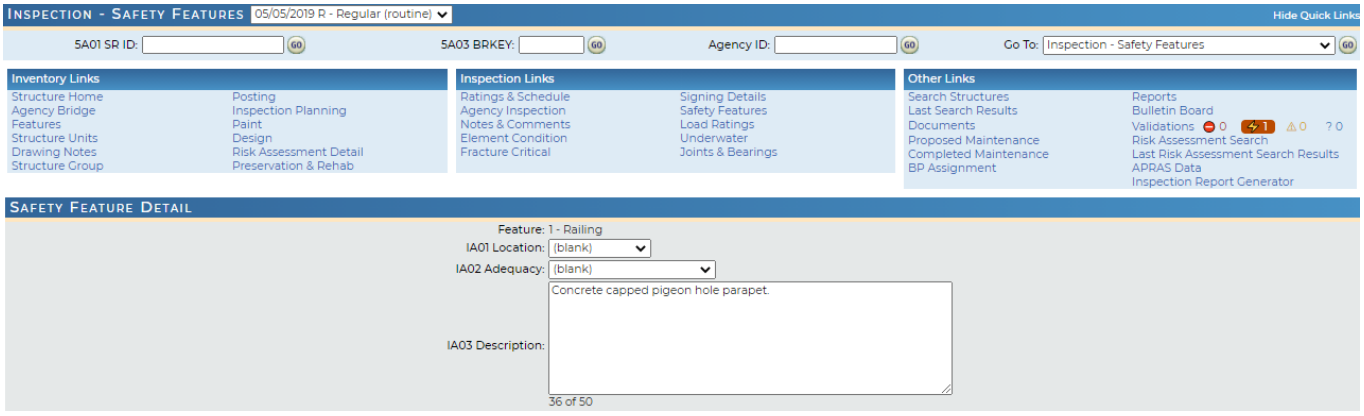


Figure 2.5.12.2-1 Safety Feature Comment Detail Screen

2.5.13 Joints & Bearings

2.5.13.1 Joints & Bearings List and Notes

The Joints & Bearings screen allows users to view and maintain joint and bearing inspection data submitted from BMS3.

This screen displays the overall condition ratings and notes for the joints and bearings. It also displays in tabular form, the location, type, and individual condition ratings for the joints and bearings. The detailed information for each of the joints or bearings cannot be directly edited on this screen – the user with the necessary security permissions must select one of the displayed items and proceed to a corresponding Detail screen to edit data . This screen also maintains a historical record of the joints and bearings as they are replaced. The screen contains the previous joint and bearing records which can be displayed by pressing the ⊞ button which will display any previous records for that location.

Each listed item also has an Edit link, which allows users to view and edit the corresponding joint or bearing.

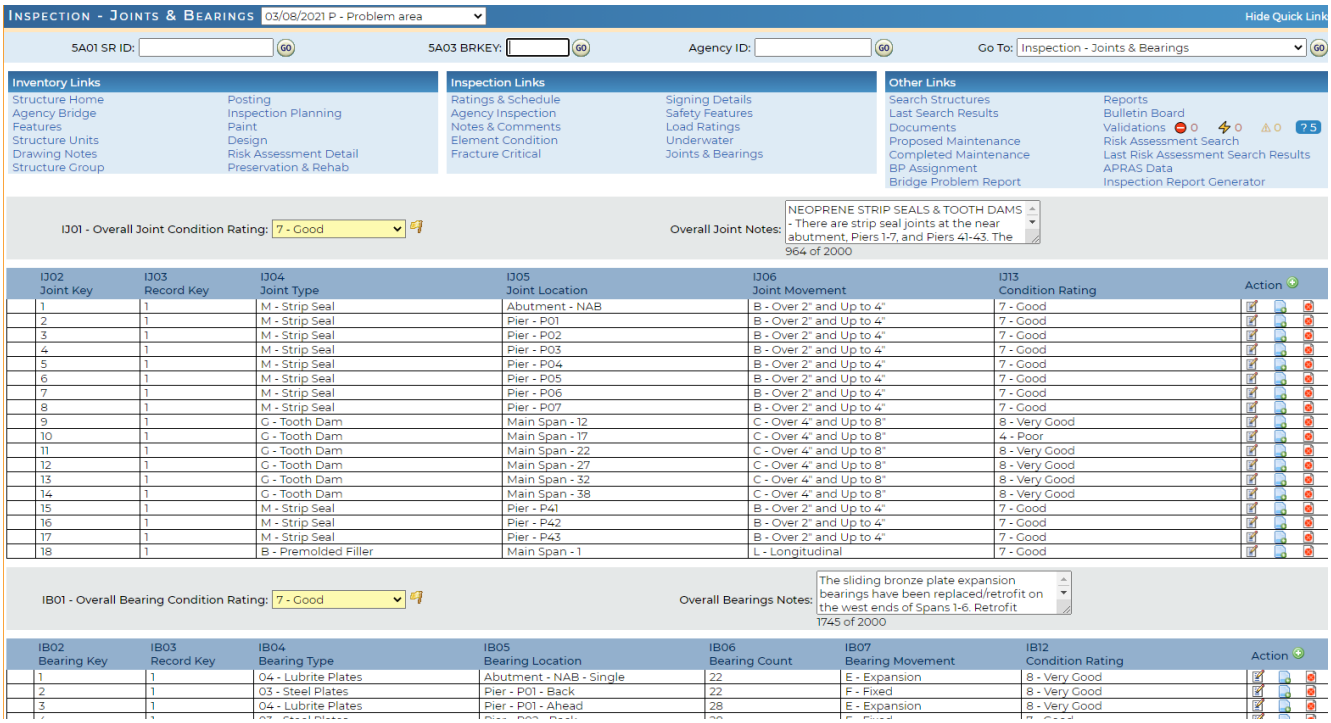


Figure 2.5.13.1-1 Joints & Bearings Screen

2.5.13.2 Joint Data Detail

The Joint Data Detail screen allows users to view and maintain detailed information about an individual joint.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next joint in the list. The Save button saves any modified data to the BMS2 database.

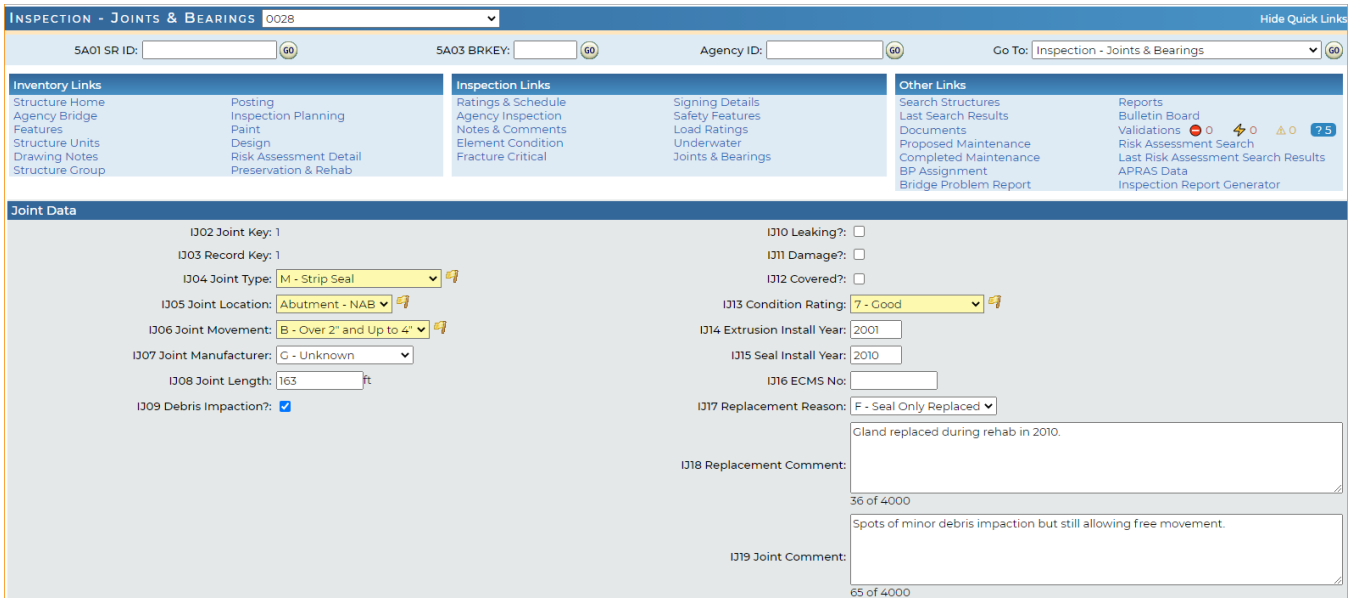


Figure 2.5.13.2-1 Joint Data Detail Screen

2.5.13.3 Bearing Data Detail

The Bearing Data Detail screen allows users to view and maintain detailed information about an individual bearing.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Previous and Next buttons allow the user to display the previous or next bearing in the list. The Save button saves any modified data to the BMS2 database.

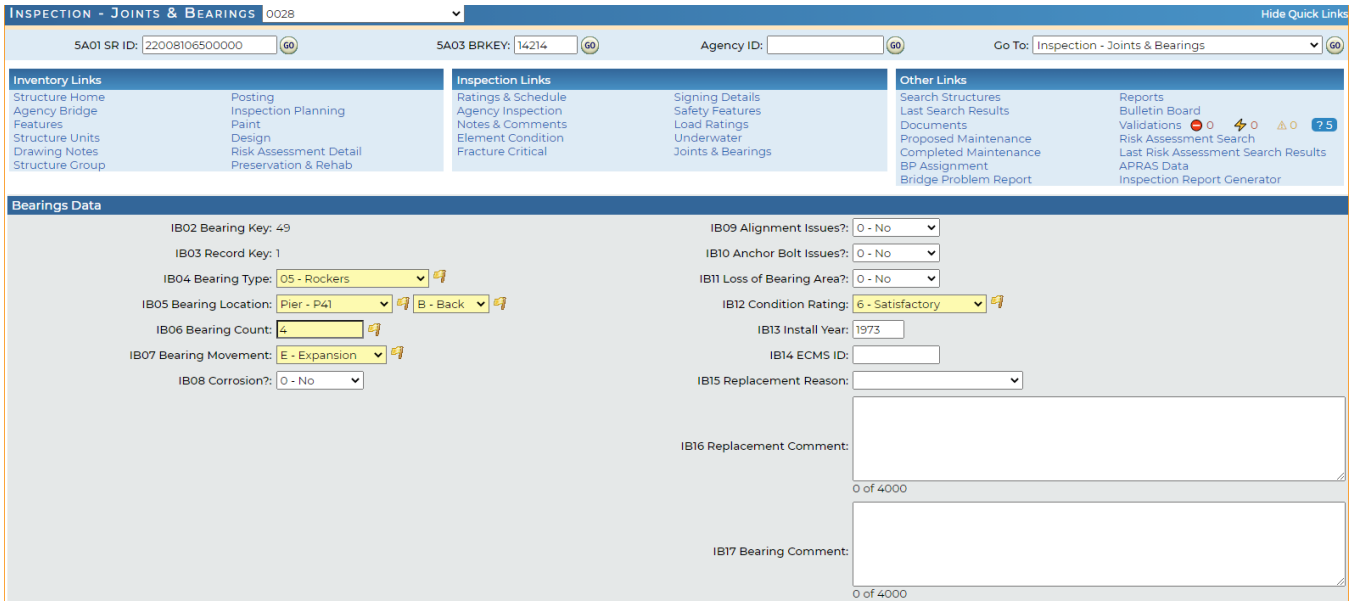


Figure 2.5.13.3-1 Bearing Comment Detail Screen

2.6 Bridge-Related ECS Documents

2.6.1 Document

The Document screen provides users with a list of electronic documents stored in the PennDOT Enterprise Content Services (ECS) that have been linked to or uploaded for the current structure. From this list the user can choose to view existing documents, remove documents, or add additional documents to the list.

This screen presents separate scrollable lists of inventory-level and inspection-level documents associated with the current structure. For a document to appear on one of these lists it must

- Exist in ECS
- Be linked to the structure in BMS2 either by being uploaded from the BMS2 Document Screen using the web upload process or "linked" to the structure using the "link" function on the Documents screen.

The Source field displayed for each listed document indicates whether the document was uploaded from BMS2 or whether it was loaded into ECS before being linked to BMS2.

Note: There may be an initial conversion and linking of existing ECS documents to corresponding structures in BMS2. However, in general a structure-related document directly loaded into ECS will not be linked to a structure unless the user manually creates the link using the BMS2 Web Link ECS Documents screen.

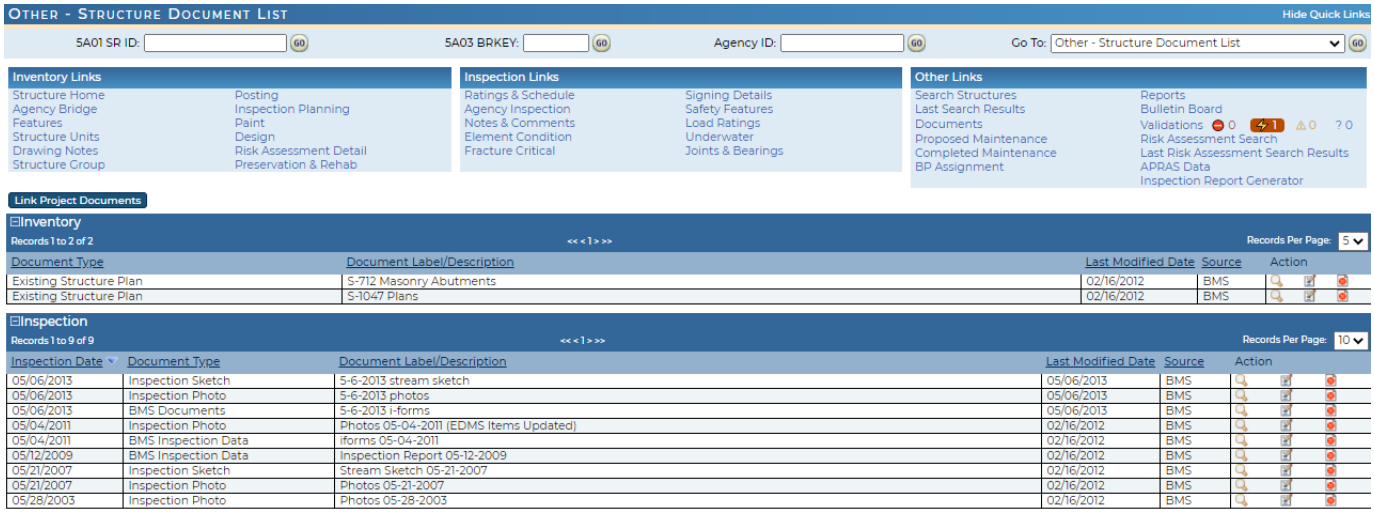


Figure 2.6.1-1 ECS Document List Screen

The View link allows users to view the actual document as retrieved from ECS. Documents accessed using the View link are displayed using an existing application on the client machine, invoked based on file association (e.g., a PDF file may open in Adobe Acrobat Reader). The display of the documents is completely dependent upon the file associations – no specific document viewer is provided via BMS2 Web. If document is a "group", the view button will open another screen where the individual files within the group can be viewed.

The Edit link allows users to update certain BMS2 properties of the link, such as the document description or the inspection date. Only specific property fields for the linked file can be edited – the user cannot edit the actual ECS document itself or change the linked ECS document.

The Delete link deletes the document link from BMS2. The delete link does not delete the document itself in ECS – only the link to the specific structure in BMS2 is removed.

In view-only mode, each listed document item only includes a single View link to access the document.

The screen also includes Upload and Link buttons. The Upload button allows users to navigate to the Upload ECS Document screen where they can upload a document from a local drive to ECS and associate the uploaded document with a specific structure and/or inspection in BMS2. The Link button allows users to navigate to the Link ECS Documents screen where users can associate a document that already exists in ECS with a specific structure or inspection.

The Upload and Link buttons are not displayed in view-only mode.

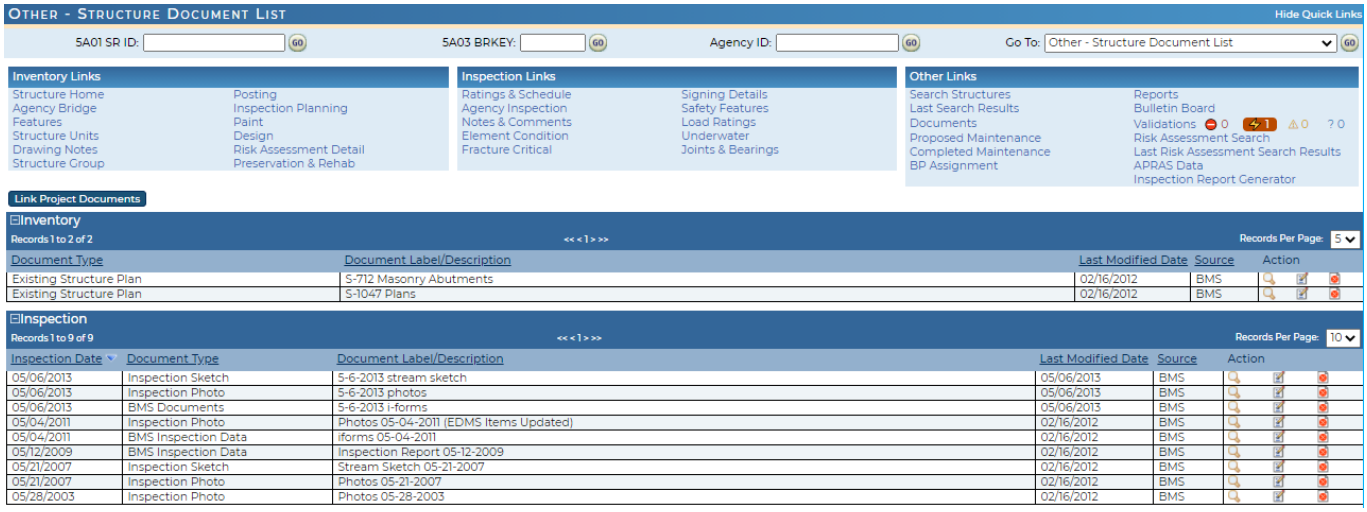


Figure 2.6.1-2 Link and Upload Buttons

2.6.2 ECS Document Upload

The ECS Document Upload screen provides users a mechanism to upload documents to ECS from the user's local machine and establish an association or "link" to a specific BMS2 structure or inspection.

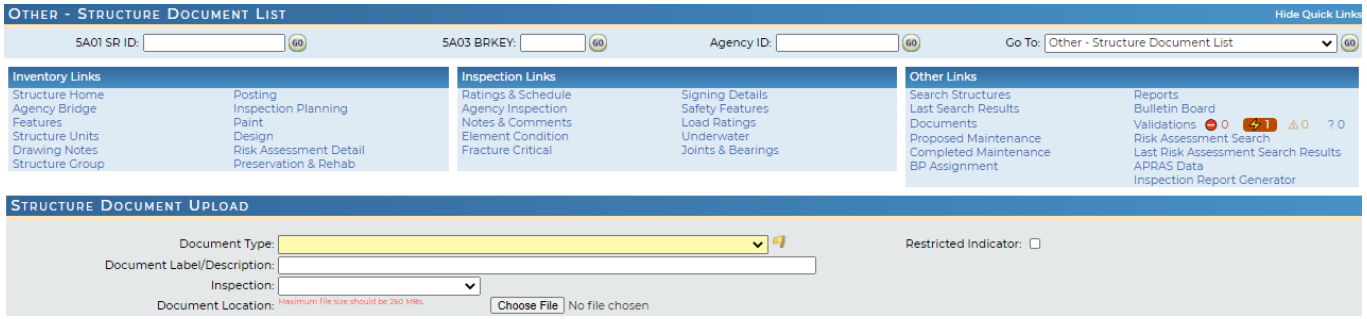


Figure 2.6.2-1 ECS Document Upload Screen

This detail screen presents the information necessary to upload a document to ECS and establish a link to a BMS2 structure. To upload a document into ECS and create a BMS2 link the user must:

1. Select a Document Type from a pre-defined list of structure-related ECS document types. The selected document type is then used to create the document in ECS.
2. (Optional) Enter a BMS2 label unique to the document. This is especially helpful if there are multiple documents of the same type for a specific structure because the label can be used to distinguish the documents without having to open up each one individually to view the content.
3. (Optional) Select the appropriate Inspection (Date) if the document is to be linked to a specific inspection rather than just the structure itself.
4. (Optional) Check the Restricted Indicator to allow only "Owner" Business Partners access to the document uploaded.
5. Enter or select the location of the file to be uploaded. The Document Location field allows the user to specify the location on the user's local machine of the document to be uploaded. The Browse button can be used to navigate the folder structure on the local machine to locate the file to be uploaded.
6. Click the Upload button.

When the Upload button is clicked, the document is transferred from the local machine to the server and deposited into ECS along with the necessary ECS key values. A record is also created in BMS2 that identifies the linked document and stores the label and specific document identifier generated in ECS. The document then appears on the ECS Document List screen.

2.6.2.1 Edit Uploaded ECS Document

The Edit Uploaded ECS Document screen is similar to the upload screen and provides users a mechanism to view and update certain properties of a document previously uploaded for a structure/inspection in BMS2.

For an uploaded document, only the Document Label and Inspection Date fields can be edited. Updated data values are saved only within the BMS2 database. The user cannot change the linked ECS document. If the user wishes to change the linked ECS document, they must remove the link (using the Remove link on the ECS Document List screen) and then upload or link to a new document. Removing the link does not remove the document from ECS.

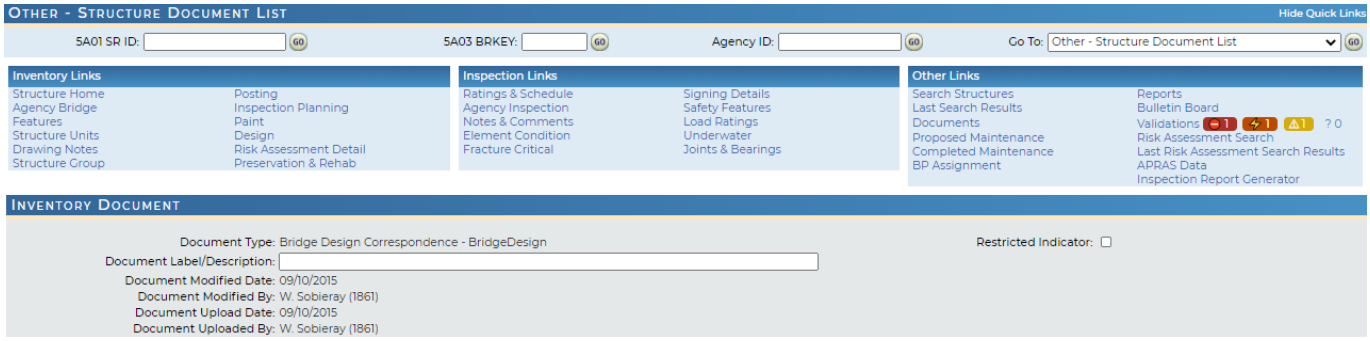


Figure 2.6.2.1-1 Edit Uploaded ECS Document Screen

2.6.3 Link ECS Document

The Link ECS Document screen provides users a mechanism to link a structure or structure inspection to a document that already exists in ECS. It serves a similar function to the Upload ECS Document screen except the document itself is not uploaded. In order for a document to appear for selection/linking, the BRKEY and/or Structure ID for the current structure must have been entered as the structure identifier when the document was created in ECS.

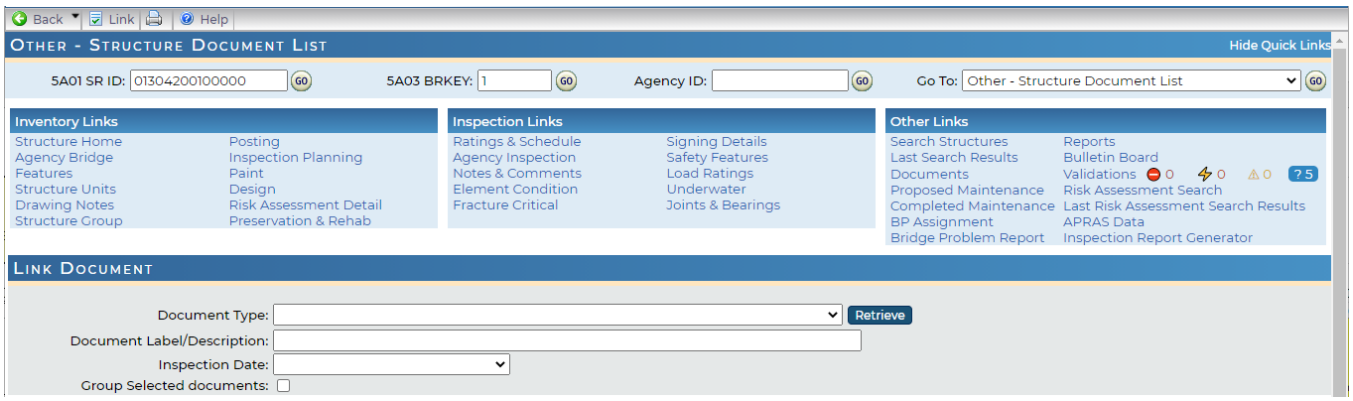


Figure 2.6.3-1 Link ECS Document Screen

The screen presents fields necessary to establish a link with one or more ECS documents. Note the "Group Selected Documents" will only appear after the "Retrieve" button is clicked. To create a BMS2 link to an existing document(s) in ECS the user must:

1. Retrieve the list of documents in ECS that are associated with the current structure. The user must specify the Document Type for which the system should search by selecting it in the Document Type dropdown list.

2. Click the Retrieve button. The system then retrieves a list of all ECS documents of the selected type associated with the current structure. The list shows all documents of the selected type that are in ECS for the current structure but indicates those documents that are already linked to the structure/inspection.

3. To select the document to be linked, the user must click the checkbox for that record. The user may choose one or more documents for a particular document link (e.g., one or more pages of a structure plan).

4. If the user would like to group documents together, after clicking the individual check boxes, the click the "Group Selected Documents" button. The group of documents will be stored together on the documents screen and have the group label that is entered in the Document Label/Description. To view the group, click the magnifying glass to view the individual files.

When the link process is complete, the user is returned to the ECS Document List screen, which now lists the linked document with the date the link was established.

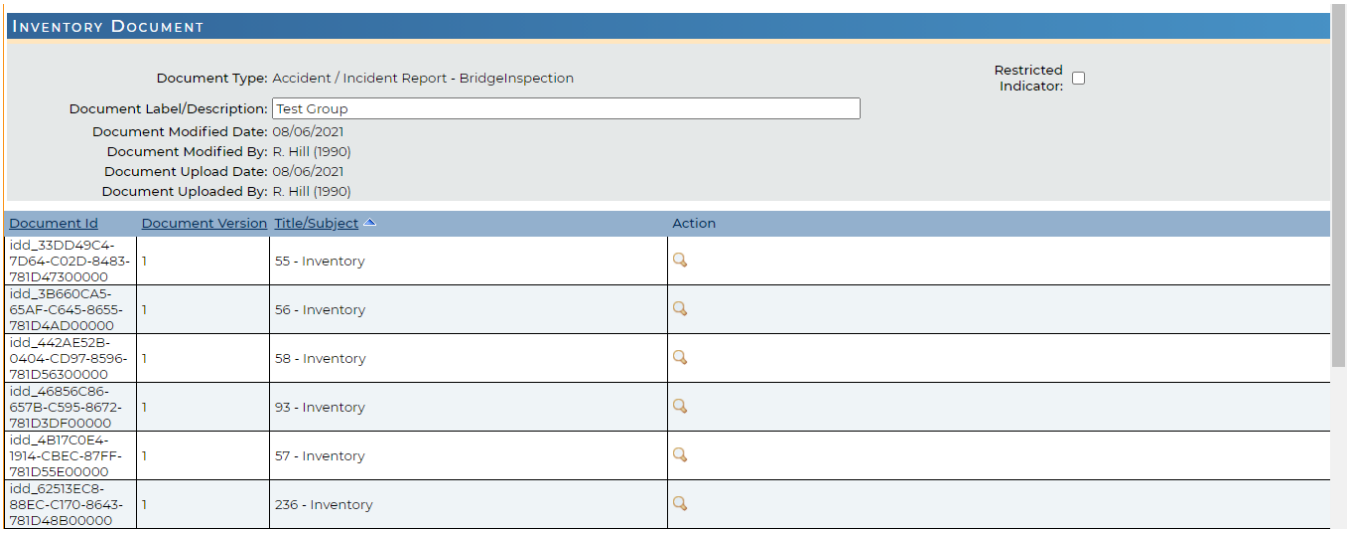


Figure 2.6.3-2 Results from Retrieve Function on Link ECS Document Screen

2.6.4 Link Project Document

The Link Project Document screen provides users a mechanism to link documents from ECMS and MPMS projects into BMS2 ECS. In order for a document to appear for selection/linking, the user must click the "Link Project Documents" button and enter the ECMS or MPMS number. All available documents will be linked.

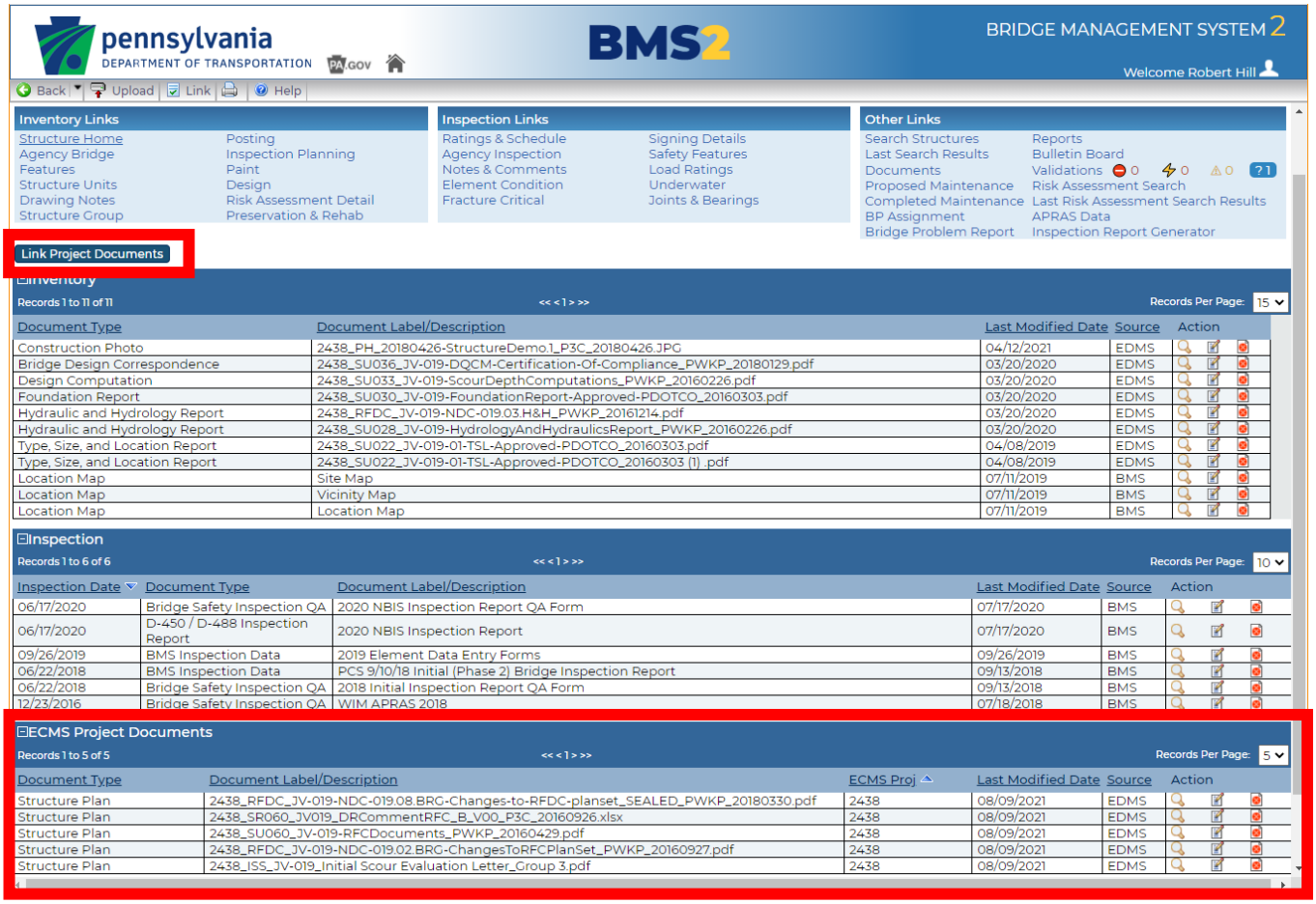


Figure 2.6.4-1 Link Project Documents

2.7 Maintenance

2.7.1 Proposed Maintenance List Screen

To view the proposed maintenance for a particular structure, click on the Proposed Maintenance link in the Quick Links - Other Links section on any structure screen. This can be done either by an authorized PennDOT user or by a business partner user whose organization has been defined as an Owner or Owner agent for the current structure.

After clicking the link, the Proposed Maintenance screen is displayed for the current structure. To view completed maintenance items on the Proposed Maintenance screen, simply check the box next to "Show Completed Work Candidates" near the center of the screen. The screen will update and show the completed maintenance items beneath the proposed.

The detailed information for each of the maintenance items cannot be directly edited on this screen – the user must select one of the displayed items and proceed to a corresponding Detail screen to edit data (assuming the user has the necessary security authorization).

Each list item also has an Edit and Remove link, which allow users to view and edit the corresponding maintenance item or delete the maintenance item, respectively.

In view mode, each maintenance item includes a single View link to access the corresponding Detail screen.

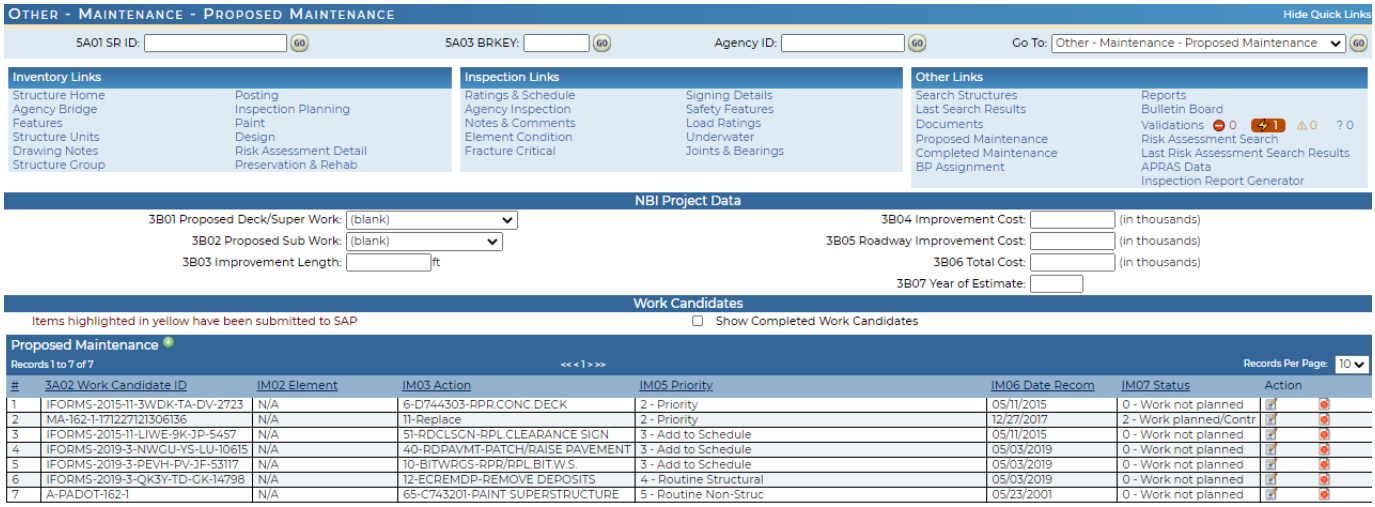


Figure 2.7.1-1 Proposed Maintenance List Screen

2.7.2 Proposed Maintenance Detail Screen

The Proposed Maintenance Detail screen allows users to view and maintain detailed structure-level proposed maintenance items.

This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

The Save button saves the modified comment to the BMS2 database.

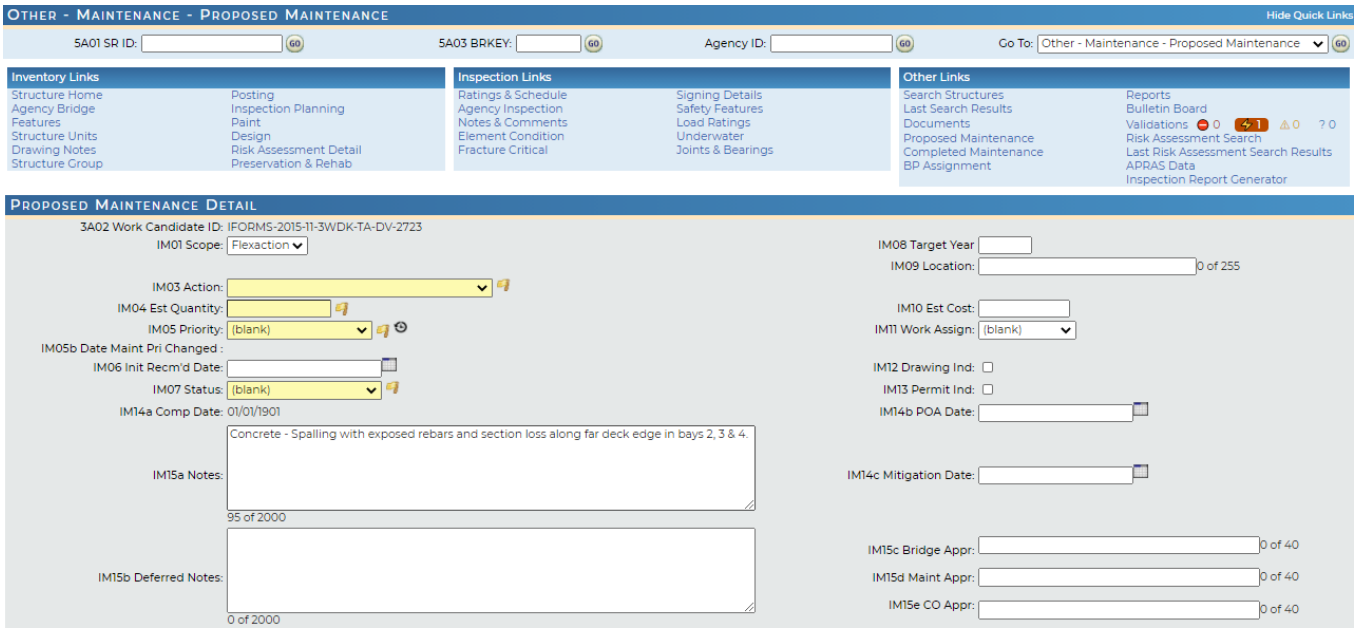


Figure 2.7.2-1 Proposed Maintenance Detail Screen

2.7.3 Completed Maintenance List Screen

To view the completed maintenance for a particular structure, click on the Completed Maintenance link in the Quick Links - Other Links section on any structure screen. This can be done either by an authorized PennDOT user or by a business partner user whose organization has been defined as an Owner or Owner agent for the current structure.

After clicking the link, the Completed Maintenance screen is displayed for the current structure.

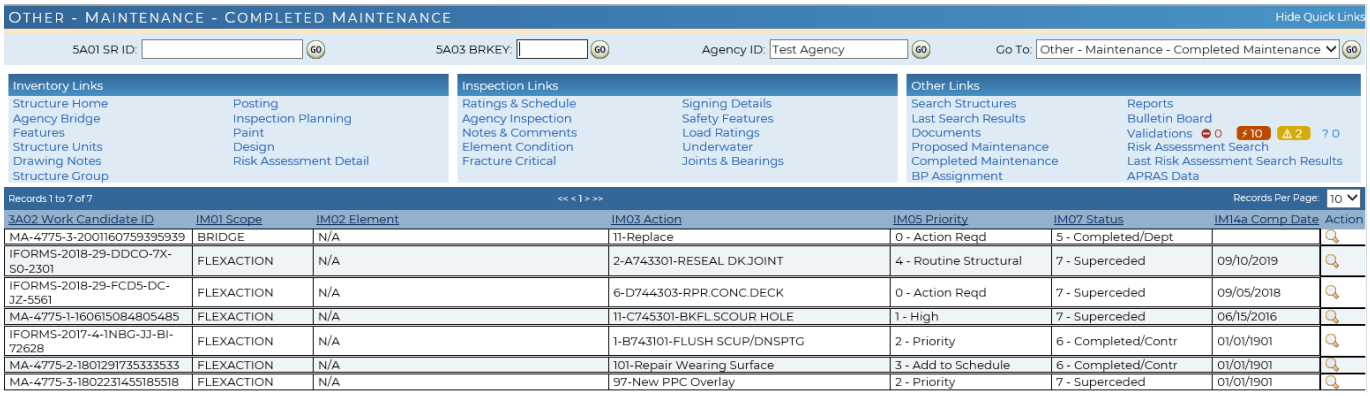


Figure 2.7.3-1 Completed Maintenance Screen

2.7.4 Completed Maintenance Detail Screen

The Completed Maintenance Detail screen allows users to view detailed structure-level completed maintenance items.

This screen is read only and cannot be edited by users.

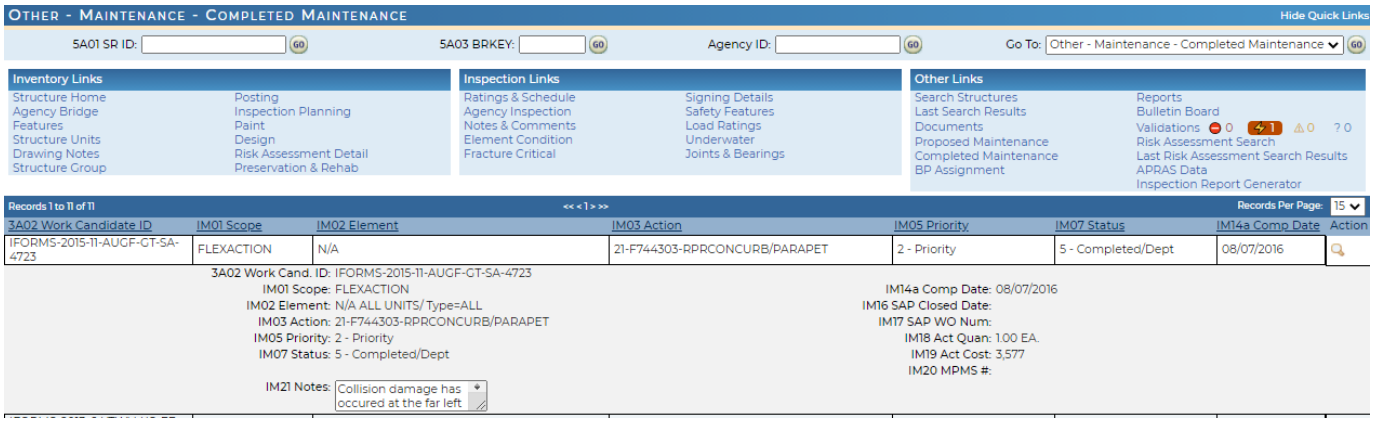


Figure 2.7.4-1 Completed Maintenance Detail Screen

2.7.5 Coding Completed Maintenance Items in BMS2

This section discusses how to code completed maintenance items that were performed by Department Forces and by Contract.

When a maintenance item is completed, and a work order is closed in SAP, BMS2 will receive notification. Depending on the type of maintenance performed, Item IM07 will change to either a "4 – Review Required" or "5 – Completed/Dept". For those items whose status is "4 – Review Required", a follow-up review from the District Bridge Unit or consultant is required to ensure that the repair work was completed satisfactorily. After determining that the work has been performed properly, the reviewer may change the status to "5 – Completed/Dept" and save the change in status. No additional review is required for maintenance items whose status is "5 – Completed/Dept". The date completed, actual quantities and costs (Items IM14, IM18, and IM19) will be taken from SAP/Plant Maintenance.

When a maintenance item is completed by contractor forces, Item IM07 must be changed to "6 – Completed/Contr". Users must also update Items IM04 and IM10 with actual values on the Proposed Maintenance screen. Once changes to these fields have been made and saved, the work item will be stored in the Completed work tab.

When a maintenance item has been eliminated due to major rehabilitation or replacement work, then the status must be changed to "7 – Eliminated", and the actual date of the work should be coded in Item IM14.

2.8 Assigning Business Partners

By definition, PennDOT users have access to all structures in BMS2 and therefore do not have to be assigned access to specific structures. However, after registering as Business Partners, non-PennDOT organizations must be assigned to a structure or group of structures before that organization's users can access BMS2 Web information.

2.8.1 Assign Business Partners to an Individual Structure

To assign business partners as owners, owner agents, inspectors, and/or planning partners for a particular structure, click on the BP Assignment link in the Quick Links - Other Links section on any structure screen. This can be done either by an authorized PennDOT user or by a business partner user whose organization has been defined as an Owner or Owner agent for the current structure.

After clicking the link, the Business Partner Assignment screen is displayed for the current structure.

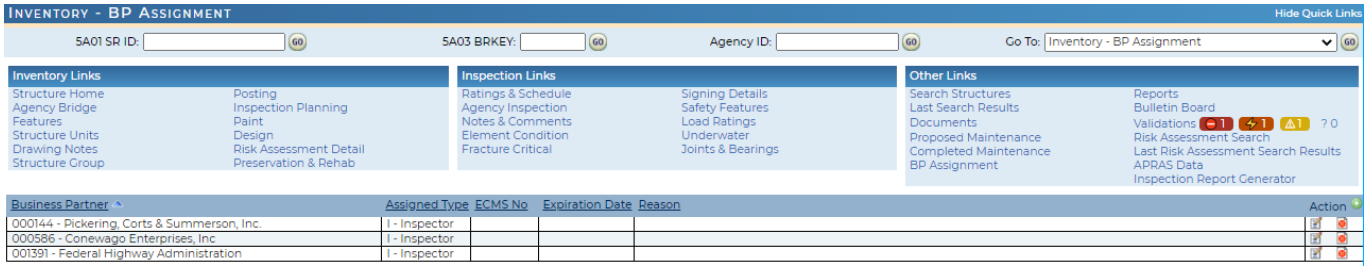


Figure 2.8.1-1 Business Partner Assignment Screen for Selected Structure

A Create link is provided to create a new business partner assignment for the structure. A Remove link is provided to remove an existing business partner assignment. The screen does not restrict the number and types of assignments that can be made – a structure can be linked to multiple owners, owner agents, inspectors, and/or planning partners simultaneously. The Business Partner assignment can also be linked with either an expiration date or with an ECMS agreement. This allows that specific Business Partner assignment to expire either after the expiration date entered, or after the ECMS agreement expires. The assigner can also add a note to explain the reason a business partner has been assigned to the given structure. The expiration date for a specific ECMS project will populate during the overnight batch process and appear the next business day.

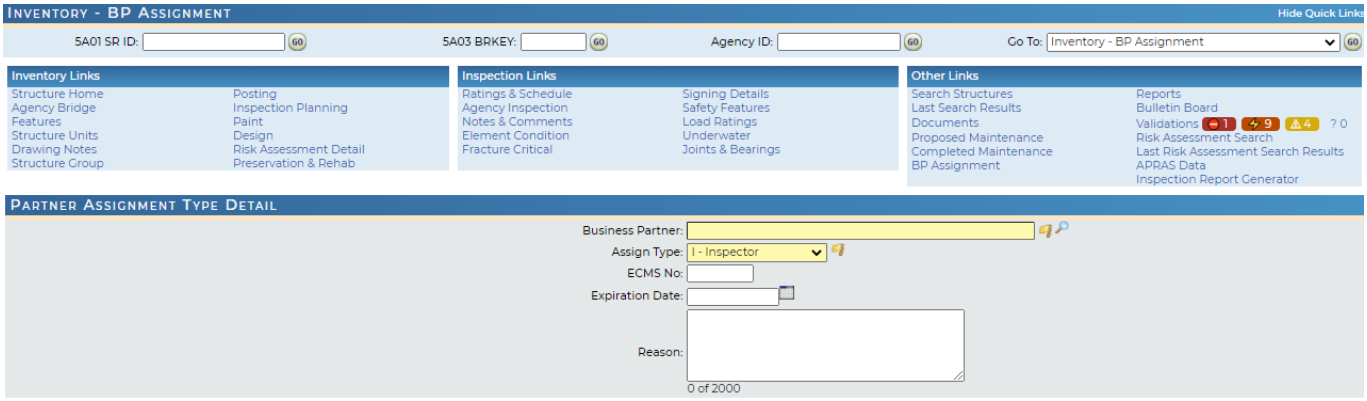


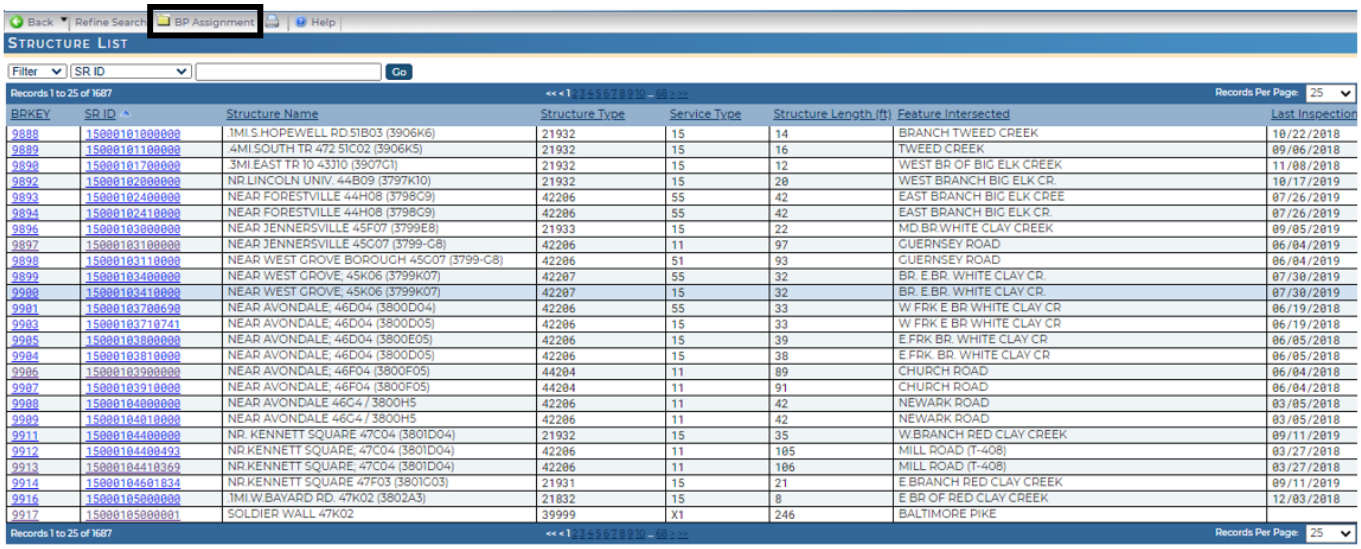
Figure 2.8.1-2 Business Partner Assignment Type Detail Screen

2.8.2 Assign Business Partner to Multiple Structures

To assign a business partner as an owner, owner agent, inspector, or planning partner to multiple structures simultaneously, a business partner assignment function is also available on the Structure List screen.

The list of structures displayed on the Structure List screen is controlled via the search criteria entered on the Structure Search screen. Before using the BP Assignment capability on the Structure List screen, ensure that the list of structures being displayed corresponds to the list of structures to which the business partner is being assigned. Every structure that is listed on the screen will be included in the set of structures used by the assignment process.

On the Structure List screen, click the BP Assignment button. This can be done either by an authorized PennDOT user or by a business partner user whose organization has been defined as an Owner or Owner agent for the structures in the list.



BRKEY	SR ID	Structure Name	Structure Type	Service Type	Structure Length (ft)	Feature Intersected	Last Inspection
9888	15000101000000	.1MI.S.HOPEWELL RD.51B03 (3906K6)	21932	15	14	BRANCH TWEED CREEK	10/22/2018
9889	15000101100000	.4MI.SOUTH TR 472 51C02 (3906K5)	21932	15	16	TWEED CREEK	09/06/2018
9890	15000101700000	.3MI.EAST TR 10 43J10 (3907C1)	21932	15	12	WEST BR OF BIG ELK CREEK	11/08/2018
9892	15000102000000	NR.LINCOLN UNIV. 44B09 (3797K10)	21932	15	20	WEST BRANCH BIG ELK CR.	10/17/2019
9893	15000102400000	NEAR FORESTVILLE 44H08 (3798C9)	42206	55	42	EAST BRANCH BIG ELK CREE	07/26/2019
9894	15000102410000	NEAR FORESTVILLE 44H08 (3798C9)	42206	55	42	EAST BRANCH BIG ELK CR.	07/26/2019
9896	15000103000000	NEAR JENNERSVILLE 45F07 (3799E8)	21933	15	22	MD.BR.WHITE CLAY CREEK	09/05/2019
9897	15000103100000	NEAR JENNERSVILLE 45C07 (3799-C8)	42206	11	97	GUERNSEY ROAD	06/04/2019
9898	15000103110000	NEAR WEST GROVE BOROUGH 45C07 (3799-C8)	42206	51	93	GUERNSEY ROAD	06/04/2019
9899	15000103400000	NEAR WEST GROVE; 45K06 (3799K07)	42207	55	32	BR. E.BR. WHITE CLAY CR.	07/30/2019
9900	15000103410000	NEAR WEST GROVE; 45K06 (3799K07)	42207	15	32	BR. E.BR. WHITE CLAY CR.	07/30/2019
9901	15000103700690	NEAR AVONDALE; 46D04 (3800D04)	42206	55	33	W FRK E BR WHITE CLAY CR	06/19/2018
9903	15000103710741	NEAR AVONDALE; 46D04 (3800D05)	42206	15	33	W FRK E BR WHITE CLAY CR	06/19/2018
9905	15000103800000	NEAR AVONDALE; 46D04 (3800E05)	42206	15	39	E.FRK BR. WHITE CLAY CR	06/05/2018
9904	15000103810000	NEAR AVONDALE; 46D04 (3800D05)	42206	15	38	E.FRK. BR. WHITE CLAY CR	06/05/2018
9906	15000103900000	NEAR AVONDALE; 46F04 (3800F05)	44204	11	89	CHURCH ROAD	06/04/2018
9907	15000103910000	NEAR AVONDALE; 46F04 (3800F05)	44204	11	91	CHURCH ROAD	06/04/2018
9908	15000104000000	NEAR AVONDALE 46C4 / 3800H5	42206	11	42	NEWARK ROAD	03/05/2018
9909	15000104010000	NEAR AVONDALE 46C4 / 3800H5	42206	11	42	NEWARK ROAD	03/05/2018
9911	15000104400000	NR. KENNETT SQUARE 47C04 (3801D04)	21932	15	35	W.BRANCH RED CLAY CREEK	09/11/2019
9912	15000104400493	NR.KENNETT SQUARE; 47C04 (3801D04)	42206	11	105	MILL ROAD (T-408)	03/27/2018
9913	15000104410369	NR.KENNETT SQUARE; 47C04 (3801D04)	42206	11	106	MILL ROAD (T-408)	03/27/2018
9914	15000104601834	NR.KENNETT SQUARE 47F03 (3801C03)	21931	15	21	E.BRANCH RED CLAY CREEK	09/11/2019
9916	15000105000000	.1MI.W.BAYARD RD. 47K02 (3802A3)	21832	15	8	E BR OF RED CLAY CREEK	12/03/2018
9917	15000105000001	SOLDIER WALL 47K02	39999	X1	246	BALTIMORE PIKE	

Records 1 to 25 of 1687 Records Per Page: 25

Figure 2.8.2-1 Structure List Screen – BP Assignment Button

After pressing the button additional fields and buttons appear at the top of the screen. A Business Partner dropdown is available to select the business partner to be assigned, along with an Assign Type, ECMS No., Expiration Date, and Reason. Grant and Revoke buttons are provided to either grant access to the structures (assign the business partner) or revoke access (unassign the business partner).

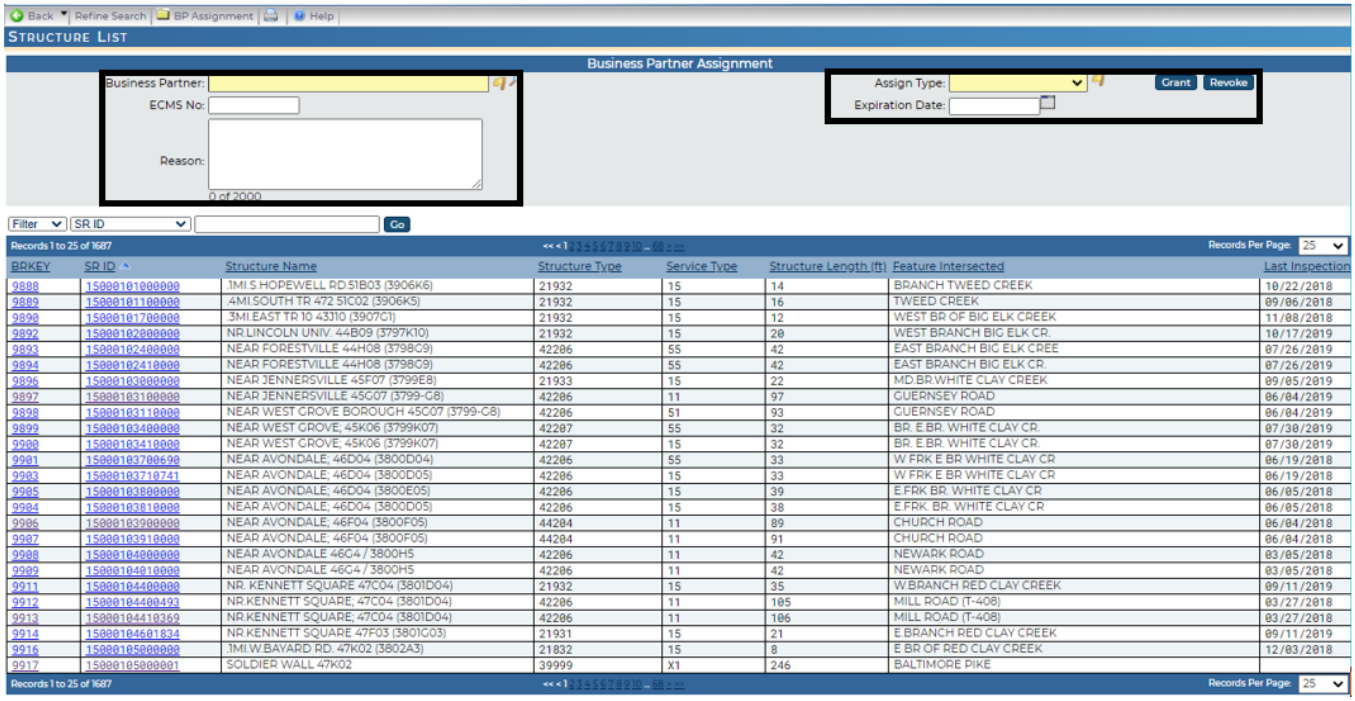


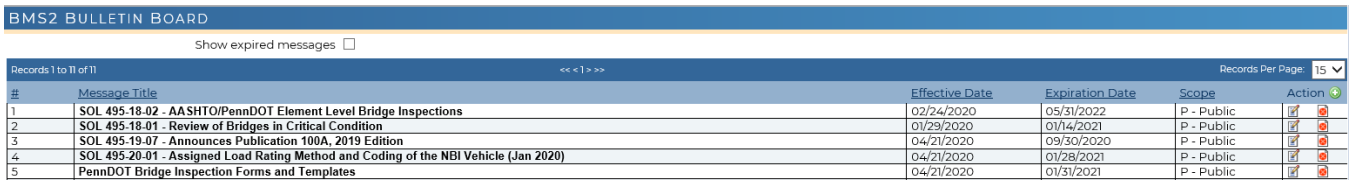
Figure 2.8.2-2 Business Partner Dropdown and Assign Type

When the user selects a business partner and assignment type in the dropdowns and clicks the Grant button, the system creates an assignment record for the business partner with the specified role for every structure included in the displayed list. If the business partner is already assigned to one or more of the structures, the assignment is not duplicated – the process simply ignores that particular structure(s).

When the user selects a business partner and assignment type in the dropdowns and clicks the Revoke button, the system deletes the assignment records for the specified business partner and role from every structure included in the displayed list. If the business partner is not assigned to one or more of the structures with the selected role, the revoke has no effect – the process simply ignores that particular structure(s).

2.9 Bulletin Board Screen

The BMS2 Web Bulletin Board allows PennDOT Central Office to post messages on its BMS2 Web site. Only authorized personnel may post messages. Users should monitor the bulletin board on a regular basis as this is the main method of communication between BMS2 and BMS3 users and the Bridge Inspection Section on a regular basis. Each new release of BMS2 and/or BMS3 is announced on the bulletin board as well as any bugs that have been identified and have not been addressed. To view messages on the bulletin board, users can either select the message while it scrolls through the board on the home screen or by click the bulletin board link at the top of the search screen or any BMS2 screen under "Other Links".



#	Message Title	Effective Date	Expiration Date	Scope	Action
1	SOL 495-18-02 - AASHTO/PennDOT Element Level Bridge Inspections	02/24/2020	05/31/2022	P - Public	
2	SOL 495-18-01 - Review of Bridges in Critical Condition	01/29/2020	01/14/2021	P - Public	
3	SOL 495-19-07 - Announces Publication 100A, 2019 Edition	04/21/2020	09/30/2020	P - Public	
4	SOL 495-20-01 - Assigned Load Rating Method and Coding of the NBI Vehicle (Jan 2020)	04/21/2020	01/28/2021	P - Public	
5	PennDOT Bridge Inspection Forms and Templates	04/21/2020	01/31/2021	P - Public	

Figure 2.9-1 Bulletin Board Screen

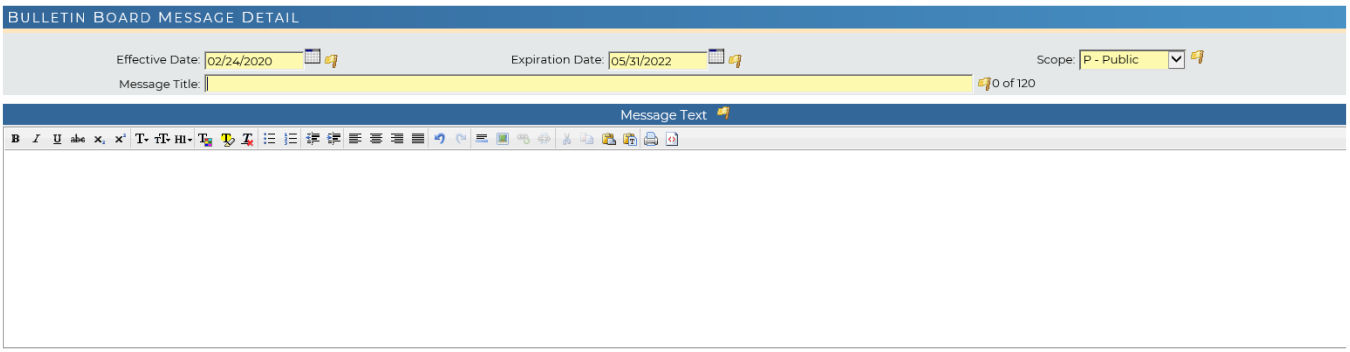


Figure 2.9-2 Bulletin Board Message Detail Screen

2.10 Validations

The validations were designed to ensure the data being submitted by inspectors is valid for the field. Users can view the number of active validations on a bridge next to the screen link for Validations under "Other Links". The validations are listed from left to right, in decreasing severity from "failure" to "info". When there are no validations of a specific type (Failure, Error, Warning, Info), the number 0 will appear to the right of the designated symbol. The number of active validations will appear next to the corresponding symbol for each severity level. The number and symbol will have an inverted color scheme compared to when there are zero validations. The count per validation type will update each time the validation page is visited for a particular bridge as well as every Monday morning when the batch process is run.

When a user clicks on the validation screen, any validations that apply to the bridge currently being viewed in BMS2 will be displayed. In addition to listing the BMS2 field(s) triggering the validations, a message is displayed to explain why the validation has appeared. Once the field is updated and saved, the validation message will automatically be deleted upon clicking the validations button if the information meets the criteria of the field. Additional validations will continue to be added to ensure the accuracy of the data stored within BMS2.

Validations can be programmed for BMS2, BMS3 or both. These settings are controlled by the Bridge Inspection Section. The determination of the applicability of the validations is based on who is responsible for updating the field. For example, the validations in BMS3 are generally restricted to inspection items while BMS2 validations include both inventory and inspection items. Furthermore, the validations vary based on structure type. For example, validations about bridge deck width and roadway width only apply to bridges and are not applicable to signs and walls.

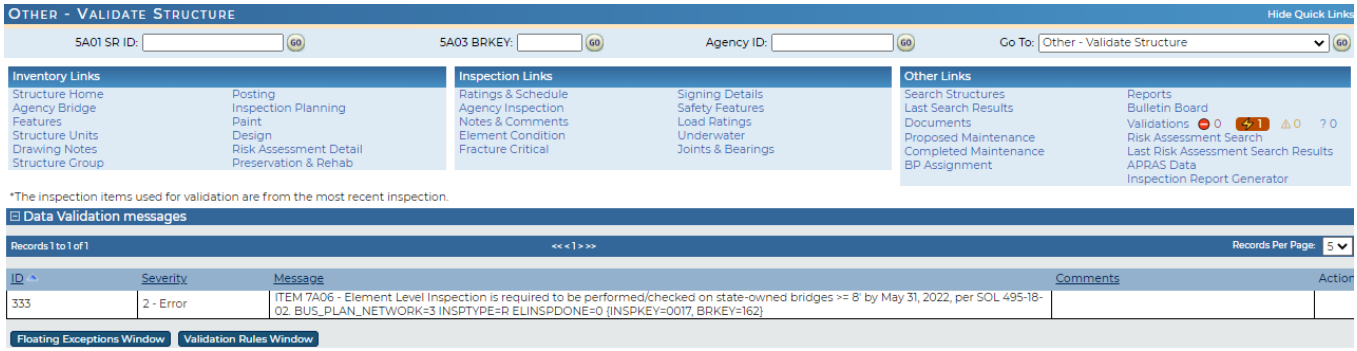


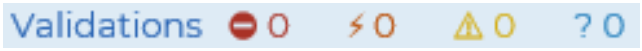
Figure 2.10.1 Validation messages screen

2.10.1 Inspection Acceptance

The main goal of the validations is to correct data within BMS2, most importantly for the NBI submission as well as for inspection planning (i.e. bridges requiring underwater inspections, inspection intervals, etc.). To ensure validation failures and errors are addressed, a pop-up box will appear when the users attempt to submit an inspection from BMS3 to BMS2 or when the user attempts to move the inspection status (Item 1A09) from any status to "9 – Accepted". The pop-up box will display notes from the previous inspection related to the validation failures and errors (if applicable).

These notes are stored in two different fields. The first comment type, 478, displays the comments from the user submitting an inspection to BMS2 from BMS3. The second comment type, 479, displays the comments from the user accepting the inspection. For the current inspection, the user must enter a minimum of 50 characters that explains why the validation errors are not being addressed. These notes will be helpful to users at the District and Central Office in understanding why the errors still remain.

2.10.2 Validation Levels



There are four different levels of validations:

Failure (First icon/number;): These validations must be addressed either in BMS3 before the inspection record can be submitted to BMS2 or before the inspection record can be moved from "2-Submitted" to "9-Accepted" status in BMS2. The failures generally relate to required fields in Publication 100A or fields used in the NBI submission. For example, there are validation failures if the deck, superstructure, or substructure condition rating is missing or invalid.

Error (Second icon/number;):: These validations should be addressed whenever possible before submitting the inspection record to BMS2 from BMS3 or when moving the inspection record to "9 – Accepted" status in BMS2. Users must submit comments explaining why the error is being bypassed. The previous bypass notes will also appear in the next inspection as reference for the current inspectors. An example of an error is when an inspection interval is entered for an Other Special (Interim) Inspection but the checkbox indicating if the Other Special (Interim) Inspection is not checked.

Warning (Third icon/number;):: These validations are meant to alert users to a possible issue. These validations should be addressed whenever possible but do not require a note when they are not addressed. An example of a warning is when the bridge is a hybrid structure that combines a bridge and a culvert. The validation warning for this particular bridge would alert the user that the structure has both substructure and superstructure condition ratings as well as a culvert condition rating. In most cases, a bridge has a substructure and superstructure condition rating or a culvert condition rating.

Info (Fourth icon/number;):: These validations are meant to inform the users of information regarding the field involved. These validations do not require the user to address them. An example of an info validation is the Scour Assessment Rating is outside the acceptable range of 0 to 100. The rating is automated and requires a future BMS2 release to address the issue.

2.11 Reports Screen

Reporting is a useful way of retrieving data stored in BMS2. There are two ways to view and generate reports - (1) Internal BMS2 reports, and (2) Crystal Reports software.

2.11.1 BMS2 Reports Screen

At the Department's discretion, reports may be posted on BMS2 Web and used by Business Partners. To access and run reports from BMS2 Web, click on the Reports link in the Other Links section on any structure screen. A list of available reports will be displayed for the user.

To run a report, click the Run Report icon under "Action". Refer to Figure 2.11.1-1. Depending on the report, a list of input parameters may appear for the user to enter. The user can use the parameters to filter out structures that are not required. Depending on the complexity of the report, it may take seconds or minutes until the report has finished running. Users may then export the report into an Excel or PDF format for their use.

Not all reports are available to all users. For example, Inspector Supervisor roles will have access to more reports than the browser roles.

All of the reports except BMS2015 – Scour Plan of Action, are run against the "query environment". This means the data is generally a day old. For example, if a change is made on Tuesday in BMS2, it will not show up in the report until Wednesday morning. However, the Scour Plan of Action is an exception and will update within a couple of minutes because the report is run against the "production environment."

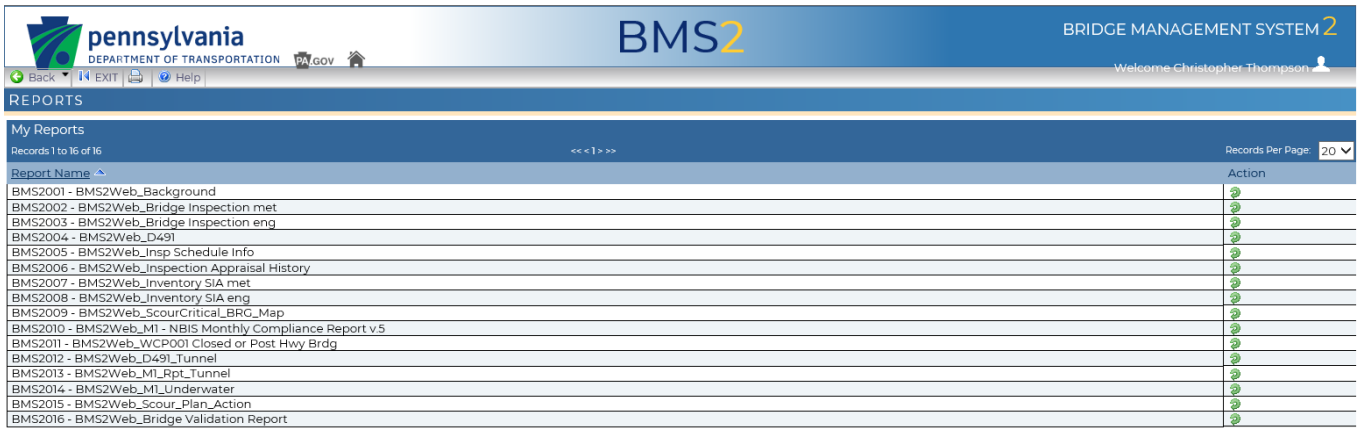


Figure 2.11.1-1 Reports Screen

2.11.1.1 Report Descriptions

BMS2001 – Background Report – the background report requires the user to select applicable Districts and Counties to run the report against. The background report provides basic inventory and location information, posting status and important inspection condition ratings. The report shows NBIS bridges as well as state bridges greater than 8'.

BMS2002 – Bridge Inspection Metric – this report provides the Structure Inventory and Appraisal Sheet in metric units. This sheet is used by states across the county as a one-page display of key information that is reported to FHWA on an annual basis for NBIS length bridges.

BMS2003 – Bridge Inspection English – this report provides the Structure Inventory and Appraisal Sheet in English units. This sheet is used by states across the county as a one-page display of key information that is reported to FHWA on an annual basis for NBIS length bridges.

BMS2004 – D491 Report – these reports are essentially a printout of the screen displays within BMS2 Web. Each screen has its own report and the fields are grouped in the report similar to the way they appear on the individual webpages.

BMS2005 – Inspection Schedule Info – this report provides an overview of the last inspection date, inspection interval and next inspection date for a given bridge for the NBI, Underwater, NSTM and Other Special (Interim) inspection types for future scheduling.

BMS2006 – Inspection Appraisal History – this report provides a snapshot of key condition ratings that are reported to FHWA annually and paint condition ratings for each Routine or Other Special (Interim) inspection record for the bridge. It also provides a snapshot of the inspection scheduling information from the most recent inspection key

BMS2007 – Inventory SIA Metric – this report provides the Structure Inventory and Appraisal Sheet in metric units. This sheet is used by states across the county as a one-page display of key information that is reported to FHWA on an annual basis for NBIS length bridges.

BMS2008 – Inventory SIA English – this report provides the Structure Inventory and Appraisal Sheet in English units. This sheet is used by states across the county as a one-page display of key information that is reported to FHWA on an annual basis for NBIS length bridges.

BMS2009 – Scour Critical Bridge Map – this report provides a list of scour critical bridges (all categories) that meet the criteria of the inputs the user selects. Within the report, the scour critical category as well as basic bridge information, waterway related condition ratings, structure type are provided as well as the latitude and longitude so the bridge can be located in the field.

BMS2010 – M1 – NBIS Monthly Compliance Report – this report is used to schedule upcoming bridge inspections. The report provides basic bridge information, condition ratings and other fields that impact the required inspection intervals associated with NBI, Underwater, NSTM, and Other Special (Interim) inspection types. The user is required to input criteria to create the list of bridges that appear on the M1.

BMS2011 – WCP001 – Closed or Post Highway Bridge – this report provides a summary of all closed or posted state-owned bridges based on the selection criteria entered by the user for the location and business network.

BMS2012 – D491 – Tunnel - these reports are essentially a printout of the screen displays within BMS2 Web specifically related to tunnels. Each screen has its own report and the fields are grouped in the report similar to the way they appear on the individual webpages.

BMS2013 – M1 Report – Tunnels - this report is used to schedule upcoming tunnel inspections. The report provides basic tunnel information and other fields that impact the required inspection intervals associated with tunnel inspection types. The user is required to input criteria to create the list of tunnels that appear on the M1.

BMS2014 – M1 Report – Underwater – this report is used to schedule upcoming underwater bridge inspections. The report provides basic bridge information, condition ratings and other fields that impact the required inspection intervals associated with Underwater inspection types. The user is required to input criteria to create the list of bridges that appear on the M1.

BMS2015 – Scour Plan of Action – the scour plan of action report provides critical information that is related to the inspection of scour critical bridges during and after flood events. The report provides information on each individual subunit, contact information and a monitoring log to be used during and after the event. This report is available for all bridge owner types.

BMS2016 – Bridge Validation Report – this report provides a list of the validations (failure, errors, warnings, information) that are present on the structure type selected in the input criteria. These validations can also be viewed on the individual bridges.

2.11.2 Crystal Reports

BMS2 inspection data is confidential under State and Federal laws and its dissemination must be carefully controlled. The District Bridge Engineers are responsible to see that this sensitive information is not inadvertently released through this reporting tool. Access to BMS2 data using Crystal Reports and the PENNDOT ePortfolio web server is only available to PENNDOT users and not outside agencies.

Frequently used or otherwise important reports can be "published" to the PennDOT Business Objects web server to enable others to view them without re-creating the report definition and without installing Crystal Reports on their local workstation.

The Bridge Office is responsible for authorizing user access to BMS2 and BMS2 data through the PennDOT Business Objects web server. Users requesting access to BMS2 and BMS2 data through the PennDOT Business Objects web server must complete a "Request for BMS2/APRAS Access" and submit to the BMS2 manager in Central Office. A user may have READER or PUBLISHER access.

A READER is a user who can access published reports on the PennDOT Business Objects web server through their Internet Explorer browser and can adjust parameters to customize the report and specify output format (e.g. hardcopy print, Excel Worksheet, etc.) and must have access to PennDOT network.

A PUBLISHER is a user who has the same capabilities as a READER, can add reports to the PennDOT Business Objects web server for other users to run and have a copy of the Crystal Reports Developer software on desktop.

The folder structure on the PennDOT Business Objects web server provides a repository for statewide reports and locations for district-specific reports. An individual user can run queries using the report definitions in the statewide or District folders but cannot modify them without first copying to his folder.

2.12 BMS3 Inspection Module and BMS2 Web

In order to perform bridge inspections, inspectors are required to use PennDOT's data collection software, the BMS3 inspection module, which replaced *i*Forms in January 2024. This section provides guidance on how the BMS3 inspection module interacts with BMS2 web.

Due to the availability of the BMS3 inspection module across the Internet, all users – PennDOT and non-PennDOT - will be required to enter their BMS2 Web userid and password when submitting inspections from BMS3 inspection module or requesting the download of inspection data to BMS3 inspection module from BMS2. The BMS3 inspection module also provides the ability to download inventory and inspection documents from ECS that are linked to the structure so that they can be viewed during an inspection.

Data stored in the BMS3 inspection module is based in the cache of the Internet browser unlike of *i*Forms where it was stored on the individual user's computer. Each individual browser a user accesses BMS3 with has it's own cache and own working list. For example, if a user accesses BMS3 from an iPad and then later from a computer, the worklist data between the two devices is not synced automatically and must be uploaded/downloaded to sync data between devices. However, the offline password for a user is consistent across all devices. If a user changes their offline password on one device, it must be updated on all devices or the users worklist will appear blank on all devices/browsers.

2.12.1 Accessing BMS3 Inspection Module

To access the BMS3 inspection module, users should navigate to the stand-alone webpage available here: (https://bms3.penndot.pa.gov). While the module is available on any web-browser, it's best used in Google's Chrome or Microsoft's Edge browsers. When users arrive on the BMS3 landing page, they will be prompted to select an option to log in as either a business partner or an internal PennDOT users. A third options is available to navigate to the bulletin board in BMS2 for critical messages from the Bridge Inspection Section.

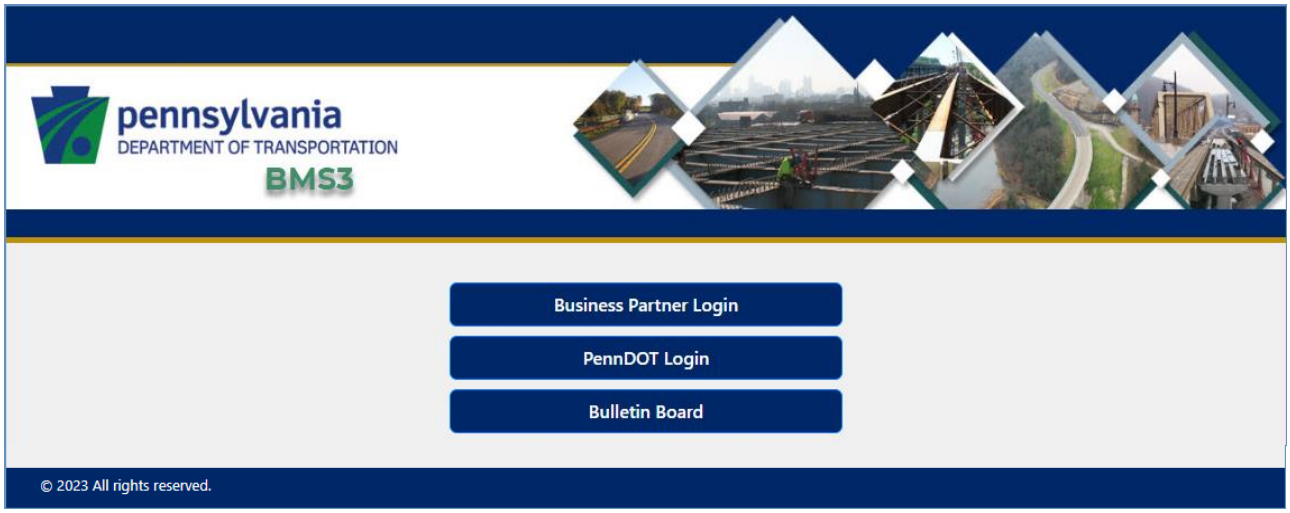


Figure 2.12.2-1 BMS3 Landing Page

Business Partner users should enter their BMS2 Web userid and password after clicking the "Business Partner Login". PennDOT users should enter their CWOPA userid and password after clicking the "PennDOT Login"

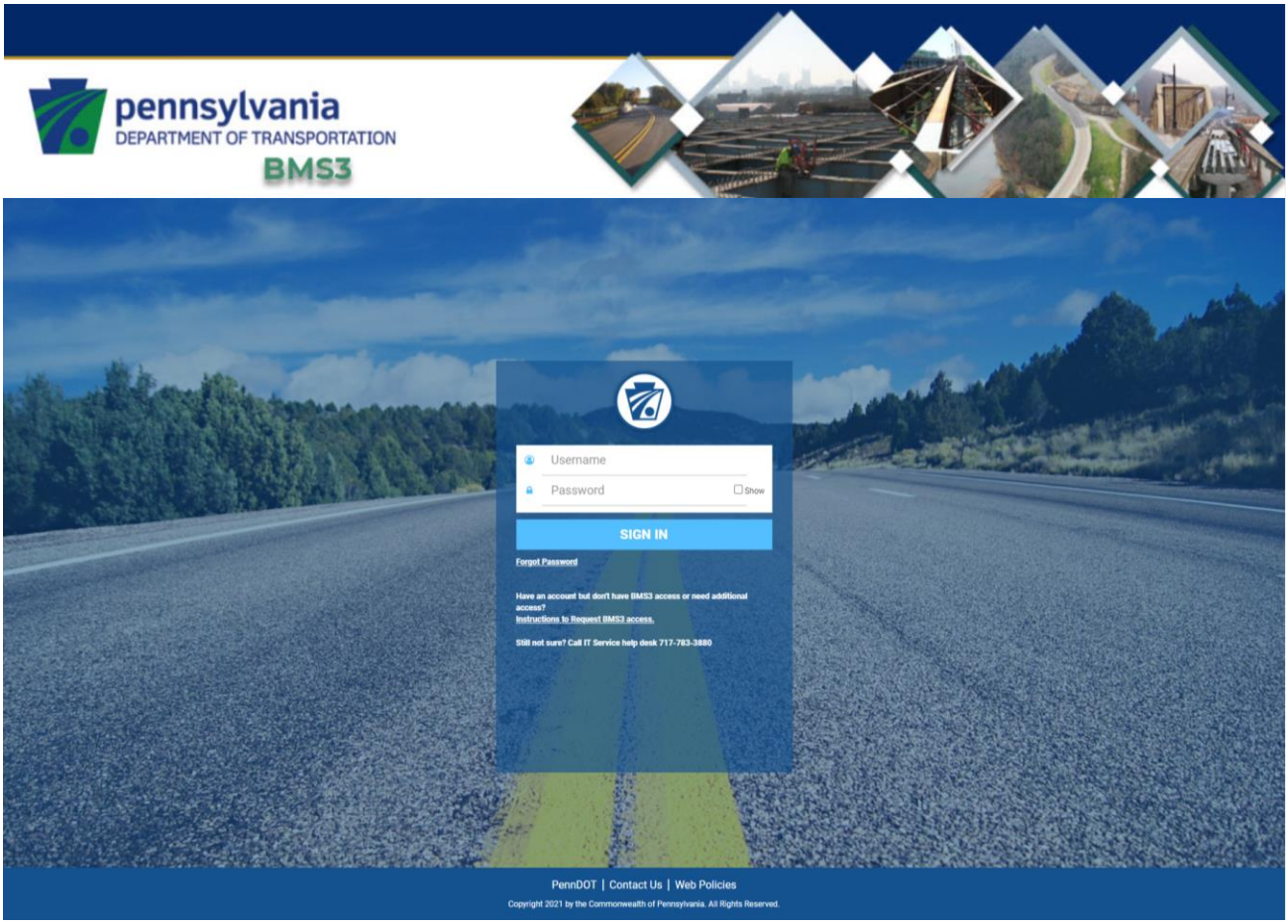


Figure 2.12.2-2 BMS3 Initial Login Page

2.12.2 BMS3 Inspection Module Initial Log-in and Offline Password

When a user successfully logs into BMS3 for the first time, they will be prompted to setup an offline password within their user profile before downloading structures. The Offline password is used to access the BMS3 inspection module when the user loses internet connection or if the user intentionally decides to work offline using the toggle in BMS3. The user's offline password does not expire and is to be the same password used regardless of the device and web browser used to access the website. Passwords must be at least eight (8) characters and is case-sensitive. If a user creates separate offline passwords on separate browsers and/or devices, they will not be able to access their worklists on any computer. The only way to resolve this issue is to clear the users cache and they will lose all unsubmitted inspection data.

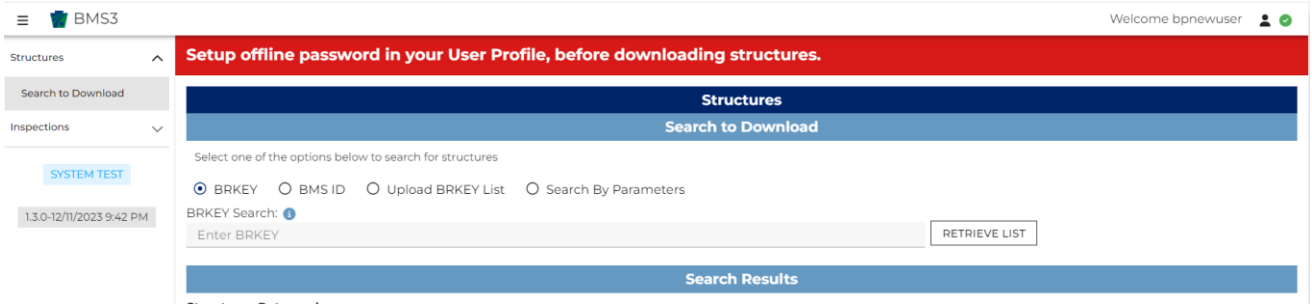


Figure 2.12.2 – 1 Offline Password Banner

To access the Offline password setup, users should navigate to the user profile in the top right corner of Figure 2.12.2-1 and click the ▲ icon.

When a user is in offline mode, they are limited in the functionality available within the BMS3 inspection module. When offline, the user cannot download structures, submit inspections to BMS2 Web, run validations or backup inspection data automatically to the virtual cloud.

2.12.3 BMS2 Web UserID and Password within BMS3 Inspection Module

Within the BMS3 inspection module, anytime the user attempts to download information from BMS2 Web into the inspection module or submit inspection data to BMS2 Web from the inspection module, the user will be prompted to enter their BMS2 Web userid and password for security validation. This process applies to all users of the BMS3 inspection module, both for business partners and PennDOT users.

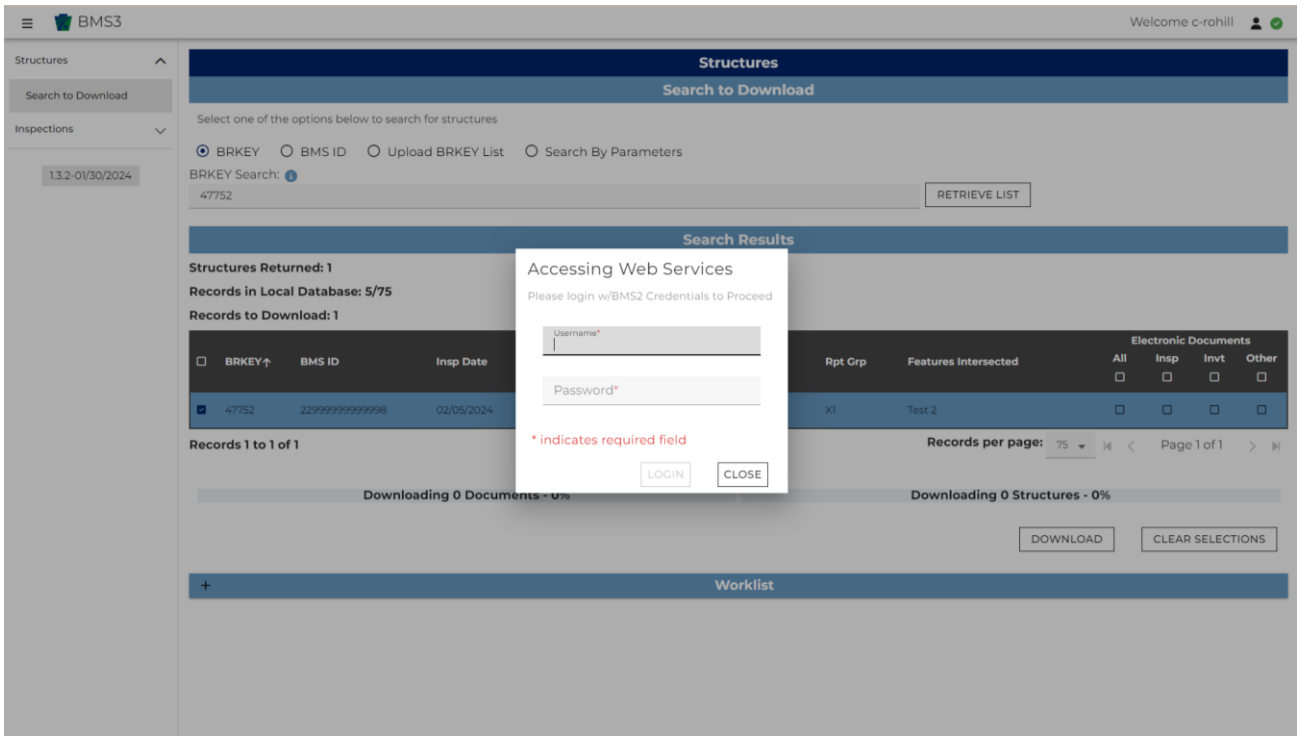


Figure 2.12.2-1 BMS2Web Login Credentials Entry Screen

If the credentials are valid, the original function selected by the user will be carried out (for instance, the submission of an inspection). Unlike with *i*Forms, the userid and password is not cached and each time the user must submit their credentials to proceed.

The user's BMS2 Web credentials are not saved locally and exist in memory only for the duration of the user's session. Any subsequent web service call from *i*Forms will pass the cached credentials so that the user will continue to be authenticated each time a BMS2 Web service is invoked.

2.12.4 ECS Document Download

The purpose of the ECS functionality within BMS3 is to facilitate the download and viewing of ECS documents associated with a specific structure/inspection. Within BMS3 this is implemented though two different screens:

- Search to Download
- E-Docs

2.12.4.1 Search to Download Page

The user may elect to download ECS documents in conjunction with downloading inspection data via the Search to Download page or may choose to download the electronic documents at the individual inspection level from the new E-Docs page.

From the Search to Download page, electronic documents associated with multiple structures can be downloaded in conjunction with the inspection data for selected structures. Two levels of download

customization exist on the Search to Download page – at the overall "grid" level and at the specific structure level.

Four additional checkboxes are provided at the overall grid level to permit the user to specify if the user wants to only download inspection, inventory and/or other electronic documents. The user also has the ability to select the "All" function to download all three document groups. By default, no boxes are checked. The user must manually select the boxes for either all the structures or the specific structures the user wishes to download documents for. A structure with only E-Docs downloaded still counts towards the 75-structure limit for a user's worklist in BMS3. If the user does NOT wish to download any electronic documents the checkboxes must be deselected.

Additionally, at the structure (row) level, the user can exclude all electronic documents for an individual structure from being downloaded by deselecting the eDocs checkbox that is presented in the grid beside the structure selection checkbox.

When the user then clicks on the "Download" button, the user is prompted to enter their BMS2 credentials before proceeding. To view the documents associated with a record after the structure has been downloaded, the user must open the structure from their worklist and proceed to the E-Doc's page.

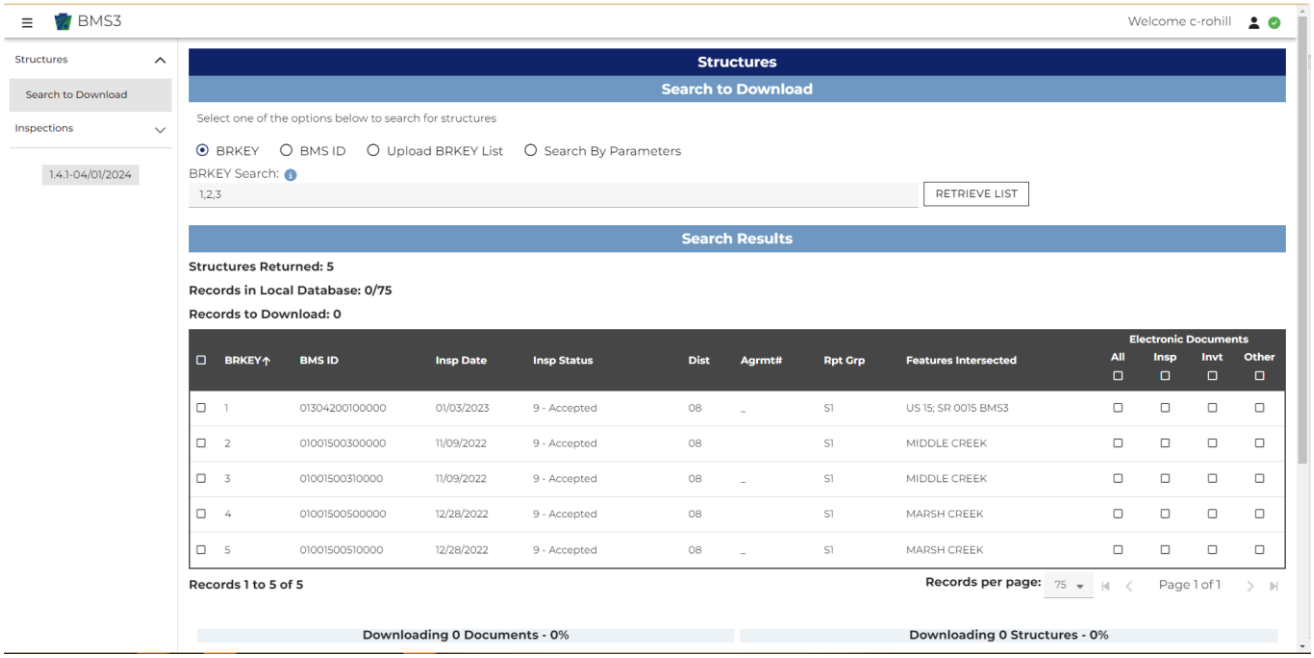


Figure 2.12.4.1-1 Search to Download Page

2.12.4.2 E-Docs Page

During a BMS3 session, the user typically views inspection data for a specific structure. Should the user elect to also download associated ECS documents, then the navigation bar at the top of a structure in BMS3 can be used to open the E-Docs page for the structure.

From the E-Docs page, electronic documents can be downloaded and viewed based on the user initiating the download. Using the E-Docs page, download is limited to a single structure at a time.

When the inspection data is downloaded to the BMS3 worklist, it includes a listing of the existing ECS documents already linked to the structure/inspection. When the E-Docs page is opened, that listing is presented to the user in 3 groupings: inventory related, inspection related and other. Only the sections that have valid documents present are shown on the page.

Within each section, a green checkbox will appear in the far-right column to indicate if a document has been downloaded for the structure already. The user can utilize the first column checkbox to select and download individual documents. This ability to select individual documents for download provides the user with a granular way to limit the amount of information downloaded and subsequently, the amount of network connectivity required.

The user can select one or more documents to download. The download is initiated by clicking on the "Download E-Docs" button. The user can elect to download all inspection document, inventory documents and/or other documents by clicking on the checkbox in the header row for each subsection of documents.

To view the documents, the user simply clicks on the hyperlink within the Description/Document label column in the row corresponding to the selected document. If no hyperlink is present, the document has not been downloaded. It is assumed that the document is presented using an application already installed on the client machine, invoked based on the file associations (e.g. a PDF file may open in Adobe Acrobat Reader). The display of the documents is completely dependent upon the file associations. No specific viewer functionality is provided within BMS3.

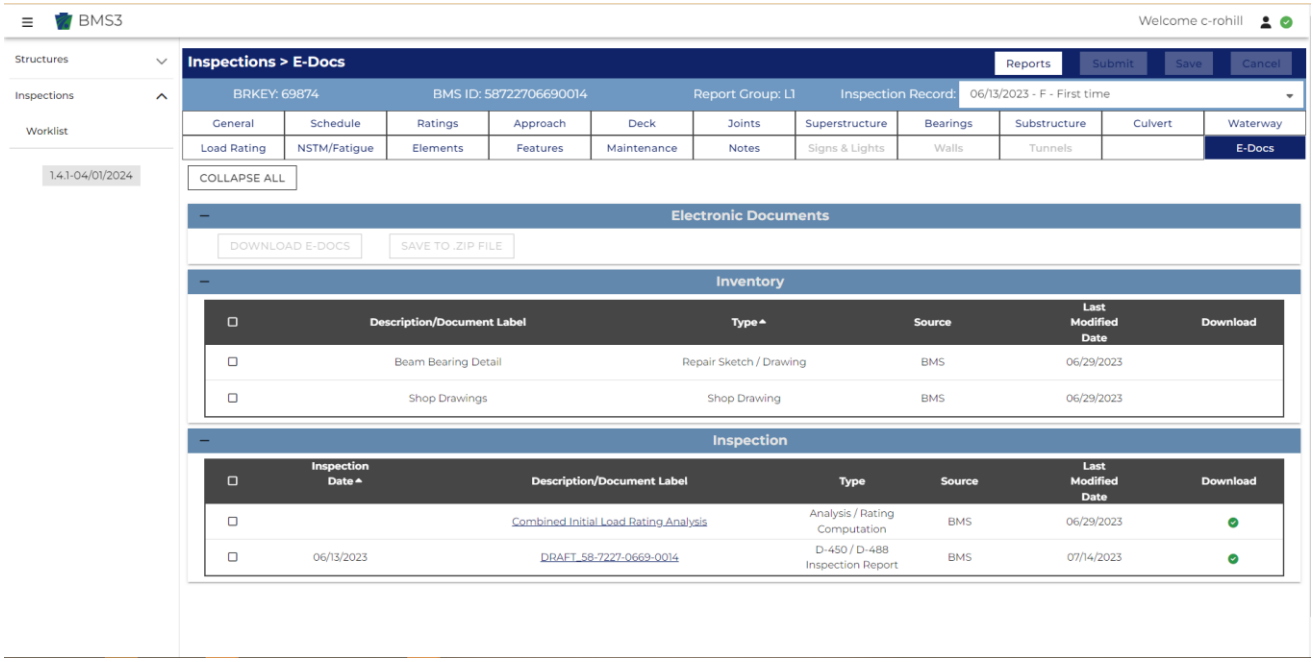


Figure 2.12.4-2 E-Docs Page

2.13 Risk Assessment

The Risk Assessment is a tool that utilizes bridge inventory data from BMS2 to define the enterprise level risk to be used as a key component in the prioritization of bridge work. The methodology is such that the overall risk of a structure to the overall transportation network is calculated, independent of condition. Enterprise level risk is a relatively static number and, when used in conjunction with more variable attributes like condition, produces information that can be used to prioritize work on structures.

The fundamental difference between the current risk assessment and previous risk assessment is that the current risk assessment maintains its independence of condition. While both risk and condition are required to generate prioritization, by keeping risk as a standalone attribute, it becomes a key component in the prioritization process that can be iteratively improved over time. This allows the Department to not prioritize based on a "worst first" approach and allows for the transition to an asset management based prioritization, which will achieve lowest life cycle cost.

Prioritization based on BMS2 risk and condition values can be accomplished in a variety of manners, from simple Excel sheets to complex multi-objective decision analysis (MODA) software tools. In the most simple sense, BMS2 can be queried for a District or Planning Partner's bridges to pull their current deck, super, sub, or culvert condition and risk scores. The list can be manually split between identified potential preservation, rehabilitation, and replacement scopes of work, then sorted by risk, and finally programmed based on available funding.

This process can be modified to a more advanced level to include additional fields to make the selection process more in-depth, such as including duration in current or previous condition states, and information outside BMS2 such as maintenance activities, over-height vehicle impacts, or weather related items. The District's more detailed knowledge of the bridges, state and local network needs, corridor improvements, and other programming considerations must be evaluated in conjunction with the scores and rankings to establish a final priority for programming.

PennDOT Searches for risk assessment data can be initiated via several locations within the BMS2 web screens.

Access to the Crystal Report for Risk Assessment is structured to enable the District or Central Office users to easily and quickly obtain and filter scoring information.

- The report is available to be run on demand.
- The report can be scheduled to run through the Business Object Server.
- The report can be exported in an Excel spreadsheet through the crystal export function.
- Automatic exporting to Excel can also be defined using the Export option. This would allow the users to export to Excel without having to view the report.
- After export, the user can save the result to the local drive or Network.
- Filters can include but are not limited to District, County, SR and other standard inspection and inventory data, Risk Assessment Date, Agency Admin Area, Owner, Business Plan Network, MPMS number, under construction, Legislative information, reconstruction history for deck/superstructure/substructure, or permanently closed status.

2.13.1 Accessing Risk Assessment

2.13.1.1 From the Structure Search Menu

After logging into BMS2 web, the tool bar in the Structure Search screen (see Figure 2.13.1.1-1) provides direct access to the Risk Assessment Search screen after clicking on "Risk Assessment".

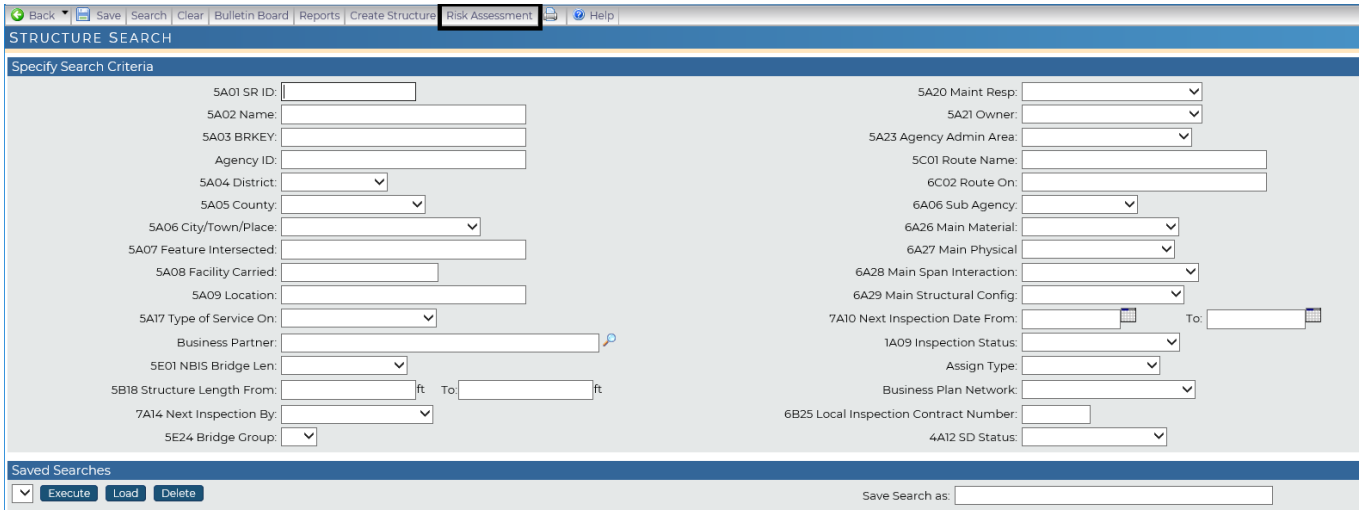


Figure 2.13.1.1-1 Risk Assessment Screen Links

2.13.1.2 From a Bridge File

While in a bridge file, users can select the Risk Assessment Detail item in the Inventory window to display the current Risk Assessment data for the structure.

Selecting "Risk Assessment Detail" provides the risk scores and ranks for the current bridge selected (see Figure 2.13.1.2-1). All scores and ranking fields are internally calculated within BMS2 and cannot be changed by the user. A comments field enables the Engineering Districts to provide any information that may or may not support the bridge ranking and assist in determining the best means of planning to improve the bridge condition.

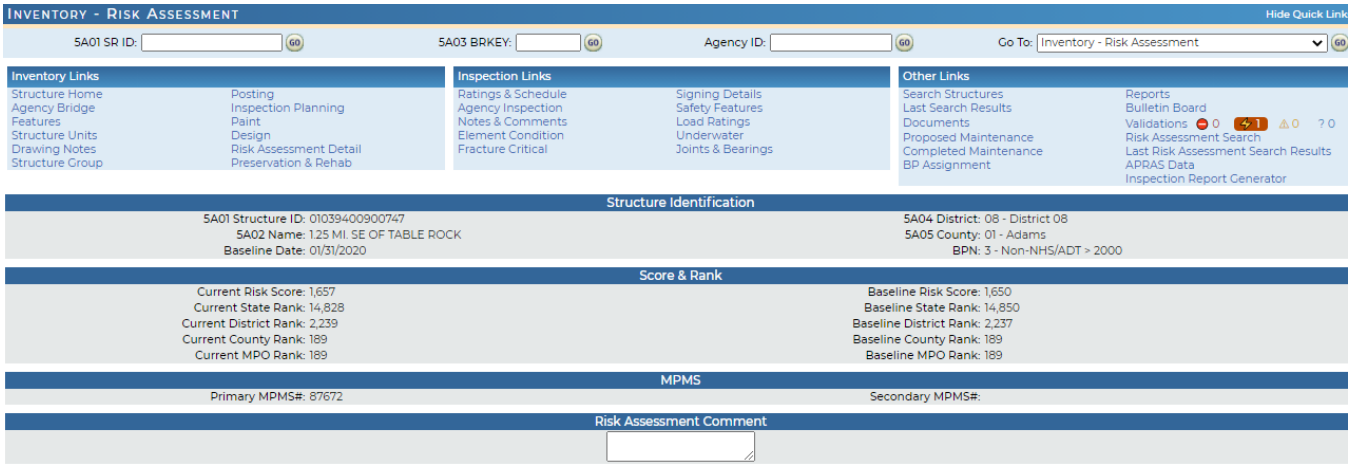


Figure 2.13.1.2-1 Inventory Links

2.13.1.3 From a Structure File

While in a structure file, links for searching risk assessment data for other structures are available in the Other Links window (see Figure 2.13.1.3-1). The user can also obtain information for the last risk assessment for the structure.

Figure 2.13.1.3-1 Other Links

2.13.2 Running a Risk Assessment Search

Selecting "Risk Assessment Search" enables the user to specify a different bridge or list of bridges than are currently open to obtain data based on the search criteria. The drop-down menu for "Baseline Date" is a required field (see Figure 2.13.2-1). The "Baseline Date" field is the date determined by the Bridge Inspection Section when the risk assessment module is run so that the data captured can be queried and compared with previous results to monitor improvement or decline in overall or specific bridge conditions. Data capture occurs on the first business day of each quarter. Permanently closed structures identified as such in the Inventory Posting Screen (VP) Item VP10 block can be excluded from the search by checking the appropriate filter box shown below.

Figure 2.13.2-1 Risk Score Search Screen

The results of the search is a list of structures based on chosen criteria that presents a tabulation of the risk assessment scoring and ranking data that has been stored in BMS2 (see Figure 2.13.2-2). The data shown in the search results structure list screen cannot be modified by the user.

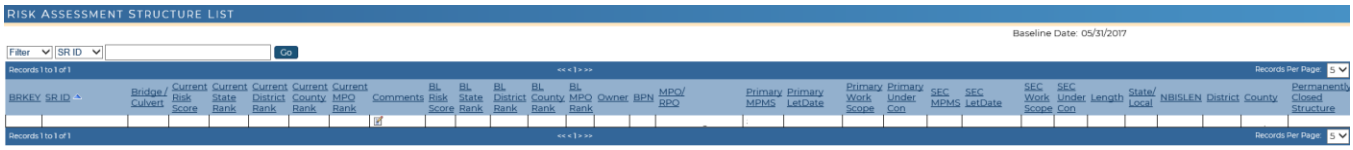


Figure 2.13.2-2 Risk Score Structure List Screen

Each structure in the list will have its own row of data under the data fields listed above. MPMS data for each structure is also presented with the scoring and ranking information.

A maximum of two MPMS numbers (primary and secondary) will be associated with each BMS2 structure. If there are more than two MPMS numbers associated with a structure, the two MPMS numbers shown will be selected based upon let dates and current date.

MPMS extract and BMS2 updates will be run daily as part of the automatic BMS2 batch cycle to accumulate additional information associated with the risk score and populate the risk score tables in BMS2.

As part of the data review, a Crystal Report can be run that can cover features such as District, County, SR and other standard inspection and inventory data, Baseline Date, Agency Admin Area, Owner, Business Plan Network, MPMS number, under construction, Legislative information, reconstruction history for deck/superstructure/substructure, permanently closed status, year built, year reconstructed, various rankings including by MPO, MPMS data for PE, FD, and scope. See Section 2.11.2 for additional discussion of Risk Assessment Crystal Report features.

2.14 Structure Management

2.14.1 Creating a New Structure

When a new structure (e.g. bridge, sign structure, retaining wall, noise wall, tunnel, other) needs to be entered into BMS2, users (at a minimum, inspection supervisors) must select the Create Structure Assistant which allows users to create a new structure in BMS2. This screen is accessed by selecting the **Create Structure** button at the top of the structure search page in BMS2. Appendix A provides a list of required fields for be entered for creating a new structure. New BRKEYs should not be created for superstructure replacements.

To create a new structure, follow the procedure as described.

1. Select the **Create Structure** at the top of the structure search screen.
2. Users will be asked to enter a predecessor BRKEY if the new bridge replaced a previous bridge. By entering a predecessor BRKEY, a link between the structures will be created on the Structure Group page and certain fields will be prepopulated on the prompts discussed below.
3. Follow the step-by-step prompts from one screen to the next. The user will not be able to progress to the next screen unless all of the necessary fields (yellow background) are filled out. The system will ensure the data inputted from the user meets certain validation criteria. Fields with incorrect data will be filled with a red background after the user acknowledges a list of the validation errors. Complete all fields on each of the "Required Data" screens.

   Note: The NBI Structure number (Item 5A03) and the Bridge Key (BRKEY) will be automatically generated by BMS2 at the completion of the create structure process. The Structure ID (Item 5A01) must be entered by the user in the 14-character SR ID (County/SR/Segment/Offset) format.
4. After entering the required fields, review the summary sheet of information. Upon review, click the submit button. A pop-up will be displayed to confirm the user is ready to create a new structure. If the creation was successful, a pop-up will display the new BRKEY for the created structure.
5. After acknowledging the new BRKEY, the user will be directed to the Structure Home page for the newly created structure. The remaining inventory data must be immediately entered via the remaining BMS2 screens with the exception of State Roadway data (see step 7). The structure inventory data must be entered into BMS2 prior to bridge being opened to traffic. No inspection data shall be entered at this time. Inspection data shall be entered through BMS3 at the time of the initial inspection.

   The BMS2 fields in table 2.14-1 shall <u>NOT</u> be entered by the user. These fields are automatically entered based on the information that has been entered and saved in the corresponding Agency screen or Create Structure Wizard.

[the remainder of this page is intentionally left blank]

BMS2 Fields NOT to be entered by the user	Corresponding Agency/Wizard field to be entered by the user
4A01 – Is the Bridge Open, Posted or Closed?	VP02 – Posting Status (This item should be coded "G – New Structure, not yet opened to traffic" until the initial inspection has been completed and bridge is open).
4A15 – Minimum Vertical Clearance over Bridge Roadway	6C20 – Min. Vertical Clearance for Left Roadway 6C21 - Min. Vertical Clearance for Right Roadway
4A17 – Minimum Vertical Underclearance	6C20 - Min. Vertical Clearance for Left Roadway 6C21 - Min. Vertical Clearance for Right Roadway
4B04 – Operating Rating Type	IR06 – Rating Method
4B05 – Operating Rating	IR11 – Operating Rating
4B06 – Inventory Rating Type	IR06 – Rating Method
4B07 – Inventory Rating	IR10 – Inventory Rating
4B08 – H20 Operating Rating Type	IR06 – Rating Method
4B09 – H20 Operating Rating	IR11 – Operating Rating
4B10 – H20 Inventory Rating Type	IR06 – Rating Method
4B11 – H20 Inventory Rating	IR10 – Inventory Rating
4B12 - ML80 Operating and Inventory Ratings	IR10 – Inventory Rating IR11 – Operating Rating
4B13 – TK527 Operating and Inventory Ratings	IR10 – Inventory Rating IR11 – Operating Rating
5B01 – Bridge Deck Structure Type	6A38 – Bridge Deck Type
5B08 – Median Type	6C25 – Median Type
5B12 – Main Span Material (FHWA)	6A26 – Material Used for Main Unit, Approach Unit, Sign Structure and Walls
5B13 – Structural Configuration of Main Spans (FHWA)	6A29 – Structural Configuration for Main Unit, Approach Unit, Sign Structure and Walls
5B15 – Approach Span Material (FHWA)	6A26 – Material Used for Main Unit, Approach Unit, Sign Structure and Walls
5B16 - Structural Configuration of Approach Spans (FHWA)	6A29 – Structural Configuration for Main Unit, Approach Unit, Sign Structure and Walls
5B19 – Deck Area	5B07 – Out-to-Out Width of Bridge Deck 5B18 – Structure Length
5C24 – Vertical Clearance over 10 ft Width (Defense Highways)	6C22 – Vert. Clear. Over 10 ft Width for Left Rdwy 6C23 – Vert. Clear. Over 10 ft Width for Right Rdwy
5C25 – Total Horizontal Clearance	6C18 – Total Horiz. Clearance for Left Roadway 6C19 – Total Horiz. Clearance for Right Roadway

Table 2.14-1 Data fields automatically filled in by BMS2

6. In order to view and enter information into the PennDOT specific BMS2 screens (Inventory, Inspection, Features Intersected and APRAS Span), the user must log into BMS2 and search for the appropriate structure. After selecting the structure from the search results, the user may select the desired screen.
7. Local roadway and other intersecting features data can also be entered for a new structure at any time, using the Inventory – Roads (Section 5C) and Agency – Roadways (Section 6C) screens and the Inventory – Features Intersected screen.
8. If the new structure is located on and/or over a state route, the RMS location information must be created before any Roadway inventory information is entered in BMS2. However, enter the value for Items 5C04, 5C05 and 5C06 prior to RMS interface. RMS will then enter data for the corresponding features for the entered route numbers. In order to properly create the RMS location information and allow RMS roadway information (See the Inventory – Roads and the Agency – Roadways sections) to be automatically updated for a structure in BMS2, **the District BMS coordinator shall provide the District RMS coordinator the newly created BRKEY number (Item 5A03).** The RMS coordinator requires the new BRKEY to create the structure in RMS. After the roadway information has been entered and saved into RMS, the data will be sent to BMS2 in an overnight batch cycle.

   For new structures, it is imperative that the BMS coordinator provides the BRKEY to the RMS coordinator the day the structure was created because APRAS utilizes RMS to locate bridges and BMS2 data to analyze permits. If the new structure is replacing an existing structure, the RMS location

information for the existing structure must be changed to point to the new structure BRKEY (if the new structure is in roughly the same location) or the existing RMS locations for the old structure must be deleted and new ones created for the new structure. RMS ties a structure location to BRKEY, and therefore the state roadway locations for an existing (demolished) structure cannot automatically be linked to a new (replacement) structure.

9. Once the overnight batch cycle has run and the State Roadway information has been updated for the structure in BMS2, review the new roadway data (See the Inventory – Roads and Agency – Roadways sections) to confirm that it is correct and enter any additional roadway-related inventory data as necessary.
10. The BMS Coordinator shall verify the SR ID (Item 5A01) with the RMS Coordinator.
11. After all inventory information has been entered, set the status of the inspection to "9 – Accepted" for Item 1A09 on the Ratings and Schedule screen.

All inventory items pertinent to the structure should be filled in. Particular attention must be given to the asterisk items to ensure all FHWA-required fields are accurately completed for the structure.

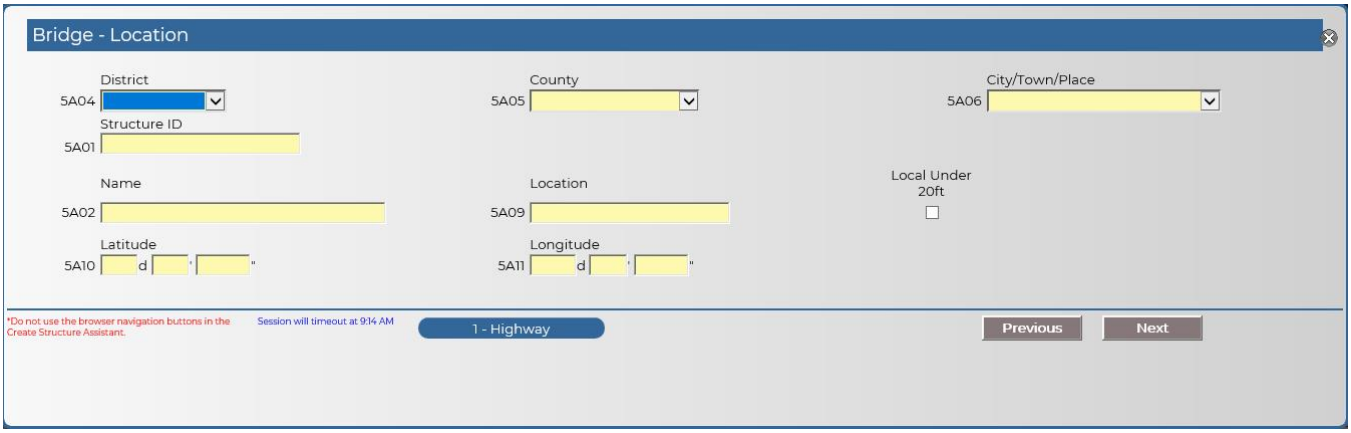


Figure 2.14.1-1 Create Structure Screen

2.14.2 BMS2 Structures Removed from Service

The process of removing a structure from BMS2 is considerably different than deleting a structure from the old BMS. The previous procedure in BMS was to submit a bridge deletion form to the former Bridge Quality Assurance Division (BQAD) to have a structure deleted from the system. In BMS2, however, authorized users at the Districts will be able to change specific fields to indicate that the structure has been removed from service. If the old structure is being replaced, the user must ensure that a new structure has been entered into BMS2 prior to marking demolished. The following sequence of steps should be followed when a new structure replaces an old structure. This process is applicable for all structures.

1. Create a new structure as described in Section 2.14.1. This includes notifying the RMS coordinator of the new BRKEY and being entered into RMS. Item VP02 should be coded "G – New structure not yet opened to traffic" until it does open to traffic.
2. Verify that the RMS data has been updated/deleted for the old structure and that the new structure is properly located in RMS. New structures can be located in RMS by updating the existing RMS locations (for the structure being removed) with the BRKEY for the new structure, or by deleting the RMS locations for the structure being removed and adding new RMS locations for the new structure. Note that the data transfer will occur overnight after being entered into RMS.
3. On the Inventory – Posting screen, create a new posting status for the existing structure. Enter the posting status date and select "X – Demol/Replaced" for Item VP02. A pop-up will appear informing the user that by changing posting status to "X – Demol/Replaced", the following changes will be automatically made:
    a. Item 5A17 (Type Service On) value changed to "X" (Demolished/Replaced)
    b. Item 5A21 (Owner) value changed to "XX" (PennDOT Owned, Demolished/Replaced)
    c. Item 6A12 (Demolished/Replaced Indicator) set to "checked"
    d. Item 6A13 (Demolished/Replaced Date) is changed to match the date in Item VP01 for the posting status
4. When the new structure is opened to traffic, create a new Posting entry on the Inventory– Posting screen and set Item VP02 to "A – Open, no Restriction".

If the existing structure is being removed but <u>not</u> replaced, only steps 3 and 4 must be followed.

Note: When developing Crystal Reports, ensure that the reports filter out the "X" values for Items VP02, 5A17 and/or 5A21. Otherwise, the data in the Crystal Reports will include data from old bridges that are no longer in existence.

2.14.3 Temporary Structures

The 2022 NBIS has changed the requirements for the inventory and inspection of temporary structures. A temporary bridge is defined as a bridge which is constructed to carry highway traffic until the permanent facility is built, repaired, rehabilitated or replaced. Temporary bridges must be inspected as soon as possible but within 3 months of the temporary bridge opening to traffic. While the NBIS indicates only temporary bridges open to traffic for a time period greater than 24 months must be reported on the annual submission to FHWA, PennDOT is electing to inventory and report the inspection findings regardless of the time period. To achieve the desired results of inspecting a temporary bridge and reporting the findings, temporary bridges need to be created as a new structure and receive a unique BRKEY. The previous practice of updating the existing bridge record for the temporary structure conditions is no longer acceptable.

2.15 Email Notifications

Email notifications are used to notify Department personnel when specific bridges meet certain criteria. For example, when a bridge changes scour critical category upon acceptance or if a new structural priority 0 or 1 maintenance item is entered into BMS2. These notifications are only available for Department staff and each District will only receive notifications for bridges within their jurisdiction. Each individual BMS2 user can control the notifications they receive.

2.15.1 Accessing Email Notifications in BMS2

To access Email Notifications within BMS2, the user must hover over their name in the upper right corner of any BMS2 screen. After hovering, a box will appear with available options depending on the user's security level. Click on the email notification link to be taken to the email notifications screen.

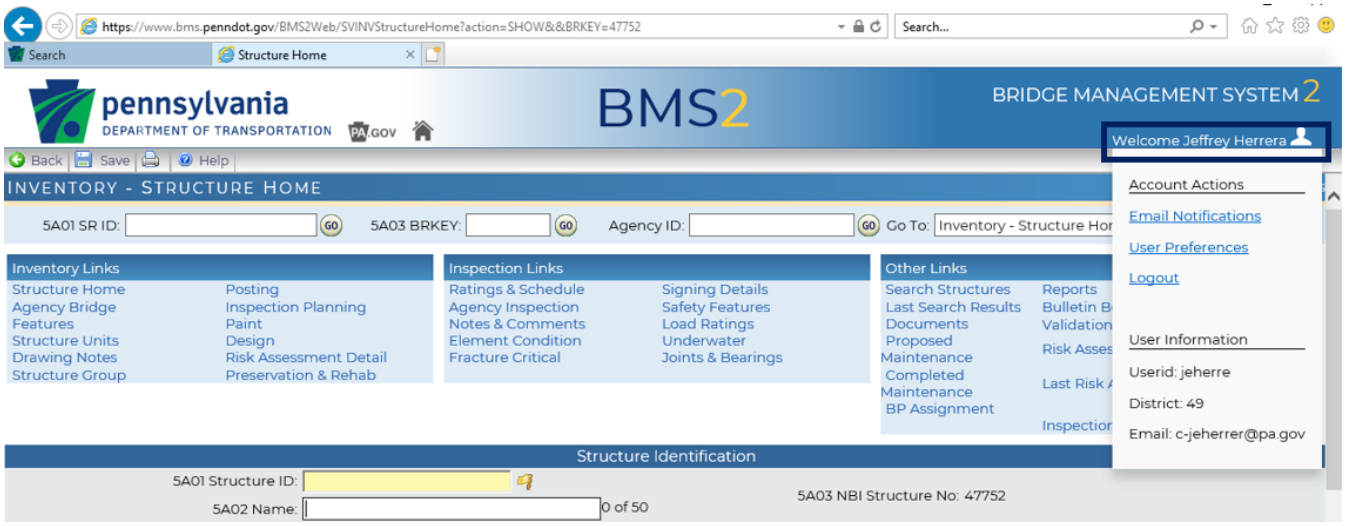


Figure 2.15.1-1 Email Notification Access

After clicking the link to email notifications, users will arrive at the Email Notification screen. By default, the list for "Subscribe to Notifications" will be minimized as shown below. To access the full list, click on the plus symbol to the left of the list.

Figure 2.15.1-2 Email Notification Screen

2.15.2 Subscribing to Email Notifications

To subscribe to email notifications, the user must expand the subscription list. Once expanded, notifications will be sorted by their ID number. Users will also see a name for the notification, a description of what the notification is used for, the frequency of the email notification and a check box that the user can check if they wish to receive the specific notification. New email notifications are added periodically.

EMAIL NOTIFICATIONS

Subscribe to Notifications

Records 1 to 147 of 147 << < 1 > >> Records Per Page: 150

ID	Name	Description	Frequency	Subscribed
10	Inspections that are ready for acceptance - STATE	When inspections are in "5-ready for acceptance" status - STATE BRIDGES	30 - Weekly	☐
11	Inspections that are ready for acceptance - LOCAL	When inspections are in "5-ready for acceptance" status - LOCAL BRIDGES	30 - Weekly	☐
12	Inspections that are ready for acceptance - AMD	When inspections are in "5-ready for acceptance" status - AMD BRIDGES	30 - Weekly	☐
13	Inspections that have been returned for correction - STATE	When inspections are in "8-returned for correction" status - STATE BRIDGES	10 - Daily	☐
14	Inspections that have been returned for correction - LOCAL	When inspections are in "8-returned for correction" status - LOCAL BRIDGES	10 - Daily	☐
15	Inspections that have been returned for correction - AMD	When inspections are in "8-returned for correction" status - AMD BRIDGES	10 - Daily	☐
16	Underwater inspection could not be completed (IN16 = C or D) - STATE	Underwater inspection could not be completed. Inspection by divers or a return to the site during low water needs to be scheduled (IN16 = C or D) - STATE	50 - Monthly	☐
17	Underwater inspection could not be completed (IN16 = C or D) - LOCAL	Underwater inspection could not be completed. Inspection by divers or a return to the site during low water needs to be scheduled (IN16 = C or D) - LOCAL	50 - Monthly	☐
18	Underwater inspection could not be completed (IN16 = C or D) - AMD	Underwater inspection could not be completed. Inspection by divers or a return to the site during low water needs to be scheduled (IN16 = C or D) - AMD	50 - Monthly	☐
19	Structural Priority 0 on STATE Bridge	Priority 0 Structural Maintenance Item on STATE Bridge	10 - Daily	☐
20	Structural Priority 0 on LOCAL Bridge	Priority 0 Structural Maintenance Item on LOCAL Bridge	10 - Daily	☐
21	Structural Priority 0 on AMD Bridge	Priority 0 Structural Maintenance Item on AMD Bridge	10 - Daily	☐
22	Structural Priority 1 on STATE Bridge	Priority 1 Structural Maintenance Item on STATE Bridge	10 - Daily	☐
23	Structural Priority 1 on LOCAL Bridge	Priority 1 Structural Maintenance Item on LOCAL Bridge	10 - Daily	☐
25	Structural Priority 1 on AMD Bridge	Priority 1 Structural Maintenance Item on AMD Bridge	10 - Daily	☐
26	Load Re-Rating is incomplete - STATE	Load Re-Rating Review is incomplete on STATE Bridge (IR01a is checked AND IR01b is in status "0-Not Reviewed","2-Re-rating Scheduled", or "5-Re-rate other") OR (IR01a is unchecked and IR01b status is "0-Not Reviewed")	30 - Weekly	☑
27	Load Re-Rating is incomplete - LOCAL	Load Re-Rating Review is incomplete on LOCAL Bridge (IR01a is checked AND IR01b is in status "0-Not Reviewed","2-Re-rating Scheduled", or "5-Re-rate other")	30 - Weekly	☑
28	Load Re-Rating is incomplete - AMD	Load Re-Rating Review is incomplete on AMD Bridge (IR01a is checked AND IR01b is in status "0-Not Reviewed","2-Re-rating Scheduled", or "5-Re-rate other")	30 - Weekly	☑
29	Load Re-Rating Acceptance - STATE	Load Re-Rating is ready for acceptance - STATE	30 - Weekly	☑

Figure 2.15.2-1 Subscribe to Notifications Screen

2.15.2.1 Explanation of Email Notification Terms

ID – This is the number assigned by the system to the email notification. This number will appear in the actual email the user receives.

Name – A short description for the specific notification. This name will appear in the actual email the user receives.

Description – This long description is used to explain to the user what the notification is being used for and how/when a bridge will meet the criteria for the notification.

Frequency – The frequency of when the email notification will be sent. Frequencies are daily, weekly, or monthly. For example, new structural priority 0 and 1 notifications are sent the next business day after they reach BMS2. A weekly notification is sent for bridges in status “5 – Ready for Acceptance”.

Date – The date the notification was created or last modified.

Count – The number of bridges within the users jurisdiction that meet the criteria for the notification the last time the notification was run. The notifications typically run prior to the start of the business day based on their frequency. Weekly notifications run on Monday’s and monthly notifications run on the 1st Monday of the month.

Follow-up – The recurrence interval of email notifications after the initial email notification is sent. The notification may be sent one time only (0 days) or it can be set to a number of days (e.g. 5 days, 30 days, 180 days) if the conditions still exist.

Notification Mode – Email notifications can be sent either when the bridge qualifies for a new notification or only with a recurring basis.

2.15.3 Notifications

After a user signs up for notifications, the user can view the most recent run of the notification by expanding the notification list. The notification screen provides the ID, name, description, date, and count for each notification. The screen also shows a magnifying glass for each separate email notification. When the user clicks the magnification glass, a pop-up box providing a list of the bridges that meet the criteria of the notification is provided for the user. The details include the BRKEY, Structure ID, Original Notification Date, and the status of the bridge. Links to the specific bridge are available by clicking either the specific BRKEY or Structure ID. Users can update the status of individual notifications by clicking on the refresh icon. This will not generate email notifications, but it can be used to update the status of notifications before the preset frequency/recurrence intervals execute.

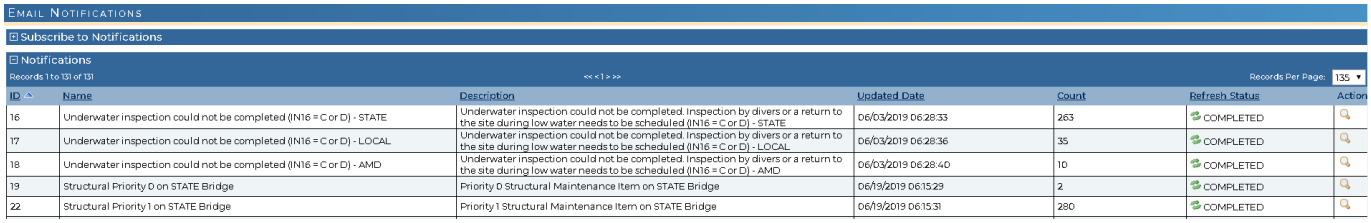


Figure 2.15.3-1 Notification Screen

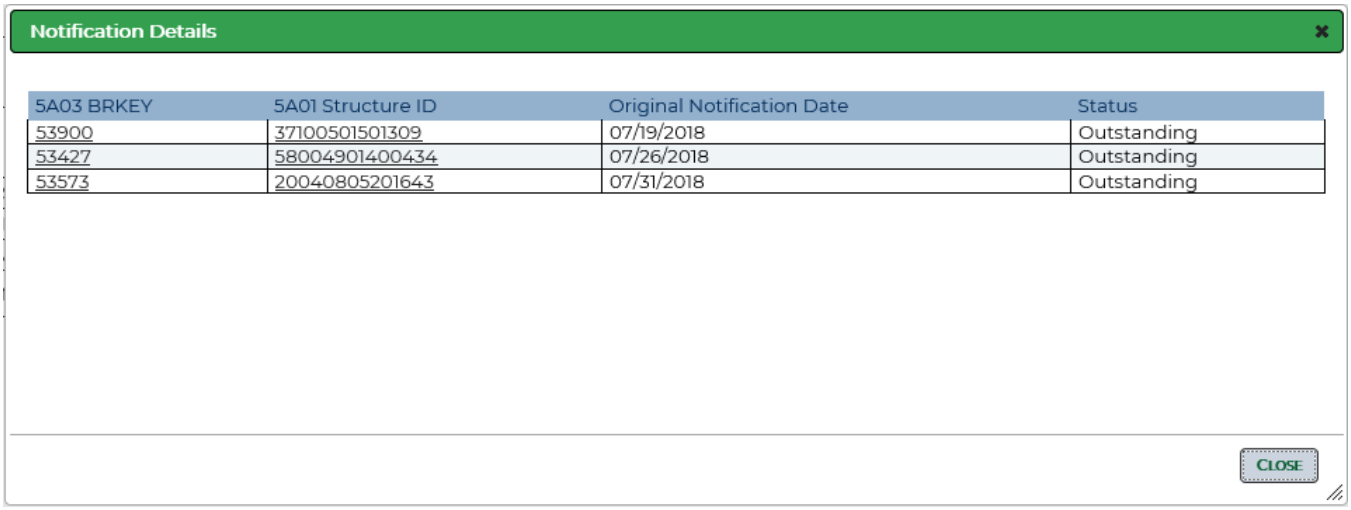


Figure 2.15.3-2 Notification Details

2.16 APRAS Data

APRAS Data is used to determine the bridge's capacity to handle overweight and oversized permit loads. Displayed are widths, heights, and load capacities for each span along the bridge's length. This screen is accessed using the 'APRAS Data' link underneath the Other Links tab. Users with the APRAS Browser or APRAS Edit security level can access this screen of data, but only users with APRAS Edit can edit the data.

2.16.1 APRAS Data Screen

The APRAS Data screen displays information on each individual APRAS Span located on the bridge. Each span can vary in dimensions and what routes/waterways/railroads go underneath. The data for each span is not editable on this screen – the user must select one of the displayed spans and proceed to a corresponding Detail screen to edit data (assuming the user has the necessary security authorization).

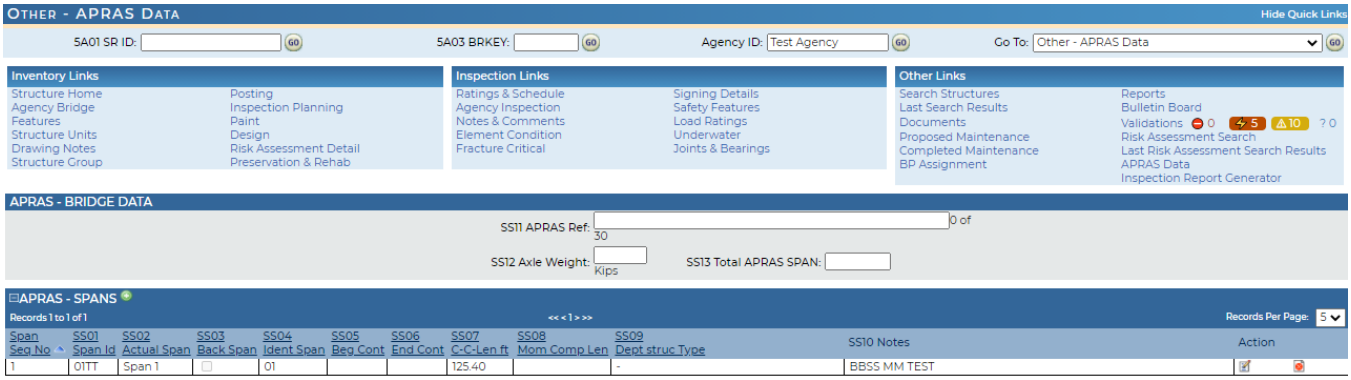


Figure 2.16.1-1 APRAS Data Screen

2.16.2 APRAS Span Detail

The APRAS Span Detail screen allows users to view and maintain detail and load capacity information about a specific span on the structure. This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

This screen also contains view only information on Clearances and Permit Conditions that can be accessed and edited by clicking the edit button associated with the corresponding line.

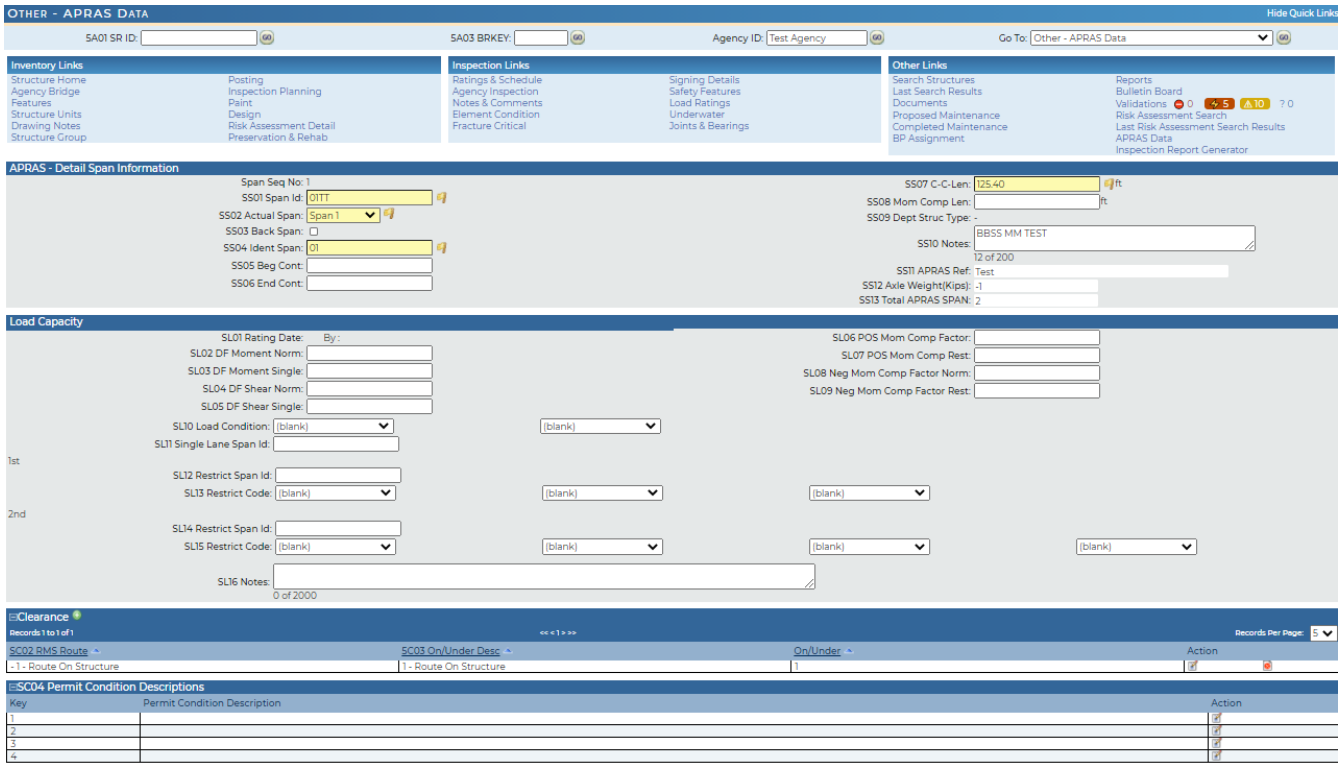


Figure 2.16.2-1 APRAS Span Detail Screen

2.16.3 APRAS Span Clearance

The APRAS Span Clearance screen allows users to view and maintain vertical and horizontal clearance information about a specific span on the structure. This screen can be accessed in Edit mode by authorized users. Changes to data on this screen are saved to the production BMS2 database.

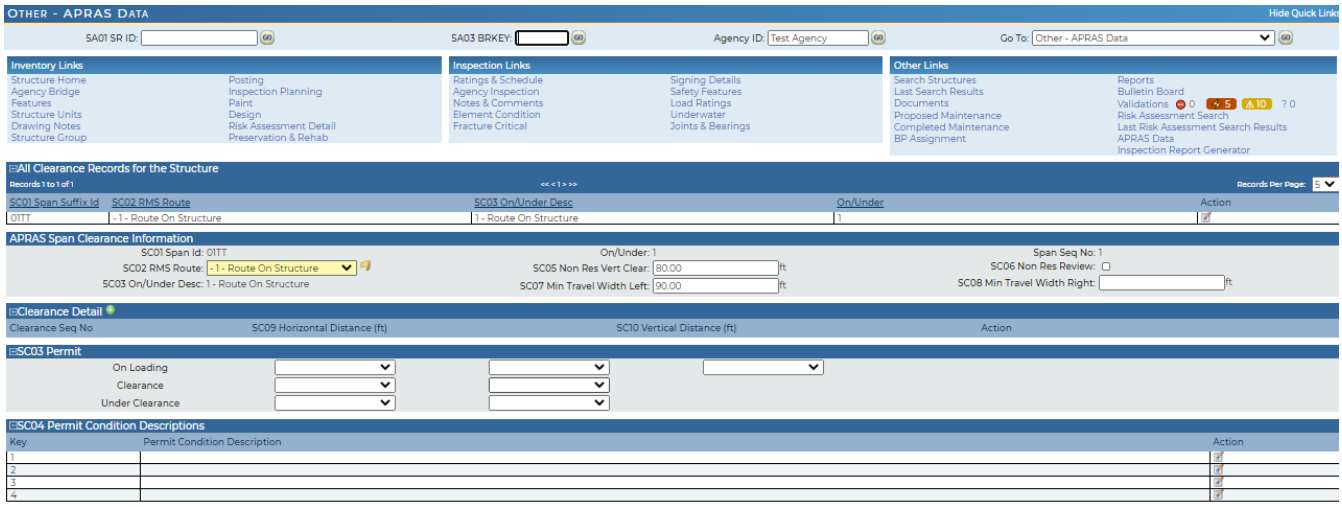


Figure 2.16.3-1 APRAS Span Clearance Screen

2.16.4 APRAS Permit Conditions

The APRAS Permit Conditions edit screen allows users to enter special conditions that issued permits must abide by. The entered information is saved to the production BMS2 database.

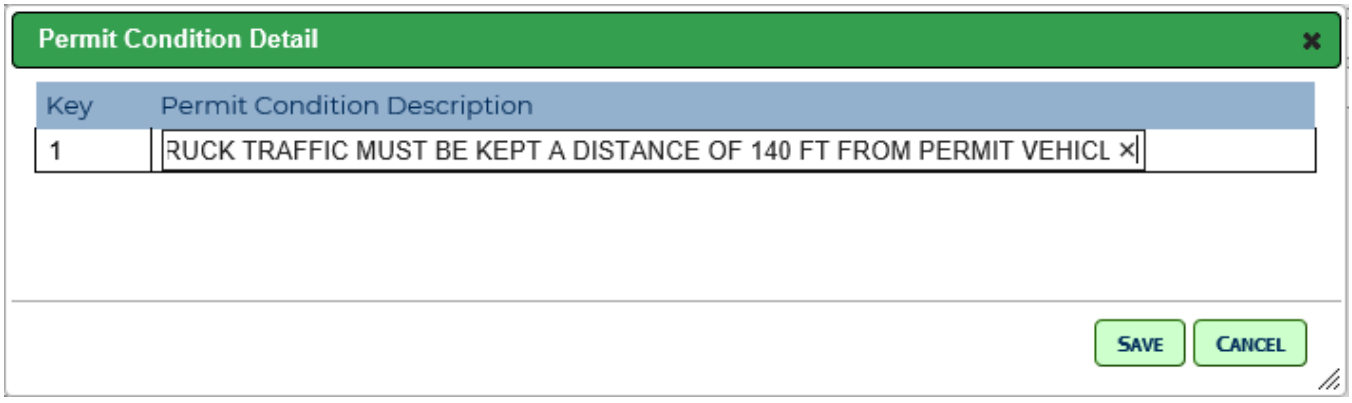


Figure 2.16.4-1 APRAS Permit Condition Screen

2.17 User Preferences Screen

Individual users have the ability to add personal information to BMS2 related to their professional licensure, bridge inspection certifications and qualifications. To access the screen, the user should hover over their name in the top right corner of any BMS2 screen and then select the user preference link.

At the top of the user preferences screen, basic user information is shown to include the users' ID, email address and name. While this information is read-only, edits can be made if needed by the system administrator for the user's account.

Under the Certifications section, users have the ability to record the bridge inspection related certifications and professional licensure they have obtained. Depending on the certification or licensure, the user have the option to enter the certification type, initial certification date, licensure location, licensure number and when the license or certification expires.

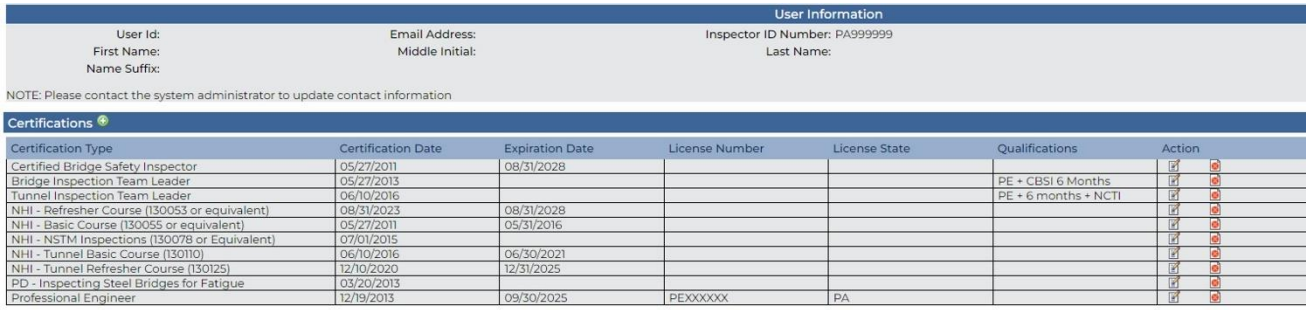
Users must keep their certification course dates updated within their user profile. At a minimum, a bridge inspector must list their basic course. The certification date should be the date of the user's initial certification for the specific course. For example, if the users' basic course was completed on February 2nd, 2011, the date entered for the certification date would be 2/2/2011. The certification expiration date should be the last day of the 60th month after completion of the course. For example, if the basic course ended February 2, 2011, enter 2/28/2016. If the certification date for the basic course has expired, the user must record a refresher training record. The expiration date for the refresher training should be 60 months after the completion of the users latest refresher training. For example, if the user took the refresher in in 2015 and 2020, the expiration date would be 60-months from the month the refresher training was completed in 2020. This criterion also applies to the "National Certified Tunnel Inspector" (NCTI) certification, substituting the tunnel basic course and refresher for the bridge records. Once the 60th month has passed, user will be removed from the team leader list if they qualified for that role. Without entering a certification expiration date in either applicable certification, the user will not show up on the team leader field (7A02).

If the user qualifies as a "Bridge Inspection Team Leader", the user should select that certification in addition to the basic and/or refresher training previously taken. When the team leader certification is selected, an additional required box will become editable, and the user will need to enter how they qualify as a team leader. For example, if they are a Professional Engineer and a CBSI, they would select PE + CBSI. Similarly, if "Tunnel Inspection Team Leader" is selected, they must select how they qualify. Certification expiration dates are not required on the team leader certifications. An additional restriction for the team leader list on bridges with NSTM's exists. Users must record the completion of an NHI 130078 training course or equivalent. The certification date for this record should match the final day of the training and no expiration date is required as PennDOT and FHWA do not require a refresher for the NHI 130078 course.

By entering this data, the user is self-certifying the information to be correct. Periodically, users will be randomly selected and asked to provide documentation that confirms their certification(s).

Changes made are instantaneous in BMS2. For example, if the user updates their information and certifies they are a team leader, their name will instantly appear in the drop-down list. However, the list in BMS3 will be updated the following day.

For Department users, an additional section is present beneath the team leader qualifications sections entitled "Email Notifications Preferences". While users must sign up for email notifications on a separate screen that is visible when hovering over their name, this section of the user preferences screen allows the user to decide if they wish to have the BMSID or BRKEY listed in the individual notifications they receive. All notifications they will receive will have either the BMSID or BRKEY.



User Information

User Id: Email Address: Inspector ID Number: PA999999
First Name: Middle Initial: Last Name:
Name Suffix:

NOTE: Please contact the system administrator to update contact information

Certifications

Certification Type	Certification Date	Expiration Date	License Number	License State	Qualifications	Action
Certified Bridge Safety Inspector	05/27/2011	08/31/2028				
Bridge Inspection Team Leader	05/27/2013				PE + CBSI 6 Months	
Tunnel Inspection Team Leader	06/10/2016				PE + 6 months + NCTI	
NHI - Refresher Course (130053 or equivalent)	08/31/2023	08/31/2028				
NHI - Basic Course (130055 or equivalent)	05/27/2011	05/31/2016				
NHI - NSTM Inspections (130078 or Equivalent)	07/01/2015					
NHI - Tunnel Basic Course (130110)	06/10/2016	06/30/2021				
NHI - Tunnel Refresher Course (130125)	12/10/2020	12/31/2025				
PD - Inspecting Steel Bridges for Fatigue	03/20/2013					
Professional Engineer	12/19/2013	09/30/2025	PEXXXXXX	PA		

Figure 2.17-1 User Preferences Screen

2.18 Standardized Inspection Report

The standardized inspection report screen was developed to establish a baseline level of reporting across the state. While the inspection report generator is not required for use, it does provide the minimum amount of information that should be included within a routine inspection report. To access the Inspection Report Generator, click the link beneath the "Other Links" section on any BMS2 screen within a specific bridge.

When the user selects the link, there will be some basic information that is editable for the user to select and customize the inspection report. The first entry point is the report name. An auto-generated name is created with the BRKEY followed by Standard Inspection Report in the event the user does not enter a custom name. The user must also select the inspection they are creating a report for. The inspection dates match the dropdown on inspection related screens.

To the right of the inspection name and inspection date, a "Generate Report" button exists. This button should be clicked when the user is ready to generate the combined inspection report. If the minimum criteria is not completed for this process, the process will not generate a report. The minimum information for the standard inspection report is the inspection summary, location map, BMS3, and photographs.

PennDOT has provided a list of 22 default section names, of which the four are required as discussed above. For each section there are up to three ways to add the section to the report. The first way to add a section is to use the "Generate" button next to the section name. By using this function, a template developed by PennDOT will be created. There are two sections that allow the user to use the "generate" function: Inspection Summary and Location Map. The inspection summary created by PennDOT is broken down into the following groups of data:

- Inventory Bridge and Selected Inspection Information
- Rating Comparison
- Bridge Description
- Bridge Type
- Inspection Schedule
- Inspection Notes
- Bridge Posting Recommendation Summary
- Load Rating Summary
- Maintenance Priorities

When the "Inspection Summary" is clicked, the user will need to upload a photograph for the cover page of the report. The user cannot progress without uploading a photograph for the cover page. After the photograph is added, the user can preview the generated report by clicking the yellow arrow to the right of the section table.

The location map generated provides both a map of the bridge as well as basic geographic information that can be used to locate the bridge using a map, specifically the latitude and longitude. The icon at the center of the map is the point that corresponds to the latitude and longitude in BMS2. This is generally the start or middle of a bridge. The map cannot be adjusted.

The second way to add documents to the sections is by the "Add from ECS" function. This function allows the user to select a document that is already located within ECS and displayed on the Documents screen. Due to system limitations, only documents loaded to the Document screen or directly to ECS after the migration from EDMS to ECS will work with this functionality currently. To avoid this issue, users can download a document from the Documents screen and reupload the file and it will work for use in the inspection generator.

The third way to add documents to the sections is by dragging a PDF onto the screen within the dotted line box or by clicking in the box and locating the desired PDF on the user's computer. Users can then add any PDF file (it must be a PDF) to the section. Only one PDF per section is allowed.

There is also additional functionality on the screen as well. If the user wants to replace the file they have selected for a given section, simply click the "clear source" button on the line of the section you want to replace. Users can also add a custom section that does not currently exist in the standard list by clicking "Add Custom Section" at the bottom of the screen. If the user selects this option, a text box appears to enter the section name and then the user can populate the data from one of the available methods. Lastly, users can utilize the table of contents feature to populate a table of contents based upon the sections added to the report. In the column labeled "Include with Table of Contents", the box will automatically be checked if the section has a data source for the information. If the user wishes to not include a table of contents, unclick all the boxes. If the user wishes to have a partial table of contents, only uncheck the boxes for the sections you don't want to include within the table of contents.

When the user is ready to generate the report, simply click "Generate Report". A pop-up box will appear showing the sections that the system is combining to make the report the user requested. If an error occurs, the user will see which section caused the failure to combine. After the PDF is generated, the generation page will remain until the user navigates away from the screen or the session times out. Users can modify the existing inputs and click generate again to create another copy of the report. Based on the web browser used to access the screen, the PDF created will either download to your computer or download and open.

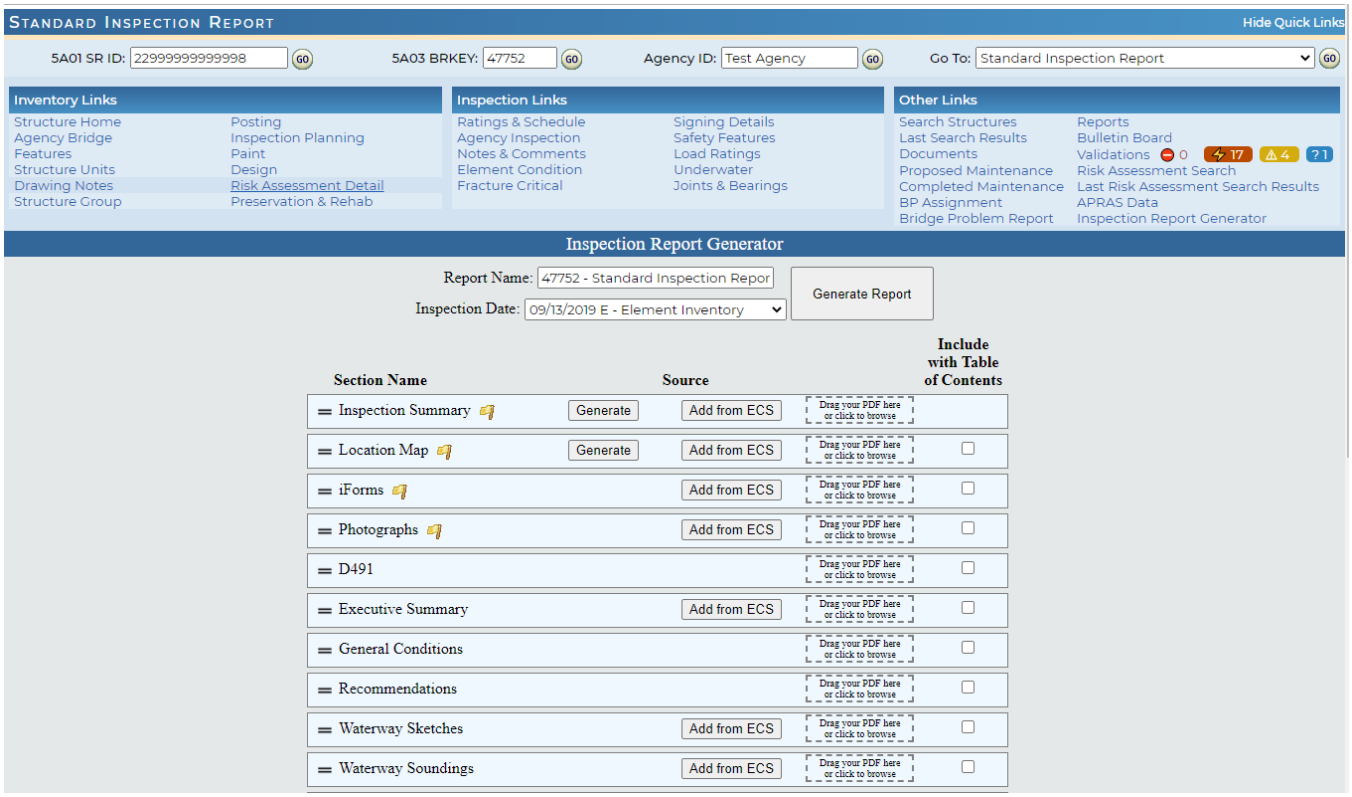


Figure 2.18-1 Inspection Report Generator

2.19 Bridge Problem Report

Whenever a serious bridge or structure problem or emergency occurs on a Department or Local Route, the District Bridge Engineer is to report the situation to the Bridge Inspection Section at Central Office. Based on the findings, the event will be reviewed and if required, reported to the Executive Staff at PennDOT and FHWA. Publication 238, Section 2.9, provides additional guidance on what events require a Bridge Problem Report (BPR) to be developed.

Previously, BPRs were submitted to the BIS in a variety of manners, but they all conveyed the basic bridge information, what happened, what action is being taken, and what follow-ups were going to occur. Generally, BPR's were submitted to the Executive Staff and FHWA with at least one photograph that depicted the criticality of the incident.

The newly created Bridge Problem Report screen will allow District users to input the key information directly into BMS2 and upon completion of the draft report, submit it to Central Office for review. This process will improve the quality of information being reported to both the BIS and Executive Staff. This will also streamline the reporting process through the individual steps and allow historical data to be collected and reviewed to identify reoccurring issues.

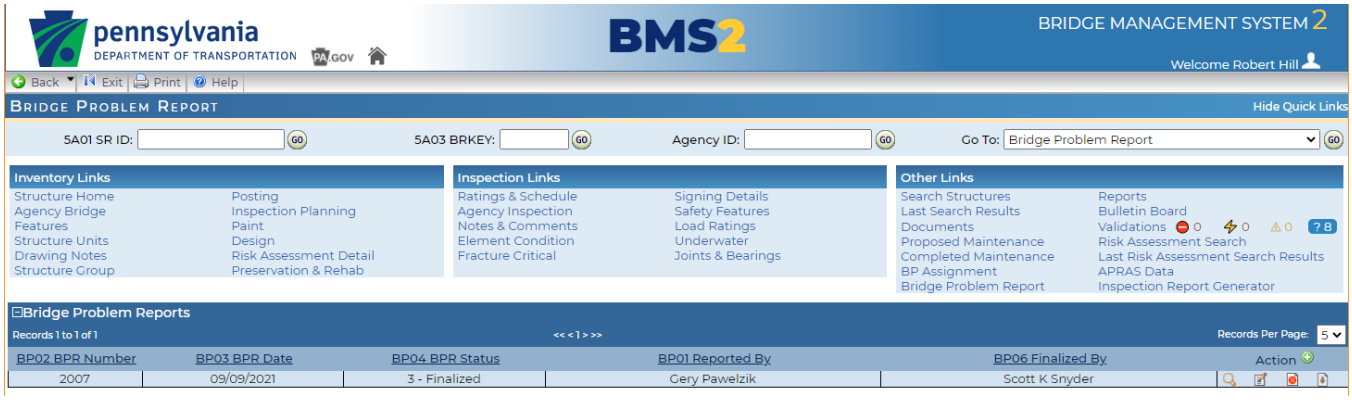


Figure 2.19-1 Bridge Problem Report Detail Screen

The new detail screen for each BPR is separated into several sections as described below:

Report Summary – this section records the administrative portion of the BPR such as who reported the incident, the date, status of the BPR, who the report was finalized by at Central Office and the automated BPR number.

Bridge Information – this section allows users to import data from other screens in BMS2 to provide a general overview of basic bridge characteristics relating to location, owner, structure type, year built and ADT among others.

Narrative Fields – there are four sub-sections of narrative fields where the user can input specific information about the incident that occurred, the actions taken to date, expected follow-up actions and previous repair recommendations. Each entry under one of the subsections will display in bullet format on the report. The user can add multiple entries under each subsection.

Cause Tags – this section of the report allows a user to identify one or more causes for the bridge incident. For example, if scour occurred due to a flooding event, both the scour and flooding checkboxes would be checked. This section allows Central Office to identify trends or review historical causes.

Photographs – users can add up to two (2) photographs per BPR to be included. The documents must already be stored on the "Documents" screen in an approved picture format (jpg/tiff/png) and the user must create a caption for the photographs selected.

After the required information is entered, the report should be submitted to Central Office for review by clicking the “Submit for Review” button. After finalization of the report by the Bridge Inspection Section, the BPR will be sent to the Executive Staff. More specific information about the individual fields is provided in Chapter 3, Section BP of this publication.

After all required information is entered, the report should be submitted for Central Office review by clicking the "Submit for Review" button. More specific information about the individual fields is provided in the BP section in Chapter 3 of this publication.

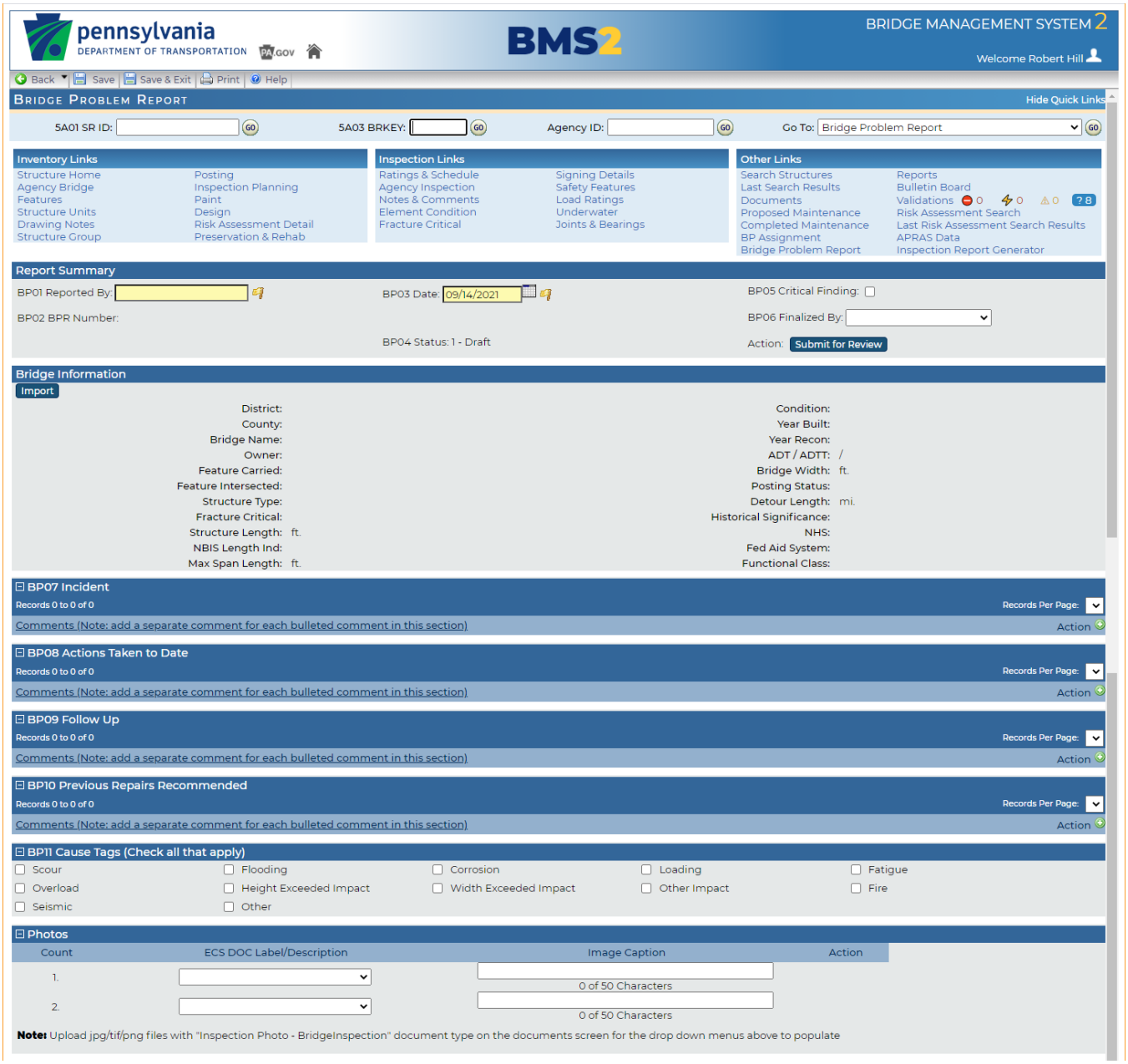


Figure 2.19-2 Bridge Problem Report Detail Screen

2.20 BMS2 Home Screen Links

On the BMS2 home screen, PennDOT has twenty valuable links that are important to the inspection community and have been placed in one central location to provide easy reference for both field and office bridge inspection staff. Below is a brief description of the available links.

Local Scour Critical Bridge Information – this link provides local bridge owners with valuable information about what a scour critical bridge is and general information about monitoring. It also provides valuable links to NOAA weather websites as well as PEMA and FHWA links. There is also important contact information for the local owner so that they can notify their local 911 center and county emergency management officials if a bridge is closed or damaged due to a weather event.

Local Scour Critical Bridge Map – this link provides a map showing the local scour critical bridges in Categories A, B and C. Users can select the county they are interested in and then select individual bridges. Within each bridge pop-up, there is a link to the updated Scour Critical Plan of Action that also includes the monitoring log to complete during and after the rain event if a triggering storm occurs.

Local Government Officials – this link takes the user to the Department of Community & Economic Development website for local government official contact information. This website should be used by bridge inspectors to find contact information for local owners to report priority maintenance items in a timely manner as well as overall inspection reports and other pertinent information.

Scour Assessment Procedures – this document was developed by the United States Geological Survey (USGS) when USGS provided scour assessments for bridges across Pennsylvania in the late 1990's. This assessment provided the baseline scour critical bridge indicator (SCBI) values and associated codings for bridges over water.

Scour Calculator Manual – this document was developed by the USGS and documents how PennDOT's scour calculator works and how the inputs on various tabs of the underwater screen impact the overall SCBI value. While this manual explains how the calculator works, some codes and cases have been updated but this manual provides the background for how the system works.

Publication 100A – this link takes the user to the current version of this publication.

Publication 238 – this link takes the user to the current version of Publication 238, Bridge Safety Inspection Manual.

ECMS – this links takes the user to PennDOT's Engineering and Construction Management System website.

Manual for Inspecting Steel Bridges for Fatigue Damage Conditions – this link references research completed by Lehigh University and was release in 1990, sponsored by PennDOT.

Bridge Inspection Forms and Templates – The link simply displays a PDF of a word document with links to forms and templates that are mentioned in this publication, Publication 238, bridge inspection training classes, or have been generated by PennDOT for use across the state to improve the documentation of inspections within Pennsylvania. Each link includes a date for when the original document is added to the page or the most recent update date so users know if the specific forms and templates were updated. Also included on this page are detailed presentations that PennDOT has made to internal staff and deemed important for all inspectors. For example, when new strike-off letters are released by Central Office, it may be deemed necessary to brief the inspectors and reviewers at the Districts about the changes, rather than waiting for an inspection refresher cycle to lapse, which could take up to four years for inspectors to find out about specific changes. Inspectors are encouraged to visit the page frequently.

BMS2/ BMS3 **Technical Support** – this link provides contact information if a user needs to report an issue with BMS2 and/or BMS3.

PennDOT Bridge Inspection Training – this link takes users to PennDOT's training website where users can sign up for all PennDOT offered courses, including bridge inspection training.

PennDOT Bridge Information and Internet Reports – this link takes users to the general "Bridge" website on PennDOT's homepage. Within this website, there are links to bridge information that is made available to the public for both state and locally owned bridges as well as maps of the bridge inventory.

FHWA – Bridge Technology – this link has general information provided by FHWA on bridges and structures.

FHWA – NBIS Q & A – this link has commonly asked questions referring to the National Bridge Inspection Standards and answers from FHWA on each section of the regulation.

FHWA – Bridge Inspector's Reference Manual (BIRM) – this link is a reference manual that can be used to review bridge inspection topics in general terms.

FHWA – NBIS Oversight Program – this link is the metric for which PennDOT is graded on annually after the submission of the bridge inspection data for all bridges.

National Bridge Inspection Standards (NBIS) – this link provides a PDF of the NBIS which PennDOT policy and procedure for bridge inspection is based upon.

Bridge Inspection QA Clarifications – this is a link to a PDF that provides Quality Assurance clarifications. Throughout the year, PennDOT completes quality assurance inspections based upon Publication 240 across Pennsylvania. All bridges over 20' are subject to a random inspection. After these inspections and associated reports are compiled, PennDOT meets with the inspectors and consultants who completed the inspections to discuss the findings. As a result of these meetings, PennDOT may find it necessary to release a clarification regarding codings in Publication 100A. This link will continually be updated as needed.

BMS3 – this link provides users the ability to access BMS3 via the BMS2 homepage. BMS3 is the replacement for iForms. BMS3 can be viewed on any internet browser.

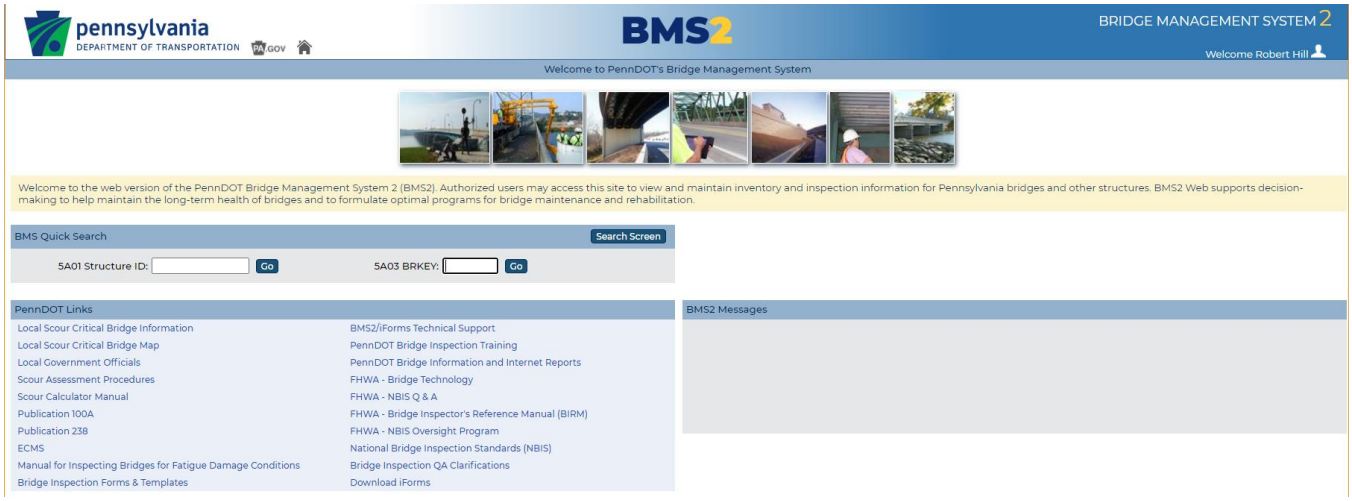


Figure 2.20-1 BMS2 Home Screen Links

3.0 BMS2 Field Groups

The following is a list of the BMS2 Field Groups. These groupings were established as part of the Pontis system and have remained grouped. For reference in each group, a link to where each field appears in BMS2 has been provided to the user.

Field Groups	Label Prefix	Field Groups	Label Prefix
Inspection Condition	1A	Inventory - Walls	VW
Inspection Condition - Create/Edit Element	1B	Structure Group	SG
Inspection Notes	2A	Inspection – Safety Feature	IA
Inspection Work	3A	Inspection – Bearings	IB
NBI Project Data	3B	Inspection – Joints	IJ
Inspection Appraisal - Other Ratings	4A	Inspection – Load Rating	IR
Inspection Appraisal - Load Ratings	4B	Inspection – Load Rating - Tunnels	IT
Inspection Inventory - ID/Admin	5A	Inspection – NSTM/Fatigue	IF
Inspection Inventory - Design	5B	Inspection – Underwater / OSA	IU
Inspection Inventory - Roads	5C	Inspection - Underwater / Sub Units	IN
Inspection Inventory - Structure Units	5D	Inspection - Underwater / Other	IL
Inspection Inventory - Classification	5E	Inspection – Signing Details	ID
Agency Bridge	6A	Inspection - Comments	IC
Agency Inspection	6B	Inspection - Maintenance	IM
Agency Roadway	6C	Inspection – Signs / Lights	IS
Inspection Schedule	7A	Inspection - Walls	IW
Inventory – Posting	VP	Feature Intersected - Utility	FT
Inventory – Paint	VA	Feature Intersected - Railroad	FR
Inventory - Maintenance Responsibility	VM	Feature Intersected - Waterway	FW
Inventory - Design	VD	APRAS Span - Span	SP
Inventory - Drawings and Notes	VN	APRAS Span – Apras Span	SS
Inventory - Inspection Planning	VI	APRAS Span – Load Capacity	SL
Inventory – Signs / Lights	VS	APRAS Span – Clearance - Permit	SC
Inventory – Tunnels	VT	APRAS Span – Clearance – Clearance Details	SC

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1A Inspection Condition

The Inspection Condition Section contains NBI and element-level condition information for the structure. This section is used to edit condition data, add and remove elements from the structure, and calculate the sufficiency rating or the NBI rating.

Condition Rating Codes Used for the Following Items

To promote uniformity between inspectors, these guidelines will be used to rate and code Items 1A01, 1A02, 1A03, 1A04, and 1A05, as well as Items 6B38, 6B39, and 6B40.

Condition ratings are used to describe the existing in-place structure as compared to the as-built condition.

Condition codes are properly used when they provide an overall characterization of the general condition of the entire component being rated.

Conversely, they are improperly used if they attempt to describe localized or nominally occurring instances of deterioration or disrepair. Correct assignment of a condition code must, therefore, consider both the severity of the deterioration or disrepair and the extent to which it is widespread throughout the component being rated.

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

Portions of the bridges that are being supported or strengthened by temporary members will be rated based on their actual condition; that is, the temporary members are not considered in the rating of the item. (See Item 5E03 for the definition of a temporary bridge).

Completed bridges not yet open to traffic, if rated, shall be coded as if open to traffic. Even if the bridge is closed, rate each item without being influenced to the fact that the bridge is closed.

The determination of which of the following ratings apply to each of the items will be based on an evaluation of all the relevant factors and information included in the detailed inspection reports. The rating chosen for each of these items will, in effect, be a composite of all the relevant factors.

It should be recognized that this will require judgment, particularly for those items where the ratings seem not to apply. There are unique situations, but again, it is expected that some judgment will be used.

Rating Codes

Code	Condition	Description
N	Not Applicable	Component does not exist.
9	Excellent	Isolated inherent defects.
8	Very Good	Some inherent defects.
7	Good	Some minor defects.
6	Satisfactory	Widespread minor or isolated moderate defects.
5	Fair	Some moderate defects; strength and performance of the component are not affected.
4	Poor	Widespread moderate or isolated major defects; strength and/or performance of the component is affected.
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	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	Imminent Failure	Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service.
0	Failed	Bridge is closed due to component condition, and is beyond corrective action. Replacement is required to restore service.

Reference: FHWA's Specification for the National Bridge Inventory (SNBI). Additional details are provided within Appendix N, including an explanation of defects. The 2025 Editions will fully incorporate the changes from the SNBI throughout Publication 100A.

Structure Type Coding Item Comparison Chart

Condition:

6B39 Approach Roadway
6B40 Deck Wearing Surface
1A01 Deck
1A04 Superstructure
1A02 Substructure
1A05 Channel
1A03 Culverts

Appraisal:

4A09 Structural Condition Appraisal
4A10 Deck Geometry
4A11 Underclearances
1A06 Waterway Adequacy
4A02 Approach Roadway Alignment

Structure Type Coding Item Comparison Chart:

Structure Type		Grade (3)	Over	BMS2 ITEM NUMBER											
				6B39	6B40	1A01	1A04	1A02	1A05	1A03	4A09	4A10	4A11	1A06	4A02
Arch	Culvert	Under Fill	Road	N	N	N	N	N	N	Yes	Yes	(1)	Yes	N	(1)
			Water	N	N	N	N	N	Yes	Yes	Yes	(1)	N	Yes	(1)
	Bridge (Closed Spandrel)	At Grade	Road	(2)	(2)	(2)	Yes	Yes	N	N	Yes	Yes	Yes	N	Yes
			Water	(2)	(2)	(2)	Yes	Yes	Yes	N	Yes	Yes	N	Yes	Yes
Box Culvert		Under Fill	Road	N	N	N	N	N	N	Yes	Yes	(1)	Yes	N	(1)
			Water	N	N	N	N	N	Yes	Yes	Yes	(1)	N	Yes	(1)
		At Grade	Road	Yes	Yes	N	N	N	N	Yes	Yes	Yes	Yes	N	Yes
			Water	Yes	Yes	N	N	N	Yes	Yes	Yes	Yes	N	Yes	Yes
Slab Bridge		Under Fill	Road	N	N	N	Yes	Yes	N	N	Yes	(1)	Yes	N	(1)
			Water	N	N	N	Yes	Yes	Yes	N	Yes	(1)	N	Yes	(1)
		At Grade	Road	Yes	Yes	Yes	Yes	Yes	N	N	Yes	Yes	Yes	N	Yes
			Water	Yes	Yes	Yes	Yes	Yes	Yes	N	Yes	Yes	N	Yes	Yes
Frame	Culvert	Under Fill	Road	N	N	N	N	N	N	Yes	Yes	(1)	Yes	N	(1)
			Water	N	N	N	N	N	Yes	Yes	Yes	(1)	N	Yes	(1)
	Bridge	At Grade	Road	Yes	Yes	Yes	Yes	Yes	N	N	Yes	Yes	Yes	N	Yes
			Water	Yes	Yes	Yes	Yes	Yes	Yes	N	Yes	Yes	N	Yes	Yes

Even if the bridge is closed, rate each item without being influenced by the fact that the bridge is closed.

Yes = Code this item numerically

N = Code of "N"

(1) Required only when parapet, headwalls and/or structure mounted bridge rails restrict the roadway.

(2) Required only when concrete slab extends beyond the spandrel wall and supports the roadway, sidewalk, and/or parapet. Otherwise, code "N".

(3) The term "under fill" refers to structures with an average depth of 2' or greater between the top of the wearing surface and the main load carrying member. The term "at grade" refers to structures with an average depth of less than 2' between the top of the wearing surface and main load carry member. There are some exceptions, as described in the coding for 6A29 when traffic restrictions exist for culverts due to headwalls.

*1A01 Deck – Deck Condition Rating (Refer to Appendix N for Guidance)

Inspection > Ratings & Schedule; BMS3: Ratings and Deck

~~Description:~~

~~This item indicates the condition of the bridge deck.~~

~~Procedure:~~

~~Select the code, which describes the overall condition of the bridge deck.~~

~~Concrete decks should be inspected for cracking, scaling, spalling, leaching, chloride contamination, delamination and full or partial depth failures.~~

~~Steel grid decks should be inspected for broken welds, broken grids, section loss and growth of filled grids from corrosion.~~

~~Timber decks should be inspected for splitting, crushing, fastener failure and deterioration from rot.~~

~~Note:~~

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

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

~~For bridge decks with overlays, the inspector must make a judgment from a previous inspection report and/or review underneath the bridge deck for evidence of decay.~~

~~Adjacent box beam structures that do not have a separate concrete deck shall have the top flange of the adjacent box beams treated as a deck for the purpose of establishing a deck condition rating. If the box beams have been covered by asphalt wearing surface, the deck rating may be based on:~~

- ~~The condition of the top of the beams before the wearing surface was placed, if known.~~
- ~~The condition of the underside of the superstructure.~~
- ~~Because the condition of the wearing surface gives an indication of the deck condition, the deck condition typically should not be higher than the wearing surface condition rating unless there is strong evidence to support otherwise.~~

~~Code "N" for bridges under fill.~~

~~Coding:~~

~~Refer to CONDITION RATING FOR CONCRETE BRIDGE DECK EVALUATION below.~~

~~Note:~~

~~The specialized table below can be used as a guide for evaluating deck conditions using different condition indicators.~~

Condition Rating for Concrete Bridge Deck Evaluation:

Category Classification	Rating	Condition Indicators					
		Deck Area		Electrical Potential	Deck Area	Chloride Content (#/CY)	Deck Area
		Visible Spalls	Delamination				
Category #3 Light Deterioration	9	none	none	0.0	none	0	none
	8	none	none	0.0 < E.P.< 0.35	none	0 < C.C.<1	none
	7	none	< 2%	0.35 < E.P.< 0.45	≤ %5	0 < C.C.<2	none
Category #2 Moderate Deterioration	6	< 2% spalls or sum of all deteriorated and/or contaminated deck concrete (≥2#/C.Y.Cl) < 20%					
	5	< 5% spalls or sum of all deteriorated and/or contaminated deck concrete 20% to 40%					
Category #1 Extensive Deterioration	4	> 5% spalls or sum of all deteriorated and/or contaminated deck concrete 40% to 60%					
	3	> 5% spalls or sum of all deteriorated and/or contaminated deck concrete > 60%					
Structurally Inadequate Deck	2	Deck structural capacity grossly inadequate					
	1	Deck has failed completely – Repairable by replacement only					
	0	Holes in deck – Danger of other sections of deck failing					

Notes: Rating 9 – No deck cracking exists.
Rating 8 – Some minor deck cracking is evident.

*1A02 Substructure - Substructure Condition Rating (Refer to Appendix N for Guidance)

Inspection > Ratings & Schedule; BMS3: Ratings and Substructure

Description:

This item indicates the condition of the bridge substructure.

Procedure:

Select the code which indicates the condition of the bridge substructure. This includes backwall abutments, integral wings, piers, piles, fenders, and footing scour conditions or other.

All substructure elements should be inspected for visible signs of distress including evidence of cracking, section loss, settlement, misalignment, scour, collision damage, and corrosion. The rating factor given to Item 1A02 should be consistent with the one given to Item 4A08 whenever a rating factor of 2 or below is determined for Item 4A08.

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

Include integral wingwalls to the first construction or expansion joint in the evaluation. For non-integral superstructure and substructure units, the substructure is considered to be the portion below the bearings. For structures where substructure and superstructure are integral, the substructure is considered to be the portion below the springline.

Coding:

Refer to CONDITION RATING CODES listed at the beginning of Section 1A.

*1A03 Culvert - Culvert Condition Rating (Refer to Appendix N for Guidance)

Inspection > Ratings & Schedule; BMS3: Ratings and Culvert

~~Description:~~

~~This item indicates the condition of a culvert.~~

~~Procedure:~~

~~Select the code which indicates the condition of the culvert. This includes alignment, settlement problems, joints, structural condition, scour and structural integrity of culverts. Integral wingwalls to the first construction or expansion joint shall be included in the evaluation.~~

~~For a detailed discussion regarding the inspection and rating of culverts, consult Report No. FHWA IP-86-2, Culvert Inspection Manual, July 1986.~~

~~Coding:~~

~~Refer to Appendix G for the coding of Item 1A03 for stone masonry arches. For other culvert structure types, rate and code the condition in accordance with the previously described general condition ratings and the following descriptive codes:~~

- ~~**N** Not applicable. Use if structure is not a culvert.~~
- ~~**9** No deficiencies.~~
- ~~**8** No noticeable or noteworthy deficiencies which affect the condition of the culvert. Insignificant scrape marks caused by drift.~~
- ~~**7** Shrinkage cracks, light scaling, and insignificant spalling which does not expose reinforcing steel. Insignificant damage caused by drift with no misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls or pipes. Metal culverts have a smooth, symmetrical curvature with superficial corrosion and no pitting.~~
- ~~**6** Deterioration or initial disintegration, minor chloride contamination, cracking with some leaching, or spalls on concrete or masonry walls and slabs. Local minor scouring at curtain walls, wingwalls or pipes. Metal culverts have a smooth curvature, non-symmetrical shape, significant corrosion or moderate pitting.~~
- ~~**5** Moderate to major deterioration or disintegration, extensive cracking and leaching, or spalls on concrete or masonry walls or slabs. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls, wingwalls or pipes. Metal culverts have a significant distortion and deflection in one section, significant corrosion or deep pitting.~~
- ~~**4** Large spalls, heavy scaling, wide cracks, considerable efflorescence, or opened construction joint permitting loss of backfill. Considerable settlement or misalignment. Considerable scouring or erosion at curtain walls, wingwalls or pipes. Metal culverts have a significant distortion and deflection throughout, extensive corrosion or deep pitting.~~
- ~~**3** Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slab. Integral wingwalls nearly severed from culvert. Severe scour or erosion at curtain walls, wingwalls or pipes. Metal culverts have extreme distortion and deflection in one section, extensive corrosion, or deep pitting with scattered perforations.~~
- ~~**2** Integral wingwalls collapsed, severe settlement of roadway due to loss of fill. Section of culvert may have failed and can no longer support embankment. Complete undermining at curtain walls and pipes. Corrective action required to maintain traffic. Metal culverts have extreme distortion and deflections throughout with extensive perforations due to corrosion.~~
- ~~**1** Bridge closed. Corrective action may put back in light service.~~
- ~~**0** Bridge closed. Replacement necessary.~~

*1A04 Superstructure - Superstructure Condition Rating (Refer to Appendix N for Guidance)

Inspection > Ratings & Schedule; BMS3: Ratings and Superstructure

~~Description:~~

~~This item indicates the condition of the bridge superstructure.~~

~~Procedure:~~

~~Select the code which indicates the condition of the bridge superstructure. The structural members should be inspected for signs of distress which may include cracking, deterioration, section loss, and malfunction and misalignment of bearings. The condition of bearings, joints, paint system, etc., shall not be included in this rating, except in extreme situations, but should be noted on the inspection form.~~

~~When the deck is the superstructure (slab bridges) or is an integral (composite) part of the superstructure (beams), base the condition rating on both the deck slab and the beams.[1] Otherwise, base it on the superstructure, excluding the deck.~~

~~Coding:~~

~~Refer to CONDITION RATING CODES listed at the beginning of Section 1A.~~

~~Refer to Appendix G for the coding of Item 1A04 for stone masonry arches.~~

~~Superstructure condition rating guidelines for Non-Composite Prestressed Concrete Adjacent Box Beams are in the table below. The use of this table is a departure from the normal condition rating procedure which is based on an overall characterization of the general condition of the entire component being rated. Instead, base the overall rating of the superstructure for this bridge type on the **lowest condition rating** of any single beam's strand exposure or deterioration in accordance with the following table:~~

Condition Rating	Percent # Strands Exposed (single beam)	Deterioration of P/S Concrete Beams (single beam)	
9 – Excellent	0%		No cracks, stains or spalls
8 – Very Good	0%		No cracks, stains or spalls
7 – Good	0%		Map cracks and miscellaneous hairline cracks
6 – Satisfactory	0%	Spalls	Minor Spalls/Delaminations, < 5%
		Cracks	Map cracks and misc. hairline cracks
5 – Fair	1-5%	Spalls	Spalls/Delaminations, < 15%
		Longitudinal Cracks	Hairline longitudinal cracks in bottom flange
		Longitudinal Joints	Leakage at joints with light efflorescence
4 – Poor	6-15%	Spalls	Spalls/Delaminations, 15 – 25%
		Transverse Cracks	Hairline flexure cracks across bottom flange
		Longitudinal Cracks	Minor efflorescence and/or minor rust stains
		Longitudinal Joints	Heavy leakage efflorescence and/or minor rust stains
		Transverse Tendons	Loose or heavily rusted
		Web Cracks	Initiation of vertical or diagonal cracks in P/S beam near open joints in barrier (< 3" length)
3 – Serious	15-20%	Spalls	Spalls/Delaminations, > 25%
		Transverse Cracks	Open flexure cracks in bottom flange
		Web Cracks	Vertical or diagonal cracks in P/S beam near open joints in barrier
		Camber	Sagging/Loss of camber
		Transverse Tendons	Broken or missing
2 – Critical	> 20%	All	Any condition worse than detailed above

Note:

This item is not applicable for a reinforced concrete box culvert at grade.

[1]This is true for Deck Condition Rating (Item 1A01) ≤ 4.

*1A05 Channel - Channel and Channel Protection Condition Rating (Refer to Appendix N for Guidance)

Inspection > Ratings & Schedule; BMS3: Ratings and Waterway

~~Description:~~

~~This item indicates the condition of the channel and channel protection.~~

~~Procedure:~~

~~Select the code which indicates the condition of the channel and channel protection. This includes stability and condition of rip-rap, spur dike, etc. Accumulation of drift and debris on the superstructure and substructure should be noted on the inspection form but not included in the condition code rating.~~

~~Coding:~~

~~Rate and code the condition in accordance with the previously described general condition ratings **and** the following condition codes:~~

~~**N**~~	~~Not applicable. Use when bridge is not over a waterway.~~
~~**9**~~	~~There are no noticeable or noteworthy deficiencies which affect the condition of the channel.~~
~~**8**~~	~~Banks are protected or well vegetated. River control devices such as spur dikes and embankment protection are not required or are in stable condition.~~
~~**7**~~	~~Bank protection is in need of minor repairs. River control devices such as spur dikes and embankment protection have little or 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 water (channel) slightly.~~
~~**5**~~	~~Bank protection is being eroded. River control devices and/or embankment have major damage. Trees and brush restrict channel~~
~~**4**~~	~~Bank and embankment protection is severely undermined. River control devices have severe damage. Large deposits of debris are in the waterway (channel).~~
~~**3**~~	~~Bank protection has failed. River control devices have been destroyed. Stream bed aggradation, degradation, or lateral movement has changed the waterway (channel) to now threaten the bridge and/or approach roadway.~~
~~**2**~~	~~The waterway (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.~~

*1A06 Waterway – Waterway Adequacy Appraisal

Inspection > Ratings & Schedule; BMS3: Ratings and Waterway

Description:

This item indicates the appraisal of the bridge waterway adequacies.

Procedure:

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

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

Remote	Greater than 100 years
Slight	11-100 years
Occasional	3 to 10 years
Frequent	Less than 3 years

Adjectives describing traffic delays mean the following:

Insignificant	Minor inconvenience. Highway passable in a matter of hours.
Significant	Traffic delays of up to several days.
Severe	Long term delays to traffic with resulting hardship.

Coding:

Refer to Table 4A below.

TABLE 4A
Rating by Functional Classification of Overtopping Frequency and/or Traffic Delays

Functional Classification, 5C22			Description
Principal Arterials – Interstates, Freeways or Expressways	Other Principal & Minor Arterials & Major Collectors	Urban Collectors, Minor Collectors, Locals	
Code			
N	N	N	Bridge not over a waterway
9	9	9	Bridge deck and roadway approaches above flood water elevations (high water); chance of overtopping is remote
8	8	8	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	If this item is the reason for closure

Note: This Table refers to Items 1A06 and 5C22.

1A07 Unrep Spalls - Unrepaired Spalls

Inspection > Ratings & Schedule; BMS3: Removed

Description:

This item indicates the actual unrepaired spalled area in the top of deck, measured in square feet.

Procedure:

Enter the total spalled area in the top of deck to the nearest square foot.

1A08 (Not Used – Reserved for Future Use)

1A09 Inspection Status

Inspection > Ratings & Schedule; BMS3: Ratings

Description:

This item indicates the status of the inspection.

Definitions used in the inspection status process include:

SUBMITTED Indicates that the inspection information is now in BMS2. Further review by the inspector may be needed before it is ready for the ACCEPTANCE review.

ACCEPTED The Department's acceptance of the inspection report after its review. The ACCEPTANCE review is a detailed review by a Department Inspection Reviewer of all BMS2 data, inspection comments and documentation for conformance with PennDOT standards and NBIS. To assist with the review of BMS2 data prior to moving the inspection record to Accepted status, the key field comparison section highlights differences from the current inspection record to the previous inspection record for certain inspection condition ratings and appraisals as well as required inspection checkboxes and intervals.

Note: See Pub 238 IP 06 for more details on the review process.

Procedure:

Select the appropriate inspection status indicator from the dropdown list.

Coding:

1A09 Coding		
0 - Ready to submit upload	This status occurs only in BMS3. The inspection information is in BMS3only and has not yet been uploaded to BMS2 Web.	Inspection Team and its internal reviews
1 – New	This 1A09 = 1 status occurs when a new inspection is started in BMS3 (not BMS2). The inspection information displayed is new and has not been submitted for ACCEPTANCE.	
2 – Submitted	The inspection information was submitted to BMS2. The inspection team's self-review is not yet complete and the inspection is complete for ACCEPTANCE review. Review for ACCEPTANCE has not been started.	
3 - Under Review	The inspection information was submitted and is currently under review by the inspection team. All fields in BMS3 are read-only if a bridge is downloaded in this status.	
4 – Validation Failure	This status occurs only in BMS3. The inspection information attempted to be uploaded but validation errors and/or failures must be corrected before the record can be uploaded to BMS2.	
5 – Ready for Acceptance Review	The inspection is complete and ready for the Acceptance Review by the Department's Inspection Reviewer.	Department Acceptance Inspection Reviewer
6 – Interim Final Review	The submitted inspection is under review for Acceptance by the Department's Inspection Reviewer.	
8 – Returned for Correction	The inspection was submitted for ACCEPTANCE and was rejected after review by a Department Inspection Reviewer. The inspection originator is to make corrections and re-submit for ACCEPTANCE.	
9 – Accepted	The inspection has been reviewed and ACCEPTED by the Department's Inspection Reviewer.	

Notes:

- All inspections being prepared in BMS3 should be submitted to BMS2 Web at the end of the day it was started to ensure inspection dates are recorded for inspection interval compliance.
- Item 1A09 = 2 - Submitted status allows the Department to establish a Plan of Action for critical findings in BMS2 and SAP immediately.

1A09a Inspection Reviewer

Inspection > Ratings & Schedule

Description:

This item is used to record the name of the inspection reviewer who accepted the inspection.

Procedure:

This item will be **automatically populated by the system** when the user moves the inspection status (Item 1A09) to accepted.

Coding:

Name of inspection reviewer who accepted the inspection.

1A10 Qty - Element Quantity

Inspection > Element Condition > Inspection Element Detail; BMS3: Elements

Description:

This item is used to record the total quantity for the corresponding element.

Procedure:

Enter the total quantity for the element. The unit of measure will vary by element and is displayed to the right of the Quantity field. For elements measured in linear feet (LF), record the quantity to the nearest tenth of a foot.

Coding:

Refer to Appendices H, I, & J for guidance on coding element quantities.

1A11 CS Qty1 / Qty2 / Qty3 / Qty4 – Condition State Quantities

Inspection > Element Condition > Inspection Element Detail; BMS3: Elements

Description:

This four-part item is used to record the quantity of the element in each condition state, 1 through 4.

Procedure:

Enter the quantity for the element in condition states 2 through 4. The quantity in condition state 1 will be automatically calculated by the system by subtracting the quantities in condition states 2 through 4 from the total quantity (Item 1A10).

Coding:

Refer to Appendices H, I, & J for guidance on coding element quantities.

1A12 Elem Cond - Element Condition Notes

Inspection > Element Condition > Inspection Element Detail; BMS3: Elements

Description:

This item is used to record notes about the condition of the currently selected element.

Procedure:

Enter notes about the condition of the currently selected element. Click on the pencil icon beside the comment to open the Notes screen. At a minimum, if an element is in CS-4 or is moved from a CS-4 to a CS-3, the documentation of the strength or serviceability review should be noted in Item 1A12 for future inspectors to reference.

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1B Inspection Condition - Create/Edit Element

The Inspection Condition - Create/Edit Element Section is used to add a new element to a structure, or view and edit detailed information about a selected element.

In order to avoid internal errors within BMS2, each structure was assigned a "Dummy Element" (Element 999). When a structure has its actual elements defined, the Dummy Element should be removed.

1B01 Element ID

Inspection > Element Condition > Inspection Element Detail; BMS3: Elements

Description:

This item indicates the desired element for the condition unit.

Procedure:

Select the desired element from the dropdown list.

Refer to Appendices H, I, & J for guidance on coding element quantities.

1B02 Structure Unit

Inspection > Element Condition > Inspection Element Detail; BMS3: Elements

Description:

This item indicates the structure unit on which the element is located.

Procedure:

Select the appropriate structure unit from the dropdown list. If left blank, the new element will be assigned to the default structure unit defined in Item 5D05. Elements shared by two structure units (e.g. piers) should be assigned to the lower numbered unit (span). Elements shall only be assigned to Main and Approach Span structure units.

If a new structure unit is required, it must be created on screen 5D Inspection Inventory - Structure Units in order to appear in the dropdown list. Refer to Item 5D04 for Structure Unit types.

For elements that are spread over multiple spans, create the element for each structure unit where it is located. The quantity for the element shall represent the quantity for that individual structure unit.

1B03 Environment

Inspection > Element Condition > Inspection Element Detail; BMS3: Elements

Description:

This item indicates the environment for the condition unit.

Procedure:

Select the appropriate environment for the condition unit.

Factors affecting environment include climate, salt use, and ADT.

Coding:

Four standard environments are available; however, **all Pennsylvania bridge elements should be coded with environment 3 - Moderate.**

1 Benign (not used)
2 Low (not used)
3 Moderate
4 Severe (not used)

1B04 (Not Used – Reserved for Future Use. Use Item 1A10)

1B05 Scale Factor

Inspection > Element Condition > Inspection Element Detail; BMS3: Elements

Description:

This item is used to record the scale factor of the element in this structure unit.

Procedure:

Enter the scale factor for the element.

Scale factor is an additional dimension field used to measure the element for developing project-level cost estimates.

Scale factors should be recorded to the nearest tenth of a foot. For elements without scale factors, enter 1.0 for not applicable.

Coding:

Enter the Scale Factor Measurement for applicable elements. Refer to Appendices H, I, & J for guidance on coding element quantities.

1B06 (Not Used - Reserved for Future Use)

1B07 Element Desc - Element Description

Inspection > Element Condition > Inspection Element Detail; BMS3: Elements

Description:

This item is used to record a short description (up to 255 characters) of the element.

Procedure:

Enter a short description of the condition unit in narrative form.

Examples:
"Element record added 2006-02-08"

"Manufacturer: XYZ Company Model #:ABC123"

"Element 28 – Steel Open Grid has been replaced with Element 26 – Concrete with Coated Bars after deck rehab on 12/10/2006"

2A Inspection Notes

The Inspection Notes Section is used to enter notes or comments about the structure, or about the current inspection.

2A01 Structure Notes

Inventory > Structure Home

Description:

This item is used to record notes about the structure in narrative form.

Procedure:

Record any narrative information about the structure that may be useful for future applications.

2A02 Inspection Notes

Inspection > Notes & Comments; BMS3: Ratings and Notes

Description:

This item is used to record notes about the inspection in narrative form.

Procedure:

Record any narrative information that is necessary to identify inspection findings.

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3A Inspection Work

The Inspection Work Section is used to recommend work candidates for the bridge, and to edit or remove those work candidates.

3A01 (Not Used – Reserved for Future Use)

3A02 Work Candidate ID

Other > Proposed Maintenance; Other > Completed Maintenance; BMS3: Maintenance

Description:

This item is used to record a unique ID for the current work candidate.

Procedure:

A new ID is assigned automatically by the system when a new work candidate is created. This ID may be changed, but no two work candidates on any bridge or element may have the same ID.

Coding:

This automatically generated ID should not be changed.

3A03 Structure Unit

BMS3: Maintenance

Description:

This item is used to select which structure unit on the bridge to which the work candidate applies.

Procedure:

Select the structure unit from the drop down list for which the maintenance item is applicable for. If the maintenance item applies to multiple spans, select the location that drives the level of the priority. In the instance where the level of priority applies to all spans of a structure, select "All Units."

Coding:

The list is populated from units in Item 5D01. Select the appropriate coding from the drop down list.

3A04 (Not Used – Reserved for Future Use. Use Item IM04)

3A05 (Not Used – Reserved for Future Use. Use Item IM02)

3A06 (Not Used – Reserved for Future Use. Use Item IM03)

3A07 (Not Used – Reserved for Future Use. Use Item IM10)

3A08 (Not Used – Reserved for Future Use. Use Item IM05)

3A09 (Not Used – Reserved for Future Use. Use Item IM06)

3A10 (Not Used – Reserved for Future Use)

3A11 (Not Used – Reserved for Future Use. Use Item IM08)

3A12 (Not Used – Reserved for Future Use)

3A13 (Not Used – Reserved for Future Use. Use Item IM11)

3A14 (Not Used – Reserved for Future Use. Use Item IM07)

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3B NBI Project Data

The NBI Project Data Section is used to view and update the NBI fields related to planned projects for a structure. To access this information, select the "Proposed Maintenance" screen under Other Links.

*3B01 Proposed Deck/Super Work

Other > Proposed Maintenance

Description:

This item is used to indicate the type of major deck and superstructure work proposed to be accomplished on the structure to improve it to the point that it will provide the type of service needed.

Procedure:

This item must be coded for bridges eligible for the Highway Bridge Replacement and Rehabilitation Program. To be eligible, a bridge must carry highway traffic, be deficient and have a sufficiency rating of 80.0 or less.

Select the code that indicates the type of work proposed.

Coding:

The deck and superstructure coding values have been combined in BMS2 as a two digit value. Any combination of the deck and superstructure coding values may be selected from the dropdown list.

Code	Deck Work		Superstructure Work
0	Do Nothing	0	Do Nothing
1	Rehabilitate concrete deck (patch, membrane, asphalt wearing surface)	1	Rehabilitate (minor)
2	Rehabilitate concrete deck (patch and latex, concrete or other wearing surface)	2	Rehabilitate (extensive)
3	Replace with concrete deck	3	Widen Bridge
4	Replace with steel grid deck	4	Widen bridge and superstructure rehabilitation
5	Replace with timber deck	5	Widen bridge and extensive superstructure rehabilitation
6	Replace deck (as component of superstructure replacement)	6	Replace

Example:

Proposed Work	Code
Replace deck and superstructure	66

Note:

Generally, when a rehabilitation and/or widening code is specified, it is presumed that the component can and will be upgraded to remove any structural deficiency, that it will have a minimum 20-year life, and condition ratings of each structural component will be 7 or greater.

*3B02 Proposed Sub Work

Other > Proposed Maintenance

Description:

This item is used to indicate the type of substructure work proposed to be accomplished on the structure to improve it to the point that it will provide the type of service needed.

Procedure:

Select the appropriate code from the dropdown list.

Coding:

0 Do nothing
1 Rehabilitate (minor)
2 Rehabilitate (extensive)
3 Replace Portion
4 Replace Major Portion
6 Replace
8 Rehabilitate Culvert
9 Replace with Culvert

Note:
Generally, when a rehabilitation and/or widening code is specified, it is presumed that the component can and will be upgraded to remove any structural deficiency, that it will have a minimum 20-year life, and condition ratings of each structural component will be 7 or greater.

*3B03 Improvement Length

Other > Proposed Maintenance

Description:

This item is used to record the length of the proposed structure improvement.

Procedure:

For replacement or rehabilitation of the entire bridge, enter the total length of the structure to the nearest foot. This will normally be the overall length measured along the centerline of roadway from paving notch to paving notch or back to back of backwalls of abutments, if present. Otherwise, end to end of the bridge floor, but in no case less than the total clear opening of the structure. For replacement or rehabilitation of only part of the structure, use the length of the portion to be improved.

For culverts, including single or multiple boxes or pipes, etc., where the clear distance between multiple openings is less than half of the smaller contiguous opening, the measurement should be made between inside edges of the exterior pipes or inside faces of the exterior walls, if any, along the centerline of roadway regardless of their depth below grade. For culverts at grade (e.g., R.C. Box Culvert without fill), the measurement should be along the centerline of roadway from paving notch to paving notch, if any, or back to back of exterior walls (see sketches for Item 5B18). If the structure is highway tunnel, enter the length of the tunnel measured along the centerline of the roadway.

Coding:

Length of the proposed structure improvement to the nearest foot.

*3B04 Improvement Cost - Bridge Improvement Cost

Other > Proposed Maintenance

Description:

This item is used to record the estimated cost of bridge or major structure improvements. This item is to be completed for all bridges eligible for the Highway Bridge Replacement and Rehabilitation Program.

Procedure:

This cost shall include only bridge construction costs, excluding roadway, right-of-way, detour, demolition, preliminary engineering, etc.

Coding:

Cost of structure improvement in $1000's.

*3B05 Roadway Improvement Cost

Other > Proposed Maintenance

Description:

This item is used to record the estimated cost of the approach roadway improvements that are included in the structure improvement project cost. This item is to be completed for all bridges eligible for the Highway Bridge Replacement and Rehabilitation Program.

Procedure:

This cost shall include only roadway construction costs, excluding bridge, right-of-way, detour, extensive roadway realignment costs, preliminary engineering, etc.

Coding:

Cost of the improvements to the roadway in $1000's.

*3B06 Total Cost - Estimated Total Cost of Overall Improvement Project

Other > Proposed Maintenance

Description:

This item is used to record the estimated cost of the structure improvement project based on the user defined Type Work. This item is to be completed for all bridges eligible for the Highway Bridge Replacement and Rehabilitation Program.

Procedure:

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 Items 3B04 and 3B05.

Coding:

Total cost of the overall structure improvement project in $1000's.

*3B07 Year of Estimate - Year of Improvement Cost Estimate

Other > Proposed Maintenance

Description:

This item is used to record the base year of improvement cost estimates.

Procedure:

Enter the appropriate year that corresponds to the costs.

Coding:

Year of estimated costs.

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4A Inspection Appraisal - Other Ratings

The Inspection Appraisal - Other Ratings Section contains information related to the appraisal of the structure, as well as to clearances and navigation data.

Appraisal Rating Codes Used For the Following Items

The intention of the "Appraisal" Section is to evaluate a bridge in relation to the highway system and functional classification of which the bridge is a part. The individual deficiencies in the various related items need to be evaluated as to how they affect the bridge as a unit. The structure then would be compared to a new one built to the Department's current standards for that particular road. On this basis, it is not always necessary to use the highest standard, but, it is not recommended to use unduly low standards. It is recommended that AASHTO standards be followed for establishing a design, minimum adequate and intolerable categories, unless the Department's approved criteria differ from those in the AASHTO guides.

Those portions of the bridges that are being supported or strengthened by temporary members will be rated based on their actual condition, i.e., the temporary members are not considered in the rating of the item. The determination of which of the above ratings apply to each of the items will be based on an evaluation of all the relevant factors and information that are included in the detailed inspection reports. The rating chosen for each item will, in effect, be a composite of all the relevant factors. It should be recognized that this will require judgment, particularly for those items where the ratings seem not to apply. It is recognized that there are unique situations, but, again, it is expected that some judgment will be used.

Appraisal Rating Codes

N	Not Applicable
9	Condition superior to present desirable criteria
8	Condition equal to present desirable criteria
7	Condition better than present minimum criteria
6	Condition equal to present minimum criteria
5	Condition somewhat better than minimum adequacy to tolerate being left in place as is
4	Condition meeting minimum tolerable limits to be left in place as is
3	Basically intolerable condition requiring high priority of corrective action
2	Basically intolerable condition requiring high priority of replacement
1	Immediate repair necessary to put back in service
0	Immediate replacement necessary to put back in service (Bridge Closed)

Reference: FHWA's Recording and Coding Guide for the Structural Inventory and Appraisal of the Nation's Bridges

Note: Refer to the Structure Type Coding Item Comparison Chart before Item 1A01 for use of "N".

*4A01 Open/Posted/Closed – Is the Bridge Open, Posted, or Closed?

Not Displayed in BMS2

Description:

This item provides information about the actual operational status of a structure. The field review could show that a structure is posted, but data Item 4B03 may indicate that posting is not required. This is possible and acceptable coding since Item 4B03 is based on the operating stress level and the governing agency's posting procedures may specify posting at some stress level less than the operating rating.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Item VP02.

*4A02 Approach Alignment - Approach Roadway Alignment Appraisal

Inspection > Ratings & Schedule; BMS3: Approach

Description:

This item indicates appraisal of the approach roadway alignment.

Procedure:

Code the rating based on the adequacy of the approach roadway alignment. This item identifies those bridges which do not function properly or safely due to the alignment of the approaches. The basic criterion is how alignment of the roadway approaches to the bridge relates to the general highway alignment for the section of the highway the bridge is on.

It is not intended that approach roadway alignment be compared to current standards, but rather to the existing highway alignment. This concept differs from other appraisal evaluations. For example, if the highway section requires a substantial speed reduction due to vertical or horizontal alignment, and the roadway approach to the bridge requires only a minor speed reduction at the bridge, the appropriate code is 6. This concept shall be used at each bridge site.

A bridge would rarely, if ever, be replaced due to approach roadway alignment, but a bridge should be classified as obsolete when its approaches are such that they can no longer safely serve today's traffic.

The individual structure shall be rated in accordance with the general appraisal rating guide in lieu of specific design values. The approach roadway alignment will be rated intolerable (a code of 3 or less) only if the horizontal or vertical curvature requires a substantial reduction in the vehicle operating speed from that on the highway section.

A very minor speed reduction will be rated 6.

When a speed reduction is not required, the appraisal code is 8. Additional codes may be selected between general values. Therefore, consideration may be given to the vertical sight distances and sharp right angle type horizontal curves on the approach to and from the bridge. Speed reduction necessary because of structure width and not alignment shall not be considered in evaluating this item.

Coding:

N Not Applicable (Refer to Structure Type Coding Item Comparison Chart before Item 1A01)
8 No Speed reduction
7 *Slight limited sight distance, with no speed reduction*
6 Very minor speed reduction
5 *Limited sight distance, with minor speed reduction*
4 Considerable speed reduction for bridge, but tolerable for route carried
3 Substantial speed reduction, intolerable for route carried
0 If this item is the reason for closure

Non-italics indicate original FHWA coding. Records of accidents and/or damage to guide rail attributed to poor alignment should be considered.

4A03 (Not Used – Reserved for Future Use. Use Item IA02)

4A04 (Not Used – Reserved for Future Use. Use Item IA02)

4A05 (Not Used – Reserved for Future Use. Use Item IA02)

4A06 (Not Used – Reserved for Future Use. Use Item IA02)

*4A07 Pier Protection – Dolphins & Fenders

Inspection > Ratings & Schedule

Description:

This item indicates the status of navigation protection.

Procedure:

If Item 4A21 has been coded "1", use the codes 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 Item 1A02.

If Item 4A21 has been coded "0" or "N", select a coding of N for this field.

Coding:

1 Navigation protection not required
2 In place and functioning
3 In place but in a deteriorating condition
4 In place but reevaluation of design suggested
5 None present but reevaluation suggestion
N Not applicable (Item 4A21 = 0 or N)

*4A08 Scour Critical - Scour Critical Bridge Indicator

Inspection > Underwater; BMS3: Ratings and Waterway

Description:

This item indicates the current status of the bridge regarding its vulnerability to scour and an appropriate code is determined based on one of two methods; computed or observed:

(1) Computed: By assigning a code based on the presence of foundations or scour measures that were designed in accordance with the results of scour calculations/analyses that are part of a Hydrologic and Hydraulic (H & H) analysis performed by hydraulic/foundation engineers. The observed scour conditions during the inspection match the design conditions described previously. To ensure these conditions match, the IN fields on the Sub-Unit detail screen must be filled out completely for all sub-units within the 500-year flood plain.

(2) Observed: By utilizing field observations and the Scour Calculator in BMS2 or BMS3. The Scour Calculator is an algorithm (step-by-step procedure) that determines an appropriate Scour Critical Bridge Indicator (SCBI) code utilizing certain item IN fields that have been determined from field observations and bridge plans. The criteria used by the algorithm is provided in Appendix M for reference. A scour critical bridge (SCBI code ≤ 3) is one with abutment or pier foundations which are rated as unstable due to (1) observed scour at the bridge site or (2) a scour potential as determined from a scour evaluation study.

Procedure:

Select the code that indicates the current status of the bridge regarding its vulnerability to scour if Item IU03 is set to Computed. When Item IU03 is set to Observed, Item 4A08 is automatically set equal to Item IU04. The scour calculator should be run during every Routine, Underwater, or any other inspection type where the substructure or channel is evaluated.

Whenever a rating factor is "4" or below for this item, Item 1A02 may need to be revised to reflect the severity of actual scour and resultant damage to the bridge. The substructure condition may need to be revised when moderate or major scour is present which has compromised the structural integrity of the abutment or pier (i.e., the scour has undermined the footing and reduced the bearing capacity, or the scour has caused settlement and cracking in the substructure).

Whenever a rating factor is "2" or below for this item, Item 1A02 or 1A03 must be equal to or less than this rating (Ref: FHWA Memo dated April 27, 2001).

For foundations on rock where scour cannot be calculated, use the coding most descriptive of site conditions.

Notes:
Additional clarification comments to the FHWA coding for this item appear in italicized print.

Coding:

N	Bridge not over waterway – *bridge over highway, railroad grade crossing, etc.*, Signs, Walls, Lights, or other non-Bridge structures
9	Bridge foundations (including piles) on dry land well above flood water elevation - *high gorge structure, abutment and/or piers well set back from the main channel (above/outside 500-yr flood elevation), bridge over concrete or gabion lined channel.*

8	Bridge foundations determined to be stable for assessed or calculated scour conditions *(H & H analysis*); Scour is determined to be above the top of the footing by assessment (i.e., bridge foundations are on rock formations that have been designed to resist scour within the service life of the bridge), by calculation *(H & H analysis)* or by installation of properly designed scour measures (see HEC 23 or DM-4, PP Chapter 7) – Designed foundations or as *determined through field observation and the use of the Scour Calculator; Culverts assessed as low risk during USGS scour screening (i.e., culverts with integral bottom such as box culverts).*
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. *As determined through field observation and the use of the Scour Calculator; countermeasures (non-designed placed rock, scour walls, etc.) have mitigated the existing scour problem. These bridges still require a Scour Plan of Action and require evaluation after certain flood events as defined in the Plan of Action.*
6	Scour calculation/evaluation has not been made. (Use only to describe case where bridge has not yet been evaluated for scour potential). *Item 4A08 shall not have a value of '6'. A code of '6' resulting from a Scour Calculator run is an indication of incorrect or incomplete data entry for BMS2 items on the IN Inspection – Underwater Sub Units Tab that are utilized by the Scour Calculator algorithm to determine the appropriate SCBI code. Examples of incorrect or incomplete data entry include incompatible, incomplete, or blank substructure (abutment/pier) or foundation types. This is outlined in the USGS Open-File Report 00-64 titled "Procedures for Scour Assessment at Bridges in Pennsylvania", which is available here: http://www.dot.state.pa.us/public/Bureaus/design/bqad/Pubs/Procedures-for-Bridge-Scour-Assessments.pdf.* *This is also outlined in the SCBI Scour Calculator Manual located at: http://www.dot.state.pa.us/public/BUREAUS/design/Scour-Calculator-Manual.pdf.* *Inspectors must correct or complete this data as needed so that the Scour Calculator can determine an appropriate SCBI code other than 6.*
5	Bridge foundations determined to be stable for assessed or calculated scour conditions. Scour is determined to be within limits of footing or piles by assessment (i.e., bridge foundations are on rock formations that have been determined to resist scour within the service life of the bridge), by calculations, or by installation of properly designed measures (see: HEC 23 or DM-4, PP Chapter 7).
4	Bridge foundations determined to be stable for assessed or calculated scour conditions; field review indicates action is required to protect exposed foundations. *As determined through field observation and the use of the Scour Calculator; these methods have established the foundations to be stable; however, mitigation efforts such as debris removal, rock protection, or other countermeasures are needed to protect exposed foundations.*
3	Bridge is scour critical; foundations determined to be unstable for assessed or calculated scour conditions: 1) Scour within limits of footing or piles 2) Scour below bottom of spread footing or pile tips *As determined through field observation and the use of the Scour Calculator; these methods have established the structure to be at risk due to potential scour. The threat may be either from moderate scour, undermining, or instability. Note: if the structure warrants a rating of 3, encode a maintenance item for the proper substructure unit on the IM screen with a priority code of "0", "1", or "2" until repairs are made.*
2	Bridge is scour critical; field review indicates that extensive scour has occurred at bridge foundations, which are determined unstable by: 1) A comparison of calculated scour and observed scour during the bridge inspection, or 2) An engineering evaluation of the observed scour condition reported by the bridge inspector in Item 1A02 *As determined through field observation and the use of the Scour Calculator; bridge inspection reveals that major scour has occurred at the site and has caused distress in substructure components or potentially threatens the structure's stability. Note: if the structure warrants a rating of 2, encode a maintenance item for the proper substructure unit on the IM screen with a priority code of "0" or a "1" until repairs are made, or the bridge is closed. Additionally, if the structure warrants an SCBI rating factor of "2" or less, Item 1A02 or 1A03 (depending on the structure type) should also be assigned the same rating value (Ref: FHWA Memo dated April 27, 2001).*

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: 1) A comparison of calculated scour and observed scour during the bridge inspection, or 2) An engineering evaluation of the observed scour condition reported by the bridge inspector in Item 1A02 *Bridge inspection reveals that the foundation is extensively scoured and at the risk of imminent failure. The risk to public safety warrants closing the bridge. Note: if the structure warrants a rating of 1, encode a maintenance item for the proper substructure unit on the IM screen with a priority code of "0" until repairs are made, or the bridge is closed. Additionally, if the structure warrants an SCBI rating factor of "2" or less, Item 1A02 or 1A03 (depending on the structure type) should also be assigned the same rating value (Ref: FHWA Memo dated April 27, 2001).*
0	Bridge is scour critical. Bridge has failed and is closed to traffic due to scour. *Bridge inspection reveals that the bridge has failed due to scour. Note: if the structure warrants a rating of 0, encode a maintenance item for the proper substructure unit on the IM screen with a priority code of "0" until repairs are made, or the bridge is closed. Additionally, if the structure warrants an SCBI rating factor of "2"or less, Item 1A02 or 1A03 (depending on the structure type) should also be assigned the same rating value (Ref: FHWA Memo dated April 27, 2001).*

Definitions:

Analyzed – The structure has received a full engineering evaluation which includes calculation of hydrology, hydraulics, scour, and foundation stability. A copy of the evaluation should be stored in BMS2. This is more commonly referred to as an "H&H Report", or as "Computed" in Item IU03.

Assessed – The structure has been properly and accurately assessed for scour (i.e., received a PA Observed Scour Assessment) utilizing the SCBI Scour Calculator in BMS2 or BMS3, including the completion of all applicable IU and IN fields. This is also referred to as "Observed" in Item IU03.

Calculate – This is the button clicked to run the scour calculator based on the data entered in the IN fields on the sub-units tab of the Underwater screen in BMS2 or on Waterway page within BMS3. The scour calculator should be run during every Routine, Underwater, or any other inspection type where the substructure or channel is evaluated.

Scour Screening – Review of pertinent data on the structure to determine a preliminary scour ranking.

SC (Scour Calculator) – Function used to determine the SCBI for an Observed Scour Assessment.

Notes:

(1) Calculated scour depths recorded in BMS2 or 100-year/500-year water surface elevations shown on the design or rehabilitation plans are an indicator that an H&H analysis was performed and that the bridge foundations have been designed to resist failure due to scour based on the results of the H&H analysis. This may include properly designed measures. Efforts should be made to locate the analysis and add it to the bridge file (preferably in the Structure Document List Screen).

(2) Although a bridge may not have originally had its foundations designed based on the results of an H&H analysis, an analysis could have been performed later to install designed measures, or to verify that the existing foundations are below the elevation of the calculated scour depth.

(3) The USGS EF (Evaluation Final) rating is documented in Item 2A01. Revised ratings for Item 4A08 could also be documented on a hardcopy print-out from the USGS Scour Calculator database and stored in the bridge file (preferably in the Structure Document List Screen).

(4) SC Inputs include Items IN04 (Change since Last Inspection), IN05 (Scour Hole), IN12 (OSA Pier/Abutment Foundation Type), IN13 (PA Foundation Type), IN14 (OSA Foundation Type), IN15 (Streambed Material), and IN19 (Movement Indicator).

(5) When Item IU03 = C, the bridge is still required to have an observed scour assessment and the scour calculator should be run. If Item IU04 is determined to be a 5 or below, the inspector should review the SC inputs and determine if Item IU03 coding should be changed from "C" to "O" to reflect SC input changes from the designed condition determined through an H&H Analysis.

4A08b Scour Critical Category

Inspection > Underwater; BMS3: Ratings and Waterway

Description:

This item indicates the calculated scour critical category of the bridge.

Procedure:

This item will be **automatically entered by the system** based on the coding shown below. Bridges that meet the criteria below are classified as requiring a scour category. Bridges in Category A, B, or C are Scour Critical. However, all scour categories (A, B, C, and D) require a Scour Plan of Action (POA) and require monitoring during storm events defined by the criteria within the specific POA for that bridge.

When determining if a bridge requires a scour category, each individual sub-unit is evaluated based on the value of Items IU27 and IN03 for that sub-unit. While the category is stored at a bridge level, it is calculated at the sub-unit level.

Coding:

A	Item 4A08 ≤ 2 OR Item IN03 ≤ 3 OR Item 4A08 = 6	C	Item 4A08 = 3 and Item IN03 = 5 through 9
B	Item 4A08 = 3 and Item IN03 = 4	D	Item 4A08 = 4 or 7

*4A09 Structural Eval – Structural Evaluation

Inspection > Ratings & Schedule

Description:

This item indicates the calculated appraisal of the structural condition of the bridge.

Procedure:

The Structural Evaluation is computed and **automatically entered by the system** for bridges that carry highways, streets, or roads. This item will be coded "N" for when Item 5A17 is not 0 through 9 (e.g. lights, signs, walls, and tunnels). The value for Item 4A09 will only update when the bridge is changed from "Submitted" to "Accepted" status or anytime it is in "Accepted" status. The value displayed under the Key Field Comparison for bridges in submitted status is the value expected when the inspection record is "Accepted."

For non-culvert type structures (Item 5B13 ≠ 19), the Appraisal Rating is based on the minimum of the superstructure and substructure condition ratings, and the value from Table 1 (see below) based on the assigned NBI inventory rating, Item 4B07, and recent ADT, Item 5C10. For culvert type structures (Item 5B13 = 19), the Appraisal Rating is based on the minimum of the culvert condition ratings, and the value from Table 1 (see below) based on the assigned NBI inventory rating, Item 4B07, and recent ADT, Item 5C10.

The value of Item 4A09 will be set to 0 if any of the following conditions are met:

- Non-culvert type structures with a superstructure or substructure condition rating equal to 1
- Culvert type structures with a culvert condition rating equal to 1
- Bridges closed to traffic (Item VP02 = C) due to structural reasons (Item VP06 = A through L)

The bridge is appraised not only on physical condition, but also on load carrying capacity of the superstructure and substructure. Hence, a well-maintained bridge may be appraised at a "4" or "5" because the original design load or the inventory rating was less than today's standard (see Table 1).

Coding:

Refer to APPRAISAL RATING CODES at the beginning of Section 4A and Table 1 on the next page.

Table 1 Notes:

1. Use the lower rating code for values between those listed in the table.
2. All bridges on the interstate system shall be evaluated using the ADT column of > 5000 regardless of the actual ADT on the bridge.
3. Values in {brackets} represent PHL-93 Rating Factors. Values can be obtained by dividing PHL-93 Inventory Rating tons by 36T or directly from analysis.

TABLE 1
Rating by Comparison of Recent ADT (5C10) and Assigned NBI Inventory Rating (4B07)

Structural Evaluation Rating Code	Inventory Rating		
	Average Daily Traffic (ADT)		
	0-500	501-5000	>5000
9	>36{1.00}* (HS20)**	>36{1.00} (HS20)	>36{1.00} (HS20)
8	36{1.00} (HS20)	36{1.00} (HS20)	36{1.00} (HS20)
7	31{0.85} (HS17)	31{0.85} (HS17)	31{0.85} (HS17)
6	23{0.65} (HS13)	25{0.70} (HS14)	27{0.75} (HS15)
5	18{0.50} (HS10)	20{0.55} (HS11)	22{0.60} (HS12)
4	12{0.33} (HS7)	14{0.40} (HS8)	18{0.50} (HS10)
3	Inventory rating less than value in rating code of 4 and requiring corrective action***		
2	Inventory rating less than value in rating code of 4 and requiring replacement***		
0	If the bridge is closed due to structural condition		

*Coded HS rating load (Load Factor) {PHL-93-LRFR}
** HS designation (typical)
*** Structures requiring corrective action should have Items 3B01/3B02 coded as rehabilitation; Structures requiring replacement should have Items 3B01/3B02 coded as replacement

*4A10 Deck Geometry - Deck Geometry Appraisal

Inspection > Ratings & Schedule; BMS3: Ratings

Description:

This item indicates the calculated appraisal of the bridge deck geometry. Value cannot be changed except through BMS3 or BMS2 web.

Procedure:

The overall rating for deck geometry includes two evaluations: Item 5C27, the curb-to-curb or face-to-face of rail bridge width using Table 2A, 2B, 2C or 2D, and Item 4A15, the minimum vertical clearance over the bridge roadway using Table 2E. The lower of the codes obtained from these tables is used. When a table lists several deck geometry rating codes for the same roadway width under a specific ADT, the lower code is used. The curb-to-curb or face-to-face of rail dimension is taken from Item 5C27. Item 4A15 is used to evaluate vertical clearance.

Example:
Table 2A lists deck geometry rating codes of 6, 7, and 8 for a 44-foot roadway width and an ADT of >5000. Code: Use the lower code for values between those listed in the tables.

6

Coding:

Refer to Tables 2A, 2B, 2C, 2D, and 2E. Code "N" for non-highway related features. Refer to the Structure Type Coding Item Comparison Chart in Section 1A for use of "N".

Table 2A, 2B, 2C, 2D, and 2E Notes:

1. The lower rating code for values between those listed in the table is used.
2. Dimensions are in feet.
3. Table 2C is used for Other Multilane Divided Facilities for 3 or more undivided lanes of 2-way traffic. Note: For 2-way traffic with non-mountable median, the full bridge width cannot be used. Use the bridge width for one direction (the more restrictive) with Table 2C.
4. On Table 2B, a value of 3 or below is coded when the ADT is greater than 100.
5. For urban bridges on curbed streets where it is unlikely that a wider replacement bridge would be built due to existing curbs, sidewalks, or other physical obstructions on the approach, a higher appraisal value may be assigned for deck geometry than indicated in Table 2A. A value of 6 or above is coded for such bridge widths that appear to be adequate for speed, ADT, and traffic safety. The bridge inspection supervisor should review such bridges. Reference the 2004 AASHTO Geometric Design Guide, Chapter IV, for acceptable curbed widths.
6. Table 2C is used for mainline "ramp" connectors between freeways.

TABLE 2A & 2B
Rating by Comparison of ADT (Item 5C10) and Bridge Roadway Width, Curb-To-Curb (Item 5C27)

TABLE 2A							TABLE 2B***	
Deck Geometry Rating Code (4A10)	Bridge Roadway Width (feet) 2 Lanes; 2 Way Traffic						Bridge Roadway Width 1 Lane; 2 Way Traffic	
	ADT (Both Directions) **						ADT (Both Directions)	
	0-100	101-400	401-1000	1001-2000	2001-5000	>5000	0-100	>100
9	>32	>36	>40	>44	>44	>44	----	----
8	32	36	40	44	44	44	15'-11"	----
7	28	32	36	40	44	44	15	----
6	24	28	30	34	40	44	14	----
5	20	24	26	28	34	38	13	----
4	18	20	22	24	28	32 (28*)	12	----
3	16	18	20	22	26	30 (26*)	11	15'-11"
2	Any width less than required for a rating code of 3 and structure is open							
0	If this item is the reason for closure							

* Use value in parenthesis for bridges longer than 200 feet.

** For closed bridges, use last known ADT.

*** If the bridge width is 16' or greater, Table 2B is not applicable.

TABLE 2C & 2D
Rating by Comparison of Number of Lanes (Item 5C08) and Bridge Roadway Width, Curb-To-Curb (Item 5C27)

TABLE 2C					TABLE 2D	
Deck Geometry Rating Code (4A10)	Bridge Roadway Width (feet) 2 Lanes or More One Direction				Bridge Roadway Width 1 Way Traffic	
	Interstate & Other Divided Freeways		Other Multilane Divided Facilities		Ramps Only	
	2 Lanes	3 or More Lanes#	2 Lanes	3 or More Lanes#	1 Lane	2 or More Lanes#
9	>42	>12N+24	>42	>12N+18	>26	>12N+12
8	42	12N+24	42	12N+18	26	12N+12
7	40	12N+20	38	12N+15	24	12N+10
6	38	12N+16	36	12N+12	22	12N+8
5	36	12N+14	33	11N+10	20	12N+6
4	34 (29)*	11N+12 (11N+7)*	30	11N+6	18	12N+4
3	33 (28)*	11N+11 (11N+6)*	27	11N+5	16	12N+2
2	Any width less than required for a rating code of 3 and structure is open					
0	If this item is the reason for closure					

* Use value in parenthesis for bridges longer than 200 feet.

N = Number of Lanes

TABLE 2E
Rating by Comparison of Minimum Vertical Clearance (Item 4A15) and Functional Classification (Item 5C22)

Deck Geometry Rating Code (4A10)	Minimum Vertical Clearance Over the Bridge (feet)			
	Functional Class			
	Interstate & Other Freeways		Other Principal & Minor Arterials	Major & Minor Collectors & Locals
	All Routes – Except as Noted for Urban Areas	Undesignated Routes – Urban Areas*		
9	>17'-0"	>16'-6"	>16'-6"	>16'-6"
8	17'-0"	16'-6"	16'-6"	16'-6"
7	16'-9"	15'-6"	15'-6"	15'-6"
6	16'-6"	14'-6"	14'-6"	14'-6"
5	15'-9"	14'-3"	14'-3"	14'-3"
4	15'-0"	14'-0"	14'-0"	14'-0"
3	Vertical clearance less than value in rating code of 4 and requiring corrective action			
2	Vertical clearance less than value in rating code of 4 and requiring replacement			
0	If this item is the reason for closure			

* Use for routes in highly developed urban areas only when there is an alternative interstate, freeway, or expressway facility with a minimum of 16'-0" clearance.

*4A11 Underclearances - Underclearance Appraisal

Inspection > Ratings & Schedule; BMS3: Ratings

Description:

This item indicates the calculated appraisal of the bridge underclearances, vertical and horizontal. Value cannot be changed except through BMS3 or BMS2 web.

Procedure:

This code indicates the appraisal of the vertical and horizontal underclearances from the through roadway to the superstructure or substructure units, respectively.

Code "N" is used unless the bridge is over a highway or railroad**.**

The vertical underclearance is evaluated using Table 3A.

The horizontal underclearance is evaluated using Table 3B. The lower of the codes obtained from Table 3A and Table 3B is used.

Bridges seldom are closed due to deficient underclearances, however, these bridges may be good candidates for rehabilitation or replacement.

Coding:

Refer to Tables 3A and 3B below.

TABLE 3A
Rating by Comparison of Minimum Vertical Underclearance (Item 4A17) and Functional Classification of Underpassing Route (Item 5C22)

Under Clearance Rating Code (4A11)	Minimum Vertical Clearance (feet)				
	Functional Class				Railroad
	Interstate & Other Freeways		Other Principal & Minor Arterials	Major & Minor Collectors & Locals	
	All Routes – Except as noted for Urban Areas	Undesignated Routes – Urban Areas*			
9	>17'-0"	>16'-6"	>16'-6"	>16'-6"	>23'-0"
8	17'-0"	16'-6"	16'-6"	16'-6"	23'-0"
7	16'-9"	15'-6"	15'-6"	15'-6"	22'-6"
6	16'-6"	14'-6"	14'-6"	14'-6"	22'-0"
5	15'-9"	14'-3"	14'-3"	14'-3"	21'-0"
4	15'-0"	14'-0"	14'-0"	14'-0"	20'-0"
3	Underclearance less than value in rating code of 4 and requiring corrective action				
2	Underclearance less than value in rating code of 4 and requiring replacement				
0	If this item is the reason for closure				

* Use for routes in highly developed urban areas only when there is an alternative interstate, freeway, or expressway facility with a minimum of 16'-0" clearance

Table 3A Notes:

1 The lower rating code for values between those listed in the table is used.

2 The functional classification of the underpassing route is used in the evaluation. If an "under" record is not coded, the underpassing route is considered a major or minor collector or a local road.

3 Ramp bridges must meet the same vertical clearance as main line structures.

TABLE 3B
Rating by Comparison of Minimum Lateral Underclearances Right (Item 4A19) & Left (Item 4A20) and Functional Classification of Underpassing Route (Item 5C22)

Under Clearance Rating Code (4A11)	Minimum Lateral Underclearance (feet)						
	Functional Class						Railroad
	1 way Traffic				2 way Traffic		
	Principal Arterials – Interstate, Freeways or Expressways				Other Principal & Minor Arterials	Major & Minor Collectors & Locals	
	Main Line		Ramp				
	Left	Right	Left	Right			
9	>30	>30	>4	>10	>30	>12	>20
8	30	30	4	10	30	12	20
7	18	21	3	9	21	11	17
6	6	12	2	8	12	10	14
5	5	11	2	6	10	8	11
4	4	10	2	4	6	4	8
3	Underclearance less than value in rating code of 4 and requiring corrective action						
2	Underclearance less than value in rating code of 4 and requiring replacement						
0	If this item is the reason for closure						

Table 3B Notes:

1 The lower rating code for values between those listed in the table is used.

2 Dimensions are in feet.

3 When acceleration or deceleration lanes or ramps are provided under 2 way traffic, the value from the right ramp column is used to determine the code.

4 The functional classification of the underpassing route is used in the evaluation. If an "under" record is not coded, the underpassing route is considered a major or minor collector of a local road.

Example:
Bridge over Highway
Code: 3 or less if vertical clearance of the highway under the bridge is < 14′-0″

Bridge over Railroad
Code 3 or less if:

1) vertical clearance under the bridge over a railroad is < 20′-0″
OR
2) minimum lateral underclearance < 8′-0″

*4A12 SD Status - Structurally Deficient/Functionally Obsolete

Inspection > Ratings & Schedule

Description:

This display only item indicates if the bridge is structurally deficient or functionally obsolete.

Procedure:

Computed and **automatically entered by the system** for bridges that carry highways, streets or roads. If condition ratings are changed in BMS2, this field will update upon acceptance.

Note:
Any bridge classified as structurally deficient is excluded from the functionally obsolete category.

Coding:

0 Not Deficient
1 Structurally Deficient
2 Functionally Obsolete

Structurally Deficient:

1. Condition Rating of 4 or Less for:

   1A01, Deck or
   1A04, Superstructure or
   1A02, Substructure or
   1A03, Culvert

Functionally Obsolete:

1. Appraisal Rating of 3 or Less for:

   4A10, Deck Geometry or
   4A11, Underclearances or
   4A02, Approach Roadway Alignment

OR

2. Appraisal Rating of 3 or Less for:

   4A09, Structural Condition or
   1A06, Waterway Adequacy

*4A13 Sufficiency Rating - Federal Sufficiency Rating of the Structure

Inspection > Ratings & Schedule

Description:

This display only item indicates the Sufficiency Rating of the structure.

Procedure:

Computed and **automatically entered by the system** overnight based on the sum of S1 + S2 + S3. S4 is subtracted from this sum when the sum is greater than or equal to 50.0. If condition ratings are changed in BMS2, the new Sufficiency Rating will be updated overnight and be displayed the following day.

Coding:

A specific number, to the nearest tenth, computed by the system.

Range: 0.0 - 100.0

100.0 Structure entirely sufficient
0.0 Structure entirely insufficient (deficient)

4A14 Bridge Condition

Inspection > Ratings & Schedule; BMS3: Ratings

Description:

This display only item indicates the Bridge Condition.

Procedure:

Computed and **automatically entered by the system** based on the lowest of the deck (Item 1A01), superstructure (Item 1A04), substructure (Item 1A02), and culvert (Item 1A03) condition ratings as follows:

Good – lowest rating >= 7 Fair – lowest rating = 5 or 6 Poor – lowest rating <=4

Coding:

G	Good condition	P	Poor condition
F	Fair condition	N	Not Applicable

4A15 Over Structure Clearance – Minimum Vertical Clearance Over Bridge Feature

Inventory > Features; BMS3: Features

Description:

This item is used to record the actual minimum vertical clearance over the bridge feature, including shoulders, to any restriction, to the nearest hundredth of a foot.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Items 6C20, 6C21, or FR11 depending on what type of feature is carried by the bridge.

*4A16 Under (Reference) - Minimum Vertical Underclearance Reference Feature

Inventory > Features; BMS3: Features

Description:

This item indicates the reference feature from which the minimum vertical underclearance measurement is taken.

Procedure:

This item will be **automatically filled in by the system** based on Items 6C20, 6C21, or FR11 for the controlling feature under the structure.

Coding:

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

*4A17 Under Clearance – Minimum Vertical Underclearance

Inventory > Features; BMS3: Features

Description:

This item is used to record the actual minimum vertical clearance from the reference feature to the structure, truncated to the nearest hundredth of a foot. It is also used to record the vertical clearance for sign structures.

Procedure:

This item will be **automatically filled in by the system** based on Items 6C20, 6C21, or FR11 for the controlling feature under the structure.

*4A18 Reference Feature - Minimum Lateral Underclearance Reference Feature

Inventory > Features; BMS3: Features

Description:

This item indicates the reference feature from which the lateral underclearance measurement is taken.

Procedure:

Select the code which indicates the reference feature from which the minimum lateral underclearance measurement is taken.

Coding:

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

*4A19 Right Side - Minimum Lateral Underclearance on the Right Side

Inventory > Features; BMS3: Features

Description:

This item is used to record the minimum lateral clearance on the right side of the feature(s) beneath the structure, measured to the nearest tenth of a foot. This item is applicable for either a highway or a railroad beneath the structure.

Procedure:

Enter the minimum lateral clearance on the right side of the feature(s) beneath the structure, measured to the nearest tenth of a foot. This item is applicable for either a highway or a railroad beneath the structure.

Refer to the Definitions Section for sketches and a definition of the right edge of a roadway for where to measure from.

The lateral clearance should be measured from the right (outside) edge of the through roadway excluding shoulders or ramps, or from the edge of the rail of the outside tracks in the case of a railroad, to the nearest obstruction[1] (pier, substructure unit, abutment, etc.) or to the rigid barrier, or to the toe of slope steeper than 3 to 1. Enter the minimum clearance after measuring in both directions of travel.

For a divided highway, measure the outside clearances of both roadways and enter the smaller distance.

In the case of a one-way street, road, or ramp, this refers to the right edge of roadway in the direction of travel.

Coding:

Lateral clearance to the nearest tenth of a foot. Refer to the sketches after Item 4A20.

Reference:
FHWA's Recording and Coding Guide for the Structural Inventory and Appraisal of the Nation's Bridges. (FHWA Green Book).

[1] Curbs are not obstructions for this item.

Note:
The purpose of this item is to identify available space for future lanes under the bridge.

*4A20 Left Side - Minimum Lateral Underclearance on the Left Side

Inventory > Features; BMS3: Features

Description:

This item is used to record the minimum lateral clearance on the left side of the feature(s) beneath the structure, measured to the nearest tenth of a foot. This item is applicable for either a highway or a railroad beneath the structure.

Procedure:

Enter the minimum lateral clearance on the left side of the feature(s) beneath the bridge, measured to the nearest tenth of a foot. This item is applicable for only a highway beneath the structure.

Refer to the Definitions Section for sketches and a definition of the left edge of a roadway for where to measure from.

The lateral clearance should be measured from the left (median side for divided highways) edge of the through roadway to the nearest obstruction[1] (pier, substructure unit, abutment, etc.) or any median barrier or to the toe of slope steeper than 2 to 1. For a divided highway, enter the minimum lateral clearance after measuring in both directions of travel.

In the case of a divided highway where there is no obstruction in the median area, enter 999 to denote open. For clearances greater than 99.8 feet, enter 998. If the feature under a bridge is a railroad, enter 000 for not applicable (enter the minimum lateral underclearance in Item 4A19 if it's for a railroad).

In the case of a one-way street, road, or ramp, this refers to the left edge of roadway in the direction of travel.

Coding:

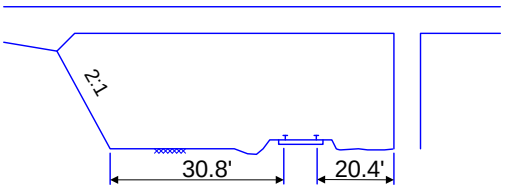
Lateral clearance to the nearest tenth of a foot. Refer to the sketches after this item.

998	Lateral clearance greater than 99.8 feet
999	No obstruction in the median area (median code 5 or 7)
000	Not applicable

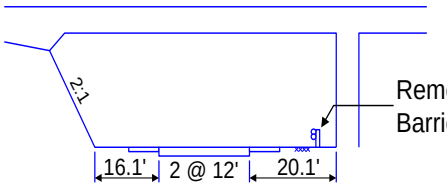
Reference:
FHWA's Recording and Coding Guide for the Structural Inventory and Appraisal of the Nation's Bridges. (FHWA Green Book).

[1] Curbs are not obstructions for this item.

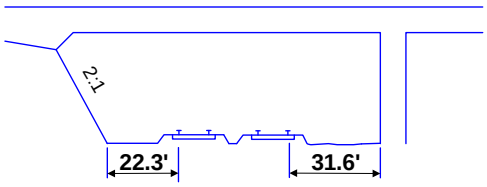
Note:
The purpose of this item is to identify available space for future lanes under the bridge.



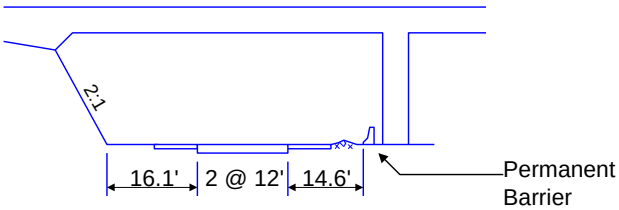
000 Lt. 20.4' Rt.



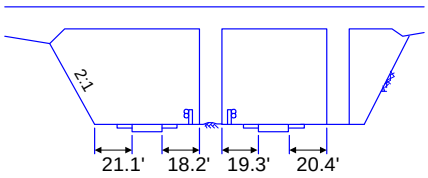
000 Lt. 16.1' Rt. for 2-way Traffic
16.1' Lt. 20.1' Rt. for 1-way Traffic



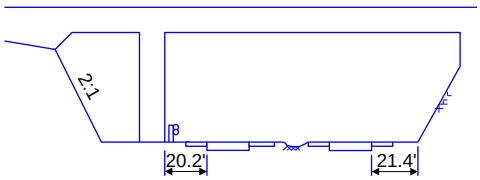
000 Lt. 22.3' Rt.



000 Lt. 14.6' Rt. for 2-way Traffic
16.1' Lt. 14.6' Rt. for 1-way Traffic



18.2' Lt. 20.4' Rt.



999 Lt. 20.2 Rt.

(ALL RAIL MEASUREMENTS ARE TO THE CENTERLINE OF TRACK)

*4A21 Nav Control Exists - Does Navigation Control Exist?

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item indicates the status of navigation control (a bridge permit for navigation) at the bridge.

Procedure:

Select the appropriate code to indicate the status of navigation control at the bridge. If this field is coded "1 – Navigational Control Exists," Item 4A07 must also be coded.

Coding:

0 No navigation control on waterway (bridge permit not required)
1 Navigation control on waterway (bridge permit required)
N Not applicable, no waterway.

*4A22 Nav Vertical Clr - Navigation Vertical Clearance

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the minimum vertical navigation clearance imposed at the site as measured above a datum that is specified on a navigation permit issued by a control agency. The minimum navigation vertical clearance is also recorded for vertical lift bridges.

Procedure:

If navigation control exists (Item 4A21 coded "1"), enter the vertical clearance. Vertical clearance is defined as the minimum clearance imposed at the site as measured above a datum that is specified on a navigation permit issued by a control agency. Code as a 3 or less digit number rounded down to the nearest 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 is measured with the bridge in the closed position (i.e., open to vehicular traffic). Vertical clearance of a vertical lift bridge is measured with the bridge in the raised or open position. Also, Item 4A24 shall be coded to provide clearance in a closed position. If Item 4A21 has been coded 0 or N, code 000 to indicate not applicable.

Coding:

Vertical clearance to the nearest foot. Code zeros if navigation control does not exist.

*4A23 Nav Horizontal Clr - Navigation Horizontal Clearance

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the minimum horizontal navigation clearance imposed at the site that is specified on a navigation permit issued by a control agency.

Procedure:

If navigation control exists (Item 4A21 coded "1"), enter the horizontal clearance. This measurement is shown on the navigation permit and may be less than the structure allows. If a navigation permit is required but not available, use the minimum horizontal clearance between fenders, if any, or clear distance between piers and bents. Code 4 digits to the nearest foot. If Item 4A21 has been coded 0 or N, code 000 to indicate not applicable.

Coding:

Horizontal clearance to the nearest foot. Code zeros if navigation control does not exist.

*4A24 Min Vert Lift Clr - Minimum Navigation Vertical Clearance - Vertical Lift Bridge

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the minimum navigation vertical clearance for vertical lift bridges in the dropped or closed position only.

Procedure:

Enter the minimum navigation vertical clearance for vertical lift bridges in the dropped or closed position only. Record the nearest foot (using 3 digits rounding down) the minimum vertical clearance imposed at the site as measured above a datum specified on a navigation permit issued by a control agency. Code this item only for a vertical lift bridge in the dropped or closed position, otherwise, leave blank. If Item 4A21 has been coded 0 or N, code 000 to indicate not applicable.

Coding:

Vertical clearance for vertical lift bridges in the dropped or closed position. Leave blank if not vertical lift bridge. Code zeros if navigation control does not exist.

4A25 (Not Used – Reserved for Future Use)

4A26 Seismic Vulnerability

SNBI Field B.AP.05

Inspection > Ratings & Schedule; BMS3: Ratings

Description:

This item is used to report the seismic vulnerability of the bridge.

Procedure:

Report the seismic vulnerability of the bridge.

Coding:

0 Evaluation Not Completed
A Evaluation Completed. No retrofit required.
N Evaluation Not Required.

Additional Coding Descriptions and Commentary from FHWA:

For a coding of N, bridge does not require seismic evaluation due to low anticipated ground motion or agency prioritization.

For a coding of A, the seismic evaluation has been completed. Bridge determined to meet the agency's performance criteria establish for the evaluation without the need for retrofit. 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.

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.

4A27 Low Vertical Clearance

Inspection > Ratings & Schedule; BMS3: To be added with future release

Description:

This item is used to identify bridges with low vertical clearance over state routes for the purpose of being displayed on the PA511 site. This item is only editable by Super Users and Power Users.

Procedure:

Vertical clearance data is queried and reviewed by the Bridge Inspection Section at six month intervals to identify the bridges. Low vertical clearance bridges are defined as those with vertical clearance measurements <= 13.75′ (Items 6C20 or 6C21) or posted vertical clearances <= 13.5′ (Items 6C37 or 6C38).

Coding:

N No
Y Yes

4B Inspection Appraisal - Load Ratings

The Inspection Appraisal - Load Ratings Section shows information about the load ratings and posting status of the structure. All fields on this screen except for Item 4B01 **are automatically filled in** based on the information entered in the Inspection – Load Rating (IR) Section. Any fields (except for Item 4B01) that require edits must be made on the Inspection - Load Rating Screen.

*4B01 Design Load

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This item indicates the live load used for design.

Procedure:

Select the code which indicates the live load used for design. Previous code of "0" is no longer valid. Code should be updated after structure is rehabilitated/reconstructed, if applicable.

Coding:

1	H10
2	H15
3	HS15
4	H20
5	HS20
6	HS20 and Alternate Military loading (2 – 24 kip axles at 4 ft c.- c.)
7	Pedestrian
8	Railroad
9	HS25
A	HS25 and 125% of Alternate Military loading plus the standard permit load at operating level.
B	HS25 and 125% of Alternate Military loading
H	HL-93
P	PHL-93
C	Greater than HL93
D	Other/Unknown

Example: The bridge was designed for an HS20 load.
Code: 5

4B02 Rat Dt – Rating Date and Initials

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This two-part item is used to record the date the load rating was performed for the structure and the initials of the person who performed the rating.

Procedure:

Do not enter the initials of the Load Rating Engineer. The name of the Load Rating Engineer should be entered in Item IR16. The rating date will be **automatically filled in by the system** based on information entered in Item IR03.

*4B03 Posting – Bridge Posting

Inspection > Ratings & Schedule; BMS3: Load Ratings

Description:

This item indicates the appraisal of the load capacity of the bridge.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Items IR06, IR11, and IR21 for the H-20, HS-20, ML-80, and TK-527 vehicles.

This item evaluates the load capacity of a bridge in comparison to the state legal load. In a way, it merely reflects the relationship between the load that may legally use the bridge and the desired capacity for bridges on the same highway system. It differs from the appraisal of the "Structural Condition" which uses inventory or design rating. Load capacity for posting at or below the operating rating may also be based on any stress level between inventory and operating rating using engineering judgment.

The use or presence of a temporary bridge affects the coding. Bridge rating appraisal should reflect either the actual capacity or the posted load, if any, of the temporary bridge. This also applies to bridge shored up or repaired on a temporary basis. This means that the appraisal rating will reflect the loads the bridge is actually carrying.

The degree that operating stress level is under the maximum legal load stress level may be used to differentiate between codes.

Coding: Relationship of Operating Rating Tonnage to Maximum Legal Load

Code	Lowest Ratio*	H-20 Rating In Tons	HS-20 Rating In Tons	ML-80 Rating In Tons	TK-527 Rating In Tons
9	1.31 or more	27or greater	48 or greater	48 or greater	53 or greater
8	1.21-1.30	25-26	44-47	45-47	49-52
7	1.11-1.20	23-24	40-43	41-44	45-48
6	1.06-1.10	22	38-39	39-40	43-44
5	1.00-1.05	20-21	36-37	36.6-38	40-42
4	0.91-0.99	19	33-35	34-36.5	37-39
3	0.81-0.90	17-18	30-32	30-33	33-36
2	0.71-0.80	15-16	26-29	26-29	29-32
1	0.61-0.70	13-14	22-25	23-25	25-28
0	0.60 or less	12 or less	21 or less	22 or less	24 or less
N	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

*Ratio =	H-20 RATING / 20.00 T	OR	HS-20 RATING / 36.00 T	OR	ML-80 RATING / 36.64 T	OR	TK-527 RATING / 40.00 T

Note: Unposted bridges where capacity is based upon engineering judgment shall be coded a maximum of 5. As a guide and for coding purposes only, the values above may be used to code this item.

Note: The actual load posting does not affect Item 4B03.

4B04 Operating Type – Operating Rating Type

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This item records the method of analysis used in determining the Operating rating for the NBI Load Rating.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Item IR06.

*4B05 Oper Rating – Operating Rating

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This item is used to record the NBI Operating Rating for the structure. The operating rating is that load which produced the operating rating stresses specified in the current AASHTO Manual for Bridge Evaluation. The operating rating is the maximum permissible weight of the load type being evaluated, to which the structure may be subjected occasionally. In determining the operating rating, the number of lanes to be loaded will be the number of design traffic lanes in accordance with current AASHTO Standard Specifications for Highway Bridges for HS-20 or AASHTO LRFD Bridge Design Specifications for PHL-93.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Item IR11.

*4B06 Inventory Type – Inventory Rating Type

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This item records the method of analysis used in determining the NBI Inventory ratings.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Item IR06.

*4B07 Inv Rating - Inventory Rating

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This item is used to record the NBI Inventory Rating for the structure. The inventory rating is that load which produces the inventory rating stresses specified in the current AASHTO Manual for Bridge Evaluation, generally the same allowable stresses used in the bridge design. The latter means that until a bridge has deteriorated structurally, or is subjected to superimposed dead loads in excess of those used in the design, the inventory rating is at least equal to the design load. Additionally, it can be stated that inventory rating is that load which can safely utilize an existing bridge for an indefinite period. In determining inventory rating, the number of lanes to be loaded is the number of design traffic lanes in accordance with current AASHTO Standard Specifications for Highway Bridges for HS-20 or AASHTO LRFD Bridge Design Specifications for PHL-93.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Item IR10.

4B08 H20 Op Rat Typ - H20 Operating Rating Type

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This item records the method of analysis used in determining the H20 Operating ratings.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Item IR06.

4B09 H20 Op Rating - H20 Operating Rating

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This item is used to record the H20 Operating rating for the structure. Refer to Item 4B05 for a description of Operating rating.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Item IR11.

4B10 H20 Inv Rat Type - H20 Inventory Rating Type

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This item records the method of analysis used in determining the H20 inventory ratings.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Item IR06.

4B11 H20 Inv Rating - H20 Inventory Rating

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This item is used to record the H20 inventory rating for the structure. Refer to Item 4B07 for a description of inventory rating.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Item IR10.

4B12 ML80

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This two-part item is used to record operating and inventory ratings for the ML80 loading. Refer to Items 4B05 and 4B07 for descriptions of operating and inventory ratings, respectively.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Items IR10 and IR11.

4B13 TK527

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This two-part item is used to record operating and inventory ratings for the TK527 truck. Refer to Items 4B05 and 4B07 for descriptions of operating and inventory ratings, respectively.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Items IR10 and IR11.

4B14 (Not Used – Reserved for Future Use)

4B15 (Not Used – Reserved for Future Use)

4B16 (Not Used – Reserved for Future Use)

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5A Inspection Inventory - ID/Admin

The Inspection Inventory - ID/Admin Section provides identification and administrative structure information for the selected structure.

5A01 Structure ID - Structure Identification Number

Inventory > Structure Home; BMS3: General

Description:

Each structure that is entered in BMS2 must have a unique identification. The method used to provide this identification is to assign a 14-digit number for each bridge being inventoried. This number is comprised of 4 parts. They are: COUNTY, STATE ROUTE, SEGMENT and OFFSET. You must use the identical identification when updating information which has been previously stored. If as little as 1 digit does not agree, it will not be possible to match the updating identification with the identification previously stored.

Procedure:

Enter the appropriate values as identified under the following subheadings for COUNTY, STATE ROUTE, SEGMENT and OFFSET.

A newly built state structure will have the county, state route, segment and offset information on the bridge plans. This will be the structure identification number. All other bridges will be coded as per the instructions, which follow for each sub-item.

County Code:

Enter the county code for the county in which the bridge is located. When a bridge is located across a county boundary, enter the code for the county which has maintenance and inspection responsibility. Prefix with zero when necessary.

County	District	County	District	County	District	County	District
01 Adams	08	18 Clinton	02	35 Lackawanna	04	52 Potter	02
02 Allegheny	11	19 Columbia	03	36 Lancaster	08	53 Schuylkill	05
03 Armstrong	10	20 Crawford	01	37 Lawrence	11	54 Snyder	03
04 Beaver	11	21 Cumberland	08	38 Lebanon	08	55 Somerset	09
05 Bedford	09	22 Dauphin	08	39 Lehigh	05	56 Sullivan	03
06 Berks	05	23 Delaware	06	40 Luzerne	04	57 Susquehanna	04
07 Blair	09	24 Elk	02	41 Lycoming	03	58 Tioga	03
08 Bradford	03	25 Erie	01	42 McKean	02	59 Union	03
09 Bucks	06	26 Fayette	12	43 Mercer	01	60 Venango	01
10 Butler	10	27 Forest	01	44 Mifflin	02	61 Warren	01
11 Cambria	09	28 Franklin	08	45 Monroe	05	62 Washington	12
12 Cameron	02	29 Fulton	09	46 Montgomery	06	63 Wayne	04
13 Carbon	05	30 Greene	12	47 Montour	03	64 Westmoreland	12
14 Centre	02	31 Huntingdon	09	48 Northampton	05	65 Wyoming	04
15 Chester	06	32 Indiana	10	49 Northumberland	03	66 York	08
16 Clarion	10	33 Jefferson	10	50 Perry	08	67 Philadelphia	06
17 Clearfield	02	34 Juniata	02	51 Pike	04		

State Route:

1. **Inventory prepared by the Department:**
   (i.e., Department is the Agency submitting, items 6A06, or other Agency that is using the Department's Location Referencing System):

   Enter the state route number shown on the straight line diagram of the route identifying the bridge. The route to be entered is the state route number of the highway on the structure. Where the structure does not carry a state route (such as a railroad, local road, etc.), enter the state route number of the highway under the structure. Sufficient zeros should be prefixed to the route number to complete the 4-digit field.

   Example:
   State Route 362: ## 0362 #### ####

   Note: Enter Structure ID without spaces

2. **Inventory prepared by the Pennsylvania Turnpike Commission:**

   Enter one of the following codes:

7076-I76, East-West Turnpike	7476–I476, Northeast Extension
7276-I276, East-West Turnpike (Philadelphia)	7495-I95, East-West Turnpike (Philadelphia)
7376-I376, Beaver Valley Expressway	7043–PA43, Mon-Fayette Expressway
7066-PA66, Greensburg Expressway	7576-PA576, Southern Beltway

   Example:
   PA Turnpike, Route 576: ## 7576 #### ####

   Note: Enter Structure ID without spaces

3. **Inventory prepared by the Delaware Joint Toll Bridge Commission:**

   Enter one of the following codes:

7991 Bridges in Bucks County	7993 Bridges in Monroe County
7992 Bridges in Northampton County	7994 Bridges in Pike County

   Example:
   Bridge in Pike County, Delaware: ## 7994 #### ####

   Note: Enter Structure ID without spaces

4. **Inventory prepared by Local Governments or Others:**

   Enter "7" plus the 3-digit county/borough code (Item 5A06).

   Example:
   County of Dauphin, Berrysburg Borough Bridge: ## 7401 #### ####

   Note: Enter Structure ID without spaces

5. **Inventory prepared by Railroad:**

   Enter "7" plus the USRA number. The 4th through 7th digits indicate the 4-digit United States Railway Association Number.

   Example:
   Railway Number 1228: ## 7122 8### ####

   Note: Enter Structure ID without spaces

Segment of Route:

1. Inventory prepared by the Department:

Enter the segment number of the State Route identified in the item "State Route".

2. Inventory prepared by Others:
(Pa. Turnpike Commission, Delaware Joint Toll Bridge Commission, Local Governments, and other agencies):

Enter "99" in the first 2 digits for the Pa. Turnpike Commission. "99" will identify the road systems under PTC jurisdiction. Use the 3rd and 4th digits plus the 4 digits provided for offset of the bridge to record the location of the bridge.

For railroad owned and inventorial structures, use the 2nd, 3rd, and 4th digits plus the 4 digits provide for offset of the bridge to record the location of the bridge.

a. Location by Milepoint:

Enter the milepoint as indicated (PTC only):

Milepoint		
1.43	## #### 9900 0143	**Note: Enter number without spaces**
126.89	## #### 9901 2689	**Note: Enter number without spaces**

b. Location by Local Bridge Number or Other Identification:

Enter the Local Bridge Number as indicated:

Bridge No.		
19	## #### 0000 0019	**Note: Enter number without spaces**
BR25	## #### 0000 0025	**Note: Enter number without spaces**

Offset:

The distance in feet from the beginning of the segment to the beginning of the bridge.

Offset		
35	## #### #### 0035	**Note: Enter number without spaces**

For inventories prepared by agencies other than the Department, refer to the instructions for the segment portion of the Structure identification for the use and interpretations of this sub-item.

*5A02 Name - Structure Name

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the name of the structure in narrative form.

Procedure:

The name of the bridge, if any, should be recorded. In lieu of the bridge name, record the bridge location. The bridge location should be keyed to a distinguishable feature (road junctions, topographical features, etc.) of an Official Department of Transportation map. In the event the bridge has no name and there are no nearby distinguishable features shown on the map, the location may be keyed to other local well known features.

Coding:

Name of bridge or narrative description of the feature intersected.

Examples:

SOUTH BRIDGE

GEORGE WADE BRIDGE

0.5 MI SO OF ROCKPORT

*5A03 NBI Structure No - NBI Structure Number

Inventory > Structure Home; BMS3: General

Description:

This display only item indicates the reference number for the structure within BMS. This item is also known as the Bridge Key (BRKEY).

Procedure:

This item is **automatically generated by the system** and need not be coded by the bridge inspector.

*5A04 District - District Number

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the district in which the bridge is located.

Procedure:

Select the district in which the bridge is located from the dropdown list.

Coding:

District 1
District 2
District 3
District 4
District 5
District 6
District 8
District 9
District 10
District 11
District 12

*5A05 County - County Code

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the county code for the county in which the bridge is located.

Procedure:

Select the county in which the bridge is located from the dropdown list. When a bridge is located across a county boundary, enter the code for the county which has maintenance and inspection responsibility.

Coding:

County	District	County	District	County	District	County	District
01 Adams	08	18 Clinton	02	35 Lackawanna	04	51 Pike	04
02 Allegheny	11	19 Columbia	03	36 Lancaster	08	52 Potter	02
03 Armstrong	10	20 Crawford	01	37 Lawrence	11	53 Schuylkill	05
04 Beaver	11	21 Cumberland	08	38 Lebanon	08	54 Snyder	03
05 Bedford	09	22 Dauphin	08	39 Lehigh	05	55 Somerset	09
06 Berks	05	23 Delaware	06	40 Luzerne	04	56 Sullivan	03
07 Blair	09	24 Elk	02	41 Lycoming	03	57 Susquehanna	04
08 Bradford	03	25 Erie	01	42 McKean	02	58 Tioga	03
09 Bucks	06	26 Fayette	12	43 Mercer	01	59 Union	03
10 Butler	10	27 Forest	01	44 Mifflin	02	60 Venango	01
11 Cambria	09	28 Franklin	08	45 Monroe	05	61 Warren	01
12 Cameron	02	29 Fulton	09	46 Montgomery	06	62 Washington	12
13 Carbon	05	30 Greene	12	47 Montour	03	63 Wayne	04
14 Centre	02	31 Huntingdon	09	48 Northampton	05	64 Westmoreland	12
15 Chester	06	32 Indiana	10	49 Northumberland	03	65 Wyoming	04
16 Clarion	10	33 Jefferson	10	50 Perry	08	66 York	08
17 Clearfield	02	34 Juniata	02	67 Philadelphia	06		

*5A06 City/Town/Place - City/Town/Place Code

Inventory > Structure Home; BMS3: General

Description:

This item identifies the subdivision of the county (i.e., City, Borough, First Class Township, or Second Class Township) in which the bridge is located.

Procedure:

Each city, borough, and township is assigned a 3-digit code number. Determine the code number for the subdivision of the county from the list in Appendix B. When a bridge is located across a municipal boundary, enter the code for the municipality which has maintenance and inspection responsibility.

Coding:

A 3-digit code from the codes listed in Appendix B.

Examples:

Cumberland County, East Pennsboro Township	101
Lycoming County, Anthony Township	201
Dauphin County, City of Harrisburg	301
Snyder County, Beavertown Borough	401

*5A07 Feature Intersected

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the features intersected by the structure whether the features are over or under the structure. (Information required to complete this item may be obtained from Item 5C01.)

Procedure:

The information to be recorded for this item will be the name or names of the features intersected by the structure whether the features are over or under the structure.

When one of the features intersected is a highway, the signed number or name of the highway (e.g. 181, US 51, SR 772, Mill Road) should appear first (left most) in the field. The name of any other feature should follow, separated by a semi-colon or a comma.

If the structure is over a stream, the name of that stream should be entered here as well as Item 5C01.

Abbreviations should be used where necessary, but an effort should be made to keep them meaningful.

Coding:

A narrative description of the features intersected.

*5A08 Facility Carried - Facility Carried by Structure

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the facility carried by the structure. (Information required to complete this item may be obtained from Item 5C01.)

Procedure:

The facility being carried by this structure should be recorded and coded. For example, S to W Ramp, Ramp from I495 to I95, C&O Railroad, Great Eastern Pipeline and others.

Coding:

A narrative description of the facility being carried by the structure.

*5A09 Location - Location of Structure

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the bridge location in a narrative form. The description is limited to 25 characters. This item must have a description.

Procedure:

The bridge location should be keyed to a distinguishable feature (road junctions, topographical features, etc.) of an Official Department of Transportation map. In the event there are no nearby distinguishable features shown on the map, the location may be keyed to other local well known features.

Coding:

A narrative description of the bridge location.

Example: A bridge is located one half mile south of Rockport: .5 MI SO OF ROCKPORT

*5A10 Latitude - Latitude of Bridge Location

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the latitude of the bridge location.

Procedure:

This item should be entered manually. The latitude should be measured and entered to the nearest hundredth of a second. The location can be entered in degrees minutes seconds or in decimal degrees. **Latitude should be measured at the center of the bridge in the field or with mapping software.** Users can switch between degrees minutes seconds and decimal degrees by clicking the toggle switch to the right of Item 5A11 in BMS2.

This item is required for all bridges on the STRAHNET Highway System. It is recommended this item be coded for all bridges.

If a  appears, the straight line distance between the GPS location combining Items 5A10 and 5A11 and the GPS location identified by PennDOT One Map is greater than 100'. If the user believes the data in Items 5A10 and 5A11 are correct and One Map is wrong, the user should contact the Bridge Inspection Section and provide a suggested correction.

Coding:

The latitude, in degrees, minutes, and seconds to the nearest hundredth of a second in one of the following format or decimal degrees:

___ ___ Deg ___ ___ *Min ___ ___.___ ___ *Sec

___ ___ . ___ ___ ___ ___ Deg

*Enter leading zeros for single digit minutes and seconds for the required number of digits

Examples:

A bridge's location is 42 degrees, 7 minutes, and 21.00 seconds latitude	42d 07' 21.00"
A bridge's location is 42 degrees, 7 minutes, and 21.00 seconds latitude	42.122500

*5A11 Longitude - Longitude of Bridge Location

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the longitude of the bridge location.

Procedure:

This item should be entered manually. The longitude should be measured and entered to the nearest hundredth of a second. The location can be entered in degrees minutes seconds or in decimal degrees. **Longitude should be measured at the center of the bridge in the field or with mapping software.** Users can switch between degrees minutes seconds and decimal degrees by clicking the toggle switch to the right of Item 5A11 in BMS2.

This item is required for all bridges on the STRAHNET Highway System. It is recommended this item be coded for all bridges.

If a  appears, the straight line distance between the GPS location combining Items 5A10 and 5A11 and the GPS location identified by PennDOT One Map is greater than 100'. If the user believes the data in

Items 5A10 and 5A11 are correct and One Map is wrong, the user should contact the Bridge Inspection Section and provide a suggested correction.

Coding:

The longitude, in degrees, minutes, and seconds to the nearest hundredth of a second in the following format or decimal degrees.

___ ___ ___ Deg ___ ___ *Min ___ ___.___ ___ *Sec

___ ___ . ___ ___ ___ ___ Deg

*Enter leading zeros for single digit minutes and seconds for the required number of digits

Examples:

A bridge's location is 76 degrees, 5 minutes, and 06.00 seconds longitude:	76d 05' 06.00"
A bridge's location is 76 degrees, 5 minutes, and 06.00 seconds longitude:	-76.085000

*5A12 Bord St, FHWA Reg, Share - Name of Border State / FHWA Region / Share Percentage

Inventory > Structure Home

Description:

This three-part item that identifies the name of the border state, the FHWA region for bridges that cross state borders, and the responsibility for improvements to the existing bridge when it is shared with a border state. Percent responsibility is expressed in terms of existing bridge deck area.

Procedure:

Select the appropriate code from the dropdown list for the name of the border state in Field 1. Select the appropriate code from the dropdown list for FHWA region in Field 2. In Field 3, enter the percentage of total deck area of the existing bridge that the border state is responsible for funding. If the bridge is not on a state border, leave blank.

Coding:

Fields 1 and 2:

State	Field 1 - State Code	Field 2 - FHWA Region
Delaware	10	3
Maryland	24	3
New Jersey	34	2
New York	36	2
Ohio	39	5
West Virginia	54	3
Bridge not on a state border	(blank)	(blank)

Field 3:

Percentage of total deck area of the existing bridge that the border state is responsible for funding.

Example:

Border State is responsible for funding 45% of future improvement costs: 45

*5A13 Border Struct No - Border Bridge Structure Number

Inventory > Structure Home

Description:

This item is used to record the structure number of the border bridge identified in Item 5A12.

Procedure:

Code the border state's NBI structure number for any structure noted in Item 5A12. This number must match exactly the border state's submitted NBI structure number. The entire 15-digit number must be accounted for including 0's and blanks whether leading, trailing or embedded in the field. If Item 5A12 is blank, Item 5A13 must also be blank.

*5A14 FIPS State / Region

Inventory > Structure Home

Description:

This two-part item is used to record the Federal Information Processing Standards (FIPS) code for State and Region.

Procedure:

Select the FIPS state code in Field 1 and the FIPS region code in Field 2.

Coding:

Field 1	Field 2
42 (Pennsylvania)	Region 3

*5A15 Year Built - Year the Bridge Was Built

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the year the bridge was built.

Procedure:

Enter the 4-digit year in which the bridge was originally built. If the year is unknown, provide a best estimate. Code "0000" for years 1900 and earlier if year built cannot be determined.

Coding:

The 4-digit year the bridge was originally built.

Example:
A bridge was built in 1997: 1997

*5A16 Year Reconstruct - Year of Last Major Reconstruction on the Bridge

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the last year that a major reconstruction was performed on the bridge.

Procedure:

Enter the last year in which major reconstruction was performed on the bridge. Use judgment in determining if any of the completed maintenance can be considered as major work. Work should be considered as a major reconstruction only if it results in a long term improvement (minimum 10 year life) and removes structural deficiencies. If the last year of a major reconstruction is unknown, provide a best estimate. If there has been no major reconstruction on the bridge, code zeros for not applicable.

For a bridge to be defined as reconstructed, 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 eligible work not to be considered as reconstruction are listed:

- Safety feature replacement or upgrading (for example, bridge rail approach guide rail or impact attenuators).
- Painting of structural steel.
- Overlay of bridge deck as part of a larger highway surfacing project (for example, overlay carried across bridge deck for surface uniformity without additional bridge work).
- Utility work.
- Emergency repair to restore structural integrity to the previous status following an accident.
- Retrofitting to correct a deficiency which does not substantially alter physical geometry or increase load carrying capacity.
- Work performed to keep a bridge operational while plans for complete rehabilitation or replacement are under preparation (for example, adding a structure element or extra girder).

Coding:

4-digit year in which major reconstruction was performed on the bridge.

*5A17 Type of Service On - Type of Service On Bridge

Inventory > Structure Home; BMS3: General

Description:

This item indicates the type of service on the bridge.

Procedure:

Select the type of service carried by the bridge from the dropdown list.

For specific sign and light structures, select “S” or “H” or for retaining wall and noise wall structures, select “R” or “N”. By entering this coding, the system will accept entries on the Sign & Light Structure or Wall Inventory Screens. Sign Structures mounted to bridges will have their own structure ID's. These should be coded as "S". For other structure types (e.g. overhead conveyers, pipelines, etc.) not covered in the rest of the groups, select “0 – Private Road or Other”.

Coding:

Type of service carried by the bridge.

1 Highway
2 Railroad
3 Pedestrian exclusively
4 Highway – Railroad
5* Highway – Pedestrian
6 Overpass structure at an interchange level of a multilevel interchange
7 Third Level (interchange)
8 Fourth Level (interchange)
9 Building or Plaza
0 Private Road or Other
H High Mast Light
N Noise Wall
R Retaining Wall
S Sign Structure
T Tunnel
X Demolished/Replaced

Note:
Refer to Publication 238 Section 1.5.3 for the definition of “Highway (Public Roads)”. A private road is a roadway not under public authority jurisdiction, not maintained by public authority, and/or not open to the public. Gated roads which are never open to public traffic should be coded as “Private Road or Other”. Gated roads which are open to seasonal or occasional public traffic should be coded as “Highway”.

*Use for intentional sidewalk applications only. This includes bridges with sidewalks or with shoulders striped for pedestrian use.

Examples:

Highway on structure: 1 Highway
Tunnel: T Tunnel
Sign Structure: S Sign Structure
Retaining Wall: R Retaining Wall
Retaining wall serving as an abutment for a bridge carrying a highway: 1 Highway

*5A18 Under - Type of Service Under Bridge

Inventory > Structure Home; BMS3: General

Description:

This item indicates the type of service under the bridge.

Procedure:

Select the type of service under the bridge from the dropdown list.

Coding:

Type of service passing under the bridge.

1	Highway w/ or w/o pedestrian	6	Highway – Waterway
2	Railroad	7	Railroad – Waterway
3	Pedestrian exclusively	8	Highway – Waterway – Railroad
4	Highway – Railroad	9	Relief (waterway)
5	Waterway	0	Private Road or Other

Note:
Refer to Publication 238 Section 1.5.3 for the definition of "Highway (Public Roads)". A private road is a roadway not under public authority jurisdiction, not maintained by public authority, and/or not open to the public. Gated roads which are never open to public traffic should be coded as "Private Road or Other". Gated roads which are open to seasonal or occasional public traffic should be coded as "Highway".

Examples:

Bridge over river:

Tunnel:

Retaining wall structure parallel with highway:

*5A19 Num Lanes Under – Number of Lanes Under the Structure

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the number of through traffic lanes under the structure. Information required to complete this item may be obtained from Item 5C08 and/or FR07.

Procedure:

This item will be **automatically filled in by the system** based on the information entered in Item 5C08 for features under the structure. This item includes all lanes carrying highway traffic (cars, trucks, buses) which are striped or otherwise operated as a full width traffic lane under the structure by the owning and/or maintaining authority. This includes any full width merge lanes and ramp lanes and is independent of directionality of usage.

When the inventory route is "under" the bridge, code the number of lanes for the inventory route only. When the inventory route is "under" the bridge, the obstruction over the inventory route may be other than a highway bridge (railroad, pedestrian, pipeline, etc.).

Code double deck bridges as 1 or 2 structures as noted in the examples under Item 5C08. Either method is acceptable however, all related data must be compatible with the method selected.

Coding:

Number of lanes under the structure.

*5A20 Maint Resp - Maintenance Responsibility for Bridge

Inventory > Structure Home; BMS3: General

Description:

This item indicates which agency has primary responsibility to maintain the bridge.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Items VM03 and VM04. This item should not be changed, but the displayed value should be confirmed.

*5A21 Owner - Owner or Principal Custodian of the Bridge

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the owner or principal custodian of the bridge.

Procedure:

Select the name of the owner or principal custodian of the bridge from the dropdown list. In the absence of a clear designation of ownership, enter the name of principal custodian, the agency responsible for maintaining the structure. (Agency maintaining only the roadway surface, curbs, sidewalks, and/or railings of similar minor items should not be considered as principal agency). If more than one agency has equal maintenance responsibility, code one agency in the hierarchy of State, Federal, county, city, railroad, and other private.

Coding:

01	State Highway Agency
02	County Highway Agency
03	Town or Township Highway Agency
04	City, Municipal, or Borough Highway Agency
11	State Park, Forest or Reservation Agency
12	Local Park, Forest or Reservation Agency
21	Other State Agencies
25	Other Local Agencies
26	Private (Other than Railroad)
27	Railroad
31	State Toll Authority
32	Local Toll Authority
40	Other Public Entity (i.e. Airport or Transit Authority)
56	U.S. Department of Veteran Affairs
60	Other Federal Agencies (not listed below)
62	Bureau of Indian Affairs
63	U.S. Fish and Wildlife Service
64	U.S. Forest Service
66	National Park Service
68	Bureau of Land Management
69	Bureau of Reclamation
70	Corps of Engineers (Civil)
80	Other or Unknown
XX	Demolished/Replaced

5A22 (Not Used – Reserved for Future Use)

5A23 Agency Admin Area - Agency Administration Area

Inventory > Structure Home

Description:

This item indicates the administrative area within which the structure is located.

Procedure:

Select the planning organization where the structure is located. When a new structure is created, a default coding is created based on the county selected in Item 5A05 – County Code.

Coding:

01-Adams MPO	07-Harrisburg Area Transportation Study	13-North Central RPO	19-Shenango Valley MPO
02-Altoona MPO	08-Johnstown MPO	14-Northwest RPO	20-Southern Alleghenies RPO
03-Centre County MPO	09-Lancaster MPO	15-Northern Tier RPO	21-Southwestern PA Commission MPO
04-DVRPC MPO	10-Lebanon County MPO	16-Reading MPO	22-Lycoming County MPO
05-Erie County MPO	11-Lehigh Valley MPO	17-Lackawanna/Luzerne MPO	23-York County MPO
06-Franklin County MPO	12-Northeastern PA Alliance MPO	18-SEDA-COG MPO	24-Wayne County

5A24 Reporting Group

Inventory > Structure Home; BMS3: General

Description:

This item is used with the validation logic to allow for more flexibility on which validations should be run on each reporting group. These groups have been setup to align with other reports used by the Department. For example, State Internet Report A consists of groups S1 and S2. Local Internet Report B contains group L1. The annual NBI submission to FHWA consists of groups S1, L1 and A1.

Procedure:

This item will be **automatically filled in by the system** based on information entered into Items 5A17 (Type of Service On), 5A18 (Type of Service Under), 6A06 (Submitting Agency), 5A21 (Owner), 5B18 (Structure Length), and 5E01 (NBIS Bridge Length Indicator).

The S, L and A series contain bridges carrying a highway (i.e. Item 5A17 = 1, 4, 5, 6, 7 or 8). "State" bridges are defined as state owned with a D## submitting agency, railroad owned carrying a non-7000 series highway with a D## submitting agency, or those carrying a non-7000 series highway with a P## submitting agency.

"Local" bridges are defined as local owned (i.e. Item 5A21 = 02, 03, 04, 25), railroad owned carrying a 7000 series highway with a ### submitting agency, or those carrying a 7000 series highway with a P## submitting agency.

"AMD" (i.e. Asset Management Division Oversight) bridges are defined as those having Item 5A21 owner codes of 11, 12, 21, 26, 31, 32, or 80, state owned not having a D## submitting agency, railroad owned carrying a non-7000 series highway not having a D## or P## submitting agency, or railroad owned carrying a 7000 series highway not having a ### submitting agency.

"Federal" bridges are defined as those having Item 5A21 owner code of 60, 62, 64, 66, 68, 69 or 70. Some federal bridges are inventoried in the BMS2 system, but they are not included in the annual NBI submission to FHWA. FHWA manages the federal bridges separately and adds them to the NBI submission made by PennDOT.

The O series contains bridges that carry private roads, pedestrians/bicyclists or railroads but do not carry a highway (i.e. Item 5A17 = 0, 2 or 3). The M1 group consists of miscellaneous structure types (Item 5A17 = 9, H, N, R or S). The T1 group consists of tunnels (Item 5A17 = T). The X1 group consists of demolished structures (Item 5A17 = X). The N1 group contains any structures that do not fit the criteria for the rest of the groups likely as a result of miscoded or missing data.

Coding:

S1	State with NBIS = Y	A3	AMD < 8ft
S2	State >= 8ft and NBIS = N	F1	Federal
S3	State < 8ft	O1	Other Bridges >= 8ft and over Highway
L1	Local with NBIS = Y	O2	Other Bridges < 8ft or not over Highway
L2	Local >= 8ft and NBIS = N	M1	Miscellaneous Structures
L3	Local < 8ft	T1	Tunnels
A1	AMD with NBIS = Y	X1	Demolished
A2	AMD >= 8ft and NBIS = N	N1	No Group

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5B Inspection Inventory - Design

The Inspection Inventory - Design Section stores design-related information about the selected structure.

*5B01 Deck Structure Type - Bridge Deck Structure Type

Inventory > Structure Home; BMS3: General and Deck

Description:

This item indicates the type of structural deck that is supported by the underlying load carrying members of the superstructure.

Procedure:

This item will be **automatically filled in by the system** based on a conversion from Item 6A38 as shown below in the coding table. This item cannot be changed, but the displayed value should be confirmed.

Note: NCABB = Non-Composite Adjacent Box Beams.

Coding:

Item 5B01 FHWA Coding		Item 6A38 PennDOT Coding
1	Concrete Cast-in-Place	10, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32
2	Concrete Precast Panels	08, 09
3	Open Grating	06,
4	Closed Grating	07, 20
5	Steel Plate (including orthotropic)	05
6	Corrugated Steel	16, 17
7	Aluminum	None
8	Wood or Timber	02, 03, 04
9	Other	00(NCABB Only),31, 99
N	Not applicable	00(Non-NCABB), 01, 18, 19

*5B02 Deck Surface Type – Bridge Deck Wearing Surface Type (Main Span)

Inventory > Structure Home; BMS3: General and Deck

Description:

This item is used to record the type of wearing surface for the main span on the bridge.

Procedure:

Select the type of wearing surface for the main span from the dropdown list.

Coding:

1	Concrete	8	Gravel
2	Concrete Overlay*	9	Other
3	Latex Concrete	0	None (e.g., steel grid)
4	Low Slump Concrete	P	PPC Overlay
5	Epoxy Overlay	N	Not applicable (applies only to structures with no deck)
6	Asphalt	Q	Epoxy on top of LMC Overlay
7	Wood or Timber		

*Separate layer of concrete added but not latex modified, low slump, etc…

*5B03 Deck Membrane Type – Bridge Deck Membrane Type (Main Span)

Inventory > Structure Home; BMS3: General and Deck

Description:

This item is used to record the type of membrane waterproofing on the bridge.

Procedure:

Select the type of membrane from the dropdown list.

Coding:

1	Built-up	9	Other
2	Preformed Fabric	0	None
3	Epoxy	N	Not applicable (applies only to structures with no deck)
8	Unknown		

*5B04 Deck Protection – Bridge Deck Protection Type (Main Span)

Inventory > Structure Home; BMS3: General and Deck

Description:

This item is used to record the type of deck corrosion protection on the bridge.

Procedure:

Select the code from the dropdown list for type of deck protection.

Coding:

1	Epoxy coated reinforcing	7	Internally sealed
2	Galvanized reinforcing	8	Unknown
3	Other coating reinforcing	9	Other
4	Cathodic protection	0	None
5	(Coding Option Removed)	N	Not applicable (applies only to structures with no deck)
6	Polymer impregnated	S	Low corrosion steel (Item 6A42 = 5, 6, or 7)

*5B05 Left - Curb / Sidewalk Width on Left

Inventory > Structure Home; BMS3: General and Deck

Description:

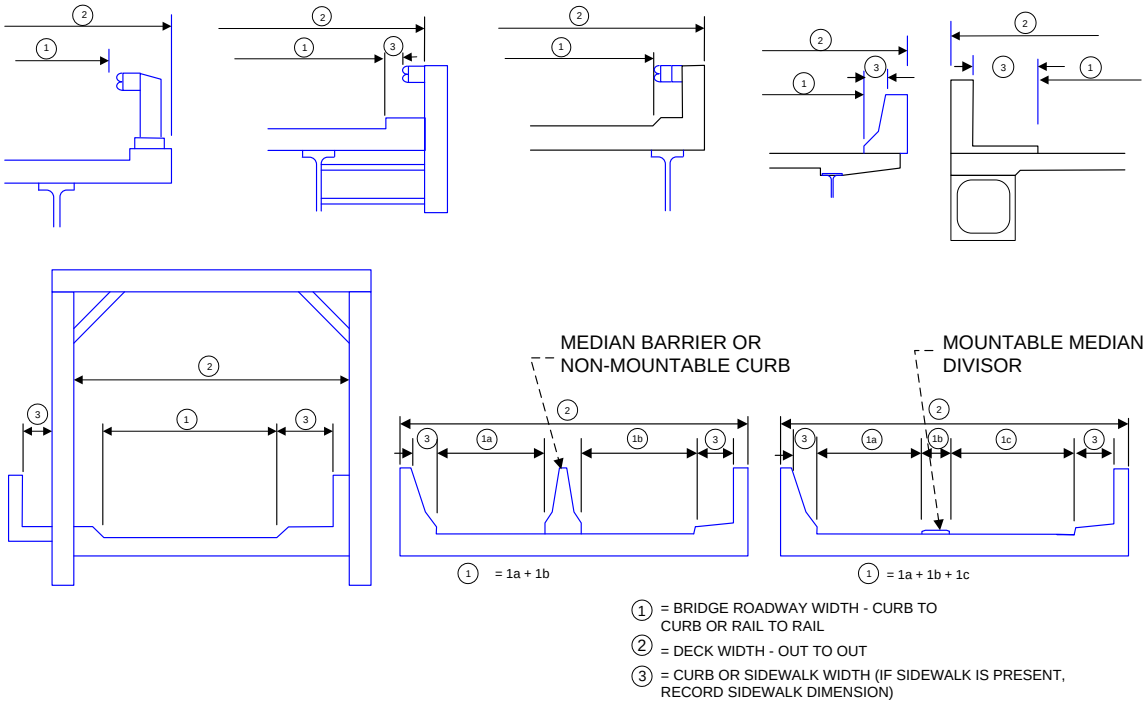
This item is used to record the width of the curb or sidewalk (includes curb width) on the left side.

Procedure:

Enter the clear walkway width of the curb or sidewalk to the nearest tenth of a foot. The width of a curb or sidewalk is measured from the face of the railing to the face of the curb. Enter the smallest width of curb or sidewalk on the bridge. See the sketches below.

Coding:

Width of sidewalk or curb to the nearest tenth foot.



*5B06 Right - Curb / Sidewalk Width on Right

Inventory > Structure Home; BMS3: General and Deck

Description:

This item is used to record the width of the curb or sidewalk (includes curb widths) on the right side.

Procedure:

Enter the clear walkway width of the curb or sidewalk to the nearest tenth of a foot. The width of a curb or sidewalk is measured from the face of the railing to the face of the curb. Enter the smallest width of curb or sidewalk on the bridge. See the sketches under Item 5B05.

Coding:

Width of sidewalk or curb to the nearest tenth foot. (See example sketches under Item 5B05)

*5B07 Deck Width (O/O) - Out-to-Out Width of the Bridge Deck

Inventory > Structure Home; BMS3: General and Deck

Description:

This item is used to record the out-to-out width of a bridge deck.

Procedure:

Enter the out-to-out width of the bridge deck. The measurement should be exclusive of flared areas for ramps, i.e., it should be the minimum or nominal width. For thru type (truss or girder) bridges, enter the width which represents the lateral clearance between superstructure members. Where traffic runs directly on the top slab (or wearing surface) of a culvert, e.g., an R/C box without fill, enter actual width (out-to-out). This also applies where fill is minimal and culvert headwalls affect the flow of traffic.

This item does not apply where the roadway is on a fill across a culvert where the culvert headwalls do not affect the flow of traffic. In this case, code "0.000" for not applicable.

For a highway tunnel (last 2 digits of Item 6A29 is 29), enter the width between the walls of the tunnel.

See the sketches following Item 5B05.

Coding:

The out-to-out width, to the nearest tenth of a foot.

*5B08 Median Type – Bridge Median Type

Inventory > Structure Home; BMS3: General

Description:

This item is used to convert the type of median on a structure to FHWA coding for NBI submission.

Procedure:

This item will be **automatically filled in by the system** based on the median type entered in Item 6C25.

Coding:

Item 5B08 FHWA Coding		Item 6C25 PennDOT Coding
0	No Median	0, N
1	Open Median	6
2	Closed Median (no barrier)	5, 7
3	Closed Median with non-mountable barriers	1, 2, 3, 4, 8, 9

*5B09 Skew - Skew Angle

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the skew angle of the FEATURE INTERSECTED.

Procedure:

Enter the skew angle for the feature intersected to the nearest degree. Normally the skew angle will be taken from the design drawings. If no design drawings are available, the angle is to be field measured, if possible, or estimated.

For the route carried by the bridge, the skew angle is the angle between the centerline of the pier and the roadway centerline.[1]

When a bridge is on a curve or if the angle of substructure unit varies, the average angle should be entered, if reasonable. Otherwise, enter "99" to indicate a major variation in angles of substructure units.

For features under the structure, the skew angle is the angle between the centerline of the bridge and the centerline of the feature.

[1] Pub. 15M (DM4), Section 3.2.2, "PennDOT defines the skew angle as the smaller angle between the highway centerline (or tangent thereto) and a line parallel to the support (wall, abutment, pier, etc.) or to the centerline of culverts (See Fig. 3.2.2-1). AASHTO defines skew angle as the angle between the centerline of a support and a line normal to the roadway centerline. The sum of PennDOT's and AASHTO's skew angle is 90°, i.e.,"

Coding:

The skew angle to the nearest degree.

Examples:

Skew Angle	Code
85° 35'	86
45° 20'	45
90° 00'	90

*5B10 Structure Flared - Is the Structure Flared?

Inventory > Structure Home; BMS3: General

Description:

This item indicates whether or not the width of the bridge varies.

Procedure:

Generally, such variance will result from ramps converging with or diverging from the through lanes on the bridge, but there may be other causes. Minor flares at the ends of the structure should be ignored. Select the code from the dropdown list that indicates if the width does or does not vary.

Coding:

0 No Flare
1 Yes, Flared

*5B11 Number of Main Spans - Total Number of Spans in Main Unit

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the number of spans in the main unit of a bridge.

Procedure:

Enter the number of spans in the main units of a bridge. It will include all spans of most bridges, the main unit of sizable structure or a unit of material or design different from that of the approach span. For a highway tunnel, enter "1" for the number of main unit spans.

Coding:

The number of spans.

*5B12 Main Span Material – Material and Span Interaction of Main Unit (FHWA)

Inventory > Structure Home; BMS3: General

Description:

This item is used to indicate the Federal Highway Administration designation of the kind of material for the main unit of the bridge.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Items 6A26 and 6A28. This item should not be changed, but the calculated value should be confirmed.

Coding:

Item 5B12 FHWA Coding		Items 6A26 – 6A28 PennDOT Coding
1	Concrete	2-1, 2-2, 2-8, 2-9, 3-1, 3-2, 3-8, 3-9
2	Concrete continuous	2-3, 2-4, 2-5, 2-6, 2-7, 2-A, 3-3, 3-4, 3-5, 3-6, 3-7, 3-A
3	Steel	1-1, 1-2, 1-8, 1-9, 8-*
4	Steel continuous	1-3, 1-4, 1-5, 1-6, 1-7, 1-A
5	Prestress concrete	4-1, 4-2, 4-8, 4-9
6	Prestress concrete continuous	4-3, 4-4, 4-5, 4-6, 4-7, 4-A
7	Timber	5-*
8	Masonry	6-*
9	Aluminum, wrought iron, cast iron	7-*
0	Other	9-*

Note: An asterisk indicates Item 6A28 values 1 through 9 or A.

*5B13 Main Span Design - Structural Configuration of Main Unit (FHWA)

Inventory > Structure Home; BMS3: General

Description:

This item is used to indicate the Federal Highway Administration designation of the type of design and/or construction for the main unit of the bridge.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Item 6A29. This item should not be changed, but the calculated value should be confirmed.

Coding:

Item 5B13 FHWA Coding	Item 6A29 PennDOT Coding
01 Slab	1, 2, 38
02 Stringer/Multi-beam Girder	4, 9, 10, 36, 37
03 Girder and Floorbeam System	11, 12, 13, 14, 15, 16
04 Tee Beam	3
05 Box Beam or Girders – Multiple	6, 7
06 Box Beam or Girders – Single	5
07 Frame	22
08 Orthotropic	23
09 Truss – Deck	17
10 Truss – Thru	18
11 Arch – Deck	19, 20
12 Arch – Thru	21
13 Suspension	24
14 Stayed Girder	25
15 Movable – Lift	26
16 Movable – Bascule	27
17 Movable – Swing	28
18 Tunnel	29
19 Culvert	30, 31, 32, 33, 34, 35
20 Mixed Types	None
21 Segmented Box Girder	52
22 Channel Beam	8
00 Other	39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 99

*5B14 Number of Approach Spans - Total Number of Approach Spans

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the number of approach spans to the main unit.

Procedure:

Enter the number of approach spans to the main unit or the number of spans of material different from that of the major bridge. If this item does not apply, code "0".

For a highway tunnel, an approach span is considered to be any length of the structure with a different material and/or type of construction than the main unit.

Coding:

The number of approach spans.

*5B15 Approach Span Material - Material and Span Interaction of Approach Spans (FHWA)

Inventory > Structure Home; BMS3: General

Description:

This item is used to indicate the Federal Highway Administration designation of the kind of material for the approach spans of the bridge.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Items 6A26 and 6A28. This item should not be changed, but the calculated value should be confirmed.

Coding:

See Item 5B12 for values.

*5B16 Approach Span Design - Structural Configuration of Approach Spans (FHWA)

Inventory > Structure Home; BMS3: General

Description:

This item is used to indicate the Federal Highway Administration designation of the type of design and/or construction for the approach spans of the bridge.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Item 6A29. This item should not be changed, but the calculated value should be confirmed.

Coding:

See Item 5B13 for values.

*5B17 Maximum Span Length

Inventory > Structure Home

Description:

This item is used to record the maximum span length.

Procedure:

Enter the length of the maximum span to the nearest foot. Measure between the center to center (c/c) of bearings along the centerline of the bridge. If only the clear open distance between piers, bents, or abutments is known, add the estimated distances from the face of the substructure elements to the centerline of bearing. For arch culverts under fill, span length is measured from springline-to-springline (same as Item 5B18).

Coding:

Length of the maximum span, to the nearest foot.

*5B18 Structure Length

Inventory > Structure Home; BMS3: General

Description:

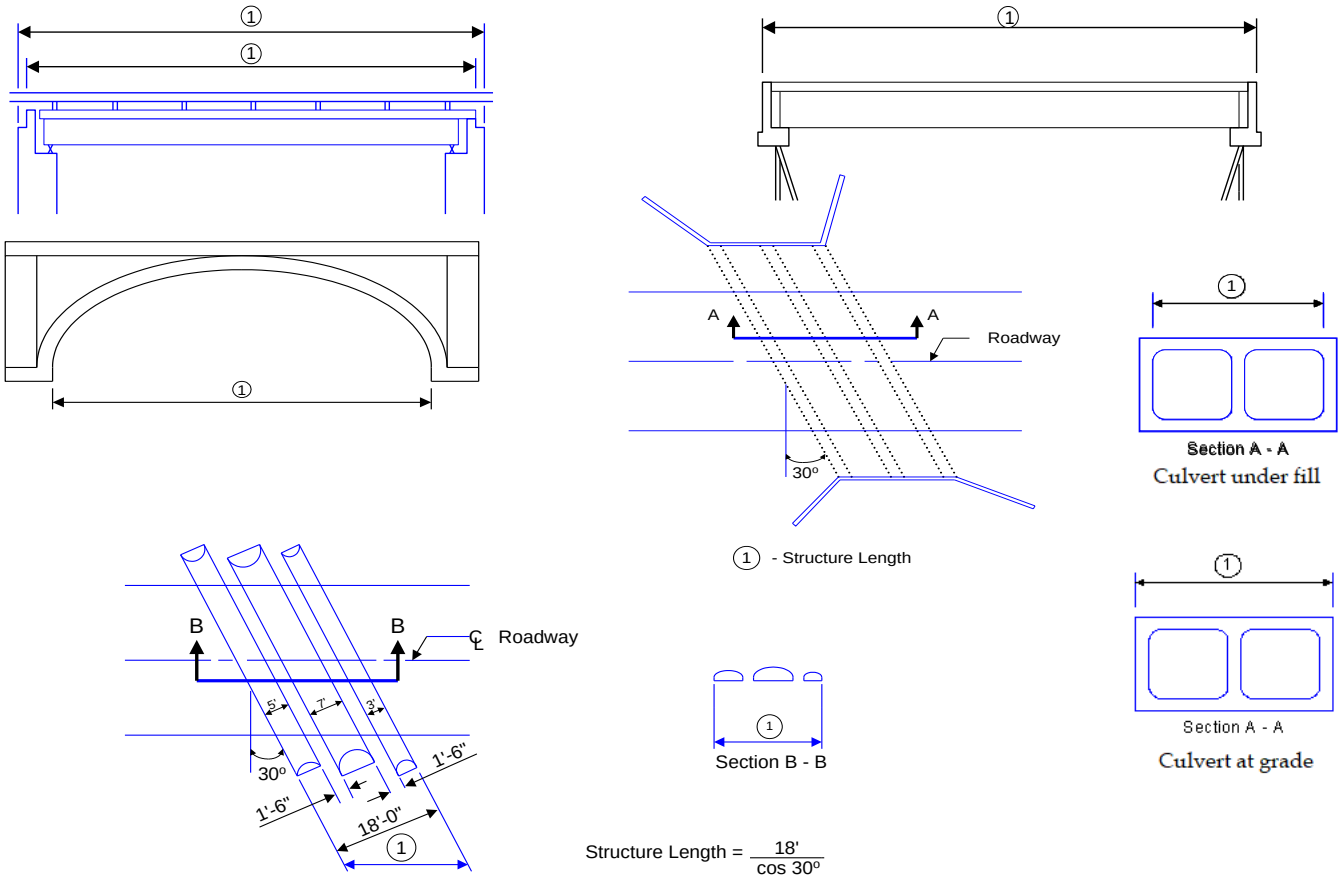
This item is used to record the total length of the structure.

Procedure:

Enter the total length of the structure to the nearest foot. This will normally be the length measured along the centerline of roadway from paving notch to paving notch or back to back of backwalls of abutments, if present. Otherwise, enter the length from end to end of the bridge floor, but in no case can this be less than the total clear opening of the structure. For culverts under fill, including single or multiple boxes or pipes, etc., where the clear distance between multiple openings is less than half of the smaller contiguous opening, the measurement should be made between inside edges of the exterior pipes or inside faces of the exterior walls, if any, along the centerline of roadway regardless of their depth below grade. For culverts at grade (e.g., R.C. Box Culvert without fill), measurement should be along the centerline of roadway from paving notch to paving notch, if any, or back to back of exterior walls (see sketches below). If the structure is highway tunnel, enter the length of the tunnel measured along the centerline of the roadway. For walls, enter the length from beginning to end of the wall. Leave blank for structure mounted or cantilever sign structures. For cantilevered sign structures, enter the length from the centerline of support to the end of the arm. For non-cantilevered sign structures, enter the length from the centerline of outer supports.

Coding:

Total length of the structure to the nearest foot.



5B19 Deck Area

Inventory > Structure Home; BMS3: General

Description:

This item is used to record the bridge's deck area in square feet.

Procedure:

This item will be **automatically filled in by the system** based on the product of the values entered in Items 5B07 and 5B18. If a structure has Item 5B07 equal to 0 (e.g. culverts under fill), this calculation will be based on Item 5C26 instead of 5B07. The automatic update occurs overnight.

Coding:

The deck area to the nearest square foot. This value will be set to 0 for non-bridge structures.

5B20 Total Length

Inventory > Structure Home

Description:

This item is used to record the total length of the structure, including approach roadways.

Procedure:

Enter the total length of the structure, including approach roadways. For the total structure length calculation, approach roadways consist of the approach slabs, if present. If approach slabs are not present, approach roadway length is zero. This value is always greater than or equal to the structure length.

Coding:

Input the total length of the structure, including approach roadways, to the nearest foot.

[the remainder of this page is intentionally left blank]

5C Inspection Inventory - Roads

The Inspection Inventory - Roads Section stores roadway information for the selected structure. Use Sections FR and FW, respectively, to enter data for railroad and waterway features. For "under" features, only record the following Items: 5C01, 5C03- 5C06, 5C08, 5C10-5C14, 5C18, 5C21, 5C23, 5C28, 5C29, 5C33.

5C01 Route Name - Road / Route Name

Inventory > Features > Highway; BMS3: Features

Description:

This item is used to record features intersected in narrative form.

Procedure:

Enter a narrative description of the features intersected by the bridge being inventoried, whether the features are on or under the bridge. Abbreviations should be used where necessary, but an effort should be made to keep them meaningful. For routes which are not state routes, the traffic route number should be recorded.

Coding:

Narrative description of the feature intersected.

Examples:

County Rd 39
Walnut St
Twp Rte T431
SR 3042 (Thompson Rd)

Note:
Refer to Item 5C03 Example 3 if structure is a tunnel.

5C02 (Not Used – Reserved for Future Use)

[the remainder of this page is intentionally left blank]

*5C03 On/Under - Is the Feature Intersected On or Under the Bridge?

Inventory > Features > Highway; BMS3: Features

Description:

This item indicates whether the feature intersected is on or under the bridge being inventoried.

Procedure:

Enter the code that indicates whether the feature intersected is on or under the bridge being inventoried.

When creating a new "on" or "under" select the appropriate route type.

For a tunnel, code the route going through the tunnel as the under feature.

When there is more than one feature under the bridge, order the routes according to the hierarchy given in Item 5C04.

To the right of the display of Item 5C03 in BMS2 on the Features screen, a two-digit RMS Key will be displayed if the feature is integrating with RMS. A blank key indicates that the feature is not integrating with RMS.

Coding:

1 – Feature is on the bridge
12 – Feature is the second feature on the bridge
2 – Only one feature under the bridge
A to Z – Feature is one of multiple features under the bridge

Examples:

	Route Name (5C01)	On/Under (5C03)
1 - A bridge carrying SR 1206 with a single route, SR 2090 passing under it:	SR 1206	1 - Route On Structure
	SR 2090	2 - One Route Under
2 - A bridge carrying SR 3001 with routes, SR 1018 and SR 3018 passing under it:	SR 3001	1 - Route On Structure
	SR 1018	A - 1st Route Under
	SR 3018	B - 2nd Route Under
3 - A tunnel with SR 0376 passing through it:	Mt. Washington	1 - Route On Structure
	SR 0376	2 - One Route Under
4 - A bridge carrying two SRs (1206 & 3001) with a single route, SR 2090 passing under it:	SR 1206	1 - Route On Structure
	SR 3001	12 - 2nd Route On
	SR 2090	2 - One Route Under

*5C04 Kind Hwy (Rt Pref) - Route Signing Prefix

Inventory > Features > Highway

Description:

This item indicates the kind of highway of the FEATURE.

Procedure:

This field is automatically filled in by the system if the feature integrates with RMS. For local and other routes, this item should be entered manually.

Select the code from the dropdown list which indicates the kind of highway. The order of the codes shown is also the hierarchy of their importance. If two or more routes are concurrent, first of the codes (reading down the list) will be used.

Coding:

1 Interstate Highway
2 U.S. Numbered Highway
3 State Highway
4 County Highway
5 City, Borough Street and Township Roads
6 Federal Lands Road
7 State Lands Road
8 Other (routes not otherwise identified above)
N Not applicable (non-highway related features)

*5C05 Desig. Lvl Service - Designated Level of Service

Inventory > Features > Highway

Description:

This item describes the designated level of service.

Procedure:

Select the code from the dropdown list which describes the feature.

Coding:

0 None of below
1 Mainline
2 Alternate
3 Bypass
4 Spur
6 Business
7 Ramp, Wye, Connector, etc.
8 Service and/or unclassified frontage road
N Not applicable (non-highway related feature)

*5C06 Rte #/Suffix - State Traffic Route / Suffix

Inventory > Features > Highway; BMS3: Features

Description:

This two-part item is used to record the traffic route number and directional suffix for the route on which the structure is being inventoried.

Procedure:

This field is automatically filled in by the system if the feature integrates with RMS. For local and other routes, this item should be entered manually.

Enter the traffic route number in Field 1. The traffic route number is the predominate highway route number posted along the highway. When two or more routes are concurrent, the highest of the hierarchy of KIND OF HIGHWAY (Item 5C04) will be used. If the concurrent routes are of the same hierarchy level, the lowest numbered route will be used.

If the FEATURE is not a highway, code "NNNNN". If the FEATURE is a highway with no traffic route number, code "00000" for not applicable.

In Field 2, select the code from the dropdown list which indicates the directional suffix for the FEATURE described as highway, street, etc. If the FEATURE is a ramp, enter the direction of the route on which the traffic from the ramp will enter.

Coding:

Field 1 (route number):

The traffic route number

Examples:

Interstate 78	00078
U.S. 322	00322
Highway with no traffic route number	00000
Non-highway related feature	NNNNN
Ramps	00000

Field 2 (suffix):

0	Traffic in both directions
1	Northbound
2	Eastbound
3	Southbound
4	Westbound
N	Not applicable (non-highway related features)

5C07 (Not Used – Reserved for Future Use)

*5C08 Lanes, Medians, Speed - Lanes On and Under the Structure / Medians on Structure / Speed

Inventory > Features > Highway; BMS3: Features

Description:

This series of three fields is used to record the number of highway traffic lanes open to the public on or under the structure, the number of medians on the structure, and the actual or posted speed of the roadway.

Procedure:

Code the number of highway lanes being carried by the structure or under the structure.

Include all lanes carrying highway traffic (cars, trucks, buses) which are striped or otherwise operated as a full width traffic lane for the entire length of the structure or under the structure by the owning and/or maintaining authority. This includes any full width merge lanes and ramp lanes, and is independent of directionality of usage (i.e., a one lane bridge carrying two directional traffic is still considered to carry only one lane on the structure).

For each inventory route on the bridge, code the total number of lanes carried by all inventoried routes on the bridge.

For each inventory route under the bridge, code the number of lanes for that inventory route only.

When the inventory route is under the bridge, the obstruction over the inventory route may be other than a highway bridge (railroad, pedestrian, pipeline, etc.). Code "00" if there are no highway lanes on the obstructing structure. Any feature with Item 5C22 coded "NN", code Item 5C08 as "00" for that feature.

Code double deck bridges as 1 or 2 structures as noted in the examples. Either method is acceptable however, all related data must be compatible with the method selected.

Enter the number of medians in the roadway in Field 2. This item includes both mountable and non-mountable medians.

Enter the actual or posted speed of the roadway in Field 3. **This item will be automatically entered by the system for state routes inventoried in RMS.** For local and other routes, this item should be entered manually.

Coding:

Examples:

Field 1

1 lane on	1
3 lanes under	3
5 lanes on double deck each direction*	10
5 lanes on double deck each direction **	05
Railroad, pedestrian and/or private road on	00

Center turn lanes carried full length across a bridge shall be considered through traffic lanes for this item and considered accordingly for Item 4A10.

*Acceptable if coded as 1 bridge. However, other data (ADT, curb-to-curb width, etc.) must be for both decks.

**Acceptable if coded as 2 separate bridges. However other data (ADT, curb-to-curb width, etc.) must be for a single deck.

Field 2	Field 3
Number of Medians on structure	Actual or posted speed of roadway in mph.

5C09 ADT Class

Inventory > Features > Highway

Description:

This item is used to record the traffic volume class of the roadway.

Procedure:

Leave this item blank until the Department provides further clarification.

*5C10 Recent ADT - Recent Average Daily Traffic

Inventory > Features > Highway; BMS3: Features

Description:

This item is used to record the "current" average annual daily traffic volume.

Procedure:

This field is automatically filled in by the system if the feature integrates with RMS. For local and other routes, this item should be entered manually. If this information is not available, a best estimate is recommended.

Coding:

Number of vehicles per day.

*5C11 Year - Year of Average Daily Traffic

Inventory > Features > Highway; BMS3: Features

Description:

This item is used to record the "current" year of the ADT.

Procedure:

This field is automatically filled in by the system if the feature integrates with RMS. For local and other routes, this item should be entered manually.

Coding:

The 4-digit year of the average annual daily traffic.

*5C12 Future ADT - Future Average Daily Traffic

Inventory > Features > Highway

Description:

This item is used to record the forecasted average daily traffic (ADT) for the inventory route.

Procedure:

Future ADT shall be projected at least 17 years but no more than 22 years from the year data is submitted to the NBI. The intent is to provide a basis for a 20-year forecast. This item may be updated anytime, but must be updated when the forecast falls below the 17 year limit. If planning data is not available, use the best estimate based on site familiarity.

Future ADT must be compatible with other items coded for the bridge. For example, parallel bridges with an open median are coded as follows: if Items 5C08 and 5C27 are coded for each bridge separately, then future ADT must be coded for each bridge separately (not total for the route).

Coding:

The future average daily traffic, in vehicles per day.

*5C13 Year - Year of Future Average Daily Traffic

Inventory > Features > Highway

Description:

This item is used to record the year of the future ADT in Item 5C12.

Procedure:

The projected year of future ADT shall be at least 17 years but no more than 22 years from the year data is submitted to NBI.

Coding:

The 4-digit year of future average daily traffic.

*5C14 Truck % ADT - Average Daily Truck Traffic (Percent)

Inventory > Features > Highway; BMS3: Features

Description:

This is a 2-digit field used to indicate the percentage of ADT that is truck traffic.

Procedure:

This field is automatically filled in by the system if the feature integrates with RMS. For local and other routes, this item should be entered manually. If this information is not available an estimate which represents the average percentage for the category of road carried by the bridge may be used. Do not include vans, pickup trucks, and other light delivery trucks in this percentage. If the ADT is less than 100, leave this field blank.

Coding:

The percentage of ADT that is truck traffic.

*5C15 Detour Length - Bypass Detour Length

Inventory > Features > Highway

Description:

This item is used to code the availability of a ground level bypass at a bridge site or to record the length of a detour which would result from closing of the bridge to highway traffic.

Procedure:

If a ground level bypass is available at the bridge site for the route, enter "00" in both positions. Otherwise, enter the actual length to the nearest mile of the feasible detour to the nearest comparable structure. If the bridge is one of twin bridges not at an interchange, code "01" to indicate that the other twin bridge can be used as a temporary bypass. In the other cases, enter the actual length to the nearest mile of the detour length. This item must be entered.

The detour length should represent the total additional travel for a vehicle, which would result from closing of the bridge.

The factor to consider when determining if a bypass is available at the site is the potential for moving vehicles, including military vehicles, around the structure, particularly, when the structure is in an interchange. For instance, a bypass likely would be available in the case of diamond interchanges, interchanges with service roads available, or other interchanges where the positioning and layout of the ramps is such that they could be used without difficulty to get around the bridge.

The detour length also needs to evaluate restrictions on the detour route. The restrictions along the detour length should not be more restrictive then the original route. For example, if the original bridge being detoured is not restricted for weight, any bridges along the detour length should not be posted for weight. A similar review of vertical clearance restrictions beneath 14'-6" should also be evaluated.

The detour route selected should be of an equal or better classification of highway if possible, including any bridges located on the highway. Functional classification maps are available from PennDOT here:

https://www.penndot.pa.gov/ProjectAndPrograms/Planning/TrafficInformation/Pages/County-Functional-Class-Maps.aspx

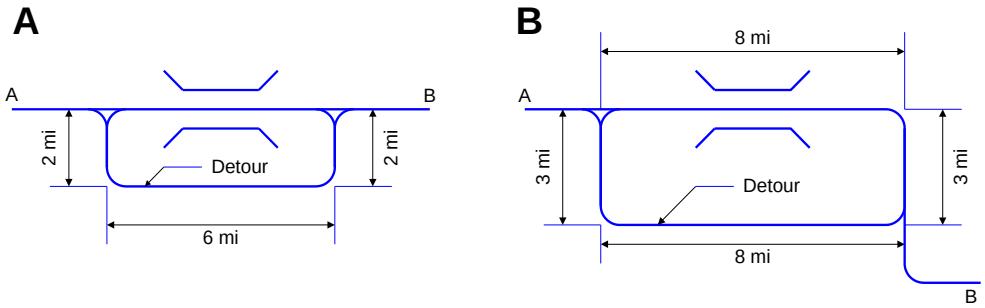
Enter this item for each ON feature of a bridge that carries highway traffic.

Coding:

0	Ground level bypass
1 - 98	Actual length of the detour route to the nearest mile
99	Detour length of 99 miles or more; or bridge on a dead-end road

Examples

Twin bridge used as a temporary bypass or additional travel length less than or equal to 1 mile.	1
Detour Figure A, 4 mile additional travel length.	4
Bridge over river, 121 mile additional travel.	99
Detour Figure B, 0 mile additional travel length.	0
Detour has 5.7 mile additional travel length.	6



More detailed examples of how to calculate the detour length are provided in Appendix M.

5C16 Speed - Detour Speed

Inventory > Features > Highway

Description:

This item is used to record the lowest posted speed of the detour route in miles per hour (mph).

Procedure:

Enter the posted speed of the detour route.

Coding:

Posted speed of detour route in mph.

5C17 Accident Cnt, Rate - Accident Count and Rate

Inventory > Features > Highway

Description:

This two-part item indicates the average annual accident count and rate of the roadway.

Procedure:

Enter the average annual accident count of the roadway in Field 1.

In Field 2, enter the average annual accident rate of the roadway per 100 million vehicle miles traveled (VMT).

Leave this item blank until the Department provides further clarification.

*5C18 Mile Pt - Mile Point

Inventory > Features > Highway

Description:

This item is used to record the location of the bridge along the inventory route.

Procedure:

The linear referencing system (LRS) mile point is used to establish the location of the bridge on the Base Highway Network (see Item 5C19). It must be from the same LRS Inventory Route and mile point system as reported in the Highway Performance Monitoring System (HPMS). The mile point coded in this item directly relates to Item 5C20.

This item must be coded for all structures located on or overpassing the Base Highway Network. Code a 7-digit number to represent the LRS mile point distance in miles to the nearest thousandth. For structures carrying the LRS Inventory Route, code the mile point at the beginning of the structure (i.e. the lowest mile point on the bridge). When the LRS Inventory Route goes under the structure (Item 5C03 coded 2 or A-Z), then code the mile point on the underpassing route where the structure is first encountered.

Coding:

Code all zeros in this field for all records where mile points are not provided. Mile points may be coded for bridges that are not located on the Base Highway Network, however Item 5C19 shall be coded 0 for these records.

*5C19 Nat Base Net - National Base Highway Network

Inventory > Features > Highway

Description:

This item indicates whether or not the inventory route is on the Base Network.

Procedure:

This field is automatically filled in by the system if the feature integrates with RMS. This item is to be coded for all records in the inventory. The Base Highway Network includes the through lane (mainline) portions of the NHS, rural/urban principal arterial system and rural minor arterial system. Ramps, frontage roads and other roadways are not included in the Base Network.

Coding:

0 Not on Base Highway Network
1 On Base Highway Network

*5C20 LRS Inventory Rte, Sub# - LRS Inventory Route and Subroute Number

Inventory > Features > Highway

Description:

This two-part item is used to record the inventory route and subroute numbers from the State's linear referencing system (LRS).

Procedure:

Leave this item blank. The Department submits this data to the FHWA based on traffic route information.

The LRS inventory route and subroute numbers to be reported in this item must correspond to the LRS inventory route and subroute numbers reported by the State for the HPMS. The LRS inventory route number is coded in the first field, while the subroute number, if it exists, is coded in the second field.

The LRS inventory route number can be alphanumeric but must not contain blanks. The LRS inventory route number is not necessarily the same as that posted along the roadway, but is a number used to uniquely identify a route within at least a county and perhaps throughout the State. The subroute number is a number that uniquely identifies portions of an inventory route sections where duplicate mile points occur. These subroute numbers, if they exist, are identified in the State's HPMS-LRS records.

*5C21 Toll Facility

Inventory > Features > Highway

Description:

This item indicates whether or not the bridge is a toll facility, and whether it carries a toll highway. Interstate toll segments under Secretarial Agreement (Section 105 of the 1978 Federal-Aid Highway Act) shall be identified separately.

Procedure:

This field is automatically filled in by the system if the feature integrates with RMS. Select the code from the dropdown list that describes the toll status of the bridge. Leave this item blank if not applicable, i.e., when the bridge carries facilities other than a highway.

Coding:

1	Toll Bridge – tolls are paid specifically to use the structure
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	On Free Road – the structure is toll free and carries a toll free highway
4	On Interstate Toll Segment Under Secretarial Agreement – structure functions as a part of the toll segment
5	Toll Bridge is a Segment Under Secretarial Agreement – structure is separate agreement from highway segment
N/A	Not Applicable

*5C22 Functional Class - Functional Classification

Inventory > Features > Highway; BMS3: Features

Description:

This item indicates the Functional Classification of the highway.

Procedure:

Select the code from the dropdown list that indicates the functional classification of the highway.

This field is automatically filled in by the system if the feature integrates with RMS. For local and other routes, this item should be entered manually.

For features other than a highway, such as a railroad, pedestrian, cattle crossing, etc., code "NN" for not applicable. Features should only be coded as "99-Ramp" if the feature is a 9XXX route. 8XXX series features take on the functional class of the feature they service.

Coding:

Rural		Urban	
01	Rural Interstate	11	Urban Interstate
02	Rural Other Principal	12	Urban Other Freeway/Expressway
03	Rural Other Freeway/Expressway	14	Urban Other Principal
06	Rural Minor Arterial	16	Urban Minor Arterial
07	Rural Major Collector	17	Urban Major Collector
08	Rural Minor Collector	18	Urban Minor Collector
09	Rural Local	19	Urban Local
NN	Other	NN	Other
99	Ramp	99	Ramp

*5C23 Traffic Direction

Inventory > Features > Highway

Description:

This item is used to indicate the direction of traffic of the route identified.

Procedure:

This field is automatically filled in by the system if the feature integrates with RMS. Select the code from the dropdown list which indicates the direction of traffic.

Coding:

0 Highway traffic not carried
1 1-way traffic
2 2-way traffic
3 One lane bridge for 2-way traffic

*5C24 Vertical - Vertical Clearance Over 10 Ft Width (Defense Highways)

Inventory > Features > Highway

Description:

This item is used to record the defense vertical clearance. The defense vertical clearance is defined as the maximum height a ten foot wide vehicle may be and still be able to pass along the feature being described.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Items 6C22 and 6C23. This item should not be changed, but the calculated value should be confirmed.

*5C25 Horiz - Total Horizontal Clearance

Inventory > Features > Highway

Description:

This item is used to record the total horizontal clearance for FEATURES which are identified as streets or highways.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Items 6C18 and 6C19. This item should not be changed, but the calculated value should be confirmed.

*5C26 Appr. Road - Width of Approach to the Bridge

Inventory > Features > Highway

Description:

This item is used to record the width of the roadway approaching the bridge.

Procedure:

The width is measured normal (perpendicular) to the centerline of the roadway approaching the structure. Usable roadway width will include the width of traffic lanes and the widths of shoulders where shoulders are defined as follows: shoulders must be constructed and normally maintained flush with the adjacent traffic lane, and must be structurally adequate for all weather and traffic conditions consistent with the

facility carried. Unstabilized grass or dirt, with no base course, flush with and beside the traffic lane is not to be considered a shoulder for this item.

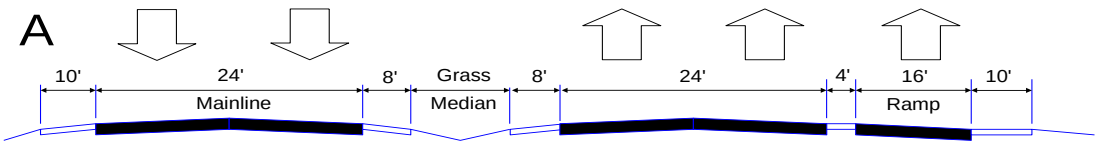
For structures with medians of any type and double decked structures, this item should be coded as the sum of the usable roadway width for the approach roadways (i.e., all median widths which do not qualify as shoulders should not be included in this dimension). When there is a variation between the approaches at either end of the structure, record and code the most restrictive of the approach conditions. This dimension should be taken at a location that is representative of the approach roadway and within 100 feet of the bridge.

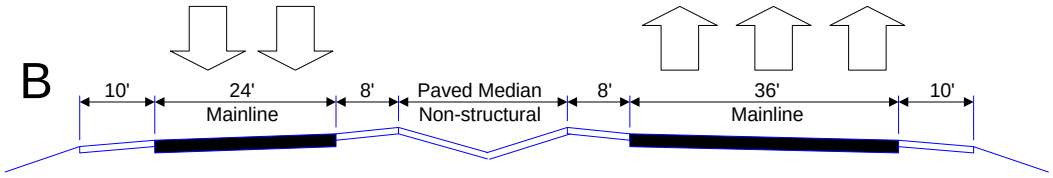
Coding:

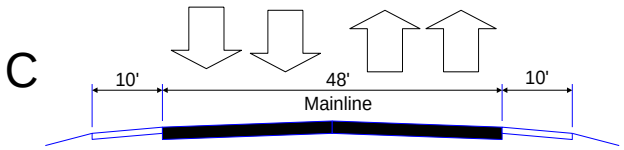
Width of roadway approach to the bridge, to the nearest foot.

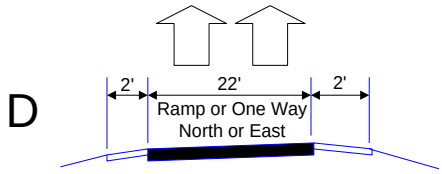
Example:

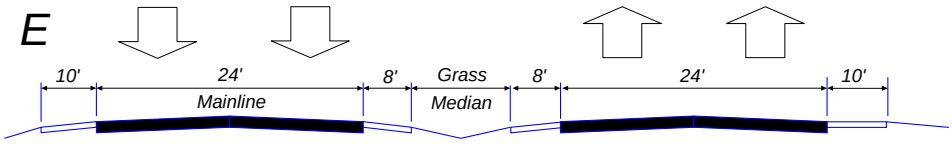
	Left Shoulder	Left Roadway	Median	Right Roadway	Right Shoulder	Code
A	10.0	24	16	44	10.0	104
B	10.0	24	16	36	10.0	096
C	10.0	----	----	48	10.0	068
D	2.0	----	----	22	2.0	026
E	10.0	24	16	24	10.0	084



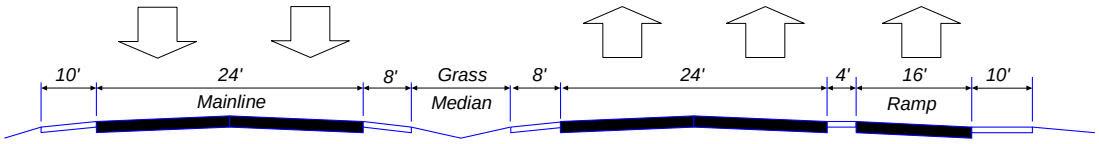








Near Approach for Example E
(more restrictive than Far Approach)



Far Approach for Example E

Regardless of whether the median is open or closed, the data coded must be compatible with other related route and bridge data (i.e., if Item 5C27 is coded for traffic in one direction only, then Items 5C26, 5C10, 5C08, etc., must be for traffic in one direction only.) For "Left" and "Right" designations, refer to the Definitions Section. If a ramp is adjacent to the through lanes approaching the structure, include in the approach roadway width.

*5C27 Brdg Rdwy Width (C/C) - Bridge Roadway Width, Curb to Curb

Inventory > Features > Highway; BMS3: Deck

Description:

This item is used to record the width between curbs or rails of the bridge roadway.

Procedure:

Enter the most restrictive minimum distance between curbs or rails on the bridge roadway. 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 structures (Raised or non-mountable medians, open medians, and barrier widths are to be excluded from the summation along with barrier-protected bicycle and equestrian lanes, however mountable medians should be included in the curb-to-curb measurement). The data recorded for this item must be comparable with other related route and bridge data (i.e., Items 5C26, 5C10, 5A19, etc.). The measurement should be exclusive of flared areas for ramps. The distance should be recorded to the nearest tenth of a foot. See coding examples below.

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

Where the roadway is on fill carried across a structure and the headwalls or parapets do not affect the flow of traffic, code "0000". This is considered proper in as much as a filled section simply maintains the roadway cross-section. See sketches following Item 5B05.

Coding:

Curb to curb width to the nearest tenth foot.

Examples:

Bridge Roadway Width		
66.37' wide	66.4	
110.13' wide	110.1	(Figure A below with non-mountable median)
114.63′ wide	114.6	(Figure B below with mountable median)

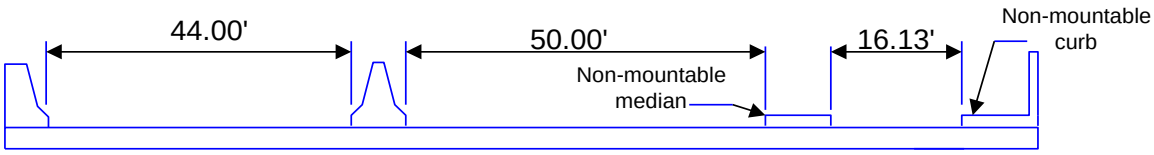


Figure A – Non-mountable median

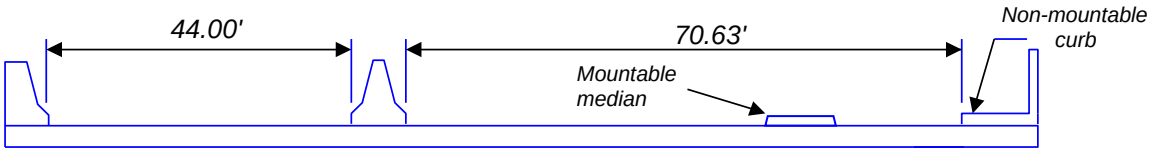


Figure B – Mountable median

*5C28 Defense Hwy - Defense Highway Designation

Inventory > Features > Highway

Description:

This item is used to indicate strategic highway network (STRAHNET) conditions.

Procedure:

This field is <u>automatically filled in by the system</u> if the feature integrates with RMS. For the inventory route, use the codes below. For the purposes of this item, the STRAHNET Connectors are considered included in the term STRAHNET.

Coding:

0	The inventory route is not a STRAHNET route.
1	The inventory route is a STRAHNET route.
2	The inventory route is a STRAHNET route that goes over or under a STRAHNET route.
3	The Inventory route is on a STRAHNET connector route.

*5C29 Nat. Hwy Sys - National Highway System

Inventory > Features > Highway; BMS3: Features

Description:

This item indicates the National Highway System (NHS) of the inventory route.

Procedure:

This field is automatically filled in by the system if the feature integrates with RMS. For local and other routes, this item should be entered manually.

Coding:

0 The inventory route **is not** on the National Highway System
1 The inventory route **is** on the National Highway System

5C30 SB - School Bus Route

Inventory > Features > Highway

Description:

This checkbox field indicates whether or not the roadway is used by school buses.

Procedure:

If the roadway is used by school buses, the box should be checked. If the roadway is not used by school buses, the box should be unchecked.

Coding:

Unchecked	The roadway is not used by school buses
Checked	The roadway is used by school buses

*5C31 Fed Lands Hwy - Federal Lands Highway

Inventory > Features > Highway

Description:

This item indicates what type of federal land, if any, the inventory route leads to and traverses through.

Procedure:

Structures owned by State and local jurisdictions on roads which lead to and traverse through federal lands sometimes require special coded unique identification because they are eligible to receive funding from the Federal Lands Highway Program.

Coding:

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

5C32 Trans - Transit Bus Route

Inventory > Features > Highway

Description:

This checkbox field indicates whether or not the roadway is used by public transit such as local or long distance scheduled buses or trolleys, etc.

Procedure:

If the roadway is used by public transit, the box should be checked. If the roadway is not used by public transit, the box should be unchecked.

Coding:

Unchecked	The roadway is not used by public transit
Checked	The roadway is used by public transit

*5C33 Nat. Truck Network - National Truck Network

Inventory > Features > Highway

Description:

This item is used to indicate whether or not the route is part of the national network for trucks. The national network for trucks includes most of the interstate system and those portions of the Federal-Aid Primary System 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 dimension and configurations described in these regulations.

Procedure:

This field is automatically filled in by the system if the feature integrates with RMS. For the route being described, indicate whether or not the route is part of the National Truck Network by using the codes below.

Coding:

0	The inventory route **is not** part of the national network for trucks
1	The inventory route **is** part of the national network for trucks

5C34 Emer – Emergency Route Indicator

Inventory > Features > Highway

Description:

This checkbox field indicates whether or not the roadway is on a critical travel route.

Procedure:

If the roadway is on a critical travel route, the box should be checked. If the roadway is not on a critical travel route, the box should be unchecked.

Coding:

Unchecked	The roadway is not on a critical travel route
Checked	The roadway is on a critical travel route

5C35 RMS Roadway BPN

Inventory > Features > Highway

Description:

This item indicates the BPN for each roadway feature that integrates with RMS.

Procedure:

For routes that integrate with RMS, the "RMS Roadway BPN" designation is **automatically filled in by the system** based on information obtained from RMS.

Coding:

1	Interstate Routes
2	Other NHS Routes (Non-Interstate)
3	Non-NHS Routes with ADT ≥ 2000
4	Other Non-NHS Routes
Blank	The roadway feature does not integrate with RMS

5C36 Adjoining Feature

Inventory > Features > Highway

Description:

This dropdown box is used to identify adjoining features that change route number beneath an overhead structure. The field will only appear on "under" features as coded in Item 5C03.

Procedure:

If the roadway changes route numbers beneath an overhead bridge, select the adjoining feature from the drop down list. Only under features as indicated in Item 5C03 will be listed in the drop down menu. A route can only be joined within one other route. The purpose of this field is to ensure the proper calculation of number of lanes under in Item 5A19.

Coding:

Adjoining Feature from available entries.

5C37 (Not Used – Reserved for Future Use)

5C38 (Not Used – Reserved for Future Use)

5C39 (Not Used – Reserved for Future Use)

5D Inspection Inventory - Structure Units

The Inspection Inventory - Structure Units Section describes the structure units of the selected structure.

Structure units serve multiple purposes:

- Bridge elements must be assigned to a structure unit.
- Structure units must be defined for substructure units so that underwater inspection data may be recorded.
- APRAS span ID.

5D01 Unit Key

Inventory > Structure Units; BMS3: General

Description:

This display only item indicates the structure unit key for the unit.

Procedure:

This item is **automatically filled in and used internally by the system** and requires no input from the bridge inspector.

5D02 Unit ID - Structure Unit ID

Inventory > Structure Units > Span Detail; BMS3: General, Elements and Maintenance

Description:

This item is used to record the identification number of the structure unit.

Procedure:

Enter the ID for the structure unit. Each span of the structure should be coded as an individual structure unit so that the structure unit ID corresponds to the span number. Each substructure unit (e.g. abutment, pier, culvert, etc…) shall be entered as a structure unit so that they may appear on the Inspection Underwater screen.

Use abutment and pier codes for single and multi-cell culverts without floors (Item 6A29 = 30 or 32). Use culvert in and culvert (CIN and COU) coding for culverts with a bottom (Item 6A29 = 31, 33, 34, or 35). Additional coding guidance is provided in the coding of Item 6A29.

Coding:

When Item 5D04 is equal to "A - Approach" or "M - Main" enter the Span number. This includes signs and wall structures.

When Item 5D04 is equal to "B - Abutment" enter one of the following:

NAB	Near Abutment
FAB	Far Abutment

When Item 5D04 is equal to "W - Wingwall" enter one of the following:

WNL	Wingwall, Near Left
WNR	Wingwall, Near Right
WFL	Wingwall, Far Left
WFR	Wingwall, Far Right

When Item 5D04 is equal to "C - Culvert" enter one of the following:
CIN Culvert Inlet
COU Culvert Outlet

When Item 5D04 is equal to "P - Pier" enter the Pier number as follows:
P01-P99 Number of Pier

When Item 5D04 is equal to "O - Other" enter one of the following or leave blank:
Misc Miscellaneous or Other Structures

When Item 5D04 is equal to "N - Panel" enter the bore number or panel description for the tunnel:
Main Main Panel
1 Panel 1

When Item 5D04 is equal to "R - Portal" enter the portal description that describes the location of the portal relative to the tunnel:
East East Portal
North North Portal

When Item 5D04 is equal to "S - Shaft" enter the shaft number for the tunnel as follows:
S01-S99 Number of Shaft

When Item 5D04 is equal to "Z – Functional System" enter the word “Systems” to capture the over tunnel unit that captures all the systems within the tunnel. Only “Z” unit should exist per tunnel.

5D03 Structure Unit Description

Inventory > Structure Units > Span Detail; BMS3: General, Elements and Maintenance

Description:

This item is used to record a narrative description of the structure unit.

Procedure:

Enter a narrative description of the structure unit.

Examples:
"Main Span", "Approach Span"

5D04 Type - Structure Unit Type

Inventory > Structure Units > Span Detail; BMS3: General and Elements

Description:

This item is used to indicate the type of structure unit.

Procedure:

Select the appropriate structure unit type from the dropdown list. All structures carrying a highway must have at least one “M – Main Span”. This includes culverts. Otherwise, elements cannot be entered and evaluated on the given structure. When a structure is created, this unit is automatically created.

Coding:

M	Main Span - This coding will include all spans for most bridges, the main units of a sizeable structure or a change of material or the design methodology different from the approach spans. This coding should also be used for signs and wall structures.
A	Approach Span - This coding will include secondary spans which differ from the main span(s) in material or design.
B	Abutment – This coding is for the Near and Far Abutments.
C	Culvert – This coding is for Culvert In (CIN) and Culvert Out (COU).
F	Frame (No longer used; use "O – Other" in it's place)
O	Other – The Other structure unit shall only be used when none of the previously mentioned structure units apply. This coding should be used sparingly.
N	Panel – This coding is used to describe the panels within a tunnel.
P	Pier – Piers need to be defined in order to be included in Item IN01 for selection.
R	Portal – This coding is used to describe the portals at either end of a tunnel structure.
S	Shaft – This coding is used to describe vertical ventilation shafts within a tunnel.
W	Wingwall – Wingwalls need to be defined as structure units if they are to be included in the dropdown menu for Item IN01.
X	APRAS Span (No longer used; APRAS data should be migrated to the Main or Approach span being analyzed).
Z	Functional System – This item is used to capture all of the functional systems at a bridge. Only one, Z-type structure unit will exist per tunnel.
Blank	Not Applicable

5D05 Default Bridge Unit - Default Bridge Unit Indicator

Inventory > Structure Units > Span Detail

Description:

This checkbox field is used to indicate that the current structure unit will be the default structure unit for the structure.

Procedure:

Check or uncheck the box to indicate if the current structure unit should or should not be the default structure unit for the structure. Only one structure unit may be selected as the Default Bridge Unit at any time. When creating new bridge elements in sections 1A and 1B, the new elements will be automatically assigned to the Structure Unit that has the Default Bridge Indicator checked if Item 1B02 is left blank. Ensure that the appropriate structure unit is selected as the Default Bridge Unit. New elements should only be assigned to Main and Approach Span structure units.

Coding:

Unchecked	The current structure unit is not the default structure unit
Checked	The current structure unit is the default structure unit

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5E Inspection Inventory - Classification

The Inspection Inventory – Classification Section describes the bridge classification and allows user defined fields for the Agency.

*5E01 NBIS Bridge Len - NBIS Bridge Length

Inventory > Structure Home; BMS3: General

Description:

This item indicates whether the structure meets or exceeds the minimum length specified to be designated as a bridge for National Bridge Inspection Standards *NBIS purposes. The following definition of a bridge is used by AASHTO and is given in the NBIS, 23 CFR 650.305:

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

This field can also be used to identify structures not applicable for the NBI submittal list. For example, structures with a service type on (Item 5A17) of 2 – Railroad, 3 – Pedestrian, H – High Mast Light, N – Noise Wall, R – Retaining Wall, S – Sign Structure or T – Tunnel should be coded as not meeting the NBIS length, regardless of their structure length. This field should also be coded as "N" for structures with a structural configuration (Item 6A29) = 29 – Tunnel.

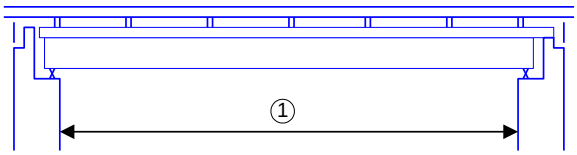
Note:
The NBIS length is not necessarily the same length as the structure length (Item 5B18).

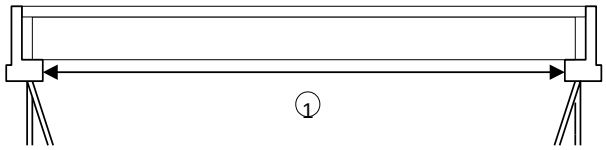
Procedure:

Select the appropriate code from below based on the above definition and the sketches below.

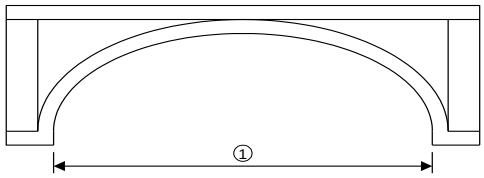
Coding:

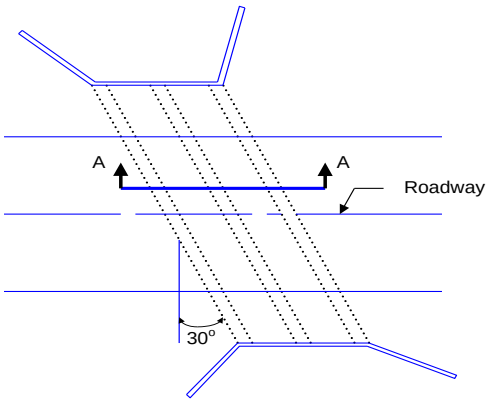
Y Yes, the structure meets or exceeds the minimum NBIS length.
N No, the structure does not meet the minimum NBIS length and/or does not qualify for the NBI submittal.

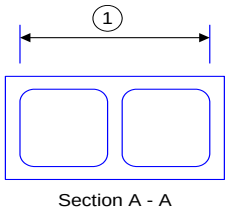




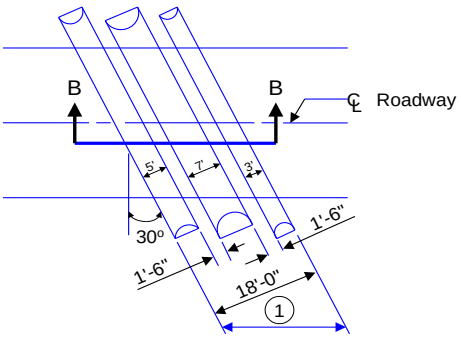
Additional sketches provided on the following page

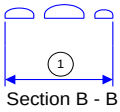






1 - NBIS Structure Length





$$\text{Structure Length} = \frac{18'}{\cos 30^{o}}$$

*5E02 Parallel Structure

Inventory > Structure Home

Description:

This item is used 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.

Procedure:

Select the appropriate code from the dropdown list.

Coding:

R	The right structure of parallel bridges carrying the roadway in the direction of the inventory.
L	The left structure of parallel bridges. This structure carries traffic in the opposite direction.
N	No parallel structure exists.

*5E03 Temporary Structure or Conditions

Inventory > Structure Home; BMS3: General

Description:

This item indicates situations where temporary structures or conditions exist.

Procedure:

Temporary structures 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:

1. Bridges shored up, including additional temporary supports.
2. Temporary repairs made to keep a bridge open.
3. Temporary structures, temporary runarounds or by-passes.*
4. Other temporary measures, such as barricaded traffic lanes to keep a bridge open.

Any repaired structure or replacement structure which is expected to remain in place without further project activity, other than maintenance, for a significant period of time (e.g. greater than 6 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.

*Following the guidance contained within the 2022 NBIS, temporary structures should be inventoried and inspected under their own unique BRKEY. Refer to Section 2.14.2 for additional guidance.

Coding:

T	Temporary structure(s) or conditions exist
Blank	Not Applicable

If the 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 conditions:

5C27	Bridge Roadway Width
4A19/4A20	Minimum Lateral Underclearance on the Left and Right
6C18/6C19	Inventory Route, Total Horizontal Clearance for Left and Right Roadways
6C20/6C21	Inventory Route, Minimum Vertical Clearance for Left and Right Roadways
VP02	Structure Open, Posted, or Closed to Traffic
VP03	Special Restrictive Posting (if applicable)
VP04	Posted Load Limits (if applicable)
VP01	Date Bridge Was Posted
VP06	Reason for Posting or Closing the Bridge
4B03	Bridge Capacity Appraisal
4A10	Deck Geometry (dependent on Item 5C27)

*5E04 Hist Significance - Historical Significance

Inventory > Structure Home; BMS3: General

Description:

This item is used to indicate the historical significance of the bridge and involves a variety of characteristics: the bridge may be a particularly unique example of the history of engineering; the crossing itself might be significant; the bridge might be associated with a historical property or area; or historical significance could be derived from the fact that the bridge was associated with significant events or circumstances.

Procedure:

This field is automatically filled in by the system if the structure integrates with CRGIS and will be displayed as a read-only value. If the structure does not integrate with CRGIS, the field will be editable and should be coded as follows:

Coding:

1	Bridge is on the National Register of Historic Places.
2	Bridge is eligible for National Register of Historic Places.
3	Bridge is possibly eligible for the National Register of Historic Places (requires further investigation before determination can be made) or bridge is on a state or local historical register.
4	Historical significance is not determinable at this time.
5	Bridge is not eligible for the National Register of Historic Places.
6	Bridge superstructure has been removed or replaced.

5E05 SHPO Key Number – State Historic Preservation Office Key Number

Inventory > Structure Home

Description:

This display only item indicates the 6-digit SHPO (State Historic Preservation Office) Key Number of the record stored in CRGIS.

Procedure:

This field is automatically filled in by the system only if the structure integrates with CRGIS.

Coding:

#######	Six-digit number if the structure integrates with CRGIS
Not in CRGIS	Displayed when the structure is not integrating with CRGIS

5E06 to 5E09 (Not Used – Reserved for Future Use)

5E10 ACM Status - Asbestos Containing Material (ACM) Status

Inventory > Structure Home

Description:

This item is used to indicate the status of the ACM evaluation.

Procedure:

Enter the appropriate code.

Coding:

A	No ACM contained, or ACM found is below threshold values (Highway bridges > 20', owned by the Department and locals)
B	ACM content is unknown and investigation is needed
C	Investigations are complete and ACM is present on bridge (may be greater than or less than threshold values)
M	Miscellaneous structures (walls, sign structures, etc.) excluded from ACM evaluation
X	Structures excluded from ACM evaluations (Non-NBIS bridges and bridges < 20')
Z	Other NBIS bridges > 20' owned by toll facilities and other agencies
?	New bridges or highway bridges whose NBIS statuses are unknown

5E11 IR - ACM Inspections Required

Inventory > Structure Home

Description:

This item is used to indicate the number of ACM inspections required.

Procedure:

Enter the number of locations on the bridge (e.g. occupancies, railroad spans) that require ACM inspections.

Coding:

Number of ACM inspections required.

5E12 IC - ACM Inspections Completed

Inventory > Structure Home

Description:

This item is used to indicate the number of ACM inspections that have been completed.

Procedure:

Enter the number of locations on the bridge where the required ACM inspections are completed.

Coding:

Number of ACM inspections completed.

5E13 ACM Insp Date - ACM Inspection Date

Inventory > Structure Home

Description:

This item is used to indicate the date of the last completed ACM inspection, regardless of findings.

Procedure:

Enter the date of the last completed ACM inspection.

Coding:

Enter the month, day, and year in the following format: MM/DD/YYYY

5E14 ACM Qty - ACM Quantity

Inventory > Structure Home

Description:

This item is used to indicate the quantity of ACM on the structure.

Procedure:

Enter the appropriate code for the quantity of ACM based on the inspection findings.

Coding:

>THRES	ACM inspection determined 1 or more locations have ACM > threshold values
<THRES	ACM inspection determined all locations have ACM < threshold values

NO_ACM	No ACM used in bridge or components
UNKNWN	Required ACM inspection not completed
ZZZZZZ	Structure not evaluated through ACM effort

5E15 ACM Num Loc - ACM Number of Locations

Inventory > Structure Home

Description:

This item is used to indicate the number of locations where ACM may be present.

Procedure:

Initially, enter the number of locations where ACM may be present. During investigations, the number should indicate the locations where inspections are incomplete or have ACM > threshold. After ACM investigations are complete, record only the number of locations ACM exceeds threshold values.

5E16 & 5E17 ACM Loc Desc 1 & 2 - ACM Location Descriptions

Inventory > Structure Home

Description:

This field is used to indicate the locations where ACM may be present.

Procedure:

Initially, enter the name of locations (occupancies, bridge components) where ACM may be present. After ACM investigations are complete, record only the locations where ACM exceeds threshold values. This should match data in Item 5E15.

5E18 - 5E21 (Not Used – Reserved for Future Use)

These fields are no longer editable in BMS2. However, some Districts stored data in these fields and the data is available via a query.

5E22 - 5E23 P3 Information

Refer to Appendix N for the coding of these new fields until the next edition of Publication 100A is released.

5E24 Bridge Group

Inventory > Structure Home

Description:

This item identifies structures that are a part of a specific group of bridges, such as the P3 project. These groups will be added at the discretion of the BMS2 Manager.

Procedure:

Select the appropriate code from the dropdown list.

Coding:

P3	Structure is part of the P3 replacement project

6A Agency Bridge

The Agency Bridge Section contains general identification and structural characteristic information for a bridge. Information should be entered for each bridge being inventoried. Not all items are applicable to all structures in the database; the items that are not applicable should be left blank.

Agency ID

Inventory > Agency Bridge

Description:

This field allows local and agency owners to uniquely identify a structure using their own identifier.

Procedure:

Enter a unique name to identify the bridge. For example, "County Bridge #68".

Coding:

A narrative description of the local or agency owner unique name for the structure. This is an optional field as not all owners use a unique name for each structure other than the BRKEY or BMS ID.

6A01 Senat Dist - State Senatorial District

Inventory > Agency Bridge

Description:

This two-part item specifies the Senatorial District Number for the bridge.

Procedure:

This item will be automatically entered by the system for state routes based on data that it obtains from RMS. For local and other routes, this item should be entered manually.

Coding:

Senatorial District Number assigned to the geographic area in which the bridge resides. For bridges that cross District borders, both District codes will be displayed (one in each item). For local bridges or to confirm state bridge information, users can find the State Senatorial District at http://www.legis.state.pa.us/.

6A02 Cong Dist - United States Congressional District

Inventory > Agency Bridge

Description:

This two-part item specifies the United States Congressional District Number assigned to the geographic area in which the bridge resides.

Procedure:

This item will be automatically entered by the system for state routes based on data that it obtains from RMS. For local and other routes, this item should be entered manually.

Coding:

United States Congressional District Number assigned to the geographic area in which the bridge resides. For bridges that cross District borders, both District codes are displayed (one in each field). For local bridges or to confirm state bridge information, users can find the United State Congressional District at http://www.house.gov/.

6A03 Leg Dist - Legislative District

Inventory > Agency Bridge

Description:

This two-part item specifies the Legislative District Number for the bridge.

Procedure:

This item will be automatically entered by the system for state routes based on data that it obtains from RMS. For local and other routes, this item should be entered manually.

Coding:

Legislative District Number assigned to the geographic area in which the bridge resides. For bridges that cross District borders, both District codes are displayed (one in each field). For local bridges or to confirm state bridge information, users can find the Legislative District at http://www.legis.state.pa.us/.

6A04 Bndy – State, County, or Municipal Boundary Intersecting Bridge

Inventory > Agency Bridge

Description:

This item is used to record the county or municipal boundary that intersects the bridge.

Procedure:

Select the code that describes the highest type of political boundary that intersects the bridge. The coding is arranged in order of decreasing hierarchy.

Coding:

1	State line	4	City or Boro line
2	County Engineering District line	5	Township line
3	County line with District	N	None of the above

6A05 Util Present - Utilities Present on the Structure

Inventory > Agency Bridge

Description:

This checkbox field indicates whether or not utilities are present on the structure.

Procedure:

If there are utilities present on the structure, the box should be checked to indicate "yes". If there are no utilities present on the structure, the box should be unchecked to indicate "no".

Coding:

Unchecked	No utilities present on structure
Checked	Utilities are present on structure

6A06 Sub Agncy - Agency Submitting Structure Inventory Record

Inventory > Agency Bridge; BMS3: General

Description:

This item identifies the agency responsible for preparing and submitting the Structure Inventory Record.

Procedure:

Select the appropriate code from the dropdown list.

Coding:

D + 2 digit district number	Department District Office
0 (zero) + 2 digit county code	County, see Item 5A01
3 digit local county subdivision code	City/Borough/Township, see Item 5A06
P + 2 digit railroad number	Railroad, see Item FR01

PTC	Pennsylvania Turnpike Commission	PHMC	PA Historical and Museum Commission
DRC	Delaware River Joint Toll Bridge Commission	PSU	Pennsylvania State University
DPA	Delaware River Port Authority		
BBC	Burlington County Bridge Commission	OSA	Other State Agency (not defined above)
DCNR	PA Department of Conservation and Natural Resources	NJS	New Jersey DOT
		NYS	New York DOT
DGS	PA Department of General Services	FHW	Federal Agency
DOE	PA Department of Education	OPA	Other Private Agency
DOH	PA Department of Health	OTH	Other Agency
DHS	PA Department of Human Services		
DMVA	PA Department of Military and Veteran Affairs		

6A07 Fed Fund - Federal Funding Code

Inventory > Agency Bridge

Description:

This item indicates whether or not a bridge was built or reconstructed with federal funds.

Procedure:

If the bridge was built or reconstructed with federal funds, select the code “1”. If no federal funds were used, code “0” (zero) for not applicable.

Coding:

0 No Federal Funding
1 Federal Funding

6A08 (Not Used - Reserved for Future Use)

6A09 Critical Facility

Inventory > Agency Bridge

Description:

This checkbox field indicates whether or not the bridge is a critical facility.

Procedure:

A structure on a designated defense highway is considered to be a critical facility, which is defined in Title 23 CFR Part 470.

Coding:

Checked	Bridge is a critical facility
Unchecked	Bridge is not a critical facility

6A10 Flood Insp - Flood Inspection

Inventory > Agency Bridge

Description:

This checkbox field is used to identify structures that shall be inspected after heavy rainfall or flooding occurs.

Procedure:

Check or uncheck box to indicate the appropriate code.

Coding:

Checked	Yes, the structure should be inspected shortly after a heavy rainfall or flooding.
Unchecked	No, there is no immediate need to perform special inspection due to heavy rain or flooding.

Notes:

Item 4A08 can be used to help code this item.

Box should be unchecked if Item 4A08 is N, 9, 8, 7, or 5.

Box should be checked if Item 4A08 is 4, 3, 2, or 1.

Use judgment if Item 4A08 is coded “6”, taking into consideration Items IN13 and IN03.

6A11 Covered Bridge - Covered Bridge Indicator

Inventory > Agency Bridge

Description:

This checkbox field indicates whether or not the bridge is a covered timber bridge that carries vehicular traffic.

Procedure:

Check or uncheck box to indicate the appropriate code.

Coding:

Checked	Yes, the bridge is a covered timber bridge and carries vehicular traffic.
Unchecked	No, the bridge is not a covered timber bridge or does not carry vehicular traffic.

6A12 Dem/Repl Ind – Demolished / Replaced Indicator

Inventory > Agency Bridge

Description:

This checkbox field indicates whether or not the bridge was demolished/replaced.

Procedure:

This box is **automatically checked by the system** if the posting status (Item VP02) is set to "X – Demol/Replaced". Check or uncheck box to indicate the appropriate code. This item must be checked for a bridge that has been demolished/replaced.

Coding:

Checked	Bridge has been demolished/replaced
Unchecked	Bridge has not been demolished/replaced

6A13 Dem/Repl Dt – Demolished / Replaced Date

Inventory > Agency Bridge

Description:

This item is used to record the date on which the bridge was demolished/replaced.

Procedure:

This date is **automatically entered by the system** if the posting status (Item VP02) is set to "X - Demol/Replaced". Enter the date on which the bridge was demolished/replaced.

Coding:

Date in MM/DD/YYYY format:

MM	2 digit month
DD	2 digit day of month
YYYY	4 digit year
00/00/0000	Not applicable

6A14 Hist Dist Cont - Historic District Contribution Indicator

Inventory > Agency Bridge

Description:

This checkbox field indicates whether or not the structure contributes to the Historic District for planning purposes.

Procedure:

Check or uncheck box to indicate the appropriate code.

FHWA and EQAD determine eligibility. Eligibility is different for individual historic bridges than for those in Historic Districts. This field cannot be Yes (checked) if the historic district name is unknown or N/A.

Coding:

Checked	Yes, the structure contributes to the Historic District
Unchecked	No, the structure does not contribute to the Historic District

6A15 Hist Dist - Historic District

Inventory > Agency Bridge

Description:

This item is used to record the name of the Historic District in which the structure is located.

Procedure:

Enter the name of the Historic District.

Coding:

Name of Historic District.

Unknown	Structure is located within a Historic District, but District name is unknown.
N/A	Structure is not located within a Historic District.

6A16 Preserv Candidate - Preservation Candidate Indicator

Inventory > Agency Bridge

Description:

This checkbox field indicates whether or not the structure is a candidate for Preservation.

Procedure:

Check or uncheck box to indicate the appropriate code.

Coding:

Checked	Yes, the bridge is a candidate for Preservation
Unchecked	No, the bridge is not a candidate for Preservation

6A17 Future Bridge Bill - Future Bridge Bill Candidate Indicator

Inventory > Agency Bridge

Description:

This checkbox field indicates whether or not the structure is a future bill candidate.

Procedure:

Check or uncheck box to indicate the appropriate code.

Coding:

Checked	Yes, the bridge is a future bill candidate
Unchecked	No, the bridge is not a future bill candidate

6A18 (Not Used – Reserved for Future Use)

6A19 Bus Plan Ntk - Business Plan Network

Inventory > Agency Bridge; BMS3: General

Description:

This item indicates the Business Plan Network of the structure.

Procedure:

For bridges that have an on feature that integrates with RMS, this item will be **automatically filled in by the system** based on the highest Roadway BPN level (Item 5C25) of all "on" features that integrate with RMS.

For bridges that do not have any on features that integrate with RMS, select the code form the dropdown list that indicates the highest BPN level of all on features.

For structures with Item 5A17 coded as H, N, R, or S, Item 6A19 will automatically be set to a coding of "N".

Note: For ramps that service the Interstate, Item 6A19 is to be coded a "2" instead of a "1". While the functional classification (Item 5C22) and the national highway system indicator (Item 5C29) fields for ramps reflect the higher level of roadway for which the ramp serves, this is not the case for the BPN item. BPN was established and defined by PennDOT to maintain various networks to different performance levels.

Coding:

1	Interstate Routes
2	Other NHS Routes (Non-Interstate)
3	Non-NHS Routes with ADT ≥ 2000
4	Other Non-NHS Routes
D	DCNR Bridges
H	Local network (NHS)
L	Local network (Non-NHS)
N	Signs, Walls, Lights, and RR
T	Turnpike

6A20 Watershed - Watershed Name

Inventory > Agency Bridge

Description:

This item is used to record the name of the watershed within which the structure is located.
This item is reserved for future use.

Procedure:

N/A

Coding:

Reserved for Future Use

6A21 De-Ice Equip - Deicing Equipment Installed

Inventory > Agency Bridge

Description:

This item is used to code any deicing equipment installed on the structure.

Procedure:

Select the type of deicing equipment installed on the structure.

Coding:

F FAST (Fixed Automated Spray Technology)
N Not Applicable

6A22 Corridor

Inventory > Agency Bridge

Description:

This item is used to record the corridor within which the structure is located.
This item is reserved for future use.

Procedure:

N/A

Coding:

Reserved for Future Use

*6A23 Owner Desc - Owner Description

Inventory > Agency Bridge; BMS3: General

Description:

This item is used to record the owner or principal custodian of the bridge in a narrative form.

Procedure:

Enter the name of the owner or principal custodian of the bridge. In the absence of a clear designation of ownership, enter the name of principal custodian, the agency responsible for maintaining the structure. (Agency maintaining only the roadway surface, curbs, sidewalks, and/or railings of similar minor items should not be considered as principal agency).

Coding:

A narrative description of the owner or principal custodians of the bridge. The description should include all owners/principal custodians listed in declining order of magnitude of ownership.

6A24 Trnback Desc - Turnback Description

Inventory > Agency Bridge

Description:

This item is used to describe the turnback of the state-owned structure to a local owner, or a locally owned structure to the Department.

Procedure:

Enter a description of the turnback of the structure.

Coding:

Enter a narrative description of the turnback. Notes such as the date of the turnback, the municipality, and any other pertinent information should be entered here.

6A25 (Not Used – Reserved for Future Use)

*6A26 Material - Material Used for Main Unit, Approach Unit, Sign Structure, and Walls (Department)

Inventory > Agency Bridge; BMS3: General and NSTM/Fatigue

Description:

This two-part item is used to indicate the kind of material used for the main load carrying members for the main unit and approach unit of bridges and culverts. Material used for sign structure and walls shall be coded in the main unit field only.

Procedure:

Select the material type for each unit from the dropdown list. The main unit applies to all spans of most bridges, to the major unit of sizable structures or to a unit of material or design different from that of the approach spans.

For sign structures and walls, select the appropriate material type from the dropdown list. The materials codes for sign structures and walls are the same as for bridges.

Coding:

Main Members are any primary load carrying members that span between substructure supports.

1 Steel
2 Concrete (cast in place)
3 Concrete (precast)
4 Prestressed precast concrete (P/S)
5 Timber
6 Masonry
7 Aluminum, wrought iron, cast iron
8 Concrete encased steel [1]
9 Other

[1] Not gunite or shotcrete

6A27 Physical - Physical Makeup of Primary Load Carrying Members for Main Unit, Approach Unit, Sign Structure, and Walls (Department)

Inventory > Agency Bridge; BMS3: General and NSTM/Fatigue

Description:

This two-part item is used to indicate the physical makeup of the primary load carrying members (when appropriate, or subcomponents of a major bridge) for the main unit and approach unit. The physical makeup of sign structures and walls shall be coded in the main unit field only.

Procedure:

Select the code for the physical makeup of the primary load carrying members for each unit from the dropdown list. The main unit applies to all spans of most bridges, to the major unit of sizable structures or to a unit of material or design different from that of the approach spans. For sign structures and walls, select "9 – Other" from the dropdown list.

Coding:

Primary Load Carrying Members are any bridge members that receive vehicular live load.
Secondary Members are bridge members that do not receive vehicular live load.
Subcomponent Members include all primary load carrying members that are not main members.

0	Unreinforced concrete	5	Combination, 2 to 4 above [1]
1	Reinforced	6	Rolled sections (used as stringers or main members)
2	Pretensioned	7	Rolled sections with cover plates (used as stringers or main members)
3	Post-tensioned	8	Combination, 6 and 7
4	Pre/post-tensioned	9	Other or none of the above

[1] Consider different designs within one span

*6A28 Span Interact - Type of Span Interaction for Main Unit, Approach Unit, Sign Structure, and Walls (Department)

Inventory > Agency Bridge; BMS3: General and NSTM/Fatigue

Description:

This two-part item is used to indicate whether or not there is composite action and continuity for the main unit, approach unit, sign structure and walls.

Procedure:

Select the code for the span interaction for each unit from the dropdown list. The main unit applies to all spans of most bridges, to the major unit of sizable structures or to a unit of material or design different from that of the approach spans.

For sign structures that are rigid frames, select "4 – Continuous, composite" from the dropdown list. For all other types of sign structures select "9 – Other" from the dropdown list.

For walls, select "9 – Other" from the dropdown list.

Coding:

1	Simple, non-composite	6	Continuous with hinges, non-composite
2	Simple, composite	7	Continuous with hinges, composite
3	Continuous, non-composite	8	More than one material and/or structure type
4	Continuous, composite	9	Other
5	Drop-in	A	Suspended span (contains hanger assembly)

*6A29 Struct Config - Structural Configuration Used for Main Unit, Approach Unit, Sign Structure, and Walls (Department)

Inventory > Agency Bridge; BMS3: General and NSTM/Fatigue

Description:

This two-part item is used to indicate the basic structural configuration for the main unit, approach unit, sign structure and walls.

Procedure:

Select the code for the structural configuration for each unit from the dropdown list. The main unit applies to all spans of most bridges, to the major unit of sizable structures or to a unit of material or design different from that of the approach spans.

This field also applies to sign structures, high mast lights, retaining walls and noise walls. Select the code for the structural configuration for the structure from the dropdown list.

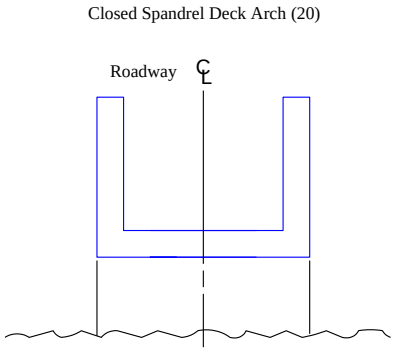
Coding:

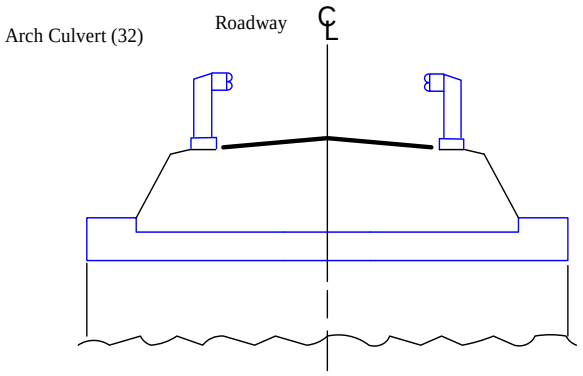
Bridges and Culverts:

BMS2	Description	BMS2	Description
01	Slab or slab beams (solid)	20	*Arch – deck – closed spandrel
02	Slab or slab beams (hollow)	21	*Arch – thru
03	T-beams – single or multiple (includes NEXT beams)	22	Rigid Frame
04	I beams (include rolled wide flange beams w/ or	23	Orthotropic
	w/o cover plate, prestressed concrete I beams or	24	Suspension
	p/s concrete Bulb Tee Beams – single or multiple	25	Stayed girder
05	Box beam – single	26	Movable - lift
06	Box beam – multiple (spread)	27	Movable – bascule
07	Box beam – adjacent	28	Movable – swing
08	Channel beams	29	Tunnel
09	I-welded beams – single or multiple	30	Frame culvert#
10	I-riveted beams – single or multiple	31	**Box culvert#
11	Girder/floorbeam (GF) system, welded – deck	32	*Arch culvert#
12	GF system, welded – thru	33	Tied arch culvert#
13	GF system, riveted – deck	34	Pipe culvert#
14	GF system, riveted – thru	35	Pipe – arch culvert#
15	GF system, welded with overhang bracket - deck	36	Solid timber beams
16	GF system, riveted with overhang bracket -deck	37	Glue-laminated timber beams
17	Truss - deck	38	Stressed timber
18	Truss - thru	52	Segmental box girder
19	*Arch – deck – open spandrel	99	Other

If a combination of types exists, code the most critical one. See *, **, and # notes below.

*The preferred distinction between a closed spandrel deck arch and an arch culvert structure type is based on the fill slope's relation to the headwall. The structure should be considered a closed spandrel deck arch when the roadway passes through the headwalls (see sketch below). The structure should be considered a culvert when the headwalls are below the roadway (see sketch below). For reference, a structure is considered to be under fill if the depth of between the top of the wearing surface and the primary load carry member is 2' or greater. If the fill is less than 2', the structure is considered to be at grade.





**The distinction between a box culvert and a slab bridge is based on the construction technique and is independent of the grade. A slab bridge will have a distinct break between the superstructure and the substructure, while a box culvert will be monolithic. Slab bridges and box culverts can be found at grade or under fill. A monolithic structure without a floor is a frame. As with arch structures, the distinction between a frame bridge and a frame culvert is based on the grade. Frame structures at grade are coded as bridges, while frame structures under fill are coded as culverts. The Structure Type Coding Item Comparison Chart before Item 1A01 gives an overview of these coding requirement differences.

There is an important distinction between a culvert with an integral bottom and a culvert without a bottom. Culverts without a bottom must be coded as 30 or 32. These structures must also have abutments coded for structure units and piers if applicable. Culverts with an integral bottom should be coded as 31, 33, 34, or 35. They must also be coded as CIN and COU for structure units. If there is conflicting information, the SCBI calculator will return a value of a "6" and the bridge will be subjected to a 6-month inspection interval as SCBI = 6 is considered Scour Category "A". The distinction between an arch culvert and a pipe-arch culvert is the pipe-arch culvert has a bottom. Additional information on culvert structure types are shown in FHWA's Bridge Inspection Reference Manual, Chapter 14.

Photographic examples of structure types 20, 22, 30, 32, 33, 34 and 35 are provided in Appendix M.

Sign Structures and High Mast Lights[(1)]:

BMS2	Description	BMS2	Description
39	Cantilever	45	Structure Mounted Sign (Old BMS code – 99)
40	2 Chord Truss	46	High Mast Light
41	3 Chord Truss	47	Pole Mounted
42	4 Chord Truss	48	Center Mounted
43	Overhead Structural Shape or Tube	49	Other
44	Overhead Truss with Multiple Spans	50	Cantilever Monotube

[(1)] Refer to Publication 238, Chapter IP-02 for descriptions of sign structure types

Walls:

BMS2	Description	BMS2	Description
61	Cantilever	69	Doublewal
62	Counterfort	70	Flexible non-Anchored Wall
63	Cribbing	71	Flexible Anchored Wall
64	Gabion	72	Concrete Modular Wall
65	Mechanically Stabilized Embankment (MSE)	73	Post and Panel Noise Wall
66	Tied Back	74	Offset Noise Barrier
67	Reinforced Earth (MSE)	75	Offset Noise Barrier – Fan Wall
68	VSL Retained Earth (MSE)	76	Other Wall

Bridge Examples for Items 6A26 to 6A29:

6A26 - 6A29	Description
21101	R.C. Slab, Simple
21301	R.C. Slab Continuous
21103	R.C. T-beam, Simple
21303	R.C. T-beam, Continuous
16104	Steel, I beam, Simple
17304	Steel, I beam (cover plates), Continuous
16204	Steel, I beam Simple, Composite
17404	Steel, I beam (cover plates), Continuous, Composite
42101	Prestressed Concrete Planks (solid)
86204	Concrete Encased Steel I beam
19934	Steel Pipe Culvert under fill
16411	Steel, Girder Floorbeam Stringer System, Welded Continuous, Composite Deck
19111	Steel, Girder Floorbeam (without stringers), Simple, Welded, Deck
19117	Steel, Truss Floorbeam (without stringers), Simple, Deck

6A26 - 6A29	Description
42107	P/S Box beam, Adjacent Simple
42206	P/S Box beam, Spread, Simple, Composite
21922	R.C. Rigid Frame
21932	R.C. Arch Culvert
21931	R.C. Box Culvert
21919	R.C. Spandrel, Open
21920	R.C. Spandrel, Closed (filled)
21199	R.C. Thru Girder
69920	Masonry Spandrel, Closed (filled arch)
59136	Timber, Solid Beam Bridge, Simple
59137	Timber, Glue-Laminated Beam Bridge, Simple
21803	Concrete T-beam Bridge, Widened using P/S Concrete Beam, Simple 2
16112	Thru Girder w/ or w/o Sidewalk Overhangs

6A30 Surf - Wearing Surface Type on Approach Spans

Inventory > Agency Bridge; BMS3: Deck

Description:

This item is used to record the type of wearing surface for the approach spans of a bridge or culvert.

Procedure:

Select the type of wearing surface from the list for the approach spans.

Coding:

1 Concrete
2 Concrete Overlay (1)
3 Latex Concrete
4 Low Slump Concrete
5 Epoxy Overlay
6 Asphalt
7 Wood or Timber
8 Gravel
9 Other
0 None (e.g., steel grid)
N Not applicable (applies only to structures with no deck)

(1) Separate layer of concrete added but not latex modified, low slump, etc.

6A31 Memb - Type of Membrane Used for Approach Spans

Inventory > Agency Bridge; BMS3: Deck

Description:

This item is used to record the type of membrane used for the approach spans of a bridge or culvert.

Procedure:

Select the type of membrane from the list for the approach spans.

Coding:

1	Built-up	9	Other
2	Preformed Fabric	0	None
3	Epoxy	N	Not applicable (applies only to structures with no deck)
8	Unknown		

6A32 Protect - Type of Deck Corrosion Protection Used for Approach Spans

Inventory > Agency Bridge; BMS3: Deck

Description:

This item is used to record the type of deck protection used for the approach spans of a bridge or culvert.

Procedure:

Select the type of deck corrosion protection from the list for the approach spans.

Coding:

1	Epoxy coated reinforcing	7	Internally sealed
2	Galvanized reinforcing	8	Unknown
3	Other coating reinforcing	9	Other
4	Cathodic protection	0	None
5	Dense Asphalt Overlay (e.g. Rosphalt 50)	N	Not applicable (applies only to structures with no deck)
6	Polymer impregnated	S	Low corrosion steel (Item 6A42 = 5, 6, or 7)

6A33 Thickness - Wearing Surface Thickness for Main and Approach Units

Inventory > Agency Bridge; BMS3: Deck

Description:

This item is used to record the average thickness of the wearing surface on the main and approach units of the bridge.

Procedure:

Enter the average thickness of the wearing surface for the main unit and approach units to the nearest tenth of an inch, if applicable.

Coding:

Enter the average thickness of the wearing surface to the nearest tenth of an inch, if known. Code “0” if thickness is not applicable. Code “0.5” for concrete integral wearing surface cast with the deck.

6A34 Dt Recorded - Date Wearing Surface Thickness for Main and Approach Units was Recorded

Inventory > Agency Bridge; BMS3: Deck

Description:

This item is used to record the date the wearing surface thickness was recorded for the main and approach units of the bridge.

Procedure:

Enter the date the average wearing surface thickness was recorded for the main and approach units, if applicable.

Coding:

Enter the date the wearing surface thickness was recorded in MM/DD/YYYY format:

MM	2 digit month
DD	2 digit day of month
YYYY	4 digit year
00/00/0000	Not applicable

6A35 Surf Thick (Over/Under) - Surface Thickness Over and Under

Inventory > Agency Bridge

Description:

This two-part item is used to record average surface thickness over and under the membrane.

Procedure:

In the 1st field, enter the average surface thickness over the membrane to the nearest tenth of an inch, if applicable.

In the 2nd field, enter the average surface thickness under the membrane to the nearest tenth of an inch, if applicable.

Coding:

Enter the average surface thickness to the nearest tenth of an inch, if known.

6A36 Protect Year - Year Protection System was Installed

Inventory > Agency Bridge

Description:

This item indicated the year the deck protective system was installed.

Procedure:

Enter the year the protective system was installed.

Coding:

4-digit year in which the protective system was installed. Leave blank if not applicable.

6A37 Protect Note - Protection System Note

Inventory > Agency Bridge

Description:

This item is used to record descriptive information about the deck protective systems.

Procedure:

Enter available information about the deck protective systems.

*6A38 Dept Struc Typ - Bridge Deck Type

Inventory > Agency Bridge; BMS3: General

Description:

This item indicates the type of structural deck that is supported by the underlying load carrying members of the superstructure.

Procedure:

Select the bridge deck type code from the list.

Coding:

00 Not applicable (e.g., concrete rigid frames, slab bridges, non-composite adjacent P/S box beam bridges, culverts at grade and similar bridges without an independent deck)
01 Under fill (1) (e.g., bridge structures which support a thickness of fill material which isolates the structure from the pavement carried by the structure)
02 Timber Plank Deck
03 Spiked Laminated Timber Deck
04 Glue Laminated Timber Deck
05 Steel Plate
06 Steel Grid – open
07 Steel Grid – concrete filled or partial depth or with CIP reinforced concrete top
08 Prestressed planks – full depth or Prestressed planks – partial depth (with CIP reinforced concrete top)
09 Precast reinforced concrete planks/slabs
10 Concrete - reinforced
11 Concrete – special mix
12 Concrete – polymer impregnated
13 Concrete – wax impregnated
14 Concrete – wire reinforced
15 Concrete – with cathodic protection
16 Concrete filled metal (corrugated/pan.) deck
17 Asphalt filled metal (corrugated/pan.) deck
18 Plain Jack – arch
19 Reinforced Jack – arch
20 Closed Steel Plate Grid
21 Post-tensioned precast concrete slab
22 Post-tensioned CIP concrete slab
23 Lightweight reinforced concrete
24 Prestressed concrete planks – full depth
25 Concrete – isotropic
26 Concrete – orthotropic
27 Concrete with calcium nitrate
28 Concrete – flyash and cement
29 Concrete – type K cement
30 HPC (High Performance Concrete)
31 Fiber Reinforced Polymer (FRP)
32 Concrete – AAAP
99 Other

(1) The term "under fill" refers to structures with an average depth of 2′ or greater between the top of the wearing surface and the main load carrying member. The term "at grade" refers to structures with an average depth of less than 2′ of fill between the top of the wearing surface and main load carry member. There are some exceptions, as described in the coding for 6A29 when traffic restrictions exist for culverts due to headwalls.

6A39 Relief Joint - Are There Pavement Relief Joints?

Inventory > Agency Bridge; BMS3: General

Description:

This checkbox field indicates whether or not pavement relief joints are present at the bridge.

Procedure:

Check the box if pavement relief joints are present at the bridge. Uncheck the box if pavement relief joints are not present.

Coding:

Checked	Pavement relief joint(s) are present
Unchecked	Pavement relief joint(s) are not present

6A40 Form Type - Type of Deck Forms Used

Inventory > Agency Bridge; BMS3: General

Description:

This item indicates the type of deck form used on the bridge.

Procedure:

Select the code that indicates the type of deck form used on the bridge.

Coding:

1 Removable deck forms
2 Permanent metal deck forms (Stay-In-Place forms)

6A41 No of Joints - Number of Deck Joints on Bridge

Inventory > Agency Bridge; BMS3: General

Description:

This item is used to record the number of deck joints on the bridge.

Procedure:

Record the number of deck joints. If there are no joints on the bridge, code "0".

Coding:

Number of deck joints.

Note:
This item should include the number of joints on the bridge. Joints off the bridge, i.e. between the end of deck or backwall and the approach pavement/slab, are not to be included. Construction joints or longitudinal joints are not to be included.

6A42 Rebar Type - Type of Deck Reinforcement Bar Protection

Inventory > Agency Bridge

Description:

This item indicates the type of protective system used on the reinforcement bars in the concrete bridge deck.

Procedure:

Select the code that indicates the type of deck rebar used in the bridge deck.

Coding:

1	Bare reinforcement bars	5	Stainless Steel Clad Rebars
2	Galvanized reinforcement bars	6	MMFX Steel
3	Epoxy coated reinforcement bars	7	Stainless Steel (Solid)
4	Dual protection (i.e., combination of 2 and 3)	9	Other

6A43 Appr Pav Width - Width of Pavement on the Approach to the Bridge

Inventory > Agency Bridge; BMS3: Approach

Description:

This item is used to record the width of the pavement on the roadway approaching the bridge.

Procedure:

The width is measured normal to the centerline of the roadway approaching the structure. This dimension will not include the widths of the outer shoulders. When there is a variation between the approaches at either end of the structure, determine the approach pavement width using the most hazardous of the approach conditions. For closed median bridges, the width of the approach pavement should include the median(1). For a dirt road, code "000".

(1) Only when the approach roadway median meets the definition for a shoulder (see Item 5C26).

Coding:

Width of the approach pavement to the nearest foot.

Examples:

Left Shoulder	Left Roadway	Median	Right Roadway	Right Shoulder	Code
4.0	----	----	16	6.0	016
6.0	----	----	36	12.0	036
12.0	48	30	48	12.0	126
10.0	24	16	36	10.0	076

The information recorded in this item must be compatible with the "Approach Roadway Width" coded in Item 5C26.

For "Left" and "Right", etc., designations, refer to the Definitions Section of this manual.

For paved shoulder approaches with no painted stripes, measure to grade breaks if present, otherwise, use full width and notify the Bridge Inspection Supervisor. The Approach Roadway Width will then be:

1 The roadway width from the automated Straight Line Diagram (SLD) in RMS.
2 The smaller of (11' or 12') times the number of traffic lanes or the entire roadway width.

6A44 Group No - NSTM Group Number for Main Unit and Approach Spans

Inventory > Agency Bridge; BMS3: General and NSTM/Fatigue

Description:

This item is used to record the bridge Group Number.

Procedure:

Select the bridge group number from the dropdown list. If the bridge meets criteria listed in more than one group, enter the lowest group number.

Coding:

Group	Structure Type	NSTM/Component/Detail
1	One Girder Bridge	Entire Girder, Tension Zone
	Two Girder Bridge	
	with Simple Span	Girder, Tension Zone
	with Suspended Span	Suspended Hanger Assembly plus Girder Tension Zone
	Truss Bridge	
	with Simple Span	Tension Member (including Eye Bar if 2 or less)
	with Suspended Span	Suspended Hanger Assembly plus Tension Members and Certain Diagonals
	Tied Arch	Tension Tie
	Cross-Girder Pier Cap	Tension Zone
	Suspension Bridges	Eye Bar (2 or less) Chain or Cables
2	Two Girder Continuous	End Span Girder, Tension Zone
	Truss, Continuous	Tension Member (including Eye Bar if 2 or less)
	Rigid Frame Steel Pier	Tension Zone
3	Two Girder Continuous	Interior Span Girder, Tension Zone
4	Three Girder Bridges	Not highly fracture critical, but consideration should be given to inspect
	with Simple Span	Girder, Tension Zone
	with Continuous Span	Girder, Tension Zone
	with Suspended Span	Suspended Hanger Assembly plus Girder Tension Zone
5	Four or more Girder Bridges Welded/Riveted/ Bolted Built-up Sections Rolled Beam with Welded Partial/Full Cover Plate	None
6	Multi-Stringer Rolled Beam Bridges (No welding except welding may be used for transverse diaphragm connection)	None
7 & 8	Reserved – Do Not Use	
9	All other Non-Steel Bridges (Concrete, P/S Concrete, Timber, P.P. Culverts, etc.)	

Note:
Shading indicates non-NSTM bridge types.
Refer to Pub. 238, Chapter IP-02, Classification of NSTMs, for further information on coding Items 6A44-6A48.

6A45 Mem Type - Critical Ranking Factor Type of Member for Main Unit and Approach Spans

Inventory > Agency Bridge; BMS3: General and NSTM/Fatigue

Description:

This item is used to record the bridge Type of Member component of the Critical Ranking Factor.

Procedure:

Select the bridge type of member from the dropdown list. If more than 1 CRF applies, use the lowest value. For additional information on this coding, refer to Pub. 238, Chapter IP-02.

Coding:

0 Suspended assembly
1 Intersecting welds
1 Welded, direct tension
2 Welded, bending
3 Riveted/bolted rolled sections with tack welding welded connection plates
4 Riveted/bolted rolled section no welding
9 Non-steel bridges

6A46 Fatig Sus - Critical Ranking Factor Fatigue Susceptibility for Main Unit and Approach Spans

Inventory > Agency Bridge; BMS3: General and NSTM/Fatigue

Description:

This item is used to record the bridge Fatigue Crack Susceptibility component of the Critical Ranking Factor.

Procedure:

Select the bridge fatigue susceptibility factor from the dropdown list. If more than 1 CRF applies, use the lowest value. For additional information on this coding, refer to Pub. 238, Chapter IP-02.

Coding:

Type	Code[2]	
Intersecting Welds	0	
Suspended Assembly	0	
Welded, Direct Tension Welded, Bending Riveted/Bolted Rolled Sections Tack Welding Welded Connection Plates	AASHTO Stress Category E'[1] E D C & C' B & B' A	Code 1 2 3 4 5 6
Riveted/Bolted Rolled Sections No Welding	Out of Plane Bending Detail code 1, else code 8	
Non-Steel Bridges	9	

[1] Includes Out of Plane Bending Details.
[2] Fatigue crack susceptibility is not dependent upon AASHTO stress category detail alone but also upon the actual stress range.

6A47 Material - Critical Ranking Factor Material for Main Unit and Approach Spans

Inventory > Agency Bridge; BMS3: General and NSTM/Fatigue

Description:

This item is used to record the bridge Material component of the Critical Ranking Factor.

Procedure:

Select the bridge material factor from the dropdown list. If more than 1 CRF applies, use the lowest value. For additional information on this coding, refer to Pub. 238, Chapter IP-02.

Coding:

<table>
<tr><th>Type</th><th colspan="3">Code</th></tr>
<tr><td>Intersecting Welds</td><td colspan="3">0</td></tr>
<tr><td>Suspended Assembly</td><td colspan="3">0</td></tr>
<tr><td>Welded, Direct Tension
Welded, Bending
Riveted/Bolted Rolled Sections
Tack Welding
Welded Connection Plates</td><td colspan="3"><table><tr><th>Weldable Steel Grade</th><th>CVN At +40°F</th><th>Code</th></tr><tr><td>No</td><td><15</td><td>1</td></tr><tr><td>No</td><td>>15</td><td>2</td></tr><tr><td>Yes</td><td><15</td><td>3</td></tr><tr><td>Yes</td><td>>15</td><td>4</td></tr></table>* If CVN not known, assume <15</td></tr>
<tr><td>Riveted/Bolted Rolled Sections
No Welding</td><td colspan="3">8</td></tr>
<tr><td>Non-Steel Bridges</td><td colspan="3">9</td></tr>
</table>

6A48 ADTT - Critical Ranking Factor Cumulative Truck Traffic for Main Unit and Approach Spans

Inventory > Agency Bridge; BMS3: General and NSTM/Fatigue

Description:

This item is used to record the bridge Cumulative Truck Traffic component of the Critical Ranking Factor.

Procedure:

Select the bridge cumulative truck traffic factor from the dropdown list. If more than 1 CRF applies, use the lowest value. For additional information on this coding, refer to Pub. 238, Chapter IP-02.

Coding:

Code	Known Remaining Fatigue Life	ADTT
1	Steel Bridges with Intersection Welds	
1	< 10 Years	> 2000
2	11 – 20 Years	1000 – 2000
3	> 20 Years	< 1000
3	Non-Steel Structures (1)	

(1) Unless a fatigue analysis indicates a problem, a coding of "3" is appropriate for non-steel bridges.

Examples:

The remaining fatigue life on a steel bridge with intersecting welds is greater than 20 years and ADTT is 1249. Code 1 for Item 6A49 because the bridge has intersecting welds.

The multi-girder steel bridge has a remaining fatigue life of 12 years and the ADTT is 980. Code 2 for Item 6A49 because the fatigue life controls over the ADTT.

A timber structure with an ADTT of 1001 trucks. Code 3 because the bridge is not a steel structure.

6A49 Total CRF - Total NSTM Critical Ranking Factor for Main Unit and Approach Spans

Inventory > Agency Bridge; BMS3: General and NSTM/Fatigue

Description:

This display only item is used to record the sum of the Main NSTM Ranking Factor or the Approach NSTM Ranking Factor. This information is automatically calculated by adding the 4 numeric values of the NSTM Critical Ranking Factor values.

Procedure:

This item is **automatically filled in by the system** from Items 6A45, 6A46, 6A47, and 6A48 to obtain a Main NSTM CRF total or the Approach NSTM CRF.

Coding:

The 2-digit sum relating to the Main NSTM CRF total or the Approach NSTM CRF.

6A50 Superstructure – Do Plug Welds exist on Bridge Superstructure?

Inventory > Agency Bridge; BMS3: NSTM/Fatigue

Description:

This item indicates if there are plug welds present on the bridge superstructure.

Procedure:

This item should be coded by District personnel based on documented information indicating plug welds exist on one or more of the bridge superstructure members. This field is used to indicate the existence of the plug welds, if applicable. Detailed notes about the plug welds should be entered in BMS3 or BMS2 in the superstructure notes and comments as well as NSTM/Fatigue Items, IF01 through IF06, if the plug welds exist on a NSTM or fatigue member.

Coding:

0 No Plug Welds Identified
1 Plug Weld(s) on NSTM
2 Plug Weld(s) on Non-NSTM

6A51 Substructure – Do Plug Welds exist on Bridge Substructure?

Inventory > Agency Bridge; BMS3: NSTM/Fatigue

Description:

This item indicates if there are plug welds present on the bridge substructure.

Procedure:

This item should be coded by District personnel based on documented information indicating plug welds exist on one or more of the bridge substructures units. This field is used to indicate the existence of the plug welds, if applicable. Detailed notes about the plug welds should be entered in BMS3 or BMS2 in the substructure notes and comments as well as NSTM/Fatigue Items, IF01 through IF06, if the plug welds exist on a NSTM or fatigue member.

Coding:

0 No Plug Welds Identified
1 Plug Weld(s) on NSTM
2 Plug Weld(s) on Non-NSTM

6A52 Traffic - Estimated Cumulative Truck Traffic in Thousands

Inventory > Agency Bridge; BMS3: NSTM/Fatigue

Description:

This item is used to record the estimated cumulative truck traffic being carried by the structure.
This item is reserved for future use.

6A53 Fatig Life - Estimated Cumulative Truck Traffic for Fatigue Damage

Inventory > Agency Bridge; BMS3: NSTM/Fatigue

Description:

This item is used to record the estimate of the cumulative truck traffic that will result in the initiation of fatigue damage on the most fatigue prone member of the bridge.

Procedure:

Enter an estimate of the cumulative truck traffic that will result in the initiation of fatigue damage, in thousands of trucks.

Coding:

The number of trucks, in thousands.

6A54 Year - Month and Year of Estimated Cumulative Truck Traffic

Inventory > Agency Bridge; BMS3: NSTM/Fatigue

Description:

This item is used to record the month and year of the estimated cumulative truck traffic.
This item is reserved for future use.

6A55 Deck Recon – Proposed Major Deck Reconstruction

Inventory > Agency Bridge

Description:

This item is used to record the type of proposed major reconstruction to be performed for the deck.

Procedure:

Enter the appropriate type of major reconstruction for the deck.

Coding:

Code using the deck type reconstruction from the table in Item 3B01.

6A56 Super Recon – Proposed Major Superstructure Reconstruction

Inventory > Agency Bridge

Description:

This item is used to record the type of proposed major reconstruction to be performed for the superstructure.

Procedure:

Enter the appropriate type of major reconstruction for the superstructure.

Coding:

Code using the superstructure type reconstruction from the table in Item 3B01.

6A57 Sub Recon – Proposed Major Substructure Reconstruction

Inventory > Agency Bridge

Description:

This item is used to record the type of proposed major reconstruction to be performed for the substructure.

Procedure:

Enter the appropriate type of major reconstruction for the substructure.

Coding:

Code using the substructure type reconstruction from the table in Item 3B02.

6A58 Contextual Preservation

Inventory > Agency Bridge

Description:

This item is used to record a bridge that merits contextual preservation in Bucks or Chester counties.

Procedure:

The Contextual Bridge Preservation Task Force established a protocol for addressing contextual preservation of bridges in Bucks and Chester Counties in District 6-0. A bridge that merits contextual preservation is defined as a bridge that has important community values reflective of the context the bridge plays in community life, including symbolic, social, and recreational. Examples might include a bridge representing a gateway into a community, or, a bridge that is the focus of an annual festival. Contextual Preservation is distinct from Historic Preservation, which is assessed through application of criteria of the National Register of Historic Places.

Local bridge owners are responsible for assessing the community context and determining whether the bridge has important community value. The assessment of state-owned bridges located in Bucks and Chester Counties shall be determined by District 6-0 following guidelines specified by the District.

Coding:

Unchecked	Structure does not meet the criteria
Checked	Structure meets the criteria

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6B Agency - Inspection

The Agency Inspection Section is used to enter agency-specific information associated with the inspection of a bridge.

6B01 Spc Insp Type - Type of Special Inspection That Is Needed

Inspection > Agency Inspection

Description:

This item is used to record the type of special inspection that is needed before the next bridge inspection. This coding is for tracking certain equipment and manpower requirements and is not applicable to Item 7A03.

Procedure:

Select the code that describes the type of special inspection that is needed.

Coding:

4	Problem areas only (existing and/or potential)
5	Special areas only – management directed
6	Personnel lift only
7	Inspection crane only
8	Rigging only
9	Underwater only
Blank	Special inspection not needed at this time

6B02 New Wear Srf Ind - New Wearing Surface Under the Bridge Indicator

Inspection > Agency Inspection; BMS3: Features

Description:

This checkbox field indicates whether or not the wearing surface underneath the bridge is new.

Procedure:

Check the box if the wearing surface is new since the previous inspection.

Coding:

Unchecked	The wearing surface is not new since the previous inspection
Checked	The wearing surface is new since the previous inspection

6B03 Inventory Correction Ind - Inventory Correction Indicator

Inspection > Agency Inspection

Description:

This checkbox field indicates whether or not the inspector recommends that inventory item(s) should be reviewed and corrected.

Procedure:

Check the box if any inventory correction has been recommended during the inspection.

Coding:

Unchecked	Inventory corrections have not been recommended
Checked	Inventory corrections have been recommended

6B04 Bump at Bridge Ind – Bump at Bridge Indicator

Inspection > Agency Inspection; BMS3: Approach

Description:

This checkbox field indicates whether or not there is a bump at the bridge.

Procedure:

Check the box if there is a bump at the bridge.

Coding:

Unchecked	There is not a bump at the bridge
Checked	There is a bump at the bridge

6B05 Deck Overlay Meas Dt - Deck Overlay Measurement Date 

Inspection > Agency Inspection

Description:

This item is used to record the date on which the deck overlay thickness was measured.

Procedure:

Enter the date on which the deck overlay thickness was measured.

Coding:

Date on which the deck overlay thickness was measured in MM/DD/YYYY format:

MM	2 digit month
DD	2 digit day of month
YYYY	4 digit year
00/00/0000	Not applicable

6B06 Utility Repair Ind - Utility Repair Required

Inspection > Agency Inspection

Description:

This checkbox field is used to indicate whether or not the utility present on the structure needs any repair.

Procedure:

Check the box to indicate that the utility present on the structure needs to be repaired. This box should always be unchecked if utilities are not present on the structure.

Coding:

Unchecked	Utilities do not need repair or do not exist
Checked	Utilities need repair

6B07 Est. Spall Delam % - Estimated Spall or Delamination Percent

Inspection > Agency Inspection

Description:

This item is used to record the estimated percentage of spalled or delaminated area of the top deck surface.

Procedure:

Enter the estimated percentage of spalled or delaminated area of the top of deck surface to the nearest percent.

Coding:

Estimated percentage of spalled or delaminated area of the deck surface to the nearest percent.

6B08 Est. Spall Delam Dt - Estimated Spall or Delamination Percent Date

Inspection > Agency Inspection

Description:

This item is used to record the date on which the spalled or delaminated area percentage was estimated.

Procedure:

Enter the date on which the spalled or delaminated area percentage was estimated.

Coding:

Date on which the spalled or delaminated area percentage was estimated in MM/DD/YYYY format:

MM	2 digit month
DD	2 digit day of month
YYYY	4 digit year
00/00/0000	Not applicable

6B09 Weather - Weather Condition

Inspection > Agency Inspection; BMS3: Schedule

Description:

This item is used to record the weather condition during the inspection.

Procedure:

Select the code from the dropdown list that most accurately describes the weather condition during the inspection.

Coding:

1	Clear
2	Partly Cloudy
3	Cloudy
4	Overcast
5	Snow
6	Rain

6B10 Est. Spall Chloride % - Estimated Chloride Content Percent

Inspection > Agency Inspection; BMS3: Deck

Description:

This item is used to record the estimated percentage of chloride content in the deck.

Procedure:

Enter the estimated percentage of chloride content in the deck to the nearest percent.

Coding:

Estimated percentage of chloride content in the deck to the nearest percent.

6B11 Est. Spall Chloride Dt - Estimated Chloride Content Date

Inspection > Agency Inspection; BMS3: Deck

Description:

This item is used to record the date on which the chloride content was estimated.

Procedure:

Enter the date on which the chloride content was estimated.

Coding:

Date on which the chloride content was estimated in MM/DD/YYYY format:

MM	2 digit month
DD	2 digit day of month
YYYY	4 digit year
00/00/0000	Not applicable

6B12 Temperature

Inspection > Agency Inspection; BMS3: Schedule

Description:

This item is used to record the atmospheric temperature during the inspection.

Procedure:

Enter the atmospheric temperature in degrees Fahrenheit (°F).

Coding:

The atmospheric temperature in degrees Fahrenheit (°F).

6B13 Under Cont Vert - Underclearance Controlling Vertical

Inspection > Agency Inspection

Description:

This item indicates the controlling vertical underclearance used in the underclearance appraisal (Item 4A11).

Procedure:

Enter the controlling vertical underclearance to the nearest tenth of a foot. This value will typically be the lesser value from Items 6C20 and 6C21 unless field measurements indicate a change in the vertical underclearance data.

Coding:

Controlling vertical underclearance to the nearest tenth of a foot.

6B14 Deck Geom Appr Tbl - Table Used for Deck Geometry Appraisal

Inspection > Agency Inspection

Description:

This item indicates the table used to determine the deck geometry appraisal.

Procedure:

Select the table used to determine the deck geometry appraisal from the dropdown list.

Coding:

Table 2A/2B
Table 2C/2D
Table 2E

6B15 (Not Used – Reserved for Future Use)

Items 6B16 to 6B18 are to be entered only if Item 4A09 utilized Table 1 for the Structural Evaluation. See Item 4A09 for Table 1.

6B16 Appr Based On - Appraisal Based On

Inspection > Agency Inspection

Description:

This item is used to indicate if Table 1 controls the code for Item 4A09.

Procedure:

Select the appropriate code from the dropdown list to indicate if Table 1 was used.

Coding:

0 Table 1 does not control the code for Item 4A09.
1 Table 1 controls the code for Item 4A09.

6B17 ADT - Average Daily Traffic

Inspection > Agency Inspection; Form A > Vertical Clearance

Description:

This item is used to record the "current" average annual daily traffic volume.

Procedure:

Enter the ADT that was used to calculate the Structural Evaluation rating for Item 4A09. If this information is not available, a best estimate is recommended.

Coding:

Number of vehicles per day.

6B18 Inventory Rating

Inspection > Agency Inspection

Description:

This item is used to record the inventory rating used to calculate the Structural Evaluation rating for Item 4A09. The HS inventory rating should be recorded.

Procedure:

Enter the HS Inventory rating or equivalent used to calculate the Structural Evaluation rating for Item 4A09.

Coding:

Inventory Rating in tons.

6B19 Cap Appr Cntrl - Capacity Appraisal Control

Inspection > Agency Inspection

Description:

This item is used to indicate what load type controls the capacity appraisal.

Procedure:

Select the appropriate code from the dropdown list to indicate the load type used for Item 4B03.

Coding:

1 H Load
2 HS Load
3 ML80 Load
4 TK527
5 Engineering Judgment

6B20 Insp Type - Next Inspection Type

Inspection > Agency Inspection; BMS3: To be added in a future release

Description:

This item is used to indicate the next inspection type required for the structure.

Procedure:

Select the type of inspection required next for the structure from the dropdown list.

Coding:

Refer to Item 7A03 for inspection type description and coding options.

6B21 Crane Insp Dt - Crane Inspection Date

Inspection > Agency Inspection; BMS3: To be added in a future release

Description:

This item is used to record the date of the next inspection that requires a crane.

Procedure:

Enter the date of the next inspection that requires a crane.

Coding:

Date of the next inspection that requires a crane in MM/DD/YYYY format:

MM	2 digit month
DD	2 digit day of month
YYYY	4 digit year
01/01/1901	Not applicable

6B22 (Not Used – Reserved for Future Use)

6B23 Member - Team Helper

Inspection > Agency Inspection; BMS3: Schedule

Description:

This narrative item is used to record the name(s) of the team helper(s) that inspected the bridge.

Procedure:

Enter the name(s) of the team helper(s) in narrative form.

Coding:

Name(s) of the team helper(s) in narrative form.

6B24 Hired By - Agency that Hired the Consultant

Inspection > Agency Inspection; BMS3: Schedule

Description:

This item indicates which agency hired the consultant to inspect the bridge.

Procedure:

This item should be completed only if the bridge was inspected by a consultant. In this case Item 7A05 should be coded "8" (consultant firm). Enter the code that describes the agency which hired the consultant.

Coding:

1	Pennsylvania Department of Transportation	5	Delaware River Joint Toll Bridge Commission
2	County	6	Other State Agency
3	City, Borough or Township	7	Railroad
4	Pennsylvania Turnpike Commission	8	Other

6B25 Insp Contract Num - Inspection Contract Number

Inspection > Agency Inspection; BMS3: Schedule

Description:

This item is used to record the inspection agreement contract number.

Procedure:

Enter the inspection agreement contract number.

Coding:

Inspection agreement contract number.

Example: E09999

6B26 NBI Crew - NBI Crew Hours (Actual)

Inspection > Agency Inspection; BMS3: Schedule

Description:

This item is used to record the number of actual crew hours taken to complete a regular NBI inspection of the structure.

Procedure:

Enter the number of actual crew hours taken to complete a regular NBI inspection of the structure to the nearest hour.

Coding:

The number of hours, to the nearest hour.

6B27 Crane - Crane Hours (Actual)

Inspection > Agency Inspection; BMS3: Schedule

Description:

This item is used to record the number of actual crane hours taken to complete a regular NBI inspection of the structure.

Procedure:

Enter the number of actual crane hours taken to complete a regular NBI inspection of the structure to the nearest hour. Include travel time required, not counting time lost due to weather or breakdown. If a crane was not used, leave blank.

Coding:

The number of hours, to the nearest hour.

6B28 Frac Crit - NSTM Hours (Actual)

Inspection > Agency Inspection; BMS3: Schedule

Description:

This item is used to record the number of actual hours taken to complete a NSTM/Fatigue inspection of the structure.

Procedure:

Enter the number of actual hours taken to complete a NSTM/Fatigue inspection of the structure to the nearest hour.

Coding:

The number of hours, to the nearest hour.

6B29 Other 1

Inspection > Agency Inspection; Form P > Next Inspection

Description:

Not Used – Reserved for Future Use.

6B30 UWater - Underwater Hours (Actual)

Inspection > Agency Inspection; BMS3: Schedule

Description:

This item is used to record the number of actual hours taken to complete an underwater inspection of the structure.

Procedure:

Enter the number of actual hours taken to complete an underwater inspection of the structure to the nearest hour.

Coding:

The number of hours, to the nearest hour.

6B31 Other 2

Inspection > Agency Inspection; Form P > Next Inspection

Description:

Not Used – Reserved for Future Use.

6B32 Engineer - Inspection Engineering Cost

Inspection > Agency Inspection; BMS3: Schedule

Description:

This item is used to record the engineering cost expended for the inspection of the bridge. This data is also used to re-coup local share of inspection costs in accordance with Act 44 of 1988.

Procedure:

This item should be completed only if the bridge was inspected by a consultant. In this case, Item 7A05 should be coded "8".

Enter the costs for the field inspection of the bridge.

Coding:

The inspection engineering costs in dollars.

Example:
The engineering inspection cost is $354,909.57.

Code 354910: 354910

6B33 Rigging - Inspection Rigging Cost

Inspection > Agency Inspection; BMS3: Schedule

Description:

This item is used to record the rigging cost expended for the inspection of the bridge. This data is also used to re-coup local share of inspection costs in accordance with Act 44 of 1988.

Procedure:

This item should be completed only if the bridge was inspected by a consultant. In this case, Item 7A05 should be coded "8".

Enter the costs for rigging the bridge for inspection. If no rigging was required, leave this item blank.

Coding:

The inspection rigging costs in dollars.

6B34 Office - Inspection Office Cost

Inspection > Agency Inspection; BMS3: Schedule

Description:

This item is used to record the office work cost associated with the inspection of the bridge. This data is also used to re-coup local share of inspection costs in accordance with Act 44 of 1988.

Procedure:

This item should be completed only if the bridge was inspected by a consultant. In this case, Item 7A05 should be coded "8".

Enter the costs for the office work associated with the inspection.

Coding:

The inspection office costs in dollars.

6B35 New Protective Coating Since Last Insp - New Protective Coating Since Last Inspection

Inspection > Agency Inspection; BMS3: Superstructure and Culvert

Description:

This checkbox field is used to indicate if the protective coating applied to the metal superstructure is new since the previous inspection.

Procedure:

Check the box if a new protective coating has been applied to the metal superstructure since the last inspection.

Coding:

Unchecked	New protective coating has not been applied to the metal superstructure since the last inspection.
Checked	New protective coating has been applied to the metal superstructure since the last inspection.

6B36 Protective Coating - Protective Coating Condition Rating

Inspection > Agency Inspection; BMS3: Superstructure and Culvert

Description:

This item indicates the condition of the metal protective coating on the bridge.

Procedure:

For non-weathering steel bridges or coated weathering steel bridges (i.e., fully painted), select the code from the dropdown list in Table 1, which indicates the condition of the metal protective coating. This item is applicable primarily to steel bridges but may also apply to other metal structure types. The purpose of this item is to establish need and priority applying a to protective coating metal structures.

For uncoated weathering steel bridges (i.e., not painted or only painted beam ends), select the code from the dropdown list in Table 2, which indicates the condition of the oxide film protective coating of the uncoated weathering steel, also known as the patina. The patina rating should be based on field observations and examinations, and patina tape adhesion test results (when tape tests are performed) using the Weathering Steel Patina Condition Rating Scale. The rating should typically represent the

average rating of the locations assessed and tested. Where section loss has occurred in the uncoated weathering steel, the overall rating should be representative of the worst-case patina location. Painted beam end conditions should be documented in the inspection notes or bridge element level coding. The coding for weathering steel is limited to 7 – Good to 2 – Critical. Coding's of 9, 8, 1, and 0 do not apply to weathering steel bridges. Like non-weathering steel bridges, N is reserved for bridges without any coating.

The locations, procedures, and frequency of tape tests shall be in accordance with Section 2.2.1.1 Patina and Section 2.2.2.1 Patina Adhesion Tape Test as provided in Publication 238 Appendix IP 02-I Uncoated Weathering Steel - Bridge Safety Inspection and Maintenance Manual.

Note:
Encased I-beams with intentionally exposed bottom flanges should be coded 0 thru 9.

Coding:

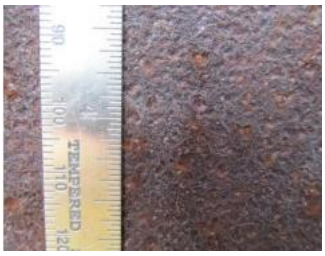
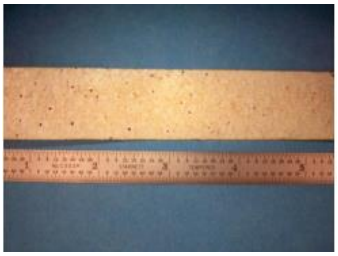
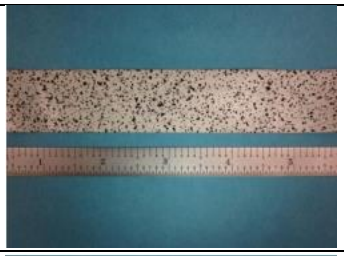
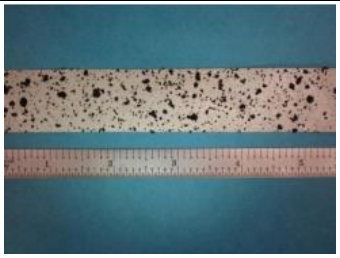
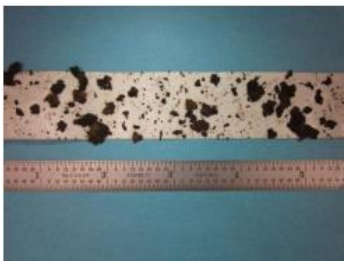
Table 1: Non-Weathering Steel Bridges Coding Language

N	Not Applicable
9	Excellent – new condition
8	Very Good – That condition of the protective coating system where there may be minor spots of deterioration or cracking with virtually all of the protective coating system intact and not peeling. A few minor rust spots are acceptable.
7	Good – Conditions that fall between code 8 and code 6.
6	Satisfactory – That condition of the protective coating system where a number of small rust areas or blisters may be noted and/or there may be loose rust formation pitting/peeling of the protective coating.
5	Fair – Conditions that fall between code 6 and code 4.
4	Poor – That condition of the protective coating system where the system has broken down and there may be major areas of peeling and cracking along with a high percentage of severely rusted areas with scales and/or flakes (need for a new protective coating is urgent).
3	Severe – That condition of the protective coating that caused the metal to corrode to such an extent of deep pitting and loss of section in non-critical areas and where the loss of section is considered to be minor.
2	Critical – The condition of the protective coating that caused corrosion of metal to such an extent that there is major loss of section and deep pitting on a large percentage of the area of the element or the loss of section which has materially affected the strength of the member and requires immediate correction.
1	Imminent Failure – The condition is intolerable; study should determine the feasibility for repair and merit of a new protective coating.
0	Failed - Applying a new protective coating will no longer help – Structure is generally in a hopeless condition.

Summary of Protective Coating Condition Rating Codes associated with Table 1 only

Coding	Indication
8, 7	Spot application of a protective coating
6, 5	Program for a new protective coating
4	Urgently in need of a new protective coating
3, 2	Structure repair may be required before applying a new protective coating
1, 0	Beyond repair (a new coating is a waste of resources)

Table 2: Uncoated Weathering Steel – Patina Condition Rating Scale (CR 2 through CR 7)

Patina Rating	Condition Description	Example Condition in Field	Example Patina Adhesion Tape Test Specimen
7 Good	*- Uniform color pattern, generally dark brown with some lighter reddish-brown, metallic, and purple-brown spots. May be difficult to see small rust product clusters.* *- Texture may be dimpled or rough but uniform in pattern. Patina layer is thin but dense and very adherent, indicative of very good protective properties. Superior adherence; tape test sparse with only very small flakes (< 1 mm).*		
6 Satisfactory	*- Uniform color pattern, generally dark brown with some lighter reddish-brown, metallic, and purple-brown spots. Individual rust product clusters visible.* *- Texture is dimpled or rough but uniform in pattern. Patina layer is thin but dense and adherent, indicative of good protective properties. Tape test easily removes very small (< 1 mm) flakes.*		
5 Fair	- Dark brown coloration, but begins to show minor variation. Flakes up to ¼" loose on surface, easily removed with tape test. - Underlying layer adherent, still relatively dense, thin and protective. Texture more granular and loose flakes may be less protective, holding water and salts. - Chalky poultice layer* may be present, but not significantly affecting performance (i.e., flake size).		
4 Poor	- Dark brown with black and some color variation. Blotchy with some salty or rusty stains. Medium (¼" to ½") flakes over most of area loose and non-protective, easily removed with tape test. - Layer beneath flakes thicker and more permeable, with some pitting beginning. Non-protective; contaminants penetrating. - Elements with poultice may show significant associated flaking.		
3 Serious	- Color is dark brown and black but non-uniform, with widespread blotchiness and staining. Non-protective. - Large (> ½") flakes, or layered delamination beginning in some areas. Thickness/permeability of rust increased, with pitting and section loss possible. - Poultice* areas have thin delamination sheets or very large flakes. Layer below loose poultice may appear similar, but still somewhat adherent.		
2 Critical	- Blackish, stained, blotchy appearance. - Formation of laminar sheets with deeply pitted semi-adherent layer beneath; chunks and sheets of rust product removable by hand. - Aggressive advancement of pitting and section loss; can be up to 50%. Complete failure of patina to protect base steel		

** Poultice layer is defined as a layer with dust, dirt, rust flakes, bird droppings, and/or other debris that can hold water and may be contaminated with chlorides. Most commonly associated with the top surface of horizontal elements such as bottom flanges or bracing members.*

6B37 Protective Coating (Extent) - Extent of the Protective Coating Condition

Inspection > Agency Inspection; BMS3: Superstructure and Culvert

Description:

The field indicates the extent of the protective coating condition described in item 6B36.

Procedure:

Select the most applicable code from the dropdown list to indicate the extent of the protective coating condition described in Item 6B36. This item is applicable to primarily steel bridges only but may also apply to other metal structure types. The purpose of this item is to establish need and priority for applying a coating metal structures.

Note:
Encased I-beams with intentionally exposed bottom flanges should be coded.

Coding:

N	Not Applicable
9	Application of a base and/or finish coating needed near deck joints only
8	Minor spot application of finish coat needed
7	Moderate spot application of finish coat needed
6	Spot application of base coat plus 1 to 60% of finish coating needs to be reapplied
5	Spot application of base coat plus greater than 60% of finish coating needs to be reapplied
4	Blast cleaning and coating needed for a zone which is about 20% to 40% of the metal
3	Blast cleaning and coating needed for a zone which is about 40% to 60% of the metal
2	Blast cleaning and coating needed for a zone which is greater than 60% of the metal surface area
1	Blast cleaning and coating of the entire bridge is needed
0	Reserved

Condition Rating Codes Used For the Following Fields

In order to promote uniformity between inspectors, these guidelines will be used to rate and code Items 6B38, 6B39, and 6B40, as well as Items 1A01, 1A02, 1A03, 1A04, and 1A05.

Refer to the guidance in Section 1A or Appendix N for coding using the guidance from the Specification for the National Bridge Inventory. Condition ratings are used to describe the existing in-place structure as compared to the as-built condition.

Rating Codes

Code	Condition	Description
N	Not Applicable	Component does not exist.
9	Excellent	Isolated inherent defects.
8	Very Good	Some inherent defects.
7	Good	Some minor defects.
6	Satisfactory	Widespread minor or isolated moderate defects.
5	Fair	Some moderate defects; strength and performance of the component are not affected.
4	Poor	Widespread moderate or isolated major defects; strength and/or performance of the component is affected.
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	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	Imminent Failure	Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service.
0	Failed	Bridge is closed due to component condition, and is beyond corrective action. Replacement is required to restore service.

The defects for specific material types are provided in Appendix N and will be incorporated into the main publication with the 2025 Edition of Publication 100A.

6B38 Appr Slab - Approach Slab Condition Rating

Inspection > Agency Inspection; BMS3: Approach

Description:

This item indicates the condition of the approach slab and the pavement relief joints of the bridge, if any.

Procedure:

Select the code from the dropdown list which indicates the condition of the reinforced concrete approach slab and the pavement relief joints. (Approach roadway, which includes the approach slab should be rated in Item 6B39). The rating code of the approach slab can be different than the coding of the approach roadway; however, the codes should match if the approach slab is below grade.

Coding:

Refer to **RATING CODES**. If no reinforced concrete approach slab is present (current Department Standard Drawings or previous standards), code "N".

6B39 Appr Roadway - Approach Roadway Condition Rating

Inspection > Agency Inspection; BMS3: Approach

Description:

This item indicates the condition of the approach roadway. If approach slabs are present and at grade, the approach roadway shall be considered the roadway beyond the end of the approach slab and the approach roadway and approach slab shall be coded independently. If approach slabs are present and below grade, the approach roadway shall be considered the roadway starting at the end of the bridge and the approach roadway and approach slab will be coded the same.

Procedure:

Select the code from the dropdown list which indicates the condition of the approach roadway in relation to it's effect on the use of the bridge. In assigning the rating, consideration should be given to the condition of the bridge approach slab as indicated above, shoulders and factors such as settlement, drainage, misalignment and/or heave, potholes, etc., and conditions which could lead to loss of vehicle control with possible impact with components of the structure.

Coding:

Refer to **RATING CODES**.

Code "N" for structures under fill.

Guide rails, etc., are not included in the assessment of approach roadway coding. They are coded in Item IA02.

6B40 Deck Wear Surf - Deck Wearing Surface Condition Rating

Inspection > Agency Inspection; BMS3: Deck

Description:

This item is used to record the condition rating of the wearing surface on the bridge deck.

Procedure:

Select the code from the dropdown list which indicates the condition of the deck wearing surface on the structure.

Coding:

Refer to **RATING CODES**. Concrete or asphaltic material overlayment on grid floor decks requires coding.

Code "N" for structures under fill, or where not applicable (e.g. steel grid floor deck, timber deck without wearing surface overlayment).

Note:
For additional information about rating P/S adjacent box beam concrete deck covered by wearing surface, refer to notes under Item 1A01.

6B41 Fund Rehab Elig - Eligibility of Bridge FCB Funds

Inspection > Agency Inspection

Description:

This item indicates the eligibility of the bridge for federal critical bridge (FCB) funds for rehabilitation or replacement.

Procedure:

If the Sufficiency Rating (SR) is less than 50.0 and the structure is structurally deficient or functionally obsolete, the structure is eligible for FCB funds for rehabilitation or replacement.

If the SR is greater than or equal to 50.0 but less than or equal to 80.0 and the structure is structurally deficient or functionally obsolete, it is eligible for FCB funds for rehabilitation only.

Coding:

Blank	Not applicable
H	Meets FHWA rehabilitation criteria
P	Meets FHWA replacement criteria

6B42 S1 – Structural Adequacy and Safety Component

Inspection > Agency Inspection

Description:

This item is used to indicate the structural adequacy and safety component of the Sufficiency Rating of the structure.

Procedure:

Computed and **automatically filled in by the system** based on the following data items: Inventory Rating Load and the condition ratings for the superstructure, substructure, and culvert. Refer to FHWA's SI&A Recording and Coding Guide for the formulates that define S1.

Coding:

A specific number, to the nearest tenth, computed by the system.

Range: 0.0 - 55.0

6B43 S2 – Serviceability and Functional Obsolescence Component

Inspection > Agency Inspection

Description:

This item is used to indicate the serviceability and functional obsolescence component of the Sufficiency Rating.

Procedure:

Computed and **automatically filled in by the system**. Refer to FHWA's SI&A Recording and Coding Guide for the numerous formulas that are used in computing this item. Refer to FHWA's SI&A Recording and Coding Guide for the formulates that define S2.

Coding:

A specific number, to the nearest tenth, computed by the system.

Range: 0.0 - 30.0

6B44 S3 – Essentiality for Public Use Component

Inspection > Agency Inspection

Description:

This item is used to indicate the essentiality for public use component of the Sufficiency Rating of the structure.

Procedure:

Computed and **automatically filled in by the system**. Refer to FHWA's SI&A Recording and Coding Guide for the numerous formulas that are used in computing this item. Refer to FHWA's SI&A Recording and Coding Guide for the formulates that define S3.

Coding:

A specific number, to the nearest tenth, computed by the system.

Range: 0.0 - 15.0

6B45 S4 – Special Reductions Component

Inspection > Agency Inspection

Description:

This item is used to indicate the special reductions component of the Sufficiency Rating.

Procedure:

Computed and **automatically filled in by the system**. Refer to FHWA's SI&A Recording and Coding Guide for the numerous formulas that are used in computing this item. Refer to FHWA's SI&A Recording and Coding Guide for the formulates that define S4.

Coding:

A specific number, to the nearest tenth, computed by the system.

Range: 0.0 - 13.0

6B46 Deficiency Rating - Total Maintenance Deficiency Points Assigned to the Bridge

Inspection > Agency Inspection

Description:

This item indicates the total maintenance deficiency points assigned to the bridge.

Procedure:

Computed and **automatically filled in by the system** when the inspection is approved. This item is based on user input of bridge maintenance activities and their urgencies. Factors considered by the system include: ADT, Detour Length, Network, Kind of Highway, Inventory Load Capacity, and Condition Ratings of the bridge components.

Coding:

A specific number, to the nearest tenth, computed by the system.

100.0	Highest priority for maintenance work
0.0	No maintenance deficiency

6B47 Deck Cracking Metric

Inspection > Agency Inspection; BMS3: Deck

Description:

This item is used to indicate the total length of deck cracks per total deck area (yards per square yards).

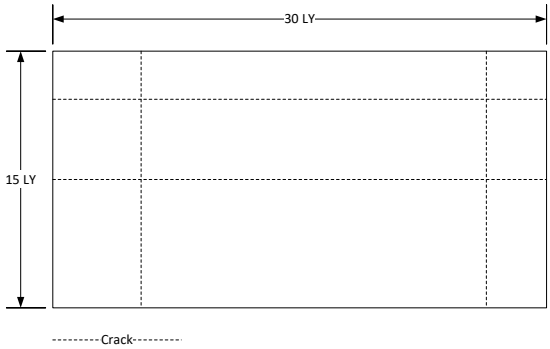
Procedure:

Determine the total length of transverse and longitudinal deck cracking in yards. Divide the total length of cracks in yards by the total deck area in square yards to calculate a ratio of yards per square yard. This field should only be coded for bridges with a bare concrete deck (Item 5B02 = 1 – Concrete). If the deck is covered in map cracking, code this field as 1.00. This measurement is designed to be quickly calculated with rough estimates.

Coding:

Enter a value between 0.00 and 1.00.

Examples:

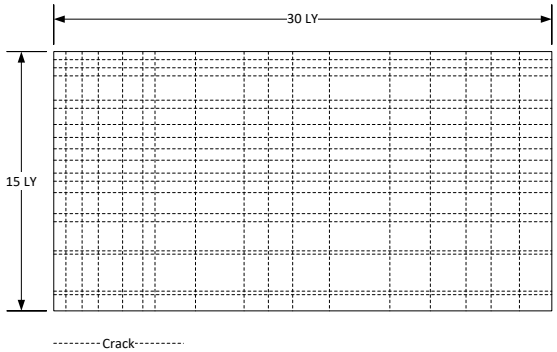


Length of cracks: 2 (15 LY) + 2 (30 LY) = 90 LY

Deck Area: 15LY x 30 LY = 450 SY

Ratio: 90LY / 450 SY = 0.20 LY/SY

(example continued on the next page)



Ratio: 1.00 LY/SY

- Extensive cracking, code as 1.00. Do not expend the effort to count the cracks on this deck.

6B48 Combust. Mat. Under Bridge – Combustible Material Stored Under the Bridge

Inspection > Agency Inspection; BMS3: Superstructure and Culvert

Description:

This item indicates the presence of combustible materials stored under the bridge.

Procedure:

Select the code from the dropdown list which indicates the type of combustible materials identified under the bridge. The coding of this field should be verified or updated for every bridge on every inspection. In addition to the coding below, details about the combustible materials should be entered in the Notes and Comments.

When the coding of this field is a value other than 12, the material should be clearly documented with photographs in the Routine inspection report and any other inspection where the value is changed. This coding should only be for used non-natural conditions. For example, a bridge over a wooded area should not be coded for a combustible material. Similarly, this field should only be coded when the materials are located within 45’ feet of a substructure unit or if the vertical clearance between the material and the bridge is less than 45’. Otherwise, the item can be noted in the associated notes field and coded “12 – Non-reportable”.

Coding:

0	Encampment	7	Combination of 4, 5, and/or 6
1	Passenger Vehicle Parking	8	Occupied Structure(s)
2	Commercial Vehicle Parking	9	Other Structure(s)
3	Combination of 1 and 2	10	Combination of 8 and 9
4	Building Materials	11	Combination of any codes between 0 and 10
5	Combustible Materials	12	No reportable materials beneath the bridge
6	Hazardous Materials		

Examples:

Parking for adjacent restaurant: 01 - Passenger Vehi. Parking

Pipes and gasoline for a construction project: 07 - Comb. of 4, 5, and/or 6

Storage shed for roadway salt: 09 - Other Structure(s)

Doctors office and parking lot: 11 - Combination of Any Above

Concrete barrier: 12 - No Reportable Materials

6B49 Inaccessible Portion of Structure – Inaccessible Area of the Bridge during Inspection

Inspection > Agency Inspection; BMS3: Schedule

Description:

This item is used to indicate if a portion of the structure is inaccessible during the inspection of the structure.

Procedure:

Select the code from the dropdown list which indicates the portion of the bridge that is inaccessible during an inspection of the structure. Selection for this field should be verified or updated for every bridge on every inspection if inaccessible areas exist, otherwise, leave blank. The inspector should also complete the inspection comment associated with field in either BMS3 or BMS2 to further explain why the location is inaccessible. Furthermore, the inspector should suggest updates to the Inspection Planning screen in BMS2 for equipment, such as a borescope, which may help with the inspection of these areas. This field should not be used to identify confined spaces. Suggestions for additional coding options should be sent to the Bridge Inspection Section.

Coding:

1	Combination of Any Below	5	Between Closely Spaced Members
2	Pin and Hanger Assembly	6	Enclosed Spans
3	Eyebar Head at Connections	7	Sandwiched Gusset Plates
4	Truss Pins		

6C Agency - Roadway

The Agency Roadway Section is used to record additional information concerning the roadway segments on and/or under the structure. Information should be entered for each roadway that is associated with a structure. A separate detail screen is available for each roadway.

6C01 - 6C04 County, St Rte Num, Seg, Offset - State Roadway Location

Inventory > Features > Highway; BMS3: Features

Description:

This item is used to record location of the roadway in relation to the bridge. This number is comprised of four subfields. They are: County (Item 6C01), State Route Number (Item 6C02), Segment Designation (Item 6C03), and Offset (Item 6C04).

The priority of state route data in the 6C Section is as follows: enter all state routes "on" the bridge and then add all state routes "under" the bridge. If no state route exists "on" the bridge, add "under" state routes accordingly.

Procedure:

These items are **automatically filled in by the system** from RMS. Users shall verify the values that locate the Department's roadway segments that are either on and/or below the structure. **If no values are present for state routes, the BMS coordinator shall notify the RMS coordinator of the discrepancy.** These items will not have values for local routes because RMS does not store data for locals.

Coding:

The Agency Roadways screen's SR ID follows the same format as the bridge identification coding for the Department's jurisdictional bridges (see Item 5A01).

Example: The bridge carries two state roadway segments on an undivided bridge over a stream. The bridge is in Dauphin County (22) and carries state route 322, segments 10 and 11, with offsets of 500 feet and 600 feet, respectively.

6C01	6C02	6C03	6C04
22	0322	0010	0500
22	0322	0011	0600

Example: The bridge carries two state roadway segments on an undivided bridge over a state route. The bridge is in Dauphin County (22) and carries state route 322, segments 10 and 11, with offsets of 500 feet and 600 feet, respectively. The state route below, SR 2002, is in segment 60 and passes under at an offset of 1200 feet.

6C01	6C02	6C03	6C04
22	0322	0010	0500
22	0322	0011	0600
22	2002	0060	1200

6C05 Adm Juris - Administrative Jurisdiction

Inventory > Features > Highway;

Description:

This item indicates the administrative jurisdiction for the highway. The organization having administrative jurisdiction over a highway is the agency responsible for the planning, design, and construction of the roadway.

Procedure:

Select the code from the dropdown list that indicates the jurisdiction for the highway on the bridge. For features other than highways, such as a railroad, this item should be coded "N" for not applicable.

Coding:

1 Pennsylvania Department of Transportation
2 Other State Agency
3 Federal Domain
4 Toll (such as PA Turnpike Commission or other toll commission)
5 County
6 Townships
7 City, Borough, or Other Local
8 Combination
9 Private
N Non-highway related feature

6C06 Fed Aid - Federal Aid

Inventory > Features > Highway

Description:

This item is used to identify the roadway on/under the structure and its Federal Aid status.

Procedure:

This item will be automatically entered for state routes inventoried in RMS. For local and other routes, this item should be entered manually.

Coding:

0 Not on Federal Aid Route
1 On Federal Aid Route
2 Other Federal Aid Route

6C07 Govt. Cont - Government Level of Control

Inventory > Features > Highway

Description:

This item is used to identify the level of government that has the responsibility for the facility. In the case of toll authorities, this code is not dependent upon a toll being charged. When more than one code could be used for a section, the lowest numerical code is reported (i.e., if county and town boundaries are the same and only one governing body exists, use code "02").

Procedure:

This item will be automatically entered for state routes inventoried in RMS. For local and other routes, this item should be entered manually.

Coding:

The Government Level of Control assigned to the SR ID.

01	State Highway Agency	31	State Toll Agency
02	County Highway Agency	32	Local Toll Agency
03	Town or Township Highway Agency	60	Other Federal Agencies (not listed below)
04	Municipal Highway Agency	62	Bureau of Indian Affairs
11	State Park, Forest or Reservation Agency	64	U.S. Forest Service
12	Local Park, Forest or Reservation Agency	66	National Park Service
21	Other State Agency	68	Bureau of Land Management
25	Other Local Agency	70	Military Reservation / Corps of Engineers
26	Private Agency		

6C08 Urban/Rural - Urban/Rural Designation

Inventory > Features > Highway

Description:

This item indicates the Urban/Rural designation of a highway on or under the bridge.

Procedure:

This item will be automatically entered for state routes inventoried in RMS. For local and other routes, this item should be entered manually.

Coding:

The designation code assigned to the SR ID.

1	Rural
2	Small Urban (population 5,000 – 49,999)
3	Medium Urbanized (population 50,000 - 199,999)
4	Large Urbanized (population> 200,000)

6C09 Hwy Ind - Highway Indicator

Inventory > Features > Highway

Description:

This item indicates whether or not the roadway on or under the bridge belongs to a state highway network.

Procedure:

This item will be automatically entered for state routes inventoried in RMS. For local and other routes, this item should be entered manually.

Coding:

H	National Highway System (NHS), (non-interstate)
I	Interstate
N	Non - Network
P	Principal Arterial

6C10 Hwy Sys Typ - Highway System

Inventory > Features > Highway

Description:

This item indicates the type of Highway System of the highway feature being described. This item is no longer an FHWA required item.

Procedure:

Select the appropriate code from the dropdown list. The most applicable code should be used for any case that does not seem to have an appropriate code. A frontage road, for example, can be coded according to the system of adjacent mainline roadway.

If the feature is not a highway, code "NN" for not applicable.

If more than one route is on the bridge, use the proper code in this order.

Interstate
Federal-Aid Primary
Federal-Aid Urban
Federal-Aid Secondary
Non-Federal-Aid

Note:
Local contracts must require identification of Federal-Aid bridges

Coding:

01	Interstate, Rural, Open to Traffic	09	Other State Highways, Rural (Non-FA)
02	Interstate, Urban, Open to Traffic	10	Other State Highways, Urban (Non-FA)
03	Other FA Primary, Rural	11	Local Rural Roads (or private rural roads)
04	Other FA Primary, Urban	12	Local City Streets (or private roads)
05	FA Secondary Rural, State Jurisdiction	14	Federal-Aid Urban
07	FA Secondary Rural, Local Jurisdiction	NN	Non-Highway Related Feature

6C11 State Code - State Highway Network

Inventory > Features > Highway

Description:

This item is used to indicate the Highway Network Designation of the highway feature being described.

Procedure:

The Highway Network Designation is assigned by the Bureau of Transportation Systems performance.

Coding:

0	Not on a priority system
1	Priority commercial network
2	Core highway network
3	Agri-Access network
4	Industrial & Commercial Access network (ICAN) and Agri-Access network
5	Industrial & Commercial Access network (ICAN)

6C12 INT - Interstate Network (INT) Indicator

Inventory > Features > Highway

Description:

This item indicates if the roadway belongs to the Interstate Network.

Procedure:

This item will be automatically entered by the system for state routes inventoried in RMS. For valid state routes entered in the 5C and 6C Sections for SR ID and the on/under fields, the "Interstate Network" designation is displayed based on information obtained from RMS.

Coding:

Y Interstate
N Not an Interstate

6C13 (Not Used – Reserved for Future Use)

6C14 ATTT – Access Tandem Trailer Truck Network (ATTT) Indicator

Inventory > Features > Highway

Description:

This item indicates if the roadway on or under the bridge belongs to the Access Tandem Trailer Truck (ATTT) commercial network.

Procedure:

This item will be automatically entered by the system for state routes inventoried in RMS. For valid state routes entered in the 5C and 6C Sections for SR ID and the on/under fields, the "ATTT" designation is displayed based on information obtained from RMS.

Coding:

6 Unrestricted access
7 Restricted access
N No access

6C15 RMS NHS - RMS National Highway System (NHS) Indicator

Inventory > Features > Highway

Description:

This item indicates if the roadway on or under the bridge is on the National Highway System (NHS).

Procedure:

This item will be automatically entered by the system for state routes inventoried in RMS. For valid state routes entered in the 5C and 6C Sections for SR ID and the on/under fields, the "RMS NHS" designation is displayed based on information obtained from RMS.

Coding:

S	NHS, Strategic Highway Network (STRAHNET)	4	Major Amtrak Station
P	NHS, Congressional Priority Corridor	5	Major Rail/Truck Terminal
C	NHS, Major STRAHNET Connector	6	Major Intercity Bus Terminal
Y	NHS	7	Major Public Transit Terminal or Multi-Modal Passenger Terminal
N	Not NHS		
2	Major Airport	8	Major Pipeline Terminal
3	Major Port Facility	9	Major Ferry Terminal

6C16 TTTN – Tandem Trailer Truck Network (TTTN) Indicator

Inventory > Features > Highway

Description:

This item indicates if the roadway on or under the bridge is in the Tandem Trailer Truck Network (TTTN) commercial network.

Procedure:

This item will be automatically entered by the system for state routes inventoried in RMS. For valid state routes entered in the 5C and 6C Sections for SR ID and the on/under fields, the "TTTN" designation is displayed based on information obtained from RMS.

Coding:

1 Designated truck route under Federal and State Authority
2 Designated truck route under State Authority only
3 Parkway - not on a designated truck route
4 Not a Parkway - not on a designated truck route

6C17 – (Not Used - Reserved for Future Use)

*6C18 Horiz (L) - Total Horizontal Clearance for the Left Roadway

Inventory > Features > Highway; BMS3: Features

Description:

This item is used to record the total horizontal clearance of the left roadway for FEATURES which are identified as streets or highways.

Procedure:

Divided Highways:

For a highway that is separated by a median barrier (MEDIAN TYPE coded 1-4, or 9 in Item 6C25), enter the total horizontal clearance for the left roadway.

Undivided Highways:

For a highway not separated by a median barrier (MEDIAN TYPE coded 5, 7, or 0 in Item 6C25), enter the total horizontal clearance if the direction code in Data Item 5C06, 2nd subfield is a 3 or 4. Otherwise leave this item blank.

One Directional Highways:

For median code N or 6, enter the horizontal clearance if the direction code in Item 5C06, 2nd subfield is a 3 or 4. Otherwise leave this item blank.

The purpose of this item is to record the available clearance for the movement of wide loads. This clearance has been identified in three ways, all of which are acceptable:

1 Roadway surface and shoulders. This will generally be usable width for the movement of wide loads when the vertical clearance influences the horizontal clearance.
2 Distance from the face of the pier (or rail around the pier) to face or rail or slope at abutment.
3 Include flush or mountable medians (Item 6C25 coded as 5).

The total horizontal clearance should be the available clearance measured between the most restrictive features such as curbs, rails, walls, or other structural feature limiting the roadway. This item must be entered for all FEATURES which are identified as streets or highways.

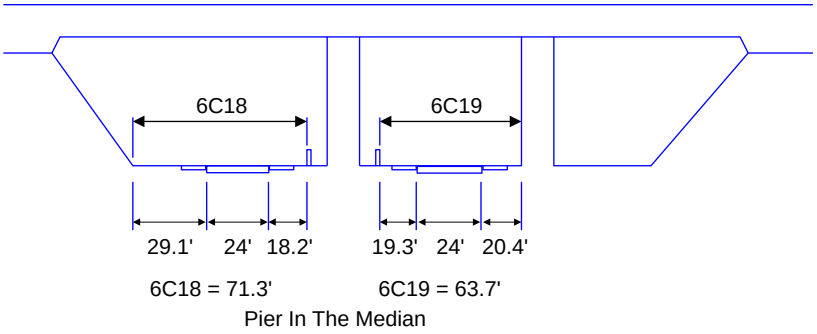
Coding:

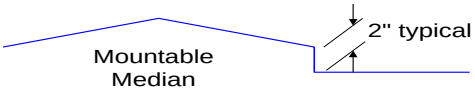
The total horizontal clearance to the nearest tenth of a foot.

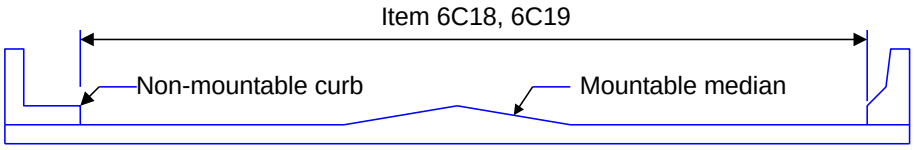
998	For clearances greater than 99.8 feet
Blank	Not applicable

Note:

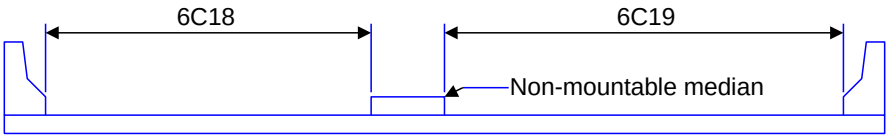
Mountable medians are designed to be driven over if need be.







No Median or Flush or Mountable Median



Raised Median or Non-mountable Median

*6C19 Horiz (R) - Total Horizontal Clearance for the Right Roadway

Inventory > Features > Highway; BMS3: Features

Description:

This item is used to record the total horizontal clearance of the right roadway for FEATURES which are identified as streets or highways.

Procedure:

Divided Highways:

For a highway that is separated by a median barrier (MEDIAN TYPE coded 1-4, or 9 in Item 6C25), enter the total horizontal clearance for the right roadway.

Undivided Highways:

For a highway not separated by a median barrier (MEDIAN TYPE coded 5, 7, or 0 in Item 6C25), enter the total horizontal clearance if the direction code in Item 5C06, 2nd subfield is a 0, 1, or 2. Otherwise leave this item blank.

One Directional Highways:

For median code N or 6, enter the horizontal clearance if the direction code in Item 5C06, 2nd subfield is a 0, 1, or 2. Otherwise leave this item blank.

The purpose of this item is to record the available clearance for the movement of wide loads. This clearance has been identified in three ways, all of which are acceptable:

1 Roadway surface and shoulders. This will generally be usable width for the movement of wide loads when the vertical clearance influences the horizontal clearance.
2 Distance from the face of the pier (or rail around the pier) to face or rail or slope at abutment.
3 Include flush or mountable medians (Item 6C25 coded as 5).

The total horizontal clearance should be the available clearance measured between the most restrictive features such as curbs, rails, walls, or other structural feature limiting the roadway. This item must be entered for all FEATURES which are identified as streets or highways.

Coding:

The total horizontal clearance to the nearest tenth of a foot.

998	For clearances greater than 99.8 feet
Blank	Not applicable

Note:

Mountable medians are designed to be driven over if need be.
See sketches after Item 6C18.

*6C20 Min Vert (L) – Minimum Vertical Clearance for the Left Roadway

Inventory > Features > Highway; BMS3: Features

Description:

This item is used to record the actual minimum vertical clearance over the left roadway features (streets, highways) to any restriction, to the nearest hundredth of a foot.

Procedure:

Divided Highway:

For a highway that is separated by a median area or a median barrier (Item 6C25 coded 1-5, 7, or 9), enter the minimum vertical clearance for the left roadway (i.e., southbound or westbound roadway). The left roadway value in this field must be the same for each of the divided highway features having the same route number.

Undivided Highway:

For a highway not separated by a median area or a median barrier, code 99.90 and place the minimum vertical clearance in Item 6C21.

Railroads[1]:

For a railroad, place the minimum vertical clearance in Item FR11.

Coding:

The total vertical clearance to the nearest hundredth of a foot.

9990 When no restriction exists or restriction is >= 99.9'

Enter the minimum vertical clearance for sign structures in this data field.

The default value for this field is 99.90.

Note:

Measurements should be taken at each edge of all travel lanes for the under feature and the on feature.

Refer to Pub. 238, Section IP 4.8.2, for clearance measurement when a roadway with a vertical sag curve passes beneath the structure.

[1] Railroad Abandonment - If there is no abandonment order for the railroad in the District files, the vertical clearance is to be coded even if the tracks have been removed.

Examples:

Restriction	Code
None	99.90
14.25 feet	14.25
100 feet	99.90

*6C21 Min Vert (R) – Minimum Vertical Clearance for the Right Roadway

Inventory > Features > Highway; BMS3: Features

Description:

This item is used to record the actual minimum vertical clearance over the right roadway features (streets, highways,) to any restriction, to the nearest hundredth of a foot.

Procedure:

Divided Highway:

For a highway that is separated by a median area or a median barrier (Item 6C25 coded 1-5, 7, or 9), enter the minimum vertical clearance for the right roadway (i.e., northbound or eastbound roadway). The right roadway value in this field must be the same for each of the divided highway features having the same route number.

Undivided Highway:

For a highway not separated by a median area or a median barrier (Item 6C25 coded 6, 0, or N), enter the minimum vertical clearance based on all lanes regardless of traffic direction.

Railroads[1]:

For a railroad, place the minimum vertical clearance in Item FR11.

Coding:

The total vertical clearance to the nearest hundredth of a foot.

9990 When no restriction exists or restriction is >= 99.9'

Enter the minimum vertical clearance for sign structures in this data item.

The default value for this field is 99.90.

Note:

Measurements should be taken at each edge of all travel lanes for the under feature and the on feature.

Refer to Pub. 238, Section IP 4.8.2, for clearance measurement when a roadway with a vertical sag curve passes beneath the structure.

[1] Railroad Abandonment - If there is no abandonment order for the railroad in the District files, the minimum vertical clearance is to be coded even if the tracks have been removed.

*6C22 Def Vert (L) - Vertical Clearance Over 10 Ft Width (Defense Highways) for Left Roadway

Inventory > Features > Highway; BMS3: Features

Description:

This item is used to record the defense vertical clearance for the left roadway. The defense vertical clearance is defined as the maximum height a ten foot wide vehicle may be and still be able to pass along the feature being described.

Procedure:

Divided Highways:

For a highway separated by a median area or a median barrier (Item 6C25 coded 1-5, 7, or 9), enter the defense vertical clearance for the left roadway (i.e., southbound or westbound roadway). The left roadway value in this field must be the same for each of the divided highway features having the same route number.

Undivided Highways:
For a highway not separated by a median area or a median barrier, code 99.90 and place the minimum vertical clearance in Item 6C23.

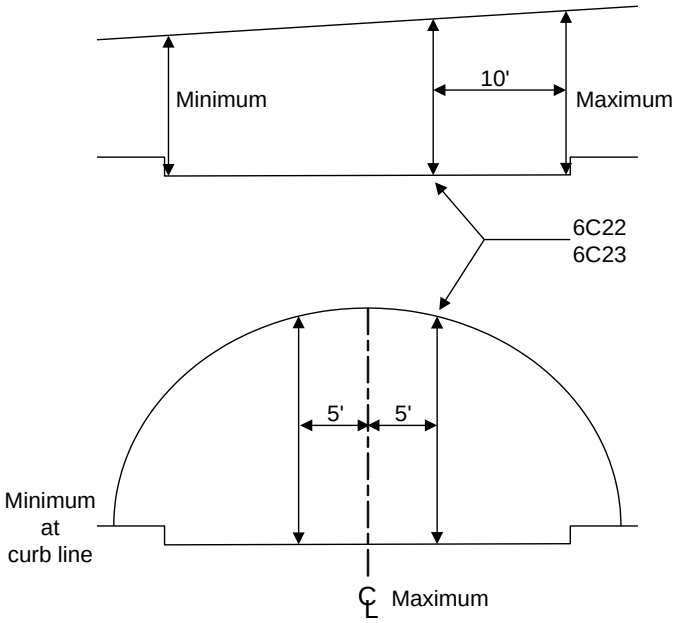
Coding:

Defense vertical clearance to the nearest hundredth of a foot. Value must be ≥ 0 and cannot be left blank.

When no restriction exists above the roadway, the defense vertical clearance is unlimited and should be entered as 9990.

9990 Restriction is >= 99.9′

Note:
The 10′ width envelope is measured from the point of maximum vertical clearance toward a point of lesser clearance.



*6C23 Def Vert (R) - Vertical Clearance Over 10 Ft Width (Defense Highways) for Right Roadway

Inventory > Features > Highway; BMS3: Features

Description:

This item is used to record the defense vertical clearance for the right roadway. The defense vertical clearance is defined as the maximum height a ten foot wide vehicle may be and still be able to pass along the feature being described.

Procedure:

Divided Highways:
For a highway separated by a median area or a median barrier (Item 6C25 coded 1-5, 7, or 9), enter the defense vertical clearance for the right roadway (i.e., northbound or eastbound roadway). The right roadway value in this field must be the same for each of the divided highway features having the same route number.

Undivided Highways:
For a highway not separated by a median area or a median barrier (Item 6C25 coded 6, 0, or N), enter the minimum defense vertical clearance based on all lanes regardless of traffic direction.

Coding:

Defense vertical clearance to the nearest hundredth of a foot. Value must be ≥ 0 and cannot be left blank.

When no restriction exists above the roadway, the defense vertical clearance is unlimited and should be entered as 9990.

9990 Restriction is >= 99.9′

Note:
The 10′ width envelope is measured from the point of maximum vertical clearance toward a point of lesser clearance. See sketch after Item 6C22.

6C24 (Not Used – Use Items 6C35 through 6C38)

*6C25 Type - Median Type

Inventory > Features > Highway

Description:

This item is used to code the type of median on a structure or the type of median separating the roadways (in opposite direction of travel) under the structure.

Procedure:

Select the type of median from the dropdown list. This item should be coded for any feature intersected that is a highway on or under the bridge.

Coding:

0 No Box beam barrier median, no barrier between opposite traffic
1 Box Beam Barrier
2 W-Type barrier
3 Concrete barrier
4 Pier in median
5 Concrete mountable curb
6 One of the dual (parallel) bridges
7 Grass or unprotected median (no barrier or no mountable curb)
8 Other
9 Non-mountable median
N Not applicable (1 lane traffic or non-highway related feature)

6C26 Width - Median Width

Inventory > Features > Highway

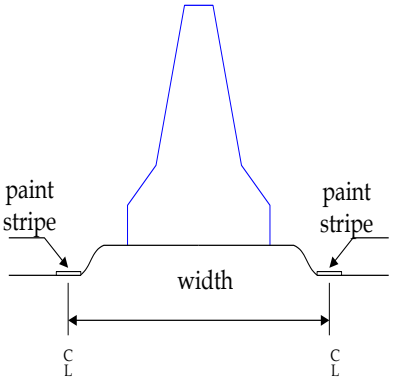
Description:

This item is used to record the width of the median, where applicable.

Procedure:

Enter the width of the median to the nearest foot. The median width is the distance between inside edges of through lanes.

This item should be coded for any feature intersected that is a highway on or under the bridge.



Coding:

The median width to the nearest foot. It is the distance between the inside edges of through lanes of roadways in opposite direction of travel. Measure from one paint stripe to the pain stripe on the opposite side of the median.

This subfield should be coded "0" when Item 6C25 is coded "6", "0", or "N".

6C27 ADTT - Average Daily Truck Traffic

Inventory > Features > Highway; BMS3: Features

Description:

This item is used to record the "current" average annual daily truck traffic volume.

Procedure:

This item will be automatically entered for state routes inventoried in RMS. For local and other routes, this item should be entered manually.

In those cases where a structure is carrying multiple state routes these values may have to be combined for FHWA reporting purposes.

Coding:

The average number of trucks per day.

6C28 ADTT Year - Year of Average Daily Truck Traffic

Inventory > Features > Highway; BMS3: Features

Description:

This item is used to record the "current" year of the ADTT count.

Procedure:

This item will be automatically entered for state routes inventoried in RMS. For local and other routes, this item should be entered manually. If this information is not available, a best estimate is recommended.

Coding:

The year of the average daily truck traffic.

6C29 (Not Used – Reserved for Future Use)

6C30 Gen Seg Ahead Lbl - General Segment Ahead Label

Inventory > Features > Highway

Description:

This item is used to record a description of the roadway segment ahead.

Procedure:

This item is automatically filled in by the system from APRAS.

6C31 User Seg Ahead Lbl - User Segment Ahead Label

Inventory > Features > Highway

Description:

This item is used to record a description of the roadway segment ahead.

Procedure:

Enter a description of the roadway segment ahead in narrative form.

6C32 Gen Seg Back Lbl - General Segment Back Label

Inventory > Features > Highway

Description:

This item is used to record a description of the roadway segment behind.

Procedure:

This item is automatically filled in by the system from APRAS.

6C33 User Seg Back Lbl - User Segment Back Label

Inventory > Features > Highway

Description:

This item is used to record a description of the roadway segment back.

Procedure:

Enter a description of the roadway segment back in narrative form.

6C34 Feature Type

Inventory > Features > Highway; Waterway Detail; Railroad Detail; Other; BMS3: Features

Description:

This item is used to record the description of the type of each feature.

Procedure:

This item will be automatically entered for state routes inventoried in RMS. For local and other routes, this item should be entered manually. Select the feature type for each "on" and "under" feature from the dropdown list. Features that are open to public traffic should be coded as "1-Highway". Features other than highways, railroads, and waterways that are not open to public traffic should be coded as "4-Other". Examples include private roads, pedestrian/bike routes, trails, canal towpaths, golf cart paths, airport runways, parking lots, conveyors, wildlife underpasses, wharfs, bluffs, etc.

Coding:

1 Highway
2 Railroad
3 Waterway
4 Other

6C35 Vert Clear Sign (L) - Vertical Clearance Signing Left

Inventory > Features > Highway; BMS3: Features

Description:

This item is used to record the presence of any vertical clearance posting sign for the feature identified under "Feature Description", Item 5C01. This field reflects the signage for the left roadway (southbound or westbound).

Procedure:

Select the appropriate code from the dropdown list. Vertical clearance posting signs are required when the actual vertical clearance is below 14'-6". The measurement on the sign should be recorded in Item 6C37. The actual vertical clearance measured in the field should be stored in Items 6C20 and 6C21.

Coding:

0 Signs not required and not existing
1 Signs required and existing
2 Signs required and not existing
3 Existing signs do not agree with the measurements and need to be replaced

Examples:

The vertical clearance measured between the roadway and the underside of the bridge was 14'-5". The vertical clearance posted on the sign should read 14'-2" or below to include the 3" buffer as described in Publications 236 and 238.

The vertical clearance measured between the roadway and the underside of the bridge was 14'-9". The vertical clearance is 14'-6", including the 3" buffer, which is 12" greater than the maximum legal height vehicle of 13'-6" and vertical clearance signage is not required.

6C36 Vert Clear Sign (R) - Vertical Clearance Signing Right

Inventory > Features > Highway; BMS3 - Features

Description:

This item is used to record the presence of any vertical clearance posting sign for the feature identified under "Feature Description", Item 5C01. This field reflects the signage for the right roadway (northbound or eastbound).

Procedure:

Select the appropriate code from the dropdown list. Vertical clearance posting signs are required when the actual vertical clearance is below 14'-6". The measurement on the sign should be recorded in Item 6C38. The actual vertical clearance measured in the field should be stored in Items 6C20 and 6C21.

Coding:

0 Signs not required and not existing
1 Signs required and existing
2 Signs required and not existing
3 Existing signs do not agree with the measurements and need to be replaced

Examples:

The vertical clearance measured between the roadway and the underside of the bridge was 14'-5". The vertical clearance posted on the sign should read 14'-2" or below to include the 3" buffer as described in Publications 236 and 238.

The vertical clearance measured between the roadway and the underside of the bridge was 14'-9". The vertical clearance is 14'-6", including the 3" buffer, which is 12" greater than the maximum legal height vehicle of 13'-6" and vertical clearance signage is not required.

6C37 Vert Clear Posting (L) - Vertical Clearance Sign Posting Left

Inventory > Features > Highway; BMS3 - Features

Description:

This item is used to record the measurement on any vertical clearance posting sign for the feature identified under "Feature Description", Item 5C01. This field reflects the signage for the left roadway (southbound or westbound).

Procedure:

This is a two-part field. Enter the feet in the first box and the inches in the second box.

Coding:

Enter the vertical clearance value displayed on the sign.

Example:

The vertical clearance sign shows a value of 14'-2". Enter 14' in the first box and 2" in the second box.

6C38 Vert Clear Posting (R) - Vertical Clearance Sign Posting Right

Inventory > Features > Highway; BMS3 - Features

Description:

This item is used to record the measurement on any vertical clearance posting sign for the feature identified under "Feature Description", Item 5C01. This field reflects the signage for the right roadway (northbound or eastbound).

Procedure:

This is a two-part field. Enter the feet in the first box and the inches in the second box.

Coding:

Enter the vertical clearance value displayed on the sign.

Example:
The vertical clearance sign shows a value of 13'-11". Enter 13' in the first box and 11" in the second box.

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7A Inspection Schedule

The Inspection Schedule Section contains information about the most recent inspection on the structure, as well as the dates of the next scheduled inspections. It also shows information on established policies for the structure regarding the interval of regular and special inspections, and estimated resource requirements. In this section of the ratings & schedule screen, inspection planning information is normally entered and updated.

*7A01 Inspection Date (Populated based on B.IE.02, refer to Appendix N)

Inspection > Ratings & Schedule; BMS3 Header

Description:

This item is used to record the date of the inspection of the bridge.

Procedure:

Enter the date (month-day-year) on which the bridge was last inspected. This date will typically be entered based on information from BMS3. Refer to Item IN16 in cases when probing of substructure units cannot be completed.

Coding:

The inspection date (month-day-year). Prefix with zeros where necessary.

Example:
Assume an inspection date of March 7, 1979: 03/07/1979

Note:
Code sign structures and retaining walls the same.

7A01e Inspection Completion Date

SNBI Field B.IE.03
Inspection > Ratings and Schedule; BMS3: Schedule

Description:

This item is used to record the overall end date of the inspection record for the given structure.

Procedure:

This item is **automatically filled in by the system** based on the maximum end date (B.IE.03) of the individual inspection types entered (B.IE.01).

Coding:

The inspection date (mm/dd/yyyy). Prefix with zeros where necessary.

Example:
B.IE.03 value for the Underwater Inspection: 03/24/2023
B.IE.03 value for the Other Special (Interim) Inspection: 03/26/2023

Code 03/26/2023 for this item.

7A02 Team Leader (Populated based on B.IE.04, refer to Appendix N)

Inspection > Ratings & Schedule; BMS3: Ratings

Description:

This item is used to record the name of the team leader who performed the bridge inspection.

Procedure:

Select the name of the team leader who performed the inspection from the dropdown list.

Coding:

Name of team leader who performed the current inspection.

*7A03 Primary Type - Primary Type of Inspection

(Populated based on B.IE.01, refer to Appendix N)

Inspection > Ratings & Schedule; BMS3: Header and Ratings

Description:

This item is used to record the primary type of inspection that was performed on the bridge.

Procedure:

Select the code for Item 7A03 from the following table that identifies the type of inspection that was performed on the bridge. For each inspection type, the tables identifies:

- Its applicability to fulfill the various types of NBI/NTI Compliance Inspections.
- Its applicability to meet the required intervals for the 24/48 month NBI/NTI inspection and/or reduced interval inspections.
- The coding of checkboxes for Item 7A06.
- The coding is also applicable for inspection types in Items 6B20, IW01, and IS01.

These tables are a duplicate of Tables IP 2.3.6.6-1 and 2.3.6.6-2 of Pub 238. For further discussion of inspection types, NBIS compliance and intervals, see Pub 238 IP 02.3.

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Coding:

7A03	Primary Inspection Type**	Meets requirements NBI 24/48 months	Meets requirements OS ≤ 24 months	Checkboxes for 7A06 Inspection Performed: NBI	FC	Underwater	Other Special	Element	7A06 Coding – See Examples after Item 7A09 ☑ Performed – Check box of inspections performed ☐ Not Performed – Uncheck the box ☐ CHECKED/UNCHECKED, AS PERFORMED If performed, check the box. ☑ If NOT performed, uncheck the box. ☐
R	**Routine**	YES	YES	☑	☐	☐	☐	☐	– **NBI Inspection#** – Must include hands-on for FCMs as per Fatigue & Fracture (F&F) Plan – Other Special (Interim) Inspection also checked when this inspection type is used to satisfy reduced interval – May include element insp., probing of substructure
C	**Routine Using Crane**	YES	YES	☑	☐	☐	☐	☐	– **NBI Inspection#** – A complete routine inspection of bridges where the inspection crane is utilized – Other Special (Interim) Inspection also checked when this inspection type is used to satisfy reduced interval – Must include hands-on for FCMs as per F&F Plan
I	**Other Special (Interim)**	NO	YES	☐	☐	☐	☑	☐	– **NOT an NBI Inspection#** – Use ONLY to meet reduced interval for Other Special (Interim) Inspections – Must include hands-on for FCMs as per F&F Plan
F	**Initial (First Time)**	YES	Not Appl.	☑	☐	☐	☐	☐	– **NBI Inspection#** – 1st time inspection of new or re-constructed bridge – 48 month NBI interval does not apply to Initial (First Time) Inspection type – Must include hands-on for FCMs as per F&F Plan
U	**Underwater Only (DIVING)**	NO	YES	☐	☐	☑	☐	☐	– **NOT an NBI Inspection#** – Meets NBIS requirements for UW Inspection only – Stand-alone underwater inspection by DIVING – Add a separate inspection 7A03 = I if the OS(I) scope extends beyond the "underwater only" inspection
W	**Routine with Underwater (DIVING)**	YES	YES	☑	☐	☑	☐	☐	– **NBI Inspection#** – Meets requirements of Routine Inspection – Includes underwater inspection (by DIVING). – Must include hands-on for FCMs as per F&F Plan – Other Special (Interim) Inspection also checked when this inspection type is used to satisfy reduced interval
A	**Access Equipment Only**	NO	NO	☐	☐	☐	☐	☐	– **Not an NBI Inspection#** – Limited inspection with special access equipment – If used to meet reduced interval of Other Special (Interim) Inspections, set Inspection Type 7A03 = I
B	**Damage**	NO	NO	☐	☐	☐	☐	☐	– **Not an NBI Inspection#** – Limited to damaged elements – **If used to meet reduced interval of Other Special (Interim) Inspections, set Inspection Type 7A03 = I or U if completed by divers.** – Check the 7A06 and 7A07 boxes for Other Special when initiating a newly required reduced inspection interval – Typical uses: Collision damage and post-flood

TABLE PAGE 1 OF 2

****Item 7A03 Inspection Types R, C, F, U, W, B, & P may also be used for 8'-20' bridges (non-NBIS length)**
 # Record crane or equipment use on BMS2 Inspection Planning Screen

		Meets requirements		Checkboxes for 7A06 Inspection Performed					7A06 Coding – See Examples after Item 7A09 ☑ Performed – Check box of inspections performed ☐ Not Performed – Uncheck the box ☐ CHECKED/UNCHECKED, AS PERFORMED If performed, check the box. ☑ If NOT performed, uncheck the box. ☐
		NBI	OS						
7A03	Primary Inspection Type**	24/48 months	≤ 24 months	NBI	FC	Underwater	Other Special	Element	
D	**In-Depth**	NO	NO	☐	☐	☐	☐	☐	– **Not an NBI Inspection#** – Inspection limited to portions of bridge – If Inspection scope suffices for NBI inspection, code Inspection Type 7A03 = R, C or W – If used only to meet a more frequent Other Special (Interim) Inspection, set Insp. Type 7A03 = I
E	**Element Inventory Only**	NO	NO	☐	☐	☐	☐	☐	– **Not an NBI Inspection#** – Inventory only of element level data.
G	**Fracture Critical**								– **NOT AVAILABLE FOR NEW INSPECTIONS** – Maintained for historical information only of code identification from superseded BMS AJ screen.
P	**Problem Area**	NO	NO	☐	☐	☐	☐	☐	– **NOT an NBI Inspection#** – One time inspection limited to critical area(s). – **If used to meet reduced interval for Other Special (Interim) Inspection, set 7A03 = I or U if completed by divers.**
Z	**Inventory Only**	NO	NO	☐	☐	☐	☐	☐	– **Not an NBI Inspection#** – Used for inventory all bridges and other structures
H	**Highway Environs Only**	NO	NO	☑	☐	☐	☐	☐	– Inspection of non-highway bridges/structures over highways. Inspection limited to highway environs. #
L	**High Mast Light Poles**	NO	NO	☐	☐	☐	☐	☐	– Add "checkmark" to 7A06 NBI only if IS01 = A or D which are NBI-like Inspection of high mast light poles, their foundations, anchor bolts and other components. #
M	**Miscellaneous**	NO	NO	☑	☐	☐	☐	☐	– NBI-like inspection of other miscellaneous structures NOT over highways, including Pedestrian bridges, Rail bridges, etc. #
O	**Overhead Non-Highway**	NO	NO	☑	☐	☐	☐	☐	– NBI-like inspection of structural components of overhead non-highway bridges. #
S	**Sign Structure**	NO	NO	☐	☐	☐	☐	☐	– Add "checkmark" to 7A06 NBI only if IS01 = A, B, C, or D which are NBI-like inspection for sign structures. #
T	**Retaining and Noise Wall**	NO	NO	☐	☐	☐	☐	☐	– Add "checkmark" to 7A06 NBI only if IW01 = F, R, or D which are NBI-like inspection for retaining walls and noise walls. #
X	**Unknown**	NO	NO	☐	☐	☐	☐	☐	– Generally, this applies to an errant record only. #

TABLE PAGE 2 OF 2

****Item 7A03 Inspection Types R, C, F, U, W, B, & P may also be used for 8'-20' bridges (non-NBIS length)**

 # Record crane or equipment use on BMS2 Inspection Planning Screen

See examples after Item 7A09

7A03	Primary Inspection Type**	Meets requirements NTI: 24-month	Meets requirements OS: ≤ 24 months	Checkboxes for 7A06 Inspection Performed: NTI	FC	Underwater	Other Special	Element	7A06 Coding – See Examples in Pub 100A ☑ Performed – Check box of inspections performed ☐ Not Performed– Uncheck the box ☐ CHECKED/UNCHECKED, AS PERFORMED If performed, check the box. ☑ If NOT performed, uncheck the box. ☐
R	**Routine**	YES	YES	☑	☐	☐	☐	☑	– **NTI Inspection#** – Other Special (Interim) Inspection also checked when this inspection type is used to satisfy reduced interval – All tunnel inspections qualify as element level
F	**Initial (1st Time)**	YES	Not Appl	☑	☐	☐	☐	☑	– **NTI Inspection#** – 1st time inspection of new or re-constructed tunnel – All tunnel inspections qualify as element level
I	**Other Special (Interim)**	NO	YES	☐	☐	☐	☑	☑	– **Not an NTI Inspection#** – Use ONLY to meet reduced interval for Other Special (Interim) Inspections – All tunnel inspections qualify as element level
B	**Damage**	NO	NO	☐	☐	☐	☐	☑	– **Not an NTI Inspection#** – Limited to damaged elements or systems – **If used to meet reduced interval of Other Special (Interim) Inspections, set Inspection Type 7A03 = I** – Check the 7A06 and 7A07 boxes for Other Special when initiating a newly required reduced inspection interval – Typical uses: Collision damage – All tunnel inspections qualify as element level
D	**In-Depth**	NO	NO	☐	☐	☐	☐	☑	– **Not an NTI Inspection#** – Inspection limited to portions of bridge. – If Inspection scope suffices for NBI inspection, code Inspection Type 7A03 = R, C, or W – If used only to meet a more frequent Other Special (Interim) Inspection, set Insp. Type 7A03 = I All tunnel inspections qualify as element level

 # Record special equipment use on the Inspection Planning Screen in BMS2

Old BMS codes for inspection types prior to 2006 (included here for information only):

1 Initial NBIS
2 Regular NBIS
3 Regular NBIS including underwater

Codes 4-9 special inspections

4 Problem areas only (existing and/or potential)
5 Special areas only – management directed
6 Personnel lift only
7 Inspection crane only
8 Rigging only
9 Underwater only

7A04 Review Required

Inspection > Ratings & Schedule

Description:

This checkbox field is used to indicate whether or not the inspection results should be reviewed.

Procedure:

This item will not be used by PennDOT. No entry is required.

7A05 Inspected By - Inspection Performed By

Inspection > Ratings & Schedule; BMS3: Ratings

Description:

This item is used to record the name of the responsible group that inspected the bridge. If a Department or other owner's inspection team performed the inspection then team member names, initials, or just the name of the team leader may be inserted here.

Procedure:

Enter the name of the consulting firm, inspector names, initials, or other identifiers.

Coding:

A-Z	Letter assigned by District to individual Department Force Inspection Team
1	PennDOT (codes A-Z may be used instead)
2	County
3	City, Borough, or Township
4	PA Turnpike Commission
5	Delaware River Joint Toll Bridge Commission
6	Other State Agency
7	Railroad
8	Consulting Firm
9	Other (includes Federal Agency)

7A05a Inspection Organization Name – Team Leader Organization

Inspection > Ratings & Schedule; BMS3: Schedule

Description:

This item is used to record the name of the organization associated with the team leader who inspected the bridge. This data is collected from ECMS and is associated with the individual team leaders within Item 7A02.

Procedure:

This item will be **automatically filled in by the system** based on the name selected in Item 7A02. Within BMS2, this field will update on saving the screen. Within BMS3, the field will update immediately upon the selection of a new team leader.

Coding:

PennDOT or Business Partner Name.

*7A06 Inspection Performed - Type of Compliance Inspections Performed

(Populated based on B.IE.01, refer to the field later in this section)

Inspection > Ratings & Schedule; BMS3: Schedule

Description:

This series of five checkbox fields is used to indicate which types of Compliance Inspections have been performed during the current inspection: National Bridge Inventory (NBI), NSTM, Underwater, Other Special, and Element. See Publication 238, Section IP 2.3 - General Types of Bridge Safety Inspections for more discussion of Compliance Inspections.

Procedure:

The inspector must check the appropriate data box(es) to indicate each type of inspection performed. See the Table for Item 7A03 for coding checkbox Item 7A06 in conjunction with Item 7A03 Primary Inspection Type. **If completing an Element Level inspection, the inspector MUST check the Element Box for Item 7A06 or the data will not be uploaded to BMS2 and will not appear on the Elements screen.**

- Multiple data boxes for Item 7A06 can be checked for a single inspection date.
  - For example: NBI, NSTM, and Element would be checked if inspections of that type were performed on the same date.
- When divers are used for Underwater Inspections (either diving or probing):
  - Check the data box for Underwater in Item 7A06.
- When probing by an inspector is used as the method of access to inspect the submerged portions of substructure units during a Routine Inspection, Item 7A03 = R, C, or F.
  - Uncheck the data box for Underwater in Item 7A06.
- When a reduced inspection interval is required by Table 2.3.2.4-1 and inspection performed meets the requirements of a Routine Inspection, Item 7A03 = R, C, or W:
  - Check the data boxes for NBI and Other Special in Item 7A06.
  - Check the data box for NSTM in Item 7A06 when a hands-on inspection is performed on bridges with FCMs.
- When a reduced inspection interval is required by Table 2.3.2.4-1 and the inspection performed meets the requirements of an Interim inspection, Item 7A03 = I:
  - Check the data box for Other Special in Item 7A06.
  - Check the data box for NSTM in Item 7A06 when a limited-scope hands-on inspection is performed on bridges with FCMs.
  - Uncheck the NBI data box.
- When a reduced inspection interval is required by Table 2.3.2.4-1 and the inspection performed is completed by divers and meets the requirements of an Interim inspection, Item 7A03 = U:
  - Check the data box for Other Special and Underwater in Item 7A06.
  - Uncheck the NBI data box.
- When "NBI-like" Inspections are performed on non-NBIS bridges or other structures (sign structures, high mast light poles, walls, etc.)
  - Check the data boxes for NBI in Item 7A06.
  - "NBI-like" inspections are not reported to FHWA because it is not an NBIS bridge, Item 5E01=N.
- When an Element Inspection was performed:
  - Check the data box for Element in Item 7A06.
  - The updated element information will upload to BMS2 during the BMS3 submission.
- When an Element Inspection was NOT performed:
  - Uncheck the data box for Element in Item 7A06.
  - *Inspectors were previously instructed to check the data box if an Element Inspection was not completed*; BMS3 release 3.0.1 removed this requirement.
- Inspectors are no longer required to add notes to Item 2A02 if an Element Inspection is not completed.

Coding:

For each inspection type (NBI, Element, NSTM, Underwater, or Other Special):

Unchecked	Inspection of this type was not performed
Checked	Inspection of this type was performed

Examples: See examples after Item 7A09

*7A07 Required (Y/N) - Required Inspections

(Populated based on Item 7A57, refer to the field later in this section)

Inspection > Ratings & Schedule; BMS3: Schedule

Description:

This series of three checkbox fields is used to indicate whether or not NSTM, Underwater, and/or Other Special inspections are required for the structure under the NBIS regulations for Critical Feature Inspections. When checked as being required, these inspections are reported to FHWA as Special Feature Inspections in NBI Items 92 and 93.

Procedure:

This data should be established prior to the inspection and reviewed after the inspection for any necessary revisions.

The appropriate boxes should be checked or unchecked to indicate whether NSTM, Underwater and/or Other Special inspections are required for the structure at the interval specified in Item 7A09.

- NBI inspections are required for all bridges, so no check box is needed or provided.
- NSTM inspections are required for all bridges with FCMs. Item 6A44 < 5.
- Underwater inspections are required when the underwater portions of a substructure unit cannot be inspected using wading techniques; a diver is needed to perform the inspection.
- Other Special Inspections are to be required when bridge conditions necessitate a reduced interval inspection (< 24 month NBI) to ensure the bridge's safety. Publication 238, Table IP 2.3.2.4-1 identifies the bridge conditions that necessitate a reduced interval inspection.
- Element inspections are not currently required by NBIS, so no inspection required check box is provided. Element inspections may be required by Department policies or inspection agreement.

For additional discussion of policies and procedures for required inspections, see Publication 238, Section IP 2.3.

Once entered into BMS2, Item 7A07 for the 4 compliance inspection types is copied by BMS2/BMS3 for the subsequent inspections.

Note:
Having a data box checked in Item 7A07 to indicate a required Compliance Type inspection does not necessarily mean that each required inspection type must be performed for every inspection. The required types of inspection due at each inspection will be governed by the inspection interval specified in Item 7A09.

Coding:

For each inspection type (NSTM, Underwater, Other Special):

Unchecked	Inspection of this type is not required
Checked	Inspection of this type is required

Examples: See examples after Item 7A09

*7A08 Last Dt - Last Inspection Date

(Populated based on Item 7A58, refer to the field later in this section)

Inspection > Ratings & Schedule; BMS3: Schedule

Description:

This series of five fields (for NBI, NSTM, Underwater, Other Special and Element) is used to record the date of the last accepted inspection for the structure, by type of inspection.

Procedure:

Item 7A08 is calculated based on the last accepted inspection. For Item 7A08 to calculate correctly, current and previous inspection must have the correct boxes checked for Item 7A06. Refer to the tables in Item 7A03 in this manual for which check boxes should be checked on each inspection type. Discrepancies shall be reported to the BMS2 coordinator.

Coding:

Date of last inspection in MM/DD/YYYY format.

*7A09 Freq - Inspection Interval

(Populated based on Item 7A59, refer to the field later in this section)

Inspection > Ratings & Schedule; BMS3: Schedule

Description:

This series of five fields is used to specify the number of months between inspections, by type of inspection.

Procedure:

This data should be established prior to the inspection and reviewed after the inspection for any necessary revisions for future inspections.

Enter the number of months from the last until the next inspection is due for each inspection type: NBI, Element, NSTM, Underwater, and Other Special.

For non-bridge structures, Item 7A09 NBI value is also to be entered into the inspection interval data field for each type of structure: Sign structures in Item IS13, high mast light poles in Item IS13, and walls in Item IW13.

Coding:

Number of months for each inspection type.

NBI:

- Refer to Publication 238 Table 2.3.2.4-1 for the maximum interval for Routine inspections.
- When a reduced interval inspection is required by bridge conditions, per Table 2.3.2.4-1, the NBI interval = 24 months.
- For other structures (sign structures, high mast light poles, walls, etc.), Item 7A09 NBI is to be set to required interval for that structure type and condition.

NSTM:

- A NSTM inspection interval is required for all bridges with NSTM's.
- A reduced inspection interval, per Pub 238 Table IP 2.3.2.4-1, can be required due to certain condition ratings of the superstructure. The scope and intensity of the NSTM inspection is to be specified in the Fatigue & Fracture Inspection Plan.
- When a bridge with NSTMs has a reduced inspection interval due to conditions not related to the NSTM, NSTM Inspection interval can be greater than Other Special interval. For example, a two-span NSTM bridge with superstructure in good condition but with a temporary support at pier due to deterioration of concrete pedestal, Item 7A09 values would be:
  - NBI = 24 months
  - NSTM = 24 months
  - Other Special = 6 months

Underwater:

- Refer to Publication 238, Table IP 2.6.2.4-1, for required underwater inspection intervals.

Other Special:

- When bridge conditions warrant reduced inspection intervals as outlined in Publication 238, Table 2.3.2.4-1.

Element:

- For bridges that require an element level inspection, the interval is identical to the NBI inspection interval.

INTERVAL NOTES:

1. If Item 7A07 = Unchecked box, then Item 7A09 = -1 (by default).
2. Other Special inspections and NBI inspections will both be required on same date when the Other Special interval is a factor of 24 months. See Item 7A06 for related instructions.
3. Do NOT Use intervals of 24 months for both NBI and Other Special inspections by scheduling the inspections in alternating years so the apparent result is 12-month intervals. This practice results in NBI Item 92 errors. The correct values for Item 7A09 are NBI = 24 months and Other Special = 12 months.

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Examples of Coding for Items 7A03, 7A06, 7A07, and 7A09: (Refer to the examples after B.IE.01 in App. N)

	Examples for Coding Scheduling and Compliance Data including: 7A03, 7A06, 7A07, and 7A09	Compliance Inspection Type	7A07 Insp Req'd	7A09 Insp Int'l	7A06 Insp Perf'd
1.	**Routine inspection of a state-owned 168' long through truss carrying a highway over a stream.** • Fracture Critical Bridge - not weight restricted. • Bridge does not meet extended inspection interval requirements (Superstructure is Fracture Critical). • Super and sub conditions do not warrant inspection interval < 24 months. • Substructure units can be inspected by wading and probing. • An element inspection was required and performed. • Inspection crane utilized. *Primary Inspection Type 7A03 = C*	**NBI**		24	☑
		Fracture Critical	☑	24	☑
		Underwater	☐	-1	☐
		Other Special	☐	-1	☐
		Element	☑	24	☑
		Note: For 7A09 UW and OS, see Pub 238 Tables IP 2.3.2.4-1 and 2.6.2.4-1 (Typical).			
2.	**Routine inspection of a 98' long state-owned GFS bridge over a stream.** • Fracture Critical Bridge. Conditions: Super 4, Sub 6 • Bridge does not meet extended inspection interval requirements (Superstructure is Fracture Critical). • Weight restricted – Posted for 20 Tons due to loss of section in fracture critical floorbeams. • Rigging used to access fracture critical members. • Substructure units can be inspected by wading and probing. • An element inspection was required and performed. *Primary Inspection Type 7A03 = R*	**NBI**		24	☑
		Fracture Critical	☑	12	☑
		Underwater	☐	-1	☐
		Other Special	☑	12	☑
		Element	☑	24	☑
3.	**Routine inspection of a state-owned 72' long P/S concrete spread box beam bridge carrying a highway over a stream.** • Bridge does not meet extended inspection interval requirements (Superstructure Condition Code is 5). • No FCMs - Not weight restricted. • Super and sub conditions do not warrant inspection interval < 24 months. • Substructure units can be inspected by wading and probing. • An element inspection was required and performed. *Primary Inspection Type 7A03 = R*	**NBI**		24	☑
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☐	-1	☐
		Element	☑	24	☑
4.	**In-Depth inspection of a local, non-NHS, 86' GFS bridge carrying a highway over a stream. In-Depth inspection met all requirements for NBI inspection.** • Fracture Critical - Not weight restricted. • Bridge does not meet extended inspection interval requirements (Local Bridge). • Super and sub conditions do not warrant inspection interval < 24 months. • Rigging used to access fracture critical members. • Substructure units can be inspected by wading and probing. • An element inspection was not required and not performed. *Primary Inspection Type 7A03 = R*	**NBI**		24	☑
		Fracture Critical	☑	24	☑
		Underwater	☐	-1	☐
		Other Special	☐	-1	☐
		Element	☐	-1	☐

Examples of Coding for Items 7A03, 7A06, 7A07, and 7A09: (Refer to the examples after B.IE.01 in App. N)

	Examples for Coding Scheduling and Compliance Data including: 7A03, 7A06, 7A07, and 7A09	Compliance Inspection Type	7A07 Insp Req'd	7A09 Insp Int'l	7A06 Insp Perf'd
5.	**In-Depth inspection of a local, NHS, 40′ RC T-Beam carrying a highway over stream. Inspection limited to hands-on inspection of beams only.** • Bridge does not meet extended inspection interval requirements (Local Bridge). • No FCMs – Not weight restricted. • Super and sub conditions do not warrant inspection interval < 24 months. • Substructure units not inspected. • An element inspection was performed in the past, but not updated at this time. ***Primary Inspection Type 7A03 = D***	**NBI**		24	☐
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☐	-1	☐
		Element	☑	24	☐
6.	**Other Special (Interim) inspection of a state-owned, 120′ long steel multi-girder bridge over a stream.** • No FCMs – Weight restricted "One truck at a time" posting. • Bridge does not meet extended inspection interval requirements (Bridge is Posted). • Super and substructure in FAIR condition. • Substructure units can be inspected by wading and probing. • An element inspection performed in past, but not updated at this time. ***Primary Inspection Type 7A03 = I***	**NBI**		24	☐
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☑	12	☑
		Element	☑	24	☐
7.	**Underwater inspection by divers of a local NHS, 70′ long steel multi-girder bridge carrying a highway over a stream.** • No FCMs – Weight restricted "One truck at a time" posting. • Super and substructure in FAIR condition. • 4A08 SCBI = 3; Minimum water depth at far abutment = 5′. • Bridge does not meet extended inspection interval requirements (SCBI < 5). • An element inspection performed in past, but not updated at this time. ***Primary Inspection Type 7A03 = U***	**NBI**		24	☐
		Fracture Critical	☐	-1	☐
		Underwater	☑	24	☑
		Other Special	☑	12	☐
		Element	☑	24	☐
		Note: Engineer-In-Charge required UW inspection due to water depth poor visibility through water that prevented direct observation of NAB & FAB.			
8.	**Routine inspection of 100′ steel 4 chord truss overhead sign structure over highway.** • Built in 2000. • IS10 Overall Condition = 8 Very Good. • Element inspection – not applicable. ***Primary Inspection Type 7A03 = S***	**NBI**		72	☑
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☐	-1	☐
		Element	☐	-1	☐
9.	**Routine inspection of a state-owned, 60′ long P/S concrete spread box beam bridge carrying a highway over a stream.** • Bridge meets all criteria for extended inspection interval as outlined in Pub 238 Table 2.3.2.4-1. • Substructure units can be inspected by wading and probing. • An element inspection was required and performed. ***Primary Inspection Type 7A03 = R***	**NBI**		48	☑
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☐	-1	☐
		Element	☑	48	☑

Examples of Coding for Items 7A03, 7A06, 7A07, and 7A09: (Refer to the examples after B.IE.01 in App. N)

	Examples for Coding Scheduling and Compliance Data including: 7A03, 7A06, 7A07, and 7A09	Compliance Inspection Type	7A07 Insp Req'd	7A09 Insp Int'l	7A06 Insp Perf'd
10.	**Inspection of completed repairs to stringer ends of 120' long GFS, local, non-NHS bridge.** • Bridge does not meet extended inspection interval requirements (Local Bridge). • Inspection was done 3 months after last Other Special (Interim) and 9 months before next NBI. • Bridge closed for repairs – this inspection is needed to verify repair has made bridge safe to re-open. • Repair consisted of reinforcing deteriorated web of several stringers with steel plates at both ends of main girder (under expansion dam). Re-rating required. • An element inspection is not required. ***Primary Inspection Type 7A03 = P***	**NBI**		24	☐
		Fracture Critical	☑	12	☐
		Underwater	☐	-1	☐
		Other Special	☑	12	☐
		Element	☐	-1	☐
		Note: FC inspection not checked for 7A06 because repairs were to non-FCMs.			
11.	**Initial inspection of a posted, local, NHS, pony truss bridge <u>after</u> its superstructure has been replaced.** • Bridge does not meet extended inspection interval requirements (Bridge must receive an Initial and one Routine separated by 24 months in order to qualify). • The new superstructure is a multi-girder P/S beam type with no load posting. • Prior to rehab, the 7A07 box would have been checked for Fracture Critical and Other Special (Interim) with 12-month intervals in 7A09. • The 7A07 and 7A09 data has been revised for the new super. • The BRKEY for the original bridge structure will be maintained. Inventory items are reviewed and updated. This inspection is needed to verify substantive repair has made bridge safe to re-open. • Initial inspection (7A03 = F) done prior to re-opening – used to record changes in inventory data. • An element inspection was required and performed. • Posting lifted as result of rehab. Fracture Critical and Other Special (Interim) inspections no longer required. ***Primary Inspection Type 7A03 = F***	**NBI**		24	☑
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☐	-1	☐
		Element	☑	24	☑
		Note: Prior to rehab, 7A07 FC box and OS box would have been checked to indicate old super was FC and posted. New super is not FC and will not be posted, so unchecked 7A07 FC and OS is correct after rehab. Update of inventory data by inspection reviewer will require un-checking the 7A07 FC and OS boxes and changing 7A09 FC and OS = -1. The above inspector codes for 7A06 to reflect inspection performed <u>after</u> rehab.			
12.	**Inspection of a state-owned, steel multi-girder bridge with an SCBI = 2, requiring an Other Special (Interim) Inspection due to undermining of the Near Abutment with a water depth of 6'.** • Bridge does not meet extended inspection interval requirements (SCBI < 5 and Substructure Condition Code < 6). • The bridge requires an underwater inspection by divers due to the water depth. • The substructure is in CRITICAL condition. • Serious undermining of the Near Abutment was recorded by the divers. • The bridge will continue to require a reduced interval inspection of the Near Abutment until repairs are made. • An element inspection performed in past, but not updated at this time. ***Primary Inspection Type 7A03 = U***	**NBI**		24	☐
		Fracture Critical	☐	-1	☐
		Underwater	☑	6	☑
		Other Special	☑	6	☑
		Element	☑	24	☐

Examples of Coding for Items 7A03, 7A06, 7A07, and 7A09: (Refer to the examples after B.IE.01 in App. N)

	Examples for Coding Scheduling and Compliance Data including: 7A03, 7A06, 7A07, and 7A09	Compliance Inspection Type	7A07 Insp Req'd	7A09 Insp Int'l	7A06 Insp Perf'd
13.	**Damage inspection of a state-owned, steel, multi-girder structure, with impact damage to a fascia girder.** • Fascia girder struck by an overheight vehicle. The impact damaged caused a tear in the girder. • The ends of the tear have been clearly marked to monitor for future growth. • The owner has determined a reduced interval is required to monitor the size of the tear. • Bridge does not meet extended inspection interval requirements (Reduced interval required). • The 7A06, 7A07, and 7A09 Other Special boxes have been checked and an interval has been entered in 7A09 Other Special to show a more frequent inspection interval is required and has been started with this inspection. • An element inspection performed in past, but not updated at this time. ***Primary Inspection Type 7A03 = B***	**NBI**		24	☐
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☑	6	☑
		Element	☑	24	☐
14.	**Other Special (Interim) inspection of a state-owned, 24' long multi-steel girder bridge with a steel open grid deck carrying a highway over a stream.** • Deck is in POOR condition; superstructure and substructure are in FAIR condition. • Bridge meets reduced interval of inspection requirements (Deck condition < 5 for steel open grid deck). • Substructure units can be inspected by wading and probing. • An element inspection performed in past, but not updated at this time. ***Primary Inspection Type 7A03 = I***	**NBI**		24	☐
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☑	12	☑
		Element	☑	24	☐
15.	**Routine inspection of a state-owned, 22' long metal arch culvert carrying a highway over a stream.** • Culvert is in SERIOUS condition. • Culvert meets reduced interval of inspection requirements (Culvert Condition < 4 and 6A29 = 30, 32, 33, or 35). • Culvert can be inspected by wading and probing. • An element inspection is required and performed. ***Primary Inspection Type 7A03 = R***	**NBI**		24	☑
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☑	6	☑
		Element	☑	24	☑
16.	**Routine inspection of a state-owned, 12' long precast concrete arch culvert carrying a highway over a stream.** • Culvert is in good condition. • The bridge is considered scour critical (SCBI = 3) and therefore not eligible for extended interval inspections. • Culvert can be inspected by wading and probing. • An element inspection is required and performed. ***Primary Inspection Type 7A03 = R***	**NBI**		24	☑
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☐	-1	☐
		Element	☑	24	☑

Examples of Coding for Items 7A03, 7A06, 7A07, and 7A09: (Refer to the examples after B.IE.01 in App. N)

	Examples for Coding Scheduling and Compliance Data including: 7A03, 7A06, 7A07, and 7A09	Compliance Inspection Type	7A07 Insp Req'd	7A09 Insp Int'l	7A06 Insp Perf'd
17.	**Routine inspection of a state-owned, 32′ long, two-span steel I-Beam bridge carrying a highway over a stream.** • The bridge is in overall good condition. • The water around the pier was over 4′ deep during this inspection and probing could not be completed. • A follow-up inspection was scheduled at 3-months to return for the completion of the probing around the pier.* • IN16 for the pier was set to D – Incomplete, Return during Low Water • An element inspection is required and performed. ***Primary Inspection Type 7A03 = R***	**NBI**		24	☑
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☑	3	☑
		Element	☐	24	☑
18.	**A follow-up inspection of a state-owned, 32′ long, two-span steel I-Beam bridge carrying a highway over a stream because the water depth was too high for probing during the last Routine.** • The bridge is in overall good condition. • The water around the pier was over 4′ deep during this inspection and probing could not be completed during the last Routine inspection. • Probing was completed. • IN16 for the pier was set to F – Probing Completed. • The Other Special (Interim) interval is removed because a future inspection is not required, and the required box unchecked. • An element inspection is not required and not performed. ***Primary Inspection Type 7A03 = I***	**NBI**		24	☐
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☐	-1	☑
		Element	☐	24	☐
19.	**Other Special (Interim) inspection of a 9′ long state-owned metal arch culvert over a stream.** • The culvert is in poor condition (Super = 4) • Bridge does not meet extended inspection interval requirements (Superstructure is poor condition). • Super condition warrants a reduced interval of 12 months. • Substructure units can be inspected by wading and probing. • An element inspection is not required and not performed. ***Primary Inspection Type 7A03 = I***	**NBI**		24	☐
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☑	12	☑
		Element	☐	24	☐
20.	**Routine inspection of a 19′ long state-owned concrete slab over a pedestrian walkway.** • The bridge is in good condition (Deck/Super/Sub = 7/8/6) • Bridge meets extended inspection interval requirements. • Substructure units can be inspected by wading and probing. • An element inspection is required and was performed. ***Primary Inspection Type 7A03 = R***	**NBI**		48	☑
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☐	-1	☐
		Element	☑	48	☑

Examples of Coding for Items 7A03, 7A06, 7A07, and 7A09: (Refer to the examples after B.IE.01 in App. N)

	Examples for Coding Scheduling and Compliance Data including: 7A03, 7A06, 7A07, and 7A09	Compliance Inspection Type	7A07 Insp Req'd	7A09 Insp Int'l	7A06 Insp Perf'd
21.	**Inspection of a state-owned, steel multi-girder bridge with an outstanding priority 1 maintenance item, requiring an Other Special (Interim) Inspection to monitor the condition of the priority 1 defect.** • The bridge is in fair condition (Deck/Super/Sub = 5/5/5) • The bridge is not posted for weight restriction. • Bridge does not meet extended inspection interval requirements. • An element inspection performed in past, but not this inspection. ***Primary Inspection Type 7A03 = I***	**NBI**		24	☐
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☑	6	☑
		Element	☑	24	☐
22.	**Follow-up Problem Area Inspection of a state-owned, steel multi-girder bridge to verify the completion of a priority 1 maintenance item. The maintenance was addressed, and Problem Area Inspection was completed 2 months after the need was identified.** • The bridge is in fair condition (Deck/Super/Sub = 5/5/5) • The bridge is not posted for weight restriction. • Bridge does not meet extended inspection interval requirements. • The priority maintenance item was completed, and the bridge no longer requires an Other Special (Interim) inspection. The scheduled 6-month Interim inspection has been removed. • # notes were added to the priority maintenance item and it was marked completed. • An element inspection performed in past, but not updated at this time. ***Primary Inspection Type 7A03 = P***	**NBI**		24	☐
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☐	-1	☐
		Element	☑	24	☐
23.	**Follow-up Problem Area Inspection of a state-owned, steel multi-girder bridge to verify the completion of a priority 1 maintenance item. The maintenance was addressed, and Problem Area Inspection was completed 8 months after the need was identified during the last routine inspection (2 months after the 6-month Other Special (Interim) to monitor the priority 1 maintenance item).** • The bridge is in poor condition (Deck/Super/Sub = 4/4/4) • The bridge is posted for a weight restriction. • Bridge does not meet extended inspection interval requirements. • The priority maintenance item was completed, and the bridge no longer requires a 6-month interval Other Special (Interim) inspection. However, a 12-month interval Other Special (Interim) inspection is required for the load posting. Therefore, a 6-month Other Special (Interim) has been scheduled to keep the bridge on a normal 12-month inspection interval (Note, a 6-month interval is based on the time between the last interim and the next required interim for the load posting). • # notes were added to the priority maintenance item and it was marked completed. • An element inspection performed in past, but not updated at this time. ***Primary Inspection Type 7A03 = P***	**NBI**		24	☐
		Fracture Critical	☐	-1	☐
		Underwater	☐	-1	☐
		Other Special	☑	6	☐
		Element	☑	24	☐

* Alternatively, the Bridge Owner can elect to keep the inspection in submitted status and update the record upon completion of the probing within 3-months after the inspection begun. Refer to Item IN16 for additional guidance.

*7A10 Next Dt - Next Inspection Date (Populated based on Item 7A60, refer to Appendix N)

Inspection > Ratings & Schedule; BMS3: Schedule

Description:

This series of five fields is used to record the date of the next required inspection by type of inspection.

Procedure:

This data should be reviewed prior to the inspection and reviewed after the inspection for any necessary revisions for future inspections.

Enter the date of the next required inspection relative to the current inspection shown for the selected structure. This date may be entered directly or calculated by the system by pressing the calculate button to the right of the "Next Inspection Date" label. For the calculate button to forecast the correct date, the scheduling data in Items 7A01, 7A07, 7A08, and 7A09 must be accurate.

For non-bridge structures, the 7A10 NBI value is also to be entered into the next inspection date data field for each type of structure: Sign structures in Item IS14, high mast light poles in Item IS14, and walls in Item IW14.

Coding:

Next inspection date for each inspection type.

7A11 Next Team Lead - Next Team Leader

Inspection > Ratings & Schedule

Description:

This item is used to record the team leader assigned to the next scheduled inspection of the structure.

Procedure:

Select the name of the team leader assigned to the next scheduled inspection of the structure from the dropdown list.

Coding:

Name of the team leader assigned to the next scheduled inspection of the structure.

7A12 NBI Crew Hours - NBI Inspection Crew Hours

Inspection > Ratings & Schedule

Description:

This item is used to record the number of man-hours needed to perform the NBI inspection of the bridge.

Procedure:

Enter the number of man-hours expended for the field inspection of the bridge. This item includes the total time for inspection of the bridge, including the following items:

- field inspection time.
- travel time incurred for the inspection.
- number of man-hours expended for rigging the bridge for inspection.
- number of man-hours expended to perform the office work associated with the inspection.

Coding:

The number of man-hours, to the nearest hour.

Example:
A 2 person bridge inspection team spends 6 hours (each) traveling and inspecting a bridge, and an additional 2.6 hours (total) performing follow-up work in the office. In addition, 10 man-hours were expended rigging the bridge for inspection.

Coding:
12 hrs (travel and inspection
+ 2.6 hrs (office work)
+ 10 hrs (rigging)
= 24.6 Total Hours 25

7A13 Crane Hours - Bridge Inspection Crane Hours

Inspection > Ratings & Schedule

Description:

This item is used to record the number of hours of use of a bridge inspection crane during the inspection of a bridge.

Procedure:

Enter the number of hours which a bridge inspection crane was used. Include travel time required, not counting time lost due to weather or breakdown. If a crane was not used, leave blank.

Coding:

The number of hours, to the nearest hour.

7A14 Next Insp By - Next Inspection Performed By

Inspection > Ratings & Schedule; BMS3: To be added in a future release

Description:

This item indicates the agency or Department Inspection Team assigned to perform the next inspection of the bridge.

Procedure:

Enter the code that describes the agency assigned to perform the inspection of the bridge. If it will be performed by a Department Inspection Team, a letter may be used to define the specific team. Code this item only if the Agency Submitting (Item 6A06) has agreed to perform the next inspection.

Coding:

A-Z	Letter assigned by District to individual Department Force Inspection Team
1	Pennsylvania Department of Transportation (codes A-Z may be used instead)
2	County
3	City, Borough, Township
4	Pennsylvania Turnpike Commission
5	Delaware River Joint Toll Bridge Commission
6	Other State Agency
7	Railroad
8	Consulting Firm (Department bridges only)
9	Other (includes Federal Agency)
Blank	No commitment on the next inspection

Examples:

The Department will perform next inspection:	1 PennDOT
Municipality wants Department to perform next inspection:	1 PennDOT
County has agreed to inspect its own bridge:	2 County
County coordinating inspection of City, Borough, or Township bridge:	2 County
City, Borough, or Township agreed to inspect its own bridge:	3 City,Borough,Twnshp
No commitment for next inspection:	

7A15 NSTM Hours – NSTM Inspection Hours

Inspection > Ratings & Schedule

Description:

This item is used to record the number of man-hours needed to perform the inspections of non-redundant steel tension members (NSTM) of the bridge.

Procedure:

Enter the number of man-hours expended for the field inspection of the bridge. This item includes the total time for inspection of the bridge, including the following items:

- field inspection time
- travel time incurred for the inspection.
- number of man-hours expended for rigging the bridge for inspection.
- number of man-hours expended to perform the office work associated with the inspection.

Coding:

The number of man-hours, to the nearest hour. See Item 7A12 for an example.

7A16 Reserved for Future Use

7A17 UWater Hours - Underwater Inspection Hours

Inspection > Ratings & Schedule

Description:

This item is used to record the number of man-hours needed to perform the underwater inspection of the bridge.

Procedure:

Enter the number of man-hours expended for the field inspection of the bridge. This item includes the total time for inspection of the bridge, including the following items:

- field inspection time
- travel time incurred for the inspection.
- number of man-hours expended for rigging the bridge for inspection.
- number of man-hours expended to perform the office work associated with the inspection.

Coding:

The number of man-hours, to the nearest hour. See Item 7A12 for an example.

7A18 Reserved for Future Use

7A19 Extended Inspection Interval Eligibility

Inspection > Ratings & Schedule; BMS3: Schedule

Description:

This item is an internally calculated item that returns a "Yes" if the bridge qualifies for an extended inspection interval of 48 months as defined in SOL 495-20-03. The field will display "No" if the bridge does not qualify. After May 31st, 2024, this field will only be used for non-NBIS length bridges. Until that time, if a bridge is coded as Yes for Item 7A19 and a No for Item 7A21, the bridge is no longer eligible for extended interval inspections.

Procedure:

This item is **automatically calculated by the system**.

Coding:

N – Not Applicable	Structure type is not eligible for extended interval inspections (non-NBIS (except 5A24 = S2), non-highway structures, tunnels, signs, walls, lights)
0 – No	Bridge is not eligible for extended interval inspections
1 – Yes	Bridge is eligible for extended interval inspections
2 – Yes, Except Owner Type	Bridge meets all eligibility criteria for extended interval except owner type (not PennDOT or Turnpike owned/maintained and NBIS length)

7A20 Extended Inspection Interval Concurrence

Inspection > Ratings & Schedule; BMS3: Schedule

Description:

This item indicates if the owner concurs with use of the Extended Inspection Interval of 48 months.

Procedure:

Select "Yes" if the owner agrees to allow the use of an Extended Inspection Interval of 48 months. Select "No" if the owner does not want the bridge to be inspected at an Extended Inspection Interval of 48 months. This value can only be changed by the District Bridge Unit Poweruser (one per District) or Central Office on behalf of the Pennsylvania Turnpike Commission.

Coding:

N – Not Applicable	Structure type is not eligible for extended interval inspections (Tunnels, Signs, Walls, Lights)
0 – No	The bridge owner does not concur with extended inspection interval or the bridge is not eligible
1 – Yes	The bridge owner concurs with extended inspection interval

7A21 Method 1 Extended Interval Eligibility

SNBI Field N/A

Inspection > Ratings and Schedule; BMS3: Schedule

Description:

This item is an internally calculated item that returns a "Yes" if the bridge qualified for an extended inspection interval of 48 months in accordance with the guidance in the criteria in Chapter IP02 of Publication 238 for NBIS length bridges only.

Procedure:

This item is **automatically filled in by the system** based on the detailed criteria in Publication 238.

Coding:

N/A	Bridge Reporting Group (5A24) ≠ A1, S1, L1
No	Bridge is not eligible for an extended inspection interval
No due to Owner/Custodian	Bridge meets all criteria except for Owner Type (5A20 ≠ 01 or 31)
Yes	Bridge is eligible for Method 1 Extended Interval

Following the addition of Item 7A21, the following scenarios for NBIS length bridges exist:

Scenario	*7A19*	*7A20*	*7A21*	*Commentary*
1	*Yes*	*Yes*	*Yes*	*Maintain current inspection interval; no changes needed.*
2	*Yes*	*Yes*	*No*	*Bridge no longer eligible for 48-month interval, bridge must be inspected by May 31st, 2024 to be compliant with current FHWA policies*
3	*Yes*	*No*	*Yes*	*Bridge owner has elected to maintain a 24-month inspection interval even though the bridge is eligible for 48-months; no change is needed.*
4	*No*	*No*	*Yes*	*Bridge is now eligible for extended interval inspections; the bridge owner may elect to retroactively change the inspection interval on the last inspection so that the next routine is completed at 48-months. The owner must update 7A20 to Yes to proceed with extended interval inspections.*
5	*No*	*No*	*No*	*Bridge is not eligible for extended interval.*
After May 2024, 7A19 is only for non-NBIS length bridges and 7A21 is only for NBIS length bridges.				

7A22 Underwater Diver Name

Inspection > Ratings & Schedule; BMS3: Schedule

Description:

This item is used to identify the underwater diver responsible for completing the requirements associated with a Type 3 – Underwater Inspection. This field must be filled in when at least one (1) substructure unit has an IN16 value of A (Underwater Inspection by Divers).

Procedure:

Report the Underwater Diver for the Underwater Inspection Type (B.IE.01 = 3 – Underwater). To appear in the dropdown list, the user must have their current inspection credentials on the user preference screen and qualify as an underwater diver as defined in 23 CFR 650, Subpart C.

Coding:

Name of the underwater diver who performed the underwater inspection type. This coding is editable when Item 5A24 (Report Group) = A1, S1, and L1.

7A23 to 7A52 (Not Used – Reserved for Future Use)

7A53 Concatenated Overall Inspection Type

SNBI Field N/A

Inspection > Inspection Record Selection Drop-Down; BMS3: All Inspection Screens

Description:

This field is used to display the concatenated overall inspection type for a given inspection.

Procedure*:*

This item is **automatically filled in by the system** based on the inspection type records present. This field concatenates the inspection types recorded on a given inspection into a single line of text and is used within the system to identify the inspection type with the date the inspection was started. This item only appears in the drop-down to select the inspection record being viewed in BMS2.

Coding:

Refer to the inspection types identified in Item B.IE.01.

Examples:

1E	First Time Inspection with Elements
234E	Routine, NSTM, Underwater & Element Inspection
57	Damage inspection that caused the need to schedule future Special Inspections
P	Problem Area Inspection to verify the completion of a priority maintenance item
46	In-Depth Inspection of NSTM Members
8	Service inspection of a bridge on extended interval
3E	Underwater inspection where elements were updated

7A54 to 7A56 (Not Used – Reserved for Future Use)

7A57 SNBI Required Inspections

SNBI Field N/A
Inspection > Ratings & Schedule; BMS3: Schedule

Description:

This series of checkbox fields is used to indicate whether or not the individual SNBI inspection type (B.IE.01) is required for the structure under the NBIS regulations or PennDOT policy.

Procedure*:*

This data should be established prior to the inspection and reviewed after the inspection for any necessary revisions. The appropriate boxes should be checked or unchecked to indicate whether the specific inspection type is required for the structure at the interval specified in Item B.IE.05. There are inspection types (B.IE.01 = 1, 5, 9, P and Q) where the coding of this field is marked as read-only. Those inspection types are on-demand and occur sporadically. Therefore, they aren't required on a specific interval and the field is coded as N/A.

- Routine inspections are required for all bridges so this box should be checked for all Item 5A24 Report Group Bridges (S1, S2, A1, and L1) bridges. The coding on remaining structure types should follow policy in Publication 238 on when a routine inspection is required.
- Underwater inspections are required when the underwater portions of a substructure unit cannot be inspected using wading techniques; a diver is needed to perform the inspection. During times of low water, if the subunits that normally require a diver to complete the inspection can be inspected by wading and probing, the required box should remain checked.
- NSTM inspections are required for all bridges with NSTM's (Item 6A44 < 5).
- In-Depth inspection requirements are at the discretion of the owner. If checked, the owner should identify the interval associated with the required inspection and provide a defined scope within BMS2. If the in-depth inspection is a one-time event, the required box can be left unchecked.
- Special inspections are to be required when bridge conditions necessitate a reduced interval inspection (< 24-month Routine) to ensure the bridge's safety. Publication 238, Table IP 2.3.2.4-1 identifies the bridge conditions that necessitate a reduced interval inspection.
- Service inspections can be used by a bridge owner to schedule a cursory inspection on a bridge with a Routine interval of 48-months. The service inspection occurs at the 24-month mark. Service inspections are also the equivalent to a highway environs inspection and should be scheduled on a routine basis for non-highway structures crossing a public roadway.
- Element inspections are not currently required on all bridges inventoried in BMS2, so the inspection required check box is provided to indicate which bridges require element level inspections based on Department policy or a language in a specific inspection agreement.

For additional discussion of policies and procedures for required inspections, see Publication 238, Chapter IP 2.Once entered into BMS2, Item 7A57 for the specific inspection types is copied by BMS2/BMS3 for the subsequent inspections.

Note: Having a data box checked in Item 7A57 to indicate a required inspection type does not necessarily mean that each required inspection type must be performed for every inspection. The required types of inspection due at each inspection will be governed by the inspection interval specified in Item B.IE.05.

Coding:

For each inspection type:

Unchecked	Inspection of this type is not required
Checked	Inspection of this type is required

Examples: See examples after Item B.IE.01 in Appendix N.

7A58 SNBI Last Inspection Date

SNBI Field N/A
Inspection > Ratings & Schedule; BMS3: Schedule

Description:

This series of fields, one for each inspection type, is used to record the date of the last accepted inspection for the structure, by type of inspection.

Procedure:

This item is **automatically filled in by the system** based on the inspection records recorded previously for the structure. Item 7A58 is calculated based on the last accepted inspection. For Item 7A08 to calculate correctly, current and previous inspection must have the correct inspection types performed (B.IE.01). Refer to the examples following B.IE.01 in this Appendix for which check boxes should be checked on each inspection type. Discrepancies shall be reported to the BMS2 coordinator.

Coding:

Date of last inspection in MM/DD/YYYY format.

*7A59 SNBI Inspection Interval

SNBI Field N/A
Inspection > Ratings & Schedule; BMS3: Schedule

Description:

This series of fields is used to specify the number of months between inspections, by type of inspection, if the inspection is a required inspection.

Procedure:

This data should be established prior to the inspection and reviewed after the inspection for any necessary revisions.

Enter the number of months from the last inspection to the next inspection is due for the inspection type. There are inspection types (B.IE.01 = 1, 5, 9, P and Q) where the coding of this field is marked as read-only. Those inspection types are on-demand and occur sporadically. Therefore, they aren't required on a specific interval and the field is coded as 0 Months.

Coding:

Number of months for each inspection type.

Routine:

- Refer to Publication 238, Chapter IP-02 for the maximum interval of Routine inspections.
- Routine inspection intervals can vary between 12, 24 and 48 months based on the criteria in Publication 238.

Underwater:

- Refer to Publication 238, Chapter IP-02, for required underwater inspection intervals.
- The most common underwater inspection intervals are 6, 12, 24, 48, and 72 months.
- If the portions of the bridge that normally need to be inspected by divers can be inspected by probing and wading during a Routine Inspection, the Underwater Inspection type can be recorded and using the inspection interval can forecast a new inspection due date for the next diving inspection.

NSTM:

- A NSTM inspection interval is required for all bridges with FCMs (6A44 ≤ 4).
- A reduced inspection interval, per Pub 238 Chapter IP-02, can be required when the NSTM Condition rating is a ≤ 4. The scope and intensity of the NSTM inspection is to be specified within the Fatigue & Fracture Inspection Plan.
- When a bridge with NSTM's has a reduced inspection interval due to conditions not related to the NSTM's, the NSTM Inspection interval can be greater than Special interval. For example, a two-span fracture critical bridge with NSTM's in good condition but with a temporary support at pier due to deterioration of concrete pedestal, Item 7A59 values would be:
  - Routine = 24 months
  - NSTM = 24 months
  - Special = 6 months

In-Depth:

- The scope and interval of an In-Depth inspection is at the discretion of the bridge owner. There are currently no requirements for bridges to have an In-Depth interval. If the owner elects to schedule these inspections on a specific interval, clear documentation of the scope and interval should exist within BMS.

Special:

- When bridge conditions warrant reduced inspection intervals as outlined in Publication 238, Chapter IP-02.

Service:

- If service inspections are scheduled for a bridge on a 48-month Routine interval, the interval for the service inspection should be 24-months. These inspections are not required by current PennDOT policy.
- When this inspection type is used in lieu of a highway environs' inspection of a structure crossing a public roadway, the inspection interval is generally 24-months.

Element:

- For bridges that require an element level inspection, the interval is identical to the Routine inspection interval.

INTERVAL NOTES:

4. If Item 7A57 = Unchecked box, then Item 7A59 = 0 (by default).
5. Special inspections and Routine inspections will both be required on same date when the Special interval is a factor of 24 months. See Item B.IE.01 for related instructions.
6. Do NOT Use intervals of 24 months for both NBI and Other Special inspections by scheduling the inspections in alternating years so the apparent result is 12-month intervals. This practice results in NBI Item 92 errors. The correct values for Item 7A09 are NBI = 24 months and Other Special = 12 months.

7A60 Next Due Dt - Next Inspection Due Date 

Inspection > Ratings & Schedule; BMS3: Schedule

Description:

This series of fields is used to specify the date the next inspection is due for the specific type of inspection.

Procedure:

This data should be reviewed prior to the inspection and reviewed after the inspection for any necessary revisions for future inspections.

Enter the date of the next required inspection relative to the current inspection shown for the selected structure. This date may be entered directly or calculated by the system by pressing the calculate button to the right of the "Next Due Date" label. For the calculate button to forecast the correct date, the

scheduling data in Item 7A57, 7A58, 7A59, B.IE.03 and/or 7A01e must be accurate. The calculate button will only exist in BMS2.

For non-bridge structures, the 7A60 Routine is also to be entered into the next inspection date data field for each type of structure: Sign structures in Item IS14, high mast light poles in Item IS14, and walls in Item IW14.

The next inspection due date should be populated using the criteria below:

1. If the inspection was completed on or before the inspection due date OR within tolerance*, Item 7A60 = The inspection end date (B.IE.03) + the inspection interval (7A59/B.IE.05)
2. If the inspection was completed beyond the tolerance window (i.e., non-compliant inspection), Item 7A60 = previous inspection due date + the inspection interval (7A59/B.IE.05)

*Inspection Completion Date Tolerance:

- 2 months for 7A59 < 24 months; 3 months for 7A59 ≥ 24 months

The inspection tolerance as described above should only be utilized with notification to the bridge owner and PennDOT. Field work should be completed by the month the inspection is due.

Coding:

Next inspection due date for each inspection type.

Examples:

Example 1 (completed on time):
Current Inspection Due Date: 5/15/2023
Inspection Type Start Date: 5/21/2023
Inspection Type End Date: 5/23/2023
Inspection Interval: 24 Months
Next Inspection Due Date: 5/23/2025

Example 2 (completed early):
Current Inspection Due Date: 5/15/2023
Inspection Type Start Date: 4/21/2023
Inspection Type End Date: 4/23/2023
Inspection Interval: 24 Months
Next Inspection Due Date: 4/23/2025

Example 3 (completed within tolerance):
Current Inspection Due Date: 5/15/2023
Inspection Type Start Date: 4/29/2023
Inspection Type End Date: 8/10/2023
Inspection Interval: 24 Months
Next Inspection Due Date: 8/10/2025

Example 4 (beyond tolerance):
Current Inspection Due Date: 5/15/2023
Inspection Type Start Date: 5/29/2023
Inspection Type End Date: 9/10/2023
Inspection Interval: 24 Months
Next Inspection Due Date: 5/15/2025

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VP Inventory - Posting

The Inventory - Posting Section is used to enter and display information related to the posted status of a bridge. This screen will capture the posting history of the structure.

By default, the posting tab will display all records for a selected bridge in a tabular form, starting from the most recent posting data. The records can be sorted for each column by clicking on the desired column heading. Clicking on the column heading a second time will sort the records in descending order.

A user may only enter a new posting. Modifications to an existing posting must be done by the BMS2 Manager. New posting information can be added using the "Create" button (green button next to Action heading). When new posting information is created, the current posting record, if it exists, becomes a part of the posting history for the structure and cannot be edited. No past posting information can be removed.

VP01 Status Date

Inventory > Posting > Posting Detail; Form K > Posting

Description:

This item is used to record the date that the corresponding posting status became effective.

Procedure:

Enter the date that the corresponding posting status became effective. If an exact date is not known, provide a best estimate.

Note:
For bridges requiring a posting change based on a revised rating, the bridge posting must be installed or revised within 30 days of the date in Item IR02. Therefore, the status date in Item VP01 must be within 30 days of the calculation date in Item IR02.

Coding:

Date that the corresponding posting status became effective in MM/DD/YYYY format.

*VP02 Posting Status

Inventory > Posting > Posting Detail; Form K > Posting

Description:

This item provides information about the actual operational status of a structure. The field review could show that a structure is posted, but Item 4B03 may indicate that posting is not required. This is possible and acceptable coding since Item 4B03 is based on the operating stress level and the governing agency's posting procedures may specify posting at some stress level lower than the operating rating.

Procedure:

Select the coding that best describes the current posting status of the bridge.

Coding:

Select a code for all structures from the dropdown menu:

A Open, no restrictions – includes sign structures.

*B Open, posting recommended but not legally implemented (all weight restriction signs including advance warning signs, etc., not in place). Legal posting must be implemented within 30 days of the date of the "B" posting. The "B" posting date should match the date in Item IR02.

C(K) Bridge closed to all traffic; must also complete Item VP01.

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.

P Posted for load (may include other restrictions); must also complete Item VP01.

R Posted for other load capacity restrictions (speed, number of vehicles on bridge, etc.).

X Bridge has been demolished/replaced.

Notes:
If codes C, P, or R are selected, Items VP01, VP03, VP04, VP05, and VP06 in the Inventory Posting (VP) Section shall be completed.

If Item 4B03 ≤ 4 and signing is correct, Item VP02 must be C, P, R, or B. Code appropriate weight limits in Items VP04 and VP05 in the Inventory Posting (VP) Section.

If code X is selected, Items 5A17 (Type of Service On), 5A21 (Owner), 6A12 (Demolished/Replaced Indicator), and 6A13 (Demolished/Replaced Date) will also be changed to match the demolished/replaced status of the structure.

*B is an interim code for pending posting only. DO NOT code B where proper posting was once completed, but signs are now missing or vandalized. For missing or vandalized posting signs or wrong signs:

- Priority code – 0
- Item 4A01 (not B), C, P, or R
- Immediately contact owner
- Follow-up on corrective action

Example:

- A bridge is inspected on April 15 and the need to update the load rating is identified.
- The load rating is updated, approved, sealed, and the rating set is uploaded into BMS2. The rating set is assigned to the current inspection on June 6 to match the date the rating was sealed (within the required 60 days from the inspection date). This will automatically set the date in Item IR02 to June 6. The revised load rating identifies the need for a load posting.
- The Bridge Posting Recommendation Data Sheets are filled out and the necessary approvals are obtained.
- Item VP02 is changed to "B" to indicate a posting is recommended but not legally implemented. Item VP01 is set to June 6 to match Item IR02.
- The owner installs the new signs on June 28. Item VP02 is changed to "P" with the appropriate posting values. Item VP01 is set to June 28 (within the required 30-day timeframe).

VP02a Posting Type

SNBI Field B.PS.01 (First Character)
Inventory > Posting Detail; BMS3: Load Ratings

Description:

This item is used to describe the type of posting at a bridge. This is the first part of the SNBI Coding.

Procedure:

Report the posting type that is present in the field based on the following terminology:

Permanent (P) – permanent bridge in place with no temporary supports or conditions.
Temporary (T) – temporary bridge in place to carry traffic while the permanent bridge is closed and awaiting repair, rehabilitation, or replacement.
Supported (S) – bridge with temporary shoring, supports, repairs or supplemental members in place to keep the bridge open pending the completion of active or imminent repair, or replacement projects.
Closed (C) – bridge is closed to all traffic.
New (N) – a newly constructed bridge that is not yet open to traffic.
Demolished (X) – a structure which has been demolished and/or replaced.

Coding:

C	Closed	S	Supported
N	New (Not Open)	T	Temporary
P	Permanent	X	Demolished

VP02b Posting Condition

SNBI Field B.PS.01 (Second Character)
Inventory > Posting Detail; BMS3: Load Ratings

Description:

This item is used to describe the posting condition at a bridge. This is the second part of the SNBI Coding.

Procedure:

Report the posting condition that is present in the field based on the following terminology:

Open (O) – bridge is open with no restrictions.
Needs Action (A) – bridge that is open with load posting recommended, but no posting signs in place, or a posting sign that is not legally enforceable.
Weight (P) – bridge is posted with a weight limit sign or signs.
Other (R) – A posting sign or other traffic control device(s) at the bridge that reduces loading by reducing speed (to reduce impact), limiting the number of lanes or vehicles, or restricting commercial vehicles in general.
Needs Reduction (D) - bridge is posted, with posting reduction recommended but not implemented.
Missing (M) - bridge has a legally enforceable load posting and was posted, but one or more required signs are missing or illegible.

Coding:

A	Needs Action	O	Open
D	Needs Reduction	P	Posted
M	Missing	R	Other

VP03 Special Restrictive Posting

Inventory > Posting > Posting Detail; Form K > Posting

Description:

This item is used to record the type of special restrictive posting for the bridge.

Procedure:

Select the code from the dropdown list that describes the type of special restrictive posting for the bridge.

Coding:

0 Not applicable
1 Bridge limited to one truck (without weight limits)
2 Bridge limited to one truck (with weight limits)

VP03a Vehicle Posting Type

SNBI Field B.EP.03
Inventory > Posting Detail; BMS3: Load Ratings

Description:

This item is used to describe type of posting at the bridge restricting the Pennsylvania legal loads.

Procedure:

Select the type of vehicle restriction in place at the bridge. If more than one vehicle restriction applies, select the restriction that appears first on the list. For example, if both posted for load and the number of vehicles, select code “G”.

Coding:

G Gross Load
C No Commercial Vehicles
S Speed Reduction
L Number of Lanes Restricted
V Number of Vehicles Restricted
X Other

VP04 Posted Weight Limit

Inventory > Posting > Posting Detail; Form K > Posting

Description:

This item is used to record the posted weight limit for the bridge.

Procedure:

This item should be completed for a bridge which has been designated as posted by entering a "R" in Item VP02. This item is required when the posting status is “B” or “P”.

Coding:

The load limit in tons. Prefix with zeros where necessary. Leave blank if not posted.

VP05 Posted Limit Combination

Inventory > Posting > Posting Detail; Form K > Posting

Description:

This item is used to record the posted load combination limit for the bridge.

Procedure:

This item should be completed for a bridge, which has been designated as posted by entering a "R" in Item VP02. This item is required when the posting status is "B" or "P".

When the posting limit for a combination is the same as the value recorded in Item VP04 (i.e., bridge is posted for load without a "Except Combination" value/sign), record the value of VP04 in item VP05 as well.

Coding:

The load limit in tons. Prefix with zeros where necessary. If no combination limit is posted (e.g. only single vehicle posting is present (VP04 ≥ 3 Tons), code -1. Otherwise, leave blank if not posted.

VP06 Posting Reason - Reason for Posting or Closing the Bridge

Inventory > Posting > Posting Detail; Form K > Posting

Description:

This item indicates the reason why the bridge was posted or closed.

Procedure:

Select the appropriate code from the dropdown list which indicates the primary reason the bridge was posted or closed. This field is required when the posting status is "P" or "C(K)".

Note:
"Phrases" shown below used primarily in communication with the State Police (BD 78-17).

Coding:

A	Deck condition rating ("deficient deck")
B	Superstructure condition rating ("main bridge members overstressed")
C	Superstructure condition rating ("deficient main bridge members")
D	Superstructure condition rating ("deficient secondary bridge members are overstressed")
E	Substructure condition rating ("deficient substructures – piers")
F	Substructure condition rating ("deficient substructures – abutment")
G	Combination of A to D
H	Combination of E and F
I	Combination of G and H
J	Structure condition appraisal rating. This applies to a bridge posted because the design load was less than HS20. ("deficient main bridge members")
K	Combination of one or more of above
L	Bridge washed out or damaged by flood flow or vehicular accident
M	Existing or new bridge under construction
N	Adjacent construction

VP07 Field Conditions

Inventory > Posting > Posting Detail

Description:

This item indicates the field conditions which may influence the determination of load limits for a posted bridge.

Procedure:

If field conditions influence the determination of load limits for a posted bridge, select the appropriate code from the dropdown list.

Coding:

0 Not applicable
1 Traffic signal or stop sign (trucks may follow each other too closely, or trucks may occupy more than one lane)
2 Rough approaches (could create impact higher than allowed in design)
3 Steep grade (influence speed or traffic)
4 Alignment (alignment is such that causes trucks to follow too closely to each other)
5 Combination of 1, 2, 3, or 4

VP08 Special Conditions

Inventory > Posting > Posting Detail

Description:

This item indicates the special conditions which may influence the determination of load limits for a posted bridge.

Procedure:

If special conditions influence the determination of load limits for a posted bridge, select the appropriate code from the dropdown list.

Coding:

0 Not applicable
1 Bridge near industrial plant
2 Bridge near quarry, mine, ready mix plant, bulk cargo hauling pier, or similar
3 Bridge near a truck stop
4 Combination of 1, 2, and/or 3
5 Risk Based Posting

VP09 AASHTO Impact Code

Inventory > Posting > Posting Detail

Description:

This field indicates whether or not the determination of load limits is influenced by the impact being lower or higher than permitted by the AASHTO Specifications.

Procedure:

Select the applicable code from the dropdown list.

Coding:

1 AASHTO Impact Factor
2 Lower than AASHTO Impact Factor
3 Higher than AASHTO Impact Factor

VP10 Permanently Closed Structure (District Use Only)

Inventory > Posting > Posting Detail

Description:

This item is used to indicate the structure is permanently closed. A permanently closed structure is defined as a structure that has no State and/or Planning Partner intent or need to restore any level of service in order to carry a highway at that location.

Procedure:

Check this box if the structure is permanently closed. This will distinguish permanently closed structures from structures where closure may be temporary. When this box is checked and the related "exclude permanently closed structure" filter box is checked on the Risk Assessment Search screen, permanently closed structures will not be included in the resulting Risk Assessment Structure List following a search. Similarly, the user will be able to exclude permanently closed structures from the Risk Assessment Crystal Report list of structures to be viewed by filtering the report content based on this field.

Coding:

Unchecked	Structure is open or closure is temporary
Checked	Structure is permanently closed

VP11 Posting Review Recommended

SNBI Field N/A
Inventory > Posting Detail; BMS3: Load Ratings

Description:

This checkbox field indicates whether or not a bridge inspector recommends a new bridge posting record be entered based on findings during the inspection.

Procedure:

If a bridge inspector believes a new posting record is required, the box should be checked to indicate "yes". If a bridge inspector doesn't believe a new posting record is required, the box should be unchecked to indicate "no". This checkbox cannot be changed in BMS2. The user should explain in Comment Type 76 why the new posting record is required. The comments entered in Comment Type 76 should be dated, similar to a priority maintenance item.

Coding:

Unchecked	A new bridge posting record is not recommended.
Checked	A new bridge posting record is recommended.

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VA Inventory - Paint

The Inventory - Paint Section is used to enter and display information related to painting of steel structures.

By default, the paint history will be displayed in chronological order with the most recent application displayed first. The records can be sorted for each column by clicking on the desired column heading. Clicking on the column heading a second time will sort the records in descending order.

New paint history records can be added using the "Create" button (green plus sign). Existing records can be deleted by selecting one or more desired records from the list and clicking on the "Remove" button. A confirm deletion prompt with be displayed by the system before the records are removed. The "Save" button is used to commit pending changes on the screen, if any, to the database.

VA01 Date Applied - Date the Bridge Was Painted

Inventory > Paint > Paint Detail

Description:

This item is used to record the date the bridge was painted.

Procedure:

Enter the date on which the painting of the bridge was completed.

Coding:

The date on which the painting of the bridge was completed in MM/DD/YYYY format. Prefix with zeros where necessary.

VA02 Paint Extent - Extent of Paint Applied to the Structure

Inventory > Paint > Paint Detail

Description:

This item is used to record the extent of the paint applied.

Procedure:

Select the code that describes the extent of the painting from the dropdown list.

Coding:

1	Entire bridge	6	Spot + <60% finish
2	Zone – 60% of steel surface area or more	7	Spot
3	Zone – 40% of steel surface area or more	8	Finish
4	Zone – 20% of steel surface area or more	9	Joint areas only
5	Spot + >60% finish	0	Reserved

VA03 Steel (ton) - Tons of Steel Painted

Inventory > Paint > Paint Detail

Description:

This item is used to record the weight of steel painted.

Procedure:

Enter the number of tons of steel painted.

Coding:

Tons of steel.

VA04 Surface Area (sq. ft) - Estimated Surface Area in Square Feet Requiring Painting

Inventory > Paint > Paint Detail

Description:

This item is used to record the estimated surface area of the structure requiring painting.

Procedure:

Enter the estimated surface area requiring painting in square feet.

Coding:

Estimated surface area in square feet.

Example:
Estimated surface area is 5,676,000 square feet: 5,676,000

VA05 Primer - Type of Primer Coat Applied to the Structure

Inventory > Paint > Paint Detail

Description:

This item is used to record the type of primer coat that was applied to the structure.

Procedure:

Select the type of primer coat applied to the bridge from the dropdown list.

Coding:

M	**M**astic
I	**I**norganic Zinc
O	**O**rganic Zinc
L	**L**ead Base

VA06 Intermediate - Type of Intermediate Coat Applied to the Structure

Inventory > Paint > Paint Detail

Description:

This item is used to record the type of intermediate coat that was applied to the structure.

Procedure:

Select the type of intermediate coat applied to the bridge from the dropdown list.

Coding:

M	**M**astic	**V**	**V**inyl	**A**	**A**crylic	**P**	**P**henolics
E	**E**poxy	**U**	**U**rethane	**R**	Chlorinated **R**ubber	K	Alkyd

VA07 Finish - Type of Finish Coat Applied to the Structure

Inventory > Paint > Paint Detail

Description:

This item is used to record the type of finish coat that was applied to the structure.

Procedure:

Select the type of finish coat applied to the bridge from the dropdown list.

Coding:

M	**M**astic	**V**	**V**inyl	**A**	**A**crylic	**P**	**P**henolics
E	**E**poxy	**U**	**U**rethane	**R**	Chlorinated **R**ubber	K	Alkyd

VA08 Paint Color - Color Number of Paint

Inventory > Paint > Paint Detail

Description:

This item indicates the color of the finish coat of paint used on the bridge.

Procedure:

Select the code from the dropdown list which indicates the color of the finish coat of the paint applied.

Coding:

01	Basic Lead Silico Chromate Ready Mixed Primer AASHTO M229-74 Type V
1R	Dull red primer
1Y	Zinc yellow primer
02	Zinc dust – Zinc oxide primer
03	Yellow paint, flat or enamel
04	Blue paint, gloss or finish coat
05	White paint, flat
5G	White paint, pebble
06	Black paint, semi-gloss
07	High heat Black paint, gloss
08	Sandstone paint
09	Antique Bronze
10	Green paint, semi-gloss
11	Black paint, gloss
12	White paint, gloss
14	Black enamel
15	Grey paint, gloss
16	Red paint, semi-gloss
17	Aztec Gold, semi-gloss
18	Azure Blue, gloss
19	Sea Mist Green, gloss
20	Aluminum paint
99	Other miscellaneous paint products

VA09 Number of Coats – Number of Coats of Paint Applied

Inventory > Paint > Paint Detail

Description:

This item is used to record the number of coats of paint applied to the bridge.

Procedure:

Enter the number of coats of paint applied to the bridge.

Coding:

Number of coats of paint applied.

VA10 Thickness (mils) - Thickness of Paint Applied to the Structure

Inventory > Paint > Paint Detail

Description:

This item is used to record the thickness of the paint applied to the structure.

Procedure:

Enter the average dry film thickness (mils) of paint applied.

Coding:

The average dry paint film thickness in mils.

VA11 Paint Volume (gal) - Gallons of Paint Applied

Inventory > Paint > Paint Detail

Description:

This item is used to record the number of gallons of paint applied to the bridge.

Procedure:

Enter the number of gallons of paint applied to the bridge.

Coding:

Number of gallons of paint applied.

VA12 Cleaning Type - Type of Cleaning Used

Inventory > Paint > Paint Detail

Description:

This item indicates the type of cleaning used on the bridge.

Procedure:

Select the code from the dropdown list which indicates the type of cleaning used.

Coding:

C	Commercial blast cleaning
S	Solvent cleaning
T	Power tool cleaning
W	Near white blast cleaning
O	Other

VA13 Paint Cost ($M) - Cost of Painting

Inventory > Paint > Paint Detail

Description:

This item is used to record the total cost of painting the bridge.

Procedure:

Enter the total cost of painting the bridge.

Coding:

Painting costs in millions of dollars.

VA14 Notes

Inventory > Paint > Paint Detail

Description:

This item is used to record any notes about the paint applied to the structure.

Procedure:

Enter any notes about the paint applied to the structure in narrative form.

Coding:

Users may include additional notes about the paint applied to the structure in narrative form that is not being captured by the other fields. Additional information may include the painting contractor, specific properties of the paint, etc.

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VM Inventory - Maintenance Responsibility

The Inventory – Maintenance Responsibility Section captures and displays information about parties responsible for maintaining various portions of a structure. These fields appear on the Structure Home Screen.

There is a one to one correspondence between an agency and a PUC docket. If an agency changes its maintenance responsibility (including eliminating its responsibility), a new row is created in this section. If a particular PUC docket involves multiple agencies, a separate row is created for each agency with each row containing the same PUC docket number. Agencies with multiple rows should be grouped together for display with the agency only appearing for the first row in the group.

Agency Responsible is a code controlled by FHWA. When an agency no longer has maintenance responsibility, PennDOT will use the "Other" code value and describe the changes in the notes. The Create button allows users to add Maintenance Responsibility records. Users may select one or more Maintenance Responsibility records and use the Remove button to remove the records. Users will be prompted by the system to confirm deletion before the records are removed. The Save button is used to commit pending changes on the screen, if any, to the database.

VM01 Legis Act Num - Legislative Act Number which Transferred Ownership

Inventory > Structure Home

Description:

This item is used to record the Legislative Act number which transferred ownership of the bridge to the Department of Transportation.

Procedure:

If the ownership of the bridge has been transferred to the Department of Transportation by Legislative Act, enter the number of the Act. Leave this item blank if ownership of the bridge has not been transferred to the Department by Legislative Act.

Coding:

The Legislative Act Number which transferred ownership of the bridge.

*VM02 Maint Resp Desc - Maintenance Responsibility for the Bridge

Inventory > Structure Home

Description:

This item is used to describe, in a narrative form, whom was responsible for maintenance of this bridge. It is used in conjunction with Item VM03.

Procedure:

Enter the name(s) of the agency responsible for maintenance of the bridge. Abbreviations should be used where necessary, but an attempt should be made to keep them meaningful. (List in declining order of magnitude of maintenance responsibility).

Coding:

A narrative description of the agencies responsible for maintenance of the bridge. Abbreviations should be used where necessary, but an attempt should be made to keep them meaningful.

Examples:
Assume a bridge is entirely maintained by the Pennsylvania Department of Transportation.

PA DOT

Assume the superstructure is maintained by the Pennsylvania Department of Transportation and the substructure is maintained by the Pennsylvania Turnpike Commission.

PA DOT Super, PTC Sub

*VM03 Agency Responsible - Agency Responsible for Bridge Maintenance

Inventory > Structure Home > Additional Maintenance Responsibility

Description:

This item indicates which agency is responsible to maintain what portion of the bridge. This item is used in conjunction with Items VM04, VM05, and VM06.

Procedure:

As many entries as required may be made to describe who is responsible to maintain what portion of the bridge. Select the appropriate entry from the dropdown list.

Coding:

01 State Highway Agency
02 County Highway Agency
03 Town or Township Highway Agency
04 City, Municipal Highway Agency or Borough
11 State Park, Forest or Reservation Agency
12 Local Park, Forest or Reservation Agency
21 Other State Agencies
25 Other Local Agencies
26 Private (other than Railroad)
27 Railroad
31 State Toll Authority
32 Local Toll Authority
60 Other Federal Agencies (not listed below)
62 Bureau of Indian Affairs
64 U.S. Forest Service
66 National Park Service
68 Bureau of Land Management
69 Bureau of Reclamation
70 Military Reservation Corps of Engineers
80 Unknown

*VM04 Portion - Portion of Bridge

Inventory > Structure Home > Additional Maintenance Responsibility

Description:

This item indicates the portion of the bridge for which the Agency identified in Item VM03 is responsible. This item is used in conjunction with Items VM03, VM05, and VM06.

Procedure:

Select the appropriate entry from the dropdown list that corresponds to the portion of the bridge for which the Agency identified in Item VM03 is responsible.

Coding:

1	Entire structure including roadway surface	6	Combination of 7 and 8
2	Entire structure excluding roadway surface	7	Roadway surfaces (includes deck and wearing surface)
3	Superstructure including roadway surface	8	Sidewalks and/or curbs and/or railings
4	Superstructure excluding roadway surface	9	Other
5	Substructure	0	Mixed responsibility

VM05 PUC Docket Num - PUC Docket Number

Inventory > Structure Home > Additional Maintenance Responsibility

Description:

This optional item is used to record the PSC-PUC Docket Number when the PSC-PUC has jurisdiction over the bridge involved. This item is used in conjunction with Items VM03, VM04, and VM06.

Procedure:

Enter the most important/use PUC Order PSC-PUC Docket Number, either A__ or C__ when the PUC has jurisdiction over the structure involved.

Coding:

PSC-PUC Docket Number.

VM06 Order Date - PUC Order Date

Inventory > Structure Home > Additional Maintenance Responsibility

Description:

This item is used to record the date the PUC order became effective. This item is used in conjunction with Items VM03, VM04, and VM05.

Procedure:

Enter the date the PUC order became effective.

Coding:

Date the PUC order became effective in MM/DD/YYYY format.

VM07 Notes

Inventory > Structure Home > Additional Maintenance Responsibility

Description:

This item is used to record additional information about the maintenance responsibility for the bridge, especially in cases where responsibility is "mixed".

Procedure:

Enter any additional information about the maintenance responsibility for the bridge in narrative form.

Coding:

Additional information about the maintenance responsibility for the bridge in narrative form.

Example:
For a structure where PennDOT maintains 4 spans and a railroad maintains the remaining 2 spans, there will be two records with the Description field set to Miscellaneous Responsibility. In this case, the Note field can be used to specify how the responsibility is distributed among the two parties.

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VD Inventory - Design

The Inventory - Design Section allows a user to enter additional information for a structure related to the design of the structure. The Design Screen is under the Inventory Links.

Fields that contain repeating values (e.g., Design Exception Codes, Steel Types, Bearing Types, etc.) are shown in plain list boxes, with no limits to the maximum number of items that can be added to these lists. To add items to a list, use the Add Item button corresponding to that list. This will display an Add Item dialog to allow user to input data specific to the list. To remove items, select one or more items (use Ctrl + Click to select multiple items), and use the Delete Item(s) button. Users will be prompted by the system to confirm deletion before the records are removed. The Save button is used to commit pending changes on the screen, if any, to the database.

VD01 Design Method

Inventory > Design

Description:

This item indicates whether Service Load Design, Load Factor Design, or Load and Resistance Factor Design (LRFD) was the method used in the design of the bridge.

Procedure:

Select the code from the dropdown list that describes the method of design used. If this information is not available, leave this item blank.

Coding:

S	Service Load Design
L	Load Factor Design
R	LRFD
Blank	Unknown

VD02 Live Load Continuity - Beams Designed for Live Load Continuity?

Inventory > Design

Description:

This item indicates whether or not continuity for the live load was incorporated in the design of the prestressed beam.

Procedure:

If the continuous live load design method was used, enter a code of "1". If the continuous live load design method was not used, enter a code of "0". For single span prestressed or non-prestressed bridges, this item may be left blank.

Coding:

0	Continuous live load design method was not used
1	Continuous live load design method was used
2	Continuity for live load was incorporated in the retrofit or rehabilitation of the bridge

Note:
In keeping with the philosophy of DM4, Section D 5.14.1.2.7a, the bridge rating should be based on the more critical condition of full continuity or as a simple span assuming complete loss of continuity.

VD03 Geometry - Geometry of Main Beams or Girders

Inventory > Design

Description:

This item indicates the geometry of the main beams or girders of a bridge.

Procedure:

Enter the code that describes the geometry of the main beams or girders of a bridge.

Coding:

1 Straight
2 Curved
3 Straight with angled splice
4 Combination of 1 and 2 above
5 Combination of 1 and 3 above
6 Combination of 2 and 3 above
7 Combination of 1, 2, and 3 above

VD04 Steel Beam Splice - Type of Field Splice Used for Steel Beams

Inventory > Design

Description:

This item indicates the type of field splice used for steel beam bridges.

Procedure:

Enter the code that describes the type of field splice used for steel beam bridges. A combination of the type splice should be coded as "9 – Other".

Coding:

1 Welded
2 Bolted
3 Riveted
9 Other

VD05 Steel Types - Types of Steel & Other Metals Used in Bridge Members

Inventory > Design

Description:

This item is used to record the types of steel used in the fabrication of main steel bridge members such as beams, girders, trusses, etc.

Procedure:

List in order of structural importance. Code using the designation shown in the design drawings.

Coding:

STRUCTURAL STEELS

Coding	*Designations*			*Description*
	Old ASTM	*New ASTM*	*'92 AASHTO*	
01 - A7/Carbon	*A7*	*Not Used in new bridge construction*	*N/A*	*Carbon*
02 - A36/A709Gr36/Carbon	*A36*	*A709 Grade 36*	*M270 Grade 36*	*Carbon*
03 - A242/Weathering	*A242*	*Not Used in new bridge construction*	*N/A*	*Weathering*
04 - A440/High Str	*A440*	*Not Used in new bridge construction*	*N/A*	*High Strength*
05 - A441/High Str	*A441*	*Not Used in new bridge construction*	*N/A*	*High Strength Low Allow*
06 - A588/A709 Gr.50W	*A588*	*A709 Grade 50W*	*M270 Grade 50W*	*Weathering*
07 - A572/A709 Gr.50	*A572*	*A709 Grade 50*	*M270 Grade 50*	*High Strength Low Alloy*
08 - A514/A517/High Fy	*A514/A517*	*N/A*	*N/A*	*High Fy, Quenched & Tempered*
09 - A94/Silicon	*A94*	*Not Used in new bridge construction*	*N/A*	*Silicon*
10 - A8/Nickel	*A8*	*Not Used in new bridge construction*	*N/A*	*Nickel*
14 - A709 Gr.70	*-*	*A709 Grade 70*	*M270 Grade 70*	
15 - A709 Gr.HPS70W	*-*	*A709 Grade HPS 70W*	*M270 Grade HPS 70W*	*High Performance Steel, Weathering*
17 - A709 Gr.HPS50W	*-*	*A709 Grade HPS 50W*	*M270 Grade HPS 50W*	*High Performance Steel, Weathering*
18 - A709 Gr.HPS100W	*-*	*A709 Grade HPS 100W*	*M270 Grade HPS 100W*	*High Performance Steel, Weathering*
19 - A709 Gr.100	*-*	*A709 Grade 100*	*M270 Grade 100*	*High Fy, Quenched and Tempered*
20 - A992/A709Gr50S/Carbon	*A992*	*ASTM A709 Grade 50S*	*M270 Grade 50S*	*Carbon*
21 – Other/Weathering	*-*	*-*	*-*	*Weathering steel comprised of modified ASTM steel*

OTHER METALS

11 - Wrought Iron
12 - Aluminum
13 - Cast Iron
16 - Galvan. (for HMLP) *High Mast Light Poles*
99 - Other

VD06 Vacuum Process - Were the Prestressed Girders Cured by Vacuum Process?

Inventory > Design

Description:

This item indicates whether or not the vacuum process for concrete curing was used on the prestressed girders.

Procedure:

If the concrete girders were cured by vacuum process, select "1". If the concrete girders were not vacuum processed, select "0".

Coding:

0 Vacuum process was not used
1 Vacuum process was used

VD07 Strand Type - Are the Strands Straight or Draped?

Inventory > Design

Description:

This item indicates if the prestressing strands used in the prestressed girders are straight or draped.

Procedure:

For bridges with prestressed girders, select the code which indicates whether straight, draped, or both straight and draped strands were used in the prestressed girders.

Coding:

1 Straight strands
2 Draped strands
3 Both straight and draped strands
4 Debonding (other than to reduce stress concentration at beam end)
5 Debonding (as per 4) plus draped strand

VD08 Comp Strength @ 28 days - Compressive Strength of Beam Concrete at 28 Days

Inventory > Design

Description:

This is a 5-digit field used to record the specified compressive strength of the beam concrete at 28 days.

Procedure:

For bridges with prestressed girders, enter the specified compressive strength of beam concrete at 28 days.

Coding:

The specified compressive strength in pounds per square inch (psi). If more than one strength of concrete is used, code “99999”.

VD09 Comp Strength @ Release - Compressive Strength of Beam Concrete at Release

Inventory > Design

Description:

This is a 5-digit field used to record the specified compressive strength of the beam concrete at the time of initial prestress (release).

Procedure:

For bridges with prestressed girders, enter the specified compressive strength of the beam concrete at the time of initial prestress (release).

Coding:

The specified compressive strength in pounds per square inch (psi). If more than one strength of concrete is used, code “99999”.

VD10 Prestressed Splice Type - Type of Field Splice Prestressed Girders

Inventory > Design

Description:

This series of three fields indicate the type of joints (field splice) in prestressed concrete girders, segmental post tensioned girders, etc. Examples are transverse joints in segmental box girders, splice joints in long prestressed I-girders, joints in drop-in spans, post-tensioned pier caps or in beams at continuity points over piers.

Procedure:

For bridges with prestressed concrete girders, enter the code that indicates the type of joint (field splice) used. Leave blank or "_" for non-prestressed beams.

Coding:

Design		Filler		Through	
0	Not applicable	0	Not applicable	0	Not applicable
1	Butt joint	1	Dry joint (no fill material)	1	Mild spliced reinforcing thru joint
2	Butt joint with single large key	2	Mortar joint filler	2	Tendon thru joint
3	Butt joint with multiple small keys	3	Epoxy joint filler	3	Additional diagonal tendons thru joint
4	Spaced joint (butt)	4	Concrete joint filler	4	Mechanical splice thru joint
5	Spaced joint (with single large key)	5	Other	5	Acts as a hinge as in drop-in spans
6	Spaced joint (with multiple small keys)			6	Cad weld splice thru joint
7	Open joint with single large key			7	Combination of above
8	Other joint			8	Other

VD11 Design Tension Methods - Prestressed Design Tensioning Methods

Inventory > Design

Description:

This series of three fields indicate the design tensioning method(s) used for a bridge with prestressed girders.

Procedure:

For bridges with prestressed girders, select the code(s) from the dropdown list, which describe the design tension method(s) used on the prestressed girders. Up to 3 design tensioning method codes may be entered.

The 1st field is used to enter the code for the first design tensioning method. The 2nd field is used to enter the code for the second design tensioning method, etc. Code zero if not applicable.

Coding:

0 Not Applicable
1 Pretensioned
2 Post Tensioned
3 Pre-Post Tensioned

VD12 Void Types

Inventory > Design

Description:

This item indicates the type of voids in the prestressed girders of a bridge.

Procedure:

For bridges with prestressed girders, enter the code(s) which describe the type(s) of voids in the girders. If there are no voids in the prestressed girders, code zero.

Coding:

0 No void
1 Rectangular void
2 Special void
3 Twin circular void
4 Singular circular void

VD13 Strand Sizes - Size of Prestressed Strands

Inventory > Design

Description:

This item indicates the size(s) of strand used on bridges with prestressed girders.

Procedure:

For bridges with prestressed girders, enter the code(s), which describe the size of strand used in the prestressed girders.

Coding:

1 5/16″ diameter strands or smaller
2 3/8″ diameter strands
3 7/16″ diameter strands
4 1/2″ diameter strands
5 0.6“ diameter strands
6 1/2“ special diameter strands
A 7/16″ coated strands
B 1/2″ coated strands

VD14 Abutment Type

Inventory > Design

Description:

This two-part item indicates the type of abutment at both the near and far ends of the bridge. Refer to the definition of Direction and Orientation for an explanation on determining near and far ends.

Procedure:

This item is divided into 2 parts to allow for the entering of both ends of the bridge. Select the appropriate code from the dropdown list for each abutment.

Notes:
Code "B" if piles are used on VSL or RE.

Underscoring denotes a proprietary product.

Codings X, Y, and Z are provided to describe field observable conditions. Use only when more detailed or exact plan information does not exist.

Coding:

1	Stub
2	Cantilever
3	Gravity Concrete
4	Gravity Stone-masonry
5	Counterfort
6	Integral
7	Cellular
8	Spill-through Abutment
9	Other (describe in comments)
A	Reinforced concrete pad resting on mechanically stabilized embankment retaining wall
B	Pile supported reinforced concrete pad behind face of mechanically stabilized embankment retaining wall
C	Precast modular earth filled wall – concrete
D	Other proprietary
E	Pile bent
F	Reserved
G	Gabion
H	VSL Retained Earth – MSE
I	Reinforced Earth – MSE
J	Doublewal (concrete modular wall)
K	Flexible anchored wall
L	Flexible non-anchored wall
M	Geosynthetic Retaining System Wall
X	Concrete unknown, cannot determine type
Y	Concrete spill-through, sloping front face to channel flood flows
Z	Mechanically stabilized panels, cannot determine type

Examples:

RC Cantilever: 2 - Cantilever

Pile supported pad on VSL wall: B - Pile supported pad

Tied back soldier beam wall: K - Flexible anchored wall

VD15 Abutment Foundation Type

Inventory > Design

Description:

This two-part item indicates the type of abutment foundation at both the near and far ends of the bridge. Refer to the definition of Direction of Orientation for an explanation on determining near and far ends.

Procedure:

This item is divided into 2 parts to allow for the entering of the type abutment foundation code at both ends of the bridge. Select the appropriate code from the dropdown list for each abutment.

A coding of blank is not permitted for this item unless no abutment is present (i.e. culvert).

Notes:
This coding system is also used in Items VD17 and IN13.

Codings of R and S are provided to describe field observable conditions. Use only when more detailed or exact plan information does not exist.

Coding:

A	Footing on competent bedrock*	K	Footing or culvert with an integral bottom on erodible bedrock (such as claystone, clay shale, silt stone, shale or weathered bedrock)
B	Cast-in-place concrete piles		
C	precast concrete piles	L	Footing and culverts with an integral bottom on soil (sand-gravel, cobbles, silt and clay)
D	Prestressed concrete piles		
E	Steel H-piles	O	Other (describe in Item IN24, inspection notes)
F	Steel pipe piles or Micropiles	P	Foundation type has been researched; information is unknown or not available with confidence
G	Timber piles		
H	Drilled caisson	R	Footing on bedrock – erodibility cannot be determined
I	Deep water caisson	S	Pile or caissons, if determined by probing
J	Pedestals	X	Information is not available at this time

*For scour purposes, good quality rock or competent bedrock is defined as rock with no significant ongoing erosion and a low risk of failure during an extreme event.

VD16 Pier Types - Pier Material and Configuration

Inventory > Design > Pier Type Detail

Description:

This item indicates the type(s) of piers used on a bridge.

Procedure:

This item is divided into 2 parts to allow for the entering of the pier material and the pier configuration. Select the appropriate code from the dropdown list for each pier.

Coding:

Material		Configuration	
1	Timber	1	Single Column
2	Steel	2	Hammerhead
3	Reinforced concrete	3	Bent
4	Plain concrete	4	Solid
5	Prestressed concrete	5	Hollow (e.g., rubble fill)
6	Stone-masonry	9	Other
7	Encased structural steel		
8	Concrete unknown, cannot determine type (i.e., reinforcement)		
9	Other		

Blank No Pier Present

Note:
The coding of 8 is provided to describe field observable conditions. Use only when more detailed or exact plan information does not exist.

VD17 Pier Foundation Types

Inventory > Design

Description:

This item indicates the type of foundation used for the piers of a bridge.

Procedure:

Select the appropriate code from the dropdown list for each pier.

A coding of blank is not permitted for this item unless no pier is present.

Coding:

A	Footing on competent bedrock*	K	Footing or culvert with an integral bottom on erodible bedrock (such as claystone, clay shale, silt stone, shale or weathered bedrock)
B	Cast-in-place concrete piles	L	Footing and culverts with an integral bottom on soil (sand-gravel, cobbles, silt and clay)
C	precast concrete piles	O	Other (describe in Item IN24, inspection notes)
D	Prestressed concrete piles	P	Foundation type has been researched; information is unknown or not available with confidence
E	Steel H-piles	R	Footing on bedrock – erodibility cannot be determined
F	Steel pipe piles or Micropiles	S	Pile or caissons, if determined by probing
G	Timber piles	X	Information is not available at this time
H	Drilled caisson		
I	Deep water caisson		
J	Pedestals		

Notes:

This coding system is also used in Items VD15 and IN13.

Codings of R and S are provided to describe field observable conditions. Use only when more detailed or exact plan information does not exist.

*For scour purposes, good quality rock or competent bedrock is defined as rock with no significant ongoing erosion and a low risk of failure during an extreme event.

VD18 Opening Type – Culvert Opening Type

Inventory > Design > Culvert Detail; BMS3: Culvert

Description:

This item is used to record the opening type for the culvert.

Procedure:

Select the opening type for the culvert from the dropdown list.

Coding:

A	Arch	P	Pipe Arch
C	Circular	R	Rectangular
H	Horizontal Ellipse	V	Vertical Ellipse

VD19 Length - Length of Culvert Barrel Along Its Centerline

Inventory > Design > Culvert Detail; BMS3: General & Culvert

Description:

This item is used to record the length of a structure under fill.

Procedure:

Enter total length of a culvert barrel. For culverts with multiple openings, enter the barrel length for each opening on separate line items. Measure along the underside of the top slab or crown of the barrel between outside faces of the headwall or ends of the barrels. Be sure to enter a value when Item 5C27 is coded "0000" and the structure carries a highway.

Coding:

The total length of the culvert, to the nearest foot.

Box Culvert Barrel Length

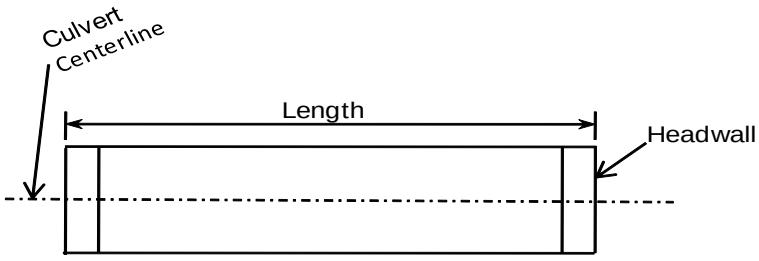


Figure 1. Plan view of culvert length measurement

VD20 Min Fill Height - Minimum Fill Height Over Culvert

Inventory > Design > Culvert Detail; BMS3: Culvert

Description:

This item is used to record the minimum height of fill on top of the culvert.

Procedure:

Enter the minimum height of fill on top of the culvert. For culverts with multiple openings, the minimum fill height may be entered for each opening on separate line items.

Coding:

Minimum height of fill on top of the culvert to the nearest tenth of a foot.

VD21 Max Fill Height - Maximum Fill Height Over Culvert

Inventory > Design > Culvert Detail; BMS3: Culvert

Description:

This item is used to record the maximum height of fill on top of the culvert.

Procedure:

Enter the maximum height of fill on top of the culvert. For culverts with multiple openings, the maximum fill height may be entered for each opening on separate line items.

Coding:

Maximum height of fill on top of the culvert to the nearest tenth of a foot.

VD22 Eff Width - Effective Width of Hydraulic Opening

Inventory > Design > Culvert Detail; BMS3: Culvert

Description:

This item is used to record the effective width of the hydraulic opening, excluding the wall between two culverts (twin boxes) or the wall thickness and the distance between boxes or pipes.

Procedure:

Enter the effective width of the hydraulic opening. For culverts with multiple openings, the width may be entered for each opening on separate line items.

Coding:

The effective width of the hydraulic opening to the nearest tenth of a foot.

VD23 Tie Type - Type of Tie for Tied Arch Culverts

Inventory > Design > Culvert Detail; BMS3: Culvert

Description:

This item indicates the type of tie used on a tied arch culvert.

Procedure:

For tied arch culverts, select the code from the dropdown list that describes the type of tie used. Leave blank if culvert is not a tied arch culvert.

Coding:

1 Reinforced
2 Post-tensioned
9 Other

VD24 Floor Type – Culvert Floor Type

Inventory > Design > Culvert Detail; BMS3: Culvert

Description:

This item indicates the type of culvert floor.

Procedure:

Select the code from the dropdown list that indicates the type of culvert floor.

Coding:

C Concrete floor without a fish channel
F Concrete floor with a fish channel
M Metal
N Natural Streambed

VD25 Exp Joint Type - Expansion Joint Type

Inventory > Design > Expansion Joint

Description:

This item indicates the type(s) of deck joints on the bridge.

Procedure:

Select the type of joint(s) from the dropdown list.

Coding:

A	Open Joint	K	Reinforced Elastomeric Dam
B	Premolded Filler	L	Modular
C	Neoprene Sponge	M	Strip Seal
D	Plate Dam	N	Armored Preformed Neoprene Compression Dam
E	Plate Dam w/Galvanized Gutter	O	Other
F	Plate Dam w/Neoprene Gutter	P	Asphaltic Plug
G	Tooth Dam	R	Preformed Silicone
H	Tooth Dam w/Galvanized Gutter	S	Two Part Silicone
I	Tooth Dam w/Neoprene Gutter	T	Two Part Silicone W/ Polymer Nosing
J	Preformed Neoprene Compression Seal		

Note: Applicable for deck joints only.

VD26 Movement Class - Expansion Joint Movement Class

Inventory > Design > Expansion Joint

Description:

This item indicates the movement class for the joints identified in Item VD25.

Procedure:

Select the movement class for each joint from the dropdown list.

Coding:

A	Up to 2″ (also use for fixed joint, i.e., “0” movement)	F	Over 16″ and up to 20″
B	Over 2″ and up to 4″	G	Over 20″ and up to 24″
C	Over 4″ and up to 8″	H	Over 24″ and up to 28″
D	Over 8″ and up to 12″	I	Over 28″ and up to 32″
E	Over 12″ and up to 16″	J	Over 32″

Note: Applicable for deck joints only.

VD27 Manufacture Code - Expansion Joint Manufacturer

Inventory > Design > Expansion Joint

Description:

This item indicates the manufacturer of the joints identified in Item VD25

Procedure:

Select the manufacturer of each joint from the dropdown list.

Coding:

A	Acme	K	R J Watson
B	Watson Bowman	L	SSI
C	Harris	M	Amrod
D	Felpro	N	LB Foster
E	D S Brown	O	Other
F	Royston	P	Kard
G	Unknown	Q	Pelet
H	Not Applicable	R	RP Machinery
I	Reserved	S	Safety Guard
J	Dow Corning		

Note: Applicable for deck joints only.

VD28 Haunch Type

Inventory > Design

Description:

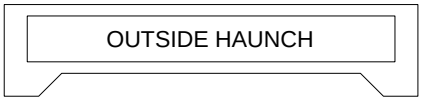
This item indicates the type of haunch in the prestressed beams.

Procedure:

For bridges with prestressed beams, enter the code which describes the haunch, inside or outside. If there are no haunches in the prestressed beams, code zero.

Coding:

0 No haunch
1 Inside haunch only
2 Outside haunch only
3 Inside and Outside haunches



VD29 Special Pier Cap – Type of Special Pier Cap

Inventory > Design

Description:

This item indicates the type of special pier cap, if any, present on the bridge.

Procedure:

If a special pier cap has been used, select the code from the dropdown list that describes the type of pier cap.

Coding:

1 Pre-fab post-tensioned
2 Post-tensioned
3 Post-tensioned – special (strengthened through external post-tensioning)
4 Steel box girder
5 Integral pier cap (prestressed concrete)
6 Integral pier cap (steel)
7 Integral pier cap (reinforced concrete)
8 Reserved
9 Other

VD30 Bearing Types - Type of Bearings

Inventory > Design

Description:

This item indicates the type(s) of bearings used on the bridge.

Procedure:

From the dropdown list select the type(s) of bearing(s) that are on the bridge.

Coding:

NN Not applicable (structures such as culverts, etc.)
01 Fixed through dowels
02 Expansion through dowels
03 Steel Plates
04 Lubrite Plates
05 Rockers
06 Rocker Nest
07 Rollers
08 Roller-Nest-Open
09 Roller-Nest-Enclosed
10 Neoprene (plain)
11 Neoprene (laminated)
12 Graphite Asbestos
13 Lead
14 Grout
15 Asphalt Felt/Tar Paper
16 Fabrica
17 Pot Bearings
18 Neoprene (plain) and Sliding Steel Plates
19 Neoprene (laminated) and Sliding Steel Plates
20 Preformed Fabric and Sliding Steel Plates
21 Spherical –Bronze or Steel
22 Disk Bearings
99 Other

VD31 Bridge Seat Cleaning– Number of Locations for Bearing Seat and Horizontal Surface Cleaning

Inventory > Design; BMS3: Superstructure

Description:

This item is used to record the number of substructure units that have open bearing areas accessible* for cleaning and flushing and have a deck joint (i.e. expansion devices on the bridge or open joints, refer to Item 6A41). This item also includes any additional areas that require horizontal surface cleaning.

Procedure:

Enter the number of substructure units and/or additional locations that require bearing seat and/or horizontal surface cleaning. This number should account for all possible areas and not only areas that currently have debris build-up.

Coding:

Enter the number of substructure units and/or additional locations. Each substructure unit shall only be counted once. For a structure with greater than 99 substructure units requiring cleaning and flushing, enter a value of 99.

Example:
Two-span, continuous structure, with deck joints at the abutments, should be coded with a count of "2" locations. If the District Bridge Engineer requests the bearing area at the pier to be cleaned because of pigeon debris, the count should be changed to "3" locations.

*This would not include joints with full-depth concrete diaphragms. The word accessible should not be used to describe the method in which access to the location is gained.

VD32 Bridge Seat Cleaning Note

Inventory > Design; BMS3: Superstructure

Description:

The item is used to record notes for the structure related to bridge seat cleaning and/or horizontal surface cleaning.

Procedure:

Record any narrative information about the structure that may be useful for future cleanings. Specific substructure units should be identified as well as if the cleaning and flushing is required for bearing seats and/or horizontal surfaces at those substructure units.

VD33 Scuppers with Downspouts – Number of Scuppers with Downspouts

Inventory > Design; BMS3: Superstructure

Description:

This item is used to record the number of scuppers with downspouts on a structure. Downspouts are pipes that carry the drain water to, or near, the ground beneath the structure.

Procedure:

Enter the total number of scuppers with downspouts for the entire bridge. If none, enter zero. Locations where the piping is not present or only extends beyond the bottom of the superstructure should be counted in Item VD34.

Coding:

Enter the number of scuppers with downspouts for the entire bridge. For structures with 99 or more scuppers with downspouts, enter a value of 99.

VD34 Scuppers without Downspouts – Number of Scuppers without Downspouts

Inventory > Design; BMS3: Superstructure

Description:

This item is used to record the number of scuppers without downspouts on a structure. The field is intended to record scuppers where the outlet pipe does not exist or only extends to the bottom of the girders but is not carrying the drain water to, or near, the ground beneath the structure.

Procedure:

Enter the total number of scuppers without downspouts for the entire bridge. If none, leave zero. Locations where the piping extends to or near ground level should be counted in Item VD33.

Coding:

Enter the number of scuppers without downspouts for the entire bridge. For structures with 99 or more scuppers without downspouts, enter a value of 99.

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VN Inventory - Drawings and Notes

The Inventory - Drawings and Notes Section is used to enter various storage and design drawings numbers for a structure. The screen is listed under Inventory Links.

Fields that contain repeating values (e.g., Design Exception Codes, Steel Types, Bearing Types, etc.) are shown in plain list boxes, with no limits to the maximum number of items that can be added to these lists. To add items to a list, use the Add Item button corresponding to that list. This will display an Add Item dialog to allow user to input data specific to the list. To remove items, select one or more items (use Ctrl + Click to select multiple items), and use the Delete Item(s) button. Users will be prompted by the system to confirm deletion before the records are removed. The Save button is used to commit pending changes on the screen, if any, to the database.

VN01 Design Exception Codes

Inventory > Drawing Notes

Description:

This item is used to indicate whether a design exception has been granted by the FHWA in its authorization of Federal funds for bridge rehabilitation or replacement.

Procedure:

Select the appropriate code from the dropdown list to indicate the type of design exception granted by FHWA. Enter this code when Federal funds have been authorized for the construction phase of the project, i.e., when FHWA has approved Form D-4232.

Coding:

1	Bridge Width	4	Any Combination of Above
2	Over or Under Clearance	5	Traffic Safety Feature End Transition
3	Live Load	Blank	No exception requested or granted

VN02 Soil Boring Notes

Inventory > Drawing Notes

Description:

This item is used to record notes concerning the soil borings performed for the structure during construction.

Procedure:

Enter any notes concerning the soil borings performed for the structure during construction in narrative form.

Coding:

Notes concerning the soil borings performed for the structure during construction in narrative form.

VN03 Test Description

Inventory > Drawing Notes

Description:

This item is used to record the testing performed for concrete or steel member properties (e.g. Charpy V-Notch (CVN) test, concrete compression strength testing, petrographic tests, etc.).

Procedure:

Enter information concerning the testing performed for member properties in narrative form.

Coding:

Enter information concerning the testing performed for member properties in narrative form. The type of test, the date(s) the testing was performed, who performed the testing and the results of the testing are all valuable information to enter in this field.

VN04 Storage Location

Inventory > Drawing Notes

Description:

This item is used to identify the location of documents in storage for the structure.

Procedure:

Enter a narrative description for the location of documents in storage for the structure.

Coding:

Narrative description for the location of documents in storage for the structure. Examples of notes for this item could be room numbers where the documents are filed, drawer numbers, or electronic file locations.

VN05 Design Drawing Numbers

Inventory > Drawing Notes > Drawing Detail

Description:

This two-part field is used to record the original design drawing number(s) and descriptive text for each drawing.

Procedure:

For each design drawing for the structure, enter the drawing number in Field 1 and a description of the design drawing in Field 2.

If the design drawing number is unknown, leave all fields blank, for not applicable.

Coding:

The design drawing number in Field 1 and a description of the design drawing in Field 2.

Note:
If no information is known to be available, enter "UNAVAIL" in Field 1. Department standard drawings (including TC's) can be entered if plan numbers are not known.

VN06 Shop Drawing Numbers

Inventory > Drawing Notes > Drawing Detail

Description:

This two-part item is used to record the original shop drawing number(s) and descriptive text for each drawing.

Procedure:

Enter the shop drawing number, in Field 1 and a description of the shop drawing in Field 2.

Coding:

The shop drawing number(s) in Field 1 and a description of the shop drawing in Field 2.

VN07 Repair Drawing Numbers - Drawing Number for the Repair

Inventory > Drawing Notes > Drawing Detail

Description:

This two-part item is used to record the drawing number, if any, for the repair and descriptive text for each drawing.

Procedure:

Enter the drawing number for the repair in Field 1 and a description of the repair drawing in Field 2. Leave this item blank if there is no drawing number or the drawing number is unknown. Also enter this drawing number in Item VN05.

Coding:

The repair drawing number in Field 1 and a description of the repair drawing in Field 2.

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VI Inventory - Inspection Planning

Required Inspection Equipment

The Inventory – Inspection Planning Section is used to record data for inspection planning. It captures and displays equipment and permits required to inspect a structure, as well as any other information that may influence the ability of the inspection team to perform their job effectively. The Inspection Planning Screen is listed under Inventory Links.

The next section, Miscellaneous Planning Information, is a group of fields that display information that affects inspection planning. Users may use the Save button to save any information entered in these fields to the database. The next section contains two tabs, Equipment and Permit. These tabs list equipment and permits required for inspecting the structure. The system allows an unlimited number of equipment items and permits to be listed in these tabs.

VI01 Min Crane Reach - Minimum Crane Reach Required

Inventory > Inspection Planning

Description:

This item indicates the minimum crane length needed to perform the inspection.

Procedure:

Enter the minimum crane length needed to perform the inspection. Leave this item blank if not applicable.

Coding:

Minimum crane length to the nearest foot.

Blank	Not applicable

VI02 High Voltage Power Line Ind – High Voltage Power Line Indicator

Inventory > Inspection Planning

Description:

This checkbox field indicates the presence of cables or high voltage power lines that may impede an inspection of the structure.

Procedure:

Check the box if cables or high voltage power lines that may impede an inspection of the structure are present. Otherwise, leave the box unchecked.

Coding:

Unchecked	No, high voltage power lines or cables do not exist
Checked	Yes, high voltage power lines or cables exist

VI03 RR Flagger Required – Railroad Flagger Required

Inventory > Inspection Planning

Description:

This checkbox field indicates whether or not a railroad flagger is required to inspect the structure.

Procedure:

Check the box if a railroad flagger is required to inspect the structure. Otherwise, leave the box unchecked.

Coding:

Unchecked	No, a railroad flagger is not required to inspect the structure
Checked	Yes, a railroad flagger is required to inspect the structure

VI04 Traffic Flagger Required

Inventory > Inspection Planning

Description:

This checkbox field indicates whether or not a traffic flagger is required to inspect the structure.

Procedure:

Check the box if a traffic flagger is required to inspect the structure. Otherwise, leave the box unchecked.

Coding:

Unchecked	No, a traffic flagger is not required to inspect the structure
Checked	Yes, a traffic flagger is required to inspect the structure

VI05 Type (Left) - Left Sidewalk Type

Inventory > Inspection Planning

Description:

This item is used to record the type of protection for the left sidewalk.

Procedure:

Select the code from the dropdown list that is applicable to the type of protection between roadway (traffic) and sidewalks (pedestrians) from the dropdown list.

Coding:

1	Unprotected sidewalk (no barrier between roadway and sidewalk. This code also applies to raised curbed sidewalks with no barriers.)
2	Sidewalk protected by guide rail barrier
3	Sidewalk protected by concrete parapet barrier
4	Sidewalk protected by other types
N	Not applicable (i.e., no sidewalk)

VI06 Type (Right) - Right Sidewalk Type

Inventory > Inspection Planning

Description:

This item is used to record the type of protection for the right sidewalk.

Procedure:

Select the code from the dropdown list that is applicable to the type of protection between roadway (traffic) and sidewalks (pedestrians) from the dropdown list.

Coding:

1 Unprotected sidewalk (no barrier between roadway and sidewalk. This code also applies to raised curbed sidewalks with no barriers.)
2 Sidewalk protected by guide rail barrier
3 Sidewalk protected by concrete parapet barrier
4 Sidewalk protected by other types
N Not applicable (i.e., no sidewalk)

VI07 Width (Left) - Left Sidewalk Width

Inventory > Inspection Planning

Description:

This item is used to record the width of the left curb or sidewalks (includes curb width).

Procedure:

This item will be **automatically filled in by the system** based on the information from Item 5B05. See coding for Item 5B05 for sidewalk width definitions and coding procedures.

Coding:

Width of sidewalk or curb to the nearest tenth foot.

VI08 Width (Right) - Right Sidewalk Width

Inventory > Inspection Planning

Description:

This item is used to record the width of the right curb or sidewalks (includes curb width).

Procedure:

This item will be **automatically filled in by the system** based on the information from Item 5B06. See coding for Item 5B06 for sidewalk width definitions and coding procedures.

Coding:

Width of sidewalk or curb to the nearest tenth foot.

VI09 Horizontal Curve - Is the Bridge on a Horizontal Curve?

Inventory > Inspection Planning

Description:

This item indicates whether or not the bridge is located on a horizontal curve.

Procedure:

Select a code of "1" from the dropdown list if the bridge is on a horizontal curve. If the bridge is not located on a horizontal curve, select "0" (zero) for not applicable.

If only a portion of the bridge is located on either a horizontal or vertical curve, the bridge should still be coded using the above coding system.

Coding:

1 Bridge is on a horizontal curve
0 Bridge is not on a horizontal curve

VI10 Vertical Curve - Is the Bridge on a Vertical Curve?

Inventory > Inspection Planning

Description:

This item indicates whether or not the bridge is located on a vertical curve.

Procedure:

Select a code of "1" from the dropdown list if the bridge is on a vertical curve (hump or crest), and "2" if on a vertical curve (sag). If the bridge is not located on a vertical curve, select "0" (zero) for not applicable.

If only a portion of the bridge is located on either a horizontal or vertical curve, the bridge should still be coded using the above coding system.

Coding:

0 Bridge is not on a vertical curve
1 Bridge is on a vertical curve (hump or crest)
2 Bridge is on a vertical curve (sag)

VI11 Inspection Limitations

Inventory > Inspection Planning

Description:

This item is used to record any inspection limitations for the structure.

Procedure:

Enter any notes concerning any inspection limitations that may be present at the bridge site.

Coding:

Notes may be entered to describe any physical limitations that the District may encounter when performing bridge inspections. Limitations may include detailed information on the width of sidewalks, pedestrian barriers, limited opening size between truss members, etc.

VI12 Equipment Type - Special Equipment Type

Inventory > Inspection Planning > Equipment Detail

Description:

This item is used to record the special equipment that is needed and/or could be useful in completing an inspection.

Procedure:

Select the code from the dropdown list that describes the needed and/or useful bridge inspection equipment.

Coding:

A	Personnel Lift
B	Inspection Crane
C	Rigging
D	Underwater
K	Traffic Control
L	Boat
N	Lantern or Lighting
O	Other

VI13 Equipment Qty - Equipment Quantity

Inventory > Inspection Planning > Equipment Detail

Description:

This item is used to record the quantity of equipment required for the inspection.

Procedure:

Enter the quantity of equipment required for the inspection.

Coding:

Quantity of equipment required for the inspection.

VI14 Consumable – Is the Type of Equipment Consumable?

Inventory > Inspection Planning > Equipment Detail

Description:

This display only item indicates whether or not the equipment is consumable.

Procedure:

Check the box if the inspection equipment is consumable. Otherwise, leave the box unchecked.

Coding:

Unchecked	Equipment is not consumable
Checked	Equipment is consumable

VI15 Assigned To

Inventory > Inspection Planning > Equipment Detail

Description:

This display only item indicates whether the equipment is assigned to the inspection team, individual, or both.

Procedure:

Enter the name of the company, inspection team, or individual that the equipment is assigned to.

Coding:

Enter the name of the company, inspection team, or individual that the equipment is assigned to.

VI16 Notes

Inventory > Inspection Planning > Equipment Detail

Description:

This item is used to record additional information regarding the equipment and its usage.

Procedure:

Enter any notes concerning the selected equipment.

Coding:

Additional information regarding the equipment and its usage.

VI17 (Not Used – Reserved for Future Use)

VI18 Permit Type

Inventory > Inspection Planning > Permit Detail

Description:

This item is used to record the type of permit required to conduct the inspection.

Procedure:

Select the code from the dropdown list that describes the needed permit type.

Coding:

PF – Peregrine Falcon
RR - Railroad

VI19 (Not Used – Reserved for Future Use)

VI20 POC – Point of Contact

Inventory > Inspection Planning > Permit Detail

Description:

This item is used to record the name of the point of contact that issues the permit required.

Procedure:

Enter the name of the point of contact.

VI21 Phone – Phone # for Point of Contact

Inventory > Inspection Planning > Permit Detail

Description:

This item is used to record the phone # for the point of contact.

Procedure:

Enter the phone # of the point of contact.

VI22 Fax – Fax # for Point of Contact

Inventory > Inspection Planning > Permit Detail

Description:

This item is used to record the fax # for the point of contact.

Procedure:

Enter the fax # of the point of contact.

VI23 Email – Email for Point of Contact

Inventory > Inspection Planning > Permit Detail

Description:

This item is used to record the email for the point of contact.

Procedure:

Enter the email of the point of contact.

VI24 Notes

Inventory > Inspection Planning > Permit Detail

Description:

This item is used to record additional information regarding the permits.

Procedure:

Enter any notes concerning the permits.

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VS Inventory - Signs / Lights

The Inventory - Signs/Lights Section allows users to view and/or edit information related to sign structures and high mast light towers. The screen is listed below Inventory Links.

VS01 (Not Used – Reserved for Future Use. Use Item 6A26)

VS02 (Not Used – Reserved for Future Use. Use Item 6A27)

VS03 (Not Used – Reserved for Future Use. Use Item 6A28)

VS04 (Not Used – Reserved for Future Use. Use Item 6A29)

VS05 Mount Type - Mounting Type

Inventory > Signs and Lights

Description:

This item indicates the type of mounting for the sign structure or high mast light pole.

Procedure:

Select the type of mount from the dropdown list.

Coding:

G Ground Mounted
S Structure Mounted

VS06 Foundation Type

Inventory > Signs and Lights

Description:

This item indicates the type of foundation for the sign structure or high mast light pole

Procedure:

Select the appropriate foundation code from the dropdown list.

Note:
Coding of R is provided to describe field observable conditions. Use only when more detailed or exact plan information does not exist.

Coding:

A Footing on competent bedrock
B Cast-in-place concrete piles
C Precast concrete piles
D Prestressed concrete piles
E Steel H-piles
F Steel pipe piles
G Timber piles
H Drilled caisson
I Deep water caisson
J Pedestals
K Footing with an integral bottom on erodible bedrock (such as claystone, clay shale, silt stone, shale, or weathered bedrock)
L Footing with an integral bottom on soil (sand-gravel, cobbles, silt, and clay)
O Other (describe in Item 2A01, notes)
P Foundation type has been researched; information is unknown or not available with confidence
R Footing on bedrock – erodibility cannot be determined
X Information is not available at this time
Z Metal foundation

VS07 Manufacturer

Inventory > Signs and Lights

Description:

This item indicates the manufacturer of the lights.

Procedure:

Enter the name of the manufacturer in narrative form.

VS08 Insp Location Info - Inspection Location Information

Inventory > Signs and Lights

Description:

This item is used to record information about how to inspect the structure.

Procedure:

Enter narrative information on how to inspect the structure, such as the location of the key to the lockbox for a high mast light tower.

VS09 (Not Used – Reserved for Future Use. Use Item 5A15)

VS10 (Not Used – Reserved for Future Use. Use Item 5A16)

VS11 Number of Signs - Number of Signs Displayed on Sign Structure

Inventory > Signs and Lights

Description:

This item is used to record the number of signs that are displayed on the sign structure.

Procedure:

Enter total number of signs on the sign structure or mounted to the bridge.

Coding:

Total number of signs on the structure. Do not count extension panels as separate signs.

VS12 Number of Lights - Number of Lights on Structure

Inventory > Signs and Lights

Description:

This item is used to record the number of lights that are on the sign or high mast light tower.

Procedure:

Enter total number of lights on the structure.

Coding:

Total number of lights on the structure.

VS13 through VS16 (Not Used – Reserved for Future Use)

VS17 Distance from Rdwy - Distance From Roadway

Inventory > Signs and Lights

Description:

This item is used to record the distance from the edge of roadway travel lane to the face of the structure, looking segments ahead (see Figure 1 below).

Procedure:

Enter the distance from edge of roadway to the face of the structure, looking segments ahead.

Coding:

Distance from edge of roadway to structure to the nearest foot. (See sketch below for measurement locations to determine Item VS17).

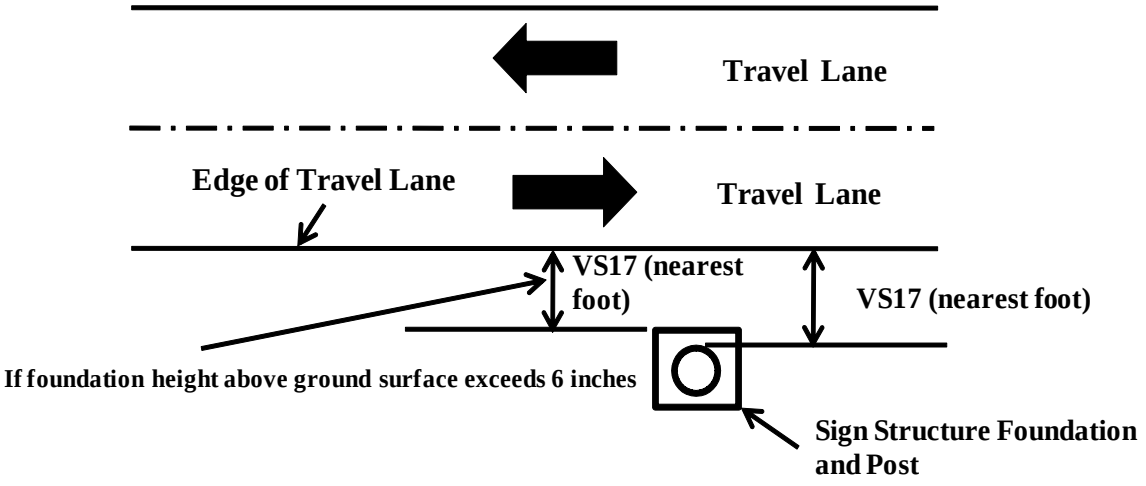


Figure 1. Measurement location for Item VS17

VS18 Direction from Rdwy - Direction from Roadway

Inventory > Signs and Lights

Description:

This item is used to record the direction the horizontal distance in Item VS17 was measured, looking segments ahead.

Procedure:

Select the direction from the dropdown list.

Coding:

R	Right
L	Left

VS19 Max Diameter - Maximum Diameter of High Mast Tower

Inventory > Signs and Lights

Description:

This item is used to record the maximum diameter of the high mast tower.

Procedure:

Enter the maximum diameter of the high mast tower to the nearest tenth of an inch.

Coding:

Maximum diameter of the high mast tower to the nearest tenth of an inch.

VS20 Min Diameter - Minimum Diameter of High Mast Tower

Inventory > Signs and Lights

Description:

This item is used to record the minimum diameter of the high mast tower.

Procedure:

Enter the minimum diameter of the high mast tower to the nearest tenth of an inch.

Coding:

Minimum diameter of the high mast tower to the nearest tenth of an inch.

VS21 Mount Bolt Base - Is the Mounting Bolt Base Grounded?

Inventory > Signs and Lights

Description:

This item indicates whether or not the mounting anchor bolt base is grounded.

Procedure:

If the mounting anchor bolt base is grounded, select "Yes". Otherwise, select "No".

Coding:

0 The mounting anchor bolt base is not grounded
1 The mounting anchor bolt base is grounded

VS22 Num Height - Height of High Mast Tower

Inventory > Signs and Lights

Description:

This item is used to record the height of the high mast tower.

Procedure:

Enter the height of the tower to the nearest tenth of a foot.

Coding:

Actual height of the high mast tower to the nearest tenth of a foot.

VS23 Movement

Inventory > Signs and Lights

Description:

This item is reserved for future use.

VS24 Alignment

Inventory > Signs and Lights

Description:

This item is reserved for future use.

VS25 Total Area of Sign - Total Area of Signs on the Structure

Inventory > Signs and Lights

Description:

This item is used to record the total area of signs on the structure.

Procedure:

Enter the total area of signs in square feet.

Coding:

Enter the total area of signs in square feet.

Example:
There are two signs on the structure that are 76″x 105″ and 76″x 96″.
This is a total of 106 square feet.

106

VS26 Height of Highest Column

Inventory > Signs and Lights

Description:

This item is used to record the height of the highest column to the nearest tenth of a foot.

Procedure:

For a three-chord truss, measure from the top of the pedestal to the center of the mid-chord. For a four-chord truss, measure from the top of the pedestal to the center of the top chord. For a single strut cantilever, measure from the top of the pedestal to the center of the strut. For a double strut cantilever, measure from the top of the pedestal to the center of the top strut.

Coding:

Actual height of the column in feet to the nearest tenth of a foot.

Examples:

Height	
50'-6"	50.50
30'-0"	30.00

VS27 (Not Used – Reserved for Future Use. Use Item 5B18)

VS28 Number of Spans

Inventory > Signs and Lights

Description:

This item is used to describe the number of spans of the sign structure.

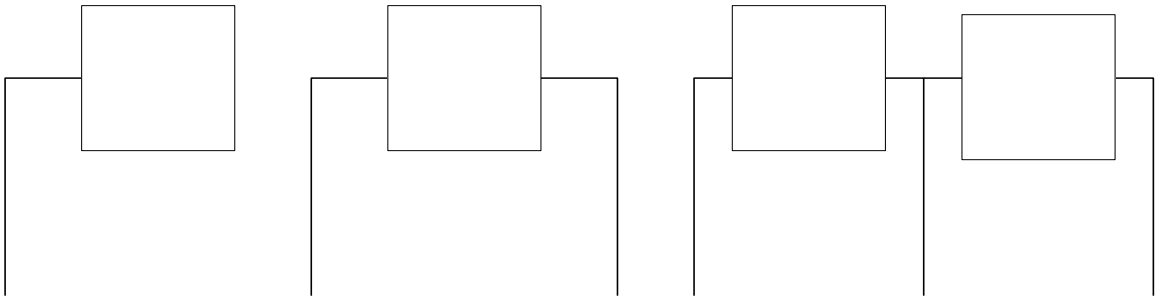
Procedure:

This item is used to count the total number of spans of the sign structure. A sign structure which spans a divided highway with a median column and berm columns on each side has two spans.

Leave blank for structure mounted or cantilever sign structures.

Coding:

The total number of spans. Acceptable coding: 1 – 9 and blank.



BLANK ONE SPAN TWO SPAN

VS29 (Not Used – Reserved for Future Use. Use Item 5A19)

VS30 Median Width Under – Median Width Under Sign Structure

Inventory > Signs and Lights

Description:

This item is used to record the width of the median located under an overhead sign structure.

Procedure:

Enter the median width under an overhead sign structure to the nearest foot. Measure the horizontal distance between inside edges of adjacent lanes.

Coding:

The median width under overhead structure to the nearest foot.

Example:

Median Width	
23'-6"	24

VS31 through VS33 (Not Used – Reserved for Future Use)

VS34 Dynamic Message Sign – Dynamic Message Sign Indicator

Inventory > Signs and Lights

Description:

This item is used to indicate the supported sign type is DMS.

Procedure:

Indicate whether the sign supported is a DMS type of sign.

Coding:

Unchecked	Sign type supported by the sign structure is other than DMS
Checked	Sign type supported by the sign structure is DMS

[the remainder of this page is intentionally left blank]

VT Inventory - Tunnels

The Inventory - Tunnel Section allows users to view and/or edit information related to tunnels. The Tunnel Screen is listed below Inventory Links. The field names below are taken directly from the Specification for the National Tunnel Inventory (SNTI). The description, procedure, and coding are provided in SNTI.

Age and Service Items:

A.8 – Service in Tunnel
Inventory - Tunnel: BMS3: Tunnels

Classification Items:

C.3 – Direction of Traffic
Inventory > Tunnel: BMS3: Tunnels

C.4 – Toll
Inventory > Tunnel: BMS3: Tunnels

C.7 – Functional Classification
Inventory > Tunnel: BMS3: Tunnels

C.8 – Urban Code
Inventory > Tunnel: BMS3: Tunnels

Identification Items:

I.11 LRS Inventory Rte, Sub# - LRS Inventory Route and Subroute Number
Inventory > Features > Highway

Description:
This two-part item is used to record the inventory route and subroute numbers from the State's linear referencing system (LRS).

Procedure:
Leave this item blank. The Department submits this data to the FHWA based on traffic route information.

The LRS inventory route and subroute numbers to be reported in this item must correspond to the LRS inventory route and subroute numbers reported by the State for the HPMS. The LRS inventory route number is coded in the first field, while the subroute number, if it exists, is coded in the second field.

The LRS inventory route number can be alphanumeric but must not contain blanks. The LRS inventory route number is not necessarily the same as that posted along the roadway, but is a number used to uniquely identify a route within at least a county and perhaps throughout the State. The subroute number is a number that uniquely identifies portions of an inventory route sections where duplicate mile points occur. These subroute numbers, if they exist, are identified in the State's HPMS-LRS records.

I.15 – Border Tunnel State Code
Inventory > Tunnel

I.16 – Border Tunnel Financial Responsibility
Inventory > Tunnel

I.17 – Border Tunnel Number
Inventory > Tunnel

I.18 – Border Tunnel Inspection Responsibility
Inventory > Tunnel

Inspection Items

D.1 – Routine Inspection Target Date
Inventory > Tunnel: BMS3: Tunnels

D.4 – In-Depth Inspection Scheduled?
Inventory > Tunnel: BMS3: Tunnels

Navigation:

N.1 – Under Navigable Waterway
Inventory > Tunnel

N.2 – Navigable Waterway Clearance
Inventory > Tunnel

N.3 – Tunnel or Portal Island Protection From Navigation
Inventory > Tunnel

Structure Type and Material Items:

S.1 – Number of Bores
Inventory > Tunnel: BMS3: Tunnels

S.2 – Tunnel Shape
Inventory > Tunnel: BMS3: Tunnels

S.3 – Portal Shape
Inventory > Tunnel: BMS3: Tunnels

S.4 – Ground Conditions
Inventory > Tunnel: BMS3: Tunnels

S.5 – Complex
Inventory > Tunnel: BMS3: Tunnels

Items listed in a greyed box do not require input from the user. The fields are automatically populated by the system, if applicable. Refer to Appendix D for the BMS2 to SNTI Conversion.

VW Inventory - Walls

The Inventory - Wall Section allows users to view and/or edit information related to retaining walls and noise walls. This screen is only shown when the user selects a wall type structure. The Walls Screen is listed below the Inventory Links.

VW01 (Not Used – Reserved for Future Use. Use Item 6A26)

VW02 (Not Used – Reserved for Future Use. Use Item 6A27)

VW03 (Not Used – Reserved for Future Use. Use Item 6A28)

VW04 (Not Used – Reserved for Future Use. Use Item 6A29)

VW05 Foundation Type

Inventory > Walls

Description:

This item indicates the type of foundation for the wall structure.

Procedure:

Select the appropriate foundation code from the dropdown list. A coding of blank is not permitted for this item.

Note:
Codings of R and S are provided to describe field observable conditions. Use only when more detailed or exact plan information does not exist.

Coding:

A	Footing on competent bedrock	K	Footing with an integral bottom on erodible bedrock (such as claystone, clay shale, silt stone, shale, or weathered bedrock)
B	Cast-in-place concrete piles	L	Footing with an integral bottom on soil (sand-gravel, cobbles, silt, and clay)
C	Precast concrete piles	O	Other (describe in Item 2A01, notes)
D	Prestressed concrete piles	P	Foundation type has been researched; information is unknown or not available with confidence
E	Steel H-piles	R	Footing on bedrock – erodibility cannot be determined
F	Steel pipe piles	X	Information is not available at this time
G	Timber piles		
H	Drilled caisson		
I	Deep water caisson		
J	Pedestals		

VW06 Backfill/Damping 1 - Primary Backfill Material

Inventory > Walls; Form W

Description:

This item is used to indicate the primary type of backfill material.

Procedure:

Select the code from the dropdown list for the primary type of backfill material. If a secondary type of backfill material exists, select the appropriate code in Item VW07.

Coding:

11	Soil	23	Coarse Aggregate, No. 57
12	Granular Material	24	Local Stone
13	Shale	35	Geosynthetic Reinforced Soil
20	Rock	91	Random Material
21	Coarse Aggregate, Type C	99	Other
22	Coarse Aggregate, No. 1		

Example:

Backfill material is compacted soil with coarse aggregate No. 57 for drainage. Estimated percentage is 10% aggregate, 90% soil.

VW07 Backfill/Damping 2 - Secondary Backfill Material

Inventory > Walls; Form W

Description:

This item is used to indicate the secondary type of backfill material.

Procedure:

Select the code from the dropdown list for the secondary type of backfill material.

Coding:

11	Soil	23	Coarse Aggregate, No. 57
12	Granular Material	24	Local Stone
13	Shale	35	Geosynthetic Reinforced Soil
20	Rock	91	Random Material
21	Coarse Aggregate, Type C	99	Other
22	Coarse Aggregate, No. 1		

Example:

Backfill material is compacted soil with coarse aggregate No. 57 for drainage. Estimated percentage is 10% aggregate, 90% soil.

VW08 Historic Elig Info - Historic Eligibility Information

Inventory > Walls

Description:

This item is used to record information about the contributing historic eligibility of the structure.

Procedure:

Enter information about the historic eligibility of the structure in narrative form.

VW09 Manufacturer

Inventory > Walls

Description:

This item is used to record the name of the wall manufacturer.

Procedure:

Enter the name of the wall manufacturer in narrative form.

VW10 Wall Use

Inventory > Walls

Description:

This item is used to describe the use of the wall.

Procedure:

Select the appropriate code from the dropdown list.

Coding:

1	Roadside Retaining Wall	5	Wingwall and Retaining Wall
2	Bridge Abutment	6	Bridge Abutment, Wingwall, and Retaining Wall
3	Wingwall	7	Noise Wall
4	Bridge Abutment and Wingwall	9	Other

Example:
Retaining wall is a bridge abutment and wingwall.
It extends 200 feet from the bridge

VW11 Mount Type - Mounting Type

Inventory > Walls

Description:

This item is used to record whether the wall structure is mounted on a structure or on the ground.

Procedure:

Select the type of mounting for the wall structure from the dropdown list.

Coding:

G	Wall mounted on ground
S	Wall mounted on structure

VW12 Post Type

Inventory > Walls

Description:

This item is used to record the type of posts used for the noise wall structure.

Procedure:

Select the type of posts used for the noise wall structure from the dropdown list.

Coding:

A Reinforced Concrete Post Type
B Steel Post Type

VW13 (Not Used – Reserved for Future Use. Use Item 5A15)

VW14 (Not Used – Reserved for Future Use. Use Item 5A16)

VW15 Architectural Forms - Were Architectural Forms Used?

Inventory > Walls

Description:

This item indicates whether or not architectural forms were used on the wall.

Procedure:

If architectural forms were used on the wall, select "1 - Yes" from the dropdown list. If architectural forms were not used, select "0 - No".

Coding:

0 No, Architectural forms were not used on the wall
1 Yes, Architectural forms were used on the wall

VW16 Rebar Protection – Type of Reinforcement Bar Protection

Inventory > Walls

Description:

This item indicates the type of protective system used on the reinforcement bars in the concrete wall.

Procedure:

Select the appropriate code from the dropdown list.

Coding:

1 Bare reinforcement bars
2 Galvanized reinforcement bars
3 Epoxy coated reinforcement bars
4 Dual protection (i.e., combination of 2 and 3)
9 Other
N Not Applicable

VW17 FCI - Compressive Strength Concrete at 28 Days

Inventory > Walls

Description:

This item is used to record the specified compressive strength of the concrete at 28 days.

Procedure:

Enter the specified compressive strength of concrete at 28 days.

Coding:

The specified compressive strength in pounds per square inch (psi). If more than one strength of concrete is used, code "9999".

VW18 Support Info - Support Information

Inventory > Walls

Description:

This item is used to record information about the support for the wall.

Procedure:

Enter "Up" to indicate that the wall is holding back a hill or slope. Enter "Down" to indicate that the wall is supporting the roadway.

Coding:

1 - Down	Wall is supporting the roadway
2 - Up	Wall is holding back a hill or slope

VW19 Direction Info - Direction Information

Inventory > Walls

Description:

This item is used to record left and right, location information to be passed to RMS.

Procedure:

Select the code from the dropdown list that indicates the direction of the wall support, looking segments ahead.

Coding:

L - Left	Support is to the left
R - Right	Support is to the right

VW20 Installed/Retrofitted

Inventory > Walls

Description:

This item indicates whether the wall was installed on a new roadway or retrofitted to an existing roadway.

Procedure:

Select the code from the dropdown list that indicates whether the wall was installed on a new roadway or retrofitted to an existing roadway.

Coding:

E	The wall was retrofitted to an existing roadway
N	The wall was installed on a new roadway

VW21 County – Begin and End – Wall Location

Inventory > Walls

Description:

This two-part item is used to record the County in which the wall begins and ends.

Procedure:

In Field 1, select the County in which the wall begins from the dropdown list. In Field 2, select the County in which the wall ends.

Coding:

County in which the wall is located.

01 Adams	15 Chester	29 Fulton	43 Mercer	57 Susquehanna
02 Allegheny	16 Clarion	30 Greene	44 Mifflin	58 Tioga
03 Armstrong	17 Clearfield	31 Huntingdon	45 Monroe	59 Union
04 Beaver	18 Clinton	32 Indiana	46 Montgomery	60 Venango
05 Bedford	19 Columbia	33 Jefferson	47 Montour	61 Warren
06 Berks	20 Crawford	34 Juniata	48 Northampton	62 Washington
07 Blair	21 Cumberland	35 Lackawanna	49 Northumberland	63 Wayne
08 Bradford	22 Dauphin	36 Lancaster	50 Perry	64 Westmoreland
09 Bucks	23 Delaware	37 Lawrence	51 Pike	65 Wyoming
10 Butler	24 Elk	38 Lebanon	52 Potter	66 York
11 Cambria	25 Erie	39 Lehigh	53 Schuylkill	67 Philadelphia
12 Cameron	26 Fayette	40 Luzerne	54 Snyder	
13 Carbon	27 Forest	41 Lycoming	55 Somerset	
14 Centre	28 Franklin	42 McKean	56 Sullivan	

VW22 SR – Begin and End – State Route Number

Inventory > Walls

Description:

This two-part item is used to record the beginning and end state route designations of features inventoried using the Department's Location Referencing System.

Procedure:

Enter the State Route identification for each route identified as a feature that has been inventoried using the Department's Location Reference System. The State Route at the beginning of the wall should be entered in Field 1, and the State Route at the end of the wall should be entered in Field 2, looking segments ahead.

Coding:

Refer to the coding of Item 5C06. Code this item only if the feature is a state route or other route that has been inventoried using the Department's Location Referencing System.

VW23 Segment – Begin and End – Segment Designation

Inventory > Walls

Description:

This two-part item is used to record the beginning and end route segment designations of features inventoried using the Department's Location Referencing System.

Procedure:

Enter the segment(s) identification for each route identified as a feature that has been inventoried using the Department's Location Reference System. The segment at the beginning of the wall should be entered in Field 1, and the segment at the end of the wall should be entered in Field 2, looking segments ahead.

Coding:

Code this item only if the feature is a state route or other route that has been inventoried using the Department's Location Referencing System.

VW24 Offset – Begin and End – Offset Designation

Inventory > Walls

Description:

This item is used to record the distance in feet from the beginning of the segment to the beginning and end of the wall.

Procedure:

Enter the offset distance at the beginning of the structure in Field 1 and enter the offset distance at the end of the structure in Field 2, looking segments ahead.

Coding:

Distance in feet from the beginning of the segment to the beginning and end of the structure.

VW25 Distance to Road

Inventory > Walls

Description:

This item is used record the distance from the base of the wall to the road.

Procedure:

Enter the distance from the base of the wall to the road.

Coding:

Distance from the base of the wall to the road to the nearest tenth of a foot.

VW26 Slope - Backfill Slope

Inventory > Walls

Description:

This item is used to describe the slope of the backfill behind the retaining wall.

Procedure:

Enter the slope of the backfill.

Coding:

Code the slope of the backfill in the form: 1:__.__

Examples:

Slope	
1:2.5	2.5
1:1	1.0

VW27 Min Clearance - Minimum Lateral Clearance

Inventory > Walls

Description:

This item is used to record the minimum lateral clearance for the wall with respect to the corresponding roadway.

Procedure:

Enter the minimum lateral clearance along the length of the wall with respect to the corresponding roadway.

Coding:

Minimum lateral clearance with respect to the corresponding roadway to the nearest tenth of a foot.

VW28 Min Wall Height - Minimum Wall Height

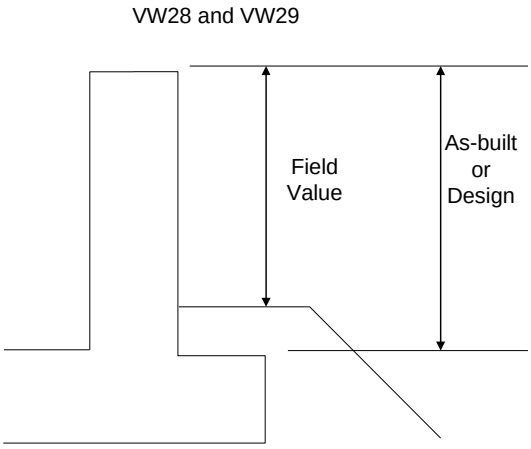
Inventory > Walls

Description:

This item is used to record the actual minimum wall height.

Procedure:

Enter the minimum stem height to the nearest tenth of a foot. (Measured from top of footing to bearing seat. Recorded in order of preference from as-built drawings, design plans, or field value for exposed stem.)



Coding:

Minimum stem height to the nearest tenth of a foot.

Examples:

Wall Height	
14'-6"	14.5
8'-3"	8.3

VW29 Max Wall Height - Maximum Wall Height

Inventory > Walls

Description:

This item is used to record the actual maximum wall height.

Procedure:

Enter the maximum stem height to the nearest tenth of a foot. (Measured from top of footing to bearing seat. Recorded in order of preference from as-built drawings, design plans, or field value for exposed stem.)

Coding:

Maximum stem height to the nearest tenth of a foot.

Examples:

Wall Height	
14'-6"	14.5
37'-10"	37.8

VW30 (Not Used – Reserved for Future Use. Use Item 5B18)

VW31 Total Area - Approximate Area of the Wall

Inventory > Walls

Description:

This item is used to enter the area of the retaining wall in square feet.

Procedure:

Enter the total area of the wall to the nearest square foot.

Coding:

The total area of the wall to the nearest square foot.

VW32 (Not Used – Reserved for Future Use. Use Item 2A02)

VW33 (Not Used – Reserved for Future Use. Use Item 5A21)

VW34 (Not Used – Reserved for Future Use. Use Item 5A20)

[the remainder of this page is intentionally left blank]

SG Structure Group

The Structure Group Section allows users to view and/or edit information related to structure groups. This section allows users to establish relationships between structures within BMS2. Structures can be a part of multiple structure groups. The Structure Group Screen is listed below the Inventory Links.

SG01 Group Type – Structure Group Type

Inventory > Structure Group > Group Detail

Description:

This item indicates the structure group type. The structure group type describes the relationship between the structures within the group.

Procedure:

Select the appropriate group type from the dropdown list. A coding of blank is not permitted for this item.

Coding:

1 – Predecessor Successor	Group demolished structures and their replacements
2 – Interchange	Group structures that comprise an interchange
3 – Border Bridge	Group bridges that border other states
4 – Adjacent	Group adjacent structures
5 – Duplicate	Group duplicated structures
9 – Test Structures	Group structures used in BMS2 for testing purposes

SG02 Group Name – Structure Group Name

Inventory > Structure Group > Group Detail

Description:

This item indicates the structure group name. The structure group name describes the structure group in a narrative form.

Procedure:

Enter the name of the structure group in narrative form. The structure group name should be unique and easily identify the group.

Coding:

A narrative description of the group.

Examples:
Eisenhower Interchange
I-81/Cameron Street Interchange

SG03 Group ID – Structure Group Identification Number

Inventory > Structure Group

Description:

This item indicates structure group identification number.

Procedure:

This field is **automatically calculated by the system** when a new structure group is added to BMS2.

Coding:

A unique, numerical number assigned by the system.

SG04 Relationship – Structure Group Relationship Type

Inventory > Structure Group > Group Structure Detail

Description:

This item indicates the structure group relationship type between structures.

Procedure:

Select the appropriate structure group relationship type from the dropdown list. A coding of blank is not permitted for this item. When Item SG01 is coded 1 – Predecessor Successor, the relationship type should either be 1 – Predecessor or 2 – Successor. In most cases, a bridge should only have a single predecessor and a single successor. When Item SG01 is 2 – Interchange, the main structure should be identified as 3 – Primary and the remaining structures should be identified as 4 – Secondary.

Coding:

1 – Predecessor	Indicates the structure that preceded the selected structure
2 – Successor	Indicates the structure that succeeded the selected structure
3 – Primary	Indicates the main structure in a structure group
4 – Secondary	Indicates the secondary structure(s) in a structure group

SG05 Description – Structure Group Description

Inventory > Structure Group > Group Detail

Description:

This item is used to record notes about the structure group in narrative form.

Procedure:

Record any narrative information about the structure group that may be useful for future applications or inspections.

VB Inventory – Preservation and Rehab

The Inventory – Preservation and Rehab screen is used to enter and display information related to preservation and rehabilitation work done on a bridge. This screen will capture the preservation and rehabilitation history of the structure.

By default, the preservation and rehab screen will display all records for a selected bridge in a tabular form, starting from the most recent preservation or rehab work entered into the system. The records can be sorted for each column by clicking on the desired column heading. Clicking on the column heading a second time will sort the records in descending order. The project detail screen can be opened by selecting the view or edit button to the far right of the project record. A project record can be deleted by selecting the delete button to the right of the view and edit button.

New preservation and rehab projects can be added using the "Create" button (green button next to Action heading). **Preservation and rehab records on this screen are to be created after the let date for a project has passed.** This will ensure the basic information be transferred over to BMS2 from ECMS is from a valid project planned for construction. Some of the basic information that is being transferred, such as Item VB06 – Total Bid Cost is only available after the let date. As part of the nightly batch between the two systems, ECMS projects with a valid BRKEY will update BMS2. This will ensure updated information is stored on the Preservation and Rehab screen.

The user may enter preservation and rehab projects that have already been completed in the past to further enhance the historical data for a structure. If the ECMS Number of the previous project is known, it may be entered in Item VB01 and will fill in the items automated based off the ECMS Number if the "Load ECMS" button is clicked or the screen is saved. If the ECMS Number is not known, the user may still enter information on the historical project but is only required to enter Items VB02 and VB03.

In addition to the specific project work type/cost information that is recorded on this page, certain condition ratings and inventory items can be recorded for before and after work done on a bridge. Below lists the procedures used for populating the condition rating and inventory information for these sections.

CONDITION RATING ITEMS

The condition rating fields on this page consist of Items VB22, VB23, VB50, VB60, VB71, VB72, VB73, and VB91. These items are used to capture the improvement in condition ratings as a result of the work done for this project record. To populate the "before" and "after" condition ratings, the user must select the appropriate inspection records in Items VB20 and VB21 and click the "Populate" button. The inspection selected in Item VB20 populates the "before" condition ratings from that inspection record and the inspection selected in Item VB21 populates the "after" condition ratings from that inspection record. The "before" condition ratings will only be populated if an inspection is selected in Item VB20. The same is true for the "after" condition ratings and Item VB21.

INVENTORY ITEMS

The inventory fields on this page linked to other areas of BMS2 consist of Items VB24-VB32 and VB74-VB77. This screen gives the ability to capture a history of these inventory items as they change with construction projects. The "before" codes for these inventory items will be populated when the project record is created on this screen. These "before" fields will remain editable for the user after project creation for when a historical project is being entered and the "before" fields need changed to the correct coding they were before that historical project. The "after" codes for these inventory items are editable fields that will need updated by the user as per changes from the project plans. When the "after" fields have been filled out, the user is given the option to click the Export button, located below Items VB32 and VB77 (both buttons have the exact same functionality), which will export those inventory items to their respective linked fields on other screens in BMS2. The Export button will export all non-condition fields to the corresponding fields on the Agency Bridge screen, regardless if a value was entered or if the field was left blank as some codings of a blank are valid.

VB01 ECMS Number

Inventory > Preservation and Rehab

Description:

This item is used to record the ECMS Project Number that is associated with the work done on the bridge.

Procedure:

This item is recorded to identify the project in ECMS and link it to this screen. **Enter the ECMS Number for a project only after it has been let. After entering the ECMS Number, click "Load ECMS" or save the screen.** If the work was completed without an ECMS Number (Department Maintenance Forces, local bridge contract), leave this field blank. A message will display if an invalid ECMS number is entered in this item.

If an ECMS number is entered, the following fields will be populated on the screen: VB04, VB05, VB06, VB08, VB12, VB15, and VB16.

Coding:

Enter a valid ECMS Number associated with the project and click "Load ECMS" or save the screen. The ECMS Number will be coded as a number up to 6 digits. If work was completed without an ECMS Number, leave **blank**.

VB02 Work Scope (TAMP)

Inventory > Preservation and Rehab

Description:

This item is used to record the TAMP (Transportation Asset Management Plan) scope of work completed on the bridge.

Procedure:

This item is recorded to identify the TAMP scope of work. The information is used by PennDOT when submitting information to FHWA regarding projects completed within the Commonwealth. **In the future this item will be automatically filled in by the system from ECMS if a valid ECMS number is entered in Item VB01.** For now, this item is selected manually. Below are the coding options that can be populated. Only one can be selected for a project. Additional information on the differences between the five coding options can be found below and on PennDOT's Asset Management website.

Coding:

1 New Construction/Capacity Added
2 Reconstruction
3 Rehabilitation
4 Preservation
5 Maintenance
6 Removal
7 Emergency Repair

Examples:

For widening projects that add lane(s), code "1 – Initial Construction/Capacity Added"
For construction of a new bridge when there was not an existing bridge, code "1 – Initial Construction/Capacity Added"
For bridges reconstructed in the same relative location, code "2 – Reconstruction"
For superstructure replacement projects, code "3 – Rehabilitation"
For projects that upgrade structure to current standards, code "3 – Rehabilitation"

VB03 Work Type (BAMS)

Inventory > Preservation and Rehab

Description:

This item is used to record the BAMS (Bridge Asset Management Section) type of work completed on the bridge.

Procedure:

This item is a multi-select checkbox field used to capture every type of work done on the bridge for the project record.

Coding:

1	Preservation – Asphalt Overlay	10	Rehab – Substructure
2	Preservation – Latex Overlay	11	Rehab – Culvert
3	Preservation – Epoxy	12	Replacement – Deck Only
4	Preservation – PPC	13	Replacement – Deck & Superstructure
5	Preservation – Joints	14	Replacement – Bridge
6	Preservation – Paint	15	Replacement – Culvert
7	Preservation – Bearings	16	Maintenance
8	Preservation – Culvert	17	New Construction
9	Rehab - Superstructure	18	Removal

VB04 Let Date

Inventory > Preservation and Rehab

Description:

This item is used to record the date the project was let for the bridge.

Procedure:

This item is automatically filled in by the system from ECMS if a valid ECMS number is entered in Item VB01. The location of this field in ECMS is as follows: 'Setup' Section > Milestones > Let Date > 'Actual Date' Column. If a project is entered without a known ECMS number, this item will no longer be automated and can be manually entered by the user.

Coding:

Date with formatting mm/dd/yyyy.

VB05 Work Completion Date

Inventory > Preservation and Rehab

Description:

This item is used to record the date that the physical work was completed on the bridge.

Procedure:

This item is automatically filled in by the system from ECMS if a valid ECMS number is entered in Item VB01. The location of this field in ECMS is as follows: 'Setup' Section > Milestones > Physical Work Complete > 'Actual Date' Column. If a project is entered without a known ECMS number, this item will no longer be automated and can be manually entered by the user.

Coding:

Date with formatting mm/dd/yyyy.

VB06 Total Bid Cost

Inventory > Preservation and Rehab

Description:

This item is used to record the total bid cost to perform the work on the bridge.

Procedure:

This item is automatically filled in by the system from ECMS if a valid ECMS number is entered in Item VB01. The location of this field in ECMS is as follows: ECMS Landing Page > Financial Information Section > Original Contract. If a project is entered without a known ECMS number, this item will no longer be automated and can be manually entered by the user.

Coding:

This item is coded in dollar amount to the cent.

VB07 Total Structure Cost @ Let

Inventory > Preservation and Rehab

Description:

This item is used to record the structural portion of the BID cost associated with the project for the individual structure.

Procedure:

This item is to be entered by the user based off costs in the original contract (BID cost) for the individual structure. This item excludes costs such as traffic control measures, roadway improvements, etc.

Coding:

This item is coded in dollar amount to the cent.

VB08 Total Amount Tendered Cost

Inventory > Preservation and Rehab

Description:

This item is used to record the total final costs associated with the project. This includes all adjustments and work orders that may have happened during the construction phase of the project and portrays the final total amount spent.

Procedure:

This item is automatically filled in by the system from ECMS if a valid ECMS number is entered in Item VB01. The location of this field in ECMS is as follows: ECMS Landing Page > Financial Information Section > Amount Tendered. If a project is entered without a known ECMS number, this item will no longer be automated and can be manually entered by the user.

Coding:

This item is coded in dollar amount to the cent.

VB09 Total Structure Cost @ Final

Inventory > Preservation and Rehab

Description:

This item is used to record the structural portion of the FINAL cost associated with the project for the individual structure.

Procedure:

This item is to be entered by the user based off costs for the final project (amount tendered cost) for the individual structure. This item excludes costs such as traffic control measures, roadway improvements, etc.

Coding:

This item is coded in dollar amount to the cent.

VB10 MPMS Number

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the MPMS Project Number that is associated with the work done on the bridge.

Procedure:

Enter the MPMS number for the specific project. This number will generally be the same as the ECMS number.

Coding:

The MPMS Number will be coded as a number up to 6 digits.

VB11 S-Drawing Number

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the number of the S-Drawings (Design Drawings) for the work done on the bridge.

Procedure:

This number can be found on the Design Drawings for the work done on the bridge. This number can also be found in ECMS in the following location: 'Setup' Section > Structures > 'S-Number' Column.

Coding:

The S-Drawing will be in formatting S-XXXXX or L-XXXXX.

Examples:

S-12345
L-87589

VB12 Work Status

Inventory > Preservation and Rehab

Description:

This item is used to record the current status of the work being done on the bridge.

Procedure:

This item is automatically filled in by the system from ECMS if a valid ECMS number is entered in Item VB01. The location of this field in ECMS is in the top right corner of the landing page. If a historical project is entered without a known ECMS number, this item will no longer be automated and can be manually entered by the user. Historical projects should all be entered as "Final" if entered without an ECMS number.

Coding:

01	Design	30	NTP Issued	95	Local Administered
02	Review Bid Package	40	Construction	96	Not Constructed
03	Advertised	50	Post-Construction	97	Pending Redesign
04	Pre-Award	55	NFQ Submitted	98	Pending Bid Opening
10	Award	60	Final	99	Pend EBS File Create
20	PreConst (Post Award)				

VB13 Project Narrative

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record details about the work done on the bridge.

Procedure:

Enter any details about the work being done. This can be used to specify exactly what kind of work is being done or to clarify information for the user.

VB14 Staged Construction?

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record whether the work utilized staged construction.

Procedure:

Select the appropriate code from the dropdown list.

Coding:

Yes	Yes, the work utilized staged construction
No	No, the work did not utilize staged construction

VB15 Primary Contractor?

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the Primary Contractor performing the work done on the bridge.

Procedure:

This item is automatically filled in by the system from ECMS if a valid ECMS number is entered in Item VB01. The location of this field in ECMS is as follows: 'Setup' Section > Team > 'Business Partners' Table > 'Contractor Team' Section. If a project is entered without a known ECMS number, this item will no longer be automated and the checkbox can be manually selected from the list of contractors by the user.

Coding:

Checked	Contractor identified under VB16 is the prime contractor for the project.
Unchecked	Contractor identified under VB16 is NOT the prime contractor for the project

VB16 Contractor

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record any contractors performing the work done on the bridge.

Procedure:

This item is automatically filled in by the system from ECMS if a valid ECMS number is entered in Item VB01. The location of this field in ECMS is as follows: 'Setup' Section > Team > 'Business Partners' Table > 'Contractor Team' Section. If a historical project is entered without a known ECMS number, this item will no longer be automated and can be manually entered by the user.

Coding:

The name of the contractor performing the work on the project.

VB16a Contractor Role

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the contractor's role in the work done on the bridge.

Procedure:

In narrative form, enter the contractor's role in the work being done.

VB17 through VB19 (Not Used – Reserved for Future Use)

VB20 Inspection Record Prior to Project

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the last inspection record prior to the work being completed on the bridge.

Procedure:

Select the inspection record prior to work being completed on the bridge and click the "Populate" button. This inspection record is used to populate the "before" condition values located on this screen. The "before" values for Items VB22, VB23, VB50, VB60, VB71, VB72, VB73, and VB91 will only be populated when the user selects the inspection record in this field. If the date is left blank and the "Populate" button is clicked, no fields will be updated.

Coding:

A dropdown list of inspection dates from the inspection dates recorded on the Ratings & Schedule screen.

VB21 Inspection Record After Project

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the first inspection record after the work is completed on the bridge.

Procedure:

Select the inspection record after the work is completed on the bridge and click the "Populate" button. This inspection record is used to populate the "after" condition values located on this screen. The "after" values for Items VB22, VB23, VB50, VB60, VB71, VB72, VB73, and VB91 will only be populated when the user selects the inspection record in this field. If the date is left blank and the "Populate" button is clicked, no fields will be updated.

Coding:

A dropdown list of inspection dates from the inspection dates recorded on the Ratings & Schedule screen.

VB22 Deck Condition Rating Before and After

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the Deck Condition Rating before and after the work is complete.

Procedure:

The "before" field is automatically filled in from Item 1A01 from the inspection record selected in Item VB20. The "before" field will be blank until an inspection record is selected in Item VB20. The "after" field is automatically filled in from Item 1A01 from the inspection record selected in Item VB21. The "after" field will be blank until an inspection is selected in Item VB21.

Coding:

Refer to **RATING CODES** located at the beginning of Section 1A.

VB23 Wearing Surface Condition Rating Before and After

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the Wearing Surface Condition Rating before and after the work is complete.

Procedure:

The "before" field is automatically filled in from Item 6B40 from the inspection record selected in Item VB20. The "before" field will be blank until an inspection record is selected in Item VB20. The "after" field is automatically filled in from Item 6B40 from the inspection record selected in Item VB21. The "after" field will be blank until an inspection is selected in Item VB21.

Coding:

Refer to **RATING CODES** located before item 6B38.

VB24a Deck Surface Type Before and After (Main Span)

Inventory > Preservation and Rehab

Description:

This two-part item is used to record the type of wearing surface for the main spans on the bridge before and after work is complete.

Procedure:

The "before" wearing surface type is automatically filled in from Item 5B02 when the project record is created. This field will remain editable after automation for entering historical coding. Select the "after" wearing surface for the main spans from the dropdown list for after the work is complete. Clicking the Export button below the table will automatically update Item 5B02 with the "after" wearing surface.

Coding:

See coding for Item 5B02.

VB24b Deck Surface Type Before and After (Approach Span)

Inventory > Preservation and Rehab

Description:

This two-part item is used to record the type of wearing surface for the approach spans on the bridge before and after work is complete.

Procedure:

The "before" wearing surface type is automatically filled in from Item 6A30 when the project record is created. This field will remain editable after automation for entering historical coding. Select the "after" wearing surface for the approach spans from the dropdown list for after the work is complete. Clicking the Export button below the table will automatically update Item 6A30 with the "after" wearing surface.

Coding:

See coding for Item 6A30.

VB25a Deck Membrane Type Before and After (Main Span)

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the type of membrane waterproofing on the main spans of the bridge before and after the work is complete.

Procedure:

The "before" membrane type is automatically filled in from Item 5B03 when the project record is created. The field will remain editable after automation for entering historical coding. Select the "after" type of membrane from the dropdown list for after the work is complete. Clicking the Export button below the table will automatically update Item 5B03 with the "after" membrane type.

Coding:

See coding for Item 5B03.

VB25b Deck Membrane Type Before and After (Approach Span)

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the type of membrane waterproofing on the approach spans of the bridge before and after the work is complete.

Procedure:

The "before" membrane type is automatically filled in from Item 6A31 when the project record is created. The field will remain editable after automation for entering historical coding. Select the "after" type of membrane from the dropdown list for after the work is complete. Clicking the Export button below the table will automatically update Item 6A31 with the "after" membrane type.

Coding:

See coding for Item 6A31.

VB26a Deck Protection Type Before and After (Main Span)

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the type of deck corrosion protection on the main spans on the bridge before and after the work is complete.

Procedure:

The "before" protection type is automatically filled in from Item 5B04 when the project record is created. The field will remain editable after automation for entering historical coding. Select the "after" type of deck protection from the dropdown list for after the work is complete. Clicking the Export button below the table will automatically update Item 5B04 with the "after" protection type.

Coding:

See coding for Item 5B04.

VB26b Deck Protection Type Before and After (Approach Span)

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the type of deck corrosion protection on the approach spans on the bridge before and after the work is complete.

Procedure:

The "before" protection type is automatically filled in from Item 6A32 when the project record is created. The field will remain editable after automation for entering historical coding. Select the "after" type of deck protection from the dropdown list for after the work is complete. Clicking the Export button below the table will automatically update Item 6A32 with the "after" protection type.

Coding:

See coding for Item 6A32.

VB27a Wearing Surface Thickness Before and After (Main Span)

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the average thickness of the wearing surface on the main span of the bridge before and after the work is complete.

Procedure:

The "before" main span wearing surface thickness is automatically filled in from Item 6A33 when the project record is created. The field will remain editable after automation for entering historical coding. Enter the "after" average thickness of the wearing surface for the main span to the nearest tenth of an inch for after the work is complete. Clicking the Export button below the table will automatically update Item 6A33 with the "after" main span wearing surface thickness.

Coding:

Enter the average thickness of the wearing surface to the nearest tenth of an inch, if known. Code "0" if thickness is not applicable. Code "0.5" for concrete integral wearing surface cast with the deck.

VB27b Wearing Surface Thickness Before and After (Approach Span)

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the average thickness of the wearing surface on the approach span of the bridge before and after the work is complete.

Procedure:

The "before" approach span wearing surface thickness is automatically filled in from Item 6A33 when the project record is created. The field will remain editable after automation for entering historical coding. Enter the "after" average thickness of the wearing surface for the approach span to the nearest tenth of an inch for after the work is complete. Clicking the Export button below the table will automatically update Item 6A33 with the "after" approach span wearing surface thickness.

Coding:

Enter the average thickness of the wearing surface to the nearest tenth of an inch, if known. Code "0" if thickness is not applicable. Code "0.5" for concrete integral wearing surface cast with the deck.

VB28 Deck Protection Year Before and After

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the year the deck protective system was installed before and after the work is complete.

Procedure:

The "before" protection year is automatically filled in from Item 6A36 when the project record is created. The field will remain editable after automation for entering historical coding. Enter the "after" protection year for after the work is complete. Clicking the Export button below the table will automatically update Item 6A36 with the "after" protection year.

Coding:

4-digit year in which the protective system was installed. Leave blank if not applicable.

VB29 Deck Protection System Note Before and After

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record descriptive information about the deck protective systems before and after the work is complete.

Procedure:

The "before" protection system note is automatically filled in from Item 6A37 when the project record is created. The field will remain editable after automation for entering historical coding. For "after", enter available information about the deck protective systems for after the work is complete. Clicking the Export button below the table will automatically update Item 6A37 with the "after" protection system note.

VB30 Bridge Deck Type Before and After

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the type of structural deck that is supported by the underlying load carrying members of the superstructure before and after the work is complete.

Procedure:

The "before" deck type is automatically filled in from Item 6A38 when the project record is created. The field will remain editable after automation for entering historical coding. Select the "after" bridge deck type listed below for after the work is complete. Clicking the Export button below the table will automatically update Item 6A38 with the "after" bridge deck type.

Coding:

See coding for Item 6A38.

VB31 Deck Form Type Before and After

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the type of deck form used on the bridge before and after the work is complete.

Procedure:

The "before" deck form type is automatically filled in from Item 6A40 when the project record is created. The field will remain editable after automation for entering historical coding. Select the "after" type of deck form used on the bridge for after the work is complete. Clicking the Export button below the table will automatically update Item 6A40 with the "after" deck form type.

Coding:

See coding for Item 6A40.

VB32 Deck Rebar Type Before and After

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the type of protective system used on the reinforcement bars in the concrete bridge deck before and after work is complete.

Procedure:

The "before" deck rebar type is automatically filled in from Item 6A42 when the project record is created. The field will remain editable after automation for entering historical coding. Select the "after" type of deck rebar used in the bridge deck for after the work is complete. Clicking the Export button below the table will automatically update Item 6A42 with the "after" deck rebar type.

Coding:

See coding for Item 6A42.

VB33 Deck Rehab Area

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the deck rehab area in square feet.

Procedure:

This item records the area of the deck rehab work. If the entire deck is being rehabbed, enter the deck area from Item 5B19. If only a portion of the deck is being rehabbed, enter that portion of the area in square feet.

Coding:

The deck rehab area to the nearest square foot.

VB34 Deck Overlay Area

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the deck overlay area in square feet.

Procedure:

This item is used to record the area of the new deck overlay placed on the bridge for this project.

Coding:

Enter the deck overlay area to the nearest square foot.

VB35 Deck Overlay Cost

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the cost of the deck overlay (from Item VB34) in dollars. This includes costs for material and installation.

Procedure:

This item is used to record the cost of the new deck overlay placed on the bridge for this project.

Coding:

Enter the deck overlay cost in dollars to the cent.

VB36 Deck Overlay Cost per SF

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is only filled in if the Items VB34 and VB35 are filled out. This item is used to record the cost of the deck overlay per square foot.

Procedure:

This item is automatically filled in from Items VB34 and VB35.

Coding:

The deck overlay cost per square foot.

VB37 Duration to Install Overlay

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is only available to fill in if the project includes deck work on the bridge (Item VB03 = 1, 2, 3, 11, 12). This item is used to record, from start to finish, the duration of the overlay work.

Procedure:

This item is used to record the duration of the new deck overlay work on the bridge for this project.

Coding:

Enter the duration in days.

VB38 Deck Repair Area

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item will record the area of deck repairs done on the bridge as defined in Pub 219M (Bridge Construction Standards), Sheet 1 of BC-783M.

Procedure:

Record the area of Type 1, Type 2, or Type 3 deck repairs.

Coding:

Enter the area of deck repairs in square feet.

VB39 Deck Repair Cost

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the total cost of the deck repairs (from Item VB38) in dollars. This includes costs for material and installation.

Procedure:

This item is used to record the cost of the new deck repairs on the bridge for this project.

Coding:

Enter the deck repair cost in dollars to the cent.

VB40 Deck Repair Cost per SF

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is only filled in if the project includes deck work on the bridge and Items VB38 and VB39 are filled out. This item is used to record the cost of the deck repair per square foot.

Procedure:

This item is automatically filled in from Items VB38 and VB39.

Coding:

The deck repair cost per square foot.

VB41 Hydro-Demolition – Was Hydro-Demolition Used?

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record if hydro-demolition was used for the work on the deck.

Procedure:

Check this box if hydro-demolition was used for work on the deck.

Coding:

Checked	Yes, hydro-demolition was used
Unchecked	No, hydro-demolition was not used

VB42a Dt Recorded - Date Wearing Surface Thickness for Main Structure Units was Recorded

Inventory > Agency Bridge; Form B > Wearing Surface

Description:

This two-part item is used to record the date the wearing surface thickness was recorded for the main structure units of the bridge before and after the work is compete.

Procedure:

The "before" date the wearing surface thickness for the main structure units was recorded is automatically filled in from Item 6A34 when the project record is created. The field will remain editable after automation for entering historical coding. Select the "after" date the wearing surface thickness for the main structure units was recorded after the work is complete. Clicking the Export button below the table will automatically update Item 6A34 with the "after" date.

Coding:

Enter the date the wearing surface thickness was recorded in MM/DD/YYYY format:

MM	2 digit month
DD	2 digit day of month
YYYY	4 digit year
00/00/0000	Not applicable

VB42b Dt Recorded - Date Wearing Surface Thickness for Approach Structure Units was Recorded

Inventory > Agency Bridge; Form B > Wearing Surface

Description:

This two-part item is used to record the date the wearing surface thickness was recorded for the approach structure units of the bridge before and after the work is compete.

Procedure:

The "before" date the wearing surface thickness for the approach structure units was recorded is automatically filled in from Item 6A34 when the project record is created. The field will remain editable after automation for entering historical coding. Select the "after" date the wearing surface thickness for the approach structure units was recorded after the work is complete. Clicking the Export button below the table will automatically update Item 6A34 with the "after" date.

Coding:

Enter the date the wearing surface thickness was recorded in MM/DD/YYYY format:

MM	2 digit month
DD	2 digit day of month
YYYY	4 digit year
00/00/0000	Not applicable

VB42 through VB49 (Not Used – Reserved for Future Use)

VB50 Overall Joint Condition Rating Before and After

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the Overall Joint Condition Rating before and after the work is complete.

Procedure:

The "before" field is automatically filled in from Item IJ01 from the inspection record selected in Item VB20. The "before" field will be blank until an inspection is selected in Item VB20. The "after" field is automatically filled in from Item IJ01 from the inspection record selected in Item VB21. The "after" field will be blank until an inspection is selected in Item VB21.

Coding:

Refer to Item IJ01 for condition coding options.

VB51 Joint Work Record Key

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item records the Joint Work Record Key for each type of joint work done on the bridge. (Enter as many records as needed, should be one per joint type/work scope, not one per location).

Procedure:

Joint Work Record Keys are added by selecting the "Create" button (green button to the far right of the Joints heading). Each additional Record Key is automatically filled in by the system and will be in numerical order.

Coding:

The Record Key for each Joint Work Type.

VB52 Joint Scope of Work

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the scope of work for joints on the bridge (Enter as many records as needed, should be one per joint type/work scope, not one per location).

Procedure:

Select the appropriate scope of work from the dropdown list.

Coding:

1 Rehab
2 Replace

VB53 Joint Type

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the type of deck expansion joint that was rehabilitated or replaced (Enter as many records as needed, should be one per joint type/work scope, not one per location). For replacement work scope, enter the joint type of the new joint being installed.

Procedure:

Select the type of joint from the dropdown list.

Coding:

See coding for Item IJ04.

VB54 Joint Movement Class

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the movement class for the joint type identified in Item VB53 (Enter as many records as needed, should be one per joint type/work scope, not one per location).

Procedure:

Select the movement class for the joint from the dropdown list.

Coding:

See coding for Item IJ06.

VB55 Length of Joint

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the length of the joint work (including vertical surfaces) for a joint work type record.

Procedure:

Enter the length of the joint work in linear feet.

Coding:

Enter the length to the nearest foot in linear feet.

VB56 Cost - Joint Work Cost

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the costs to perform the joint work for a joint work type record.

Procedure:

The cost shall include all the expenses to perform the joint rehab/replacement.

Coding:

Enter the joint work cost in dollars to the cent.

VB57 Cost per LF - Joint Work Cost per LF

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item will only be filled in if the project includes joint work on the bridge and Items VB55 and VB56 are filled out. This item is used to record the cost per linear foot of the joint work for a joint work type record.

Procedure:

This item is automatically filled in from Items VB55 and VB56 if both values are filled in.

Coding:

The joint work cost per linear foot.

VB58 (Not Used – Reserved for Future Use)

VB59 (Not Used – Reserved for Future Use)

VB60 Overall Bearing Condition Rating Before and After

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the Overall Bearing Condition Rating before and after the work is complete.

Procedure:

The "before" field is automatically filled in from Item IB01 from the inspection record selected in Item VB20. The "before" field will be blank until an inspection is selected in Item VB20. The "after" field is automatically filled in from Item IB01 from the inspection record selected in Item VB21. The "after" field will be blank until an inspection is selected in Item VB21.

Coding:

Refer to Item IB01 for condition coding options.

VB61 Bearing Work Record Key

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item records the Bearing Work Record Key for each type of bearing work done on the bridge. (Enter as many records as needed, should be one per bearing type/work scope, not one per location).

Procedure:

Bearing Work Record Keys are added by selecting the "Create" button (green button to the far right of the Bearings heading). Each additional Record Key is automatically filled in by the system and will be in numerical order.

Coding:

The Record Key for each Bearing Work Type.

VB62 Bearing Scope of Work

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is only available to fill in if the project includes bearing work on the bridge (Item VB03 = 6, 12). This item is used to record the scope of work for bearings on the bridge (Enter as many records as needed, should be one per bearing type/work scope, not one per location).

Procedure:

Select the appropriate scope of work from the dropdown list.

Coding:

1 Rehab
2 Replace

VB63 Bearing Type

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the type of bearing that was rehabilitated or replaced (Enter as many records as needed, should be one per bearing type/work scope, not one per location). For replacement work scope, enter the bearing type of the new bearing being installed.

Procedure:

Select the type of bearing from the dropdown list.

Coding:

See coding for Item IB04.

VB64 Bearing Movement Type

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the movement type for the bearing type identified in Item VB63 (Enter as many records as needed, should be one per bearing type/work scope, not one per location).

Procedure:

Select the movement type for the bearing from the dropdown list.

Coding:

See coding for Item IB07.

VB65 Bearing Count on Bridge

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the count of bearings being worked on for a bearing work type record.

Procedure:

Enter the count of bearings being worked on.

Coding:

Enter the count as an integer.

VB66 Cost - Bearing Work Cost

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the costs to perform the bearing work for a bearing work type record.

Procedure:

The cost shall include all the expenses to perform the bearing rehab/replacement.

Coding:

Enter the bearing work cost in dollars to the cent.

VB67 Cost per Bearing

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item will only be filled in if the project includes bearing work on the bridge and Items VB65 and VB66 are filled out. This item is used to record the cost per bearing of the work for a bearing work type record.

Procedure:

This item is automatically filled in from Items VB65 and VB66.

Coding:

The work cost per bearing.

VB68 (Not Used – Reserved for Future Use)

VB69 (Not Used – Reserved for Future Use)

VB70 Superstructure Work Type

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the type of superstructure/culvert/paint work being done.

Procedure:

This item is a multi-select checkbox field used to capture every type of superstructure/culvert/paint work done for the current project. Select the most appropriate coding from the options below.

Coding:

1	Steel Beam Repair	8	Timber Beam Replace
2	Steel Beam Replace	9	Truss Member Repair
3	Concrete Beam Repair	10	Truss Member Replace
4	Concrete Beam Replace	11	Culvert Repair
5	Masonry Repair	12	Paint – Partial Superstructure
6	Masonry Replace	13	Paint – Full Superstructure
7	Timber Beam Repair	14	Other

VB71 Superstructure Condition Rating Before and After

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the Superstructure Condition Rating before and after the work is complete.

Procedure:

The "before" field is automatically filled in from Item 1A04 from the inspection record selected in Item VB20. The "before" field will be blank until an inspection is selected in Item VB20. The "after" field is automatically filled in from Item 1A04 from the inspection record selected in Item VB21. The "after" field will be blank until an inspection is selected in Item VB21.

Coding:

Refer to **RATING CODES** located at the beginning of Section 1A.

VB72 Culvert Condition Rating Before and After

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the Culvert Condition Rating before and after the work is complete.

Procedure:

The "before" field is automatically filled in from Item 1A03 from the inspection record selected in Item VB20. The "before" field will be blank until an inspection is selected in Item VB20. The "after" field is automatically filled in from Item 1A03 from the inspection record selected in Item VB21. The "after" field will be blank until an inspection is selected in Item VB21.

Coding:

Refer to **RATING CODES** located at the beginning of Section 1A.

VB73 Paint Condition Rating Before and After

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the Paint Condition Rating before and after the work is complete.

Procedure:

The "before" field is automatically filled in from Item 6B36 from the inspection record selected in Item VB20. The "before" field will be blank until an inspection is selected in Item VB20. The "after" field is automatically filled in from Item 6B36 from the inspection record selected in Item VB21. The "after" field will be blank until an inspection is selected in Item VB21.

Coding:

Refer to coding guide for Item 6B36.

VB74 Material Type Before and After (Main, Approach)

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the kind of material used for the main load carrying members for the main unit and approach unit (if applicable) of the bridge before and after the work is complete.

Procedure:

The "before" material type for main and approach spans is automatically filled in from Item 6A26 when the project record is created. This field will remain editable after automation for entering historical coding. Select the "after" material type for main and approach spans from the dropdown list for after the work is complete. The main unit applies to all spans of most bridges, to the major unit of sizable structures, or to a unit of material or design different from that of the approach spans. Clicking the Export button below the table will automatically update Item 6A26 with the "after" material type for main and approach spans.

Coding:

See coding for Item 6A26.

VB75 Physical Makeup Before and After (Main, Approach)

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the physical makeup of the primary load carrying members (when appropriate, or subcomponents of a major bridge) for the main unit and approach unit (if applicable) of the bridge before and after the work is complete.

Procedure:

The "before" physical makeup for main and approach spans is automatically filled in from Item 6A27 when the project record is created. This field will remain editable after automation for entering historical coding. Select the "after" physical makeup of the primary load carrying members for main and approach spans from the dropdown list for after the work is complete. The main unit applies to all spans of most bridges, to the major unit of sizable structures, or to a unit of material or design different from that of the approach spans. Clicking the Export button below the table will automatically update Item 6A27 with the "after" physical makeup for the main and approach spans.

Coding:

See coding for Item 6A27.

VB76 Span Interaction Before and After (Main, Approach)

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record whether or not there is composite action and continuity for the main unit and approach unit (if applicable) of the bridge before and after the work is complete.

Procedure:

The "before" span interaction for main and approach spans is automatically filled in from Item 6A28 when the project record is created. This field will remain editable after automation for entering historical coding. Select the "after" span interaction for main and approach spans from the dropdown list for after the work is complete. The main unit applies to all spans of most bridges, to the major unit of sizable structures, or to a unit of material or design different from that of the approach spans. Clicking the Export button below the table will automatically update Item 6A28 with the "after" span interaction for the main and approach spans.

Coding:

See coding for Item 6A28.

VB77 Structural Configuration Before and After (Main, Approach)

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the basic structural configuration for the main unit and approach unit (if applicable) of the bridge before and after the work is complete.

Procedure:

The "before" structural configuration for main and approach spans is automatically filled in from Item 6A29 when the project record is created. This field will remain editable after automation for entering historical coding. Select the "after" structural configuration for main and approach spans from the dropdown list for after the work is complete. The main unit applies to all spans of most bridges, to the major unit of sizable structures, or to a unit of material or design different from that of the approach spans. Clicking the Export button below the table will automatically update Item 6A29 with the "after" structural configuration for the main and approach spans.

Coding:

See coding for Item 6A29.

VB78 Square Footage of Painting

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the area painted in square feet.

Procedure:

This item records the area of the painting done on the superstructure.

Coding:

Enter the painting area to the nearest square foot.

VB79 Paint Cost

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the cost of the painting work (from Item VB78) in dollars. This includes costs for material and installation.

Procedure:

This item is used to record the cost of the new paint placed on the bridge for this project.

Coding:

Enter the painting cost in dollars to the cent.

VB80 Paint Cost per SF

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is only filled in if the project includes superstructure/culvert/paint work on the bridge and Items VB78 and VB79 are filled out. This item is used to record the cost of the paint per square foot.

Procedure:

This item is automatically filled in from Items VB78 and VB79.

Coding:

The painting cost per square foot.

VB81 through VB89 (Not Used – Reserved for Future Use)

VB90 Substructure Work Type

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This item is used to record the type of substructure work being done on the bridge.

Procedure:

This item is a multi-select checkbox field used to capture every type of substructure work done for the current project. Select the most appropriate coding from the options below.

Coding:

1	Bridge Seat or Pier Cap Repair	6	Underpinning Abutment or Pier
2	Concrete Abutment or Pier Repair	7	Backfill Scour Hole
3	Steel Abutment or Pier Repair	8	Install Rock Protection
4	Masonry Abutment or Pier Repair	9	Other Channel/Scour Improvements
5	Other Abutment or Pier Repair	10	Other

VB91 Substructure Condition Rating Before and After

Inventory > Preservation and Rehab > Preservation and Rehab Detail

Description:

This two-part item is used to record the Substructure Condition Rating before and after the work is complete.

Procedure:

The "before" field is automatically filled in from Item 1A02 from the inspection record selected in Item VB20. The "before" field will be blank until an inspection is selected in Item VB20. The "after" field is automatically filled in from Item 1A02 from the inspection record selected in Item VB21. The "after" field will be blank until an inspection is selected in Item VB21.

Coding:

Refer to **RATING CODES** located at the beginning of Section 1A.

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BP Bridge Problem Report

The Bridge Problem Report (BPR) screen is a centralized location where Districts can report significant bridge or structure issues to Highway Administration Staff through the Bridge Inspection Section. This screen allows Districts to input basic information about the bridge and specific incident as well as up to two (2) photographs for the Deputy Secretary to review and gain an understanding of the problem and steps being taken to correct the issue moving forward. The viewing of the screen is limited to Department users. In addition to inputting the information on the screen itself, Districts should contact the Bridge Inspection Section Chief to alert them to the report.

Users may notice BPR's before number 1962 may not have all the basic information completed. These BPR's were migrated from an external database in February 2021.

BP01 Reported By – Name of Individual Reporting the BPR

Other Links > Bridge Problem Report > Bridge Problem Report Detail

Description:

This item is used to record the name of the individual inputting the BPR into BMS2. This name provides a point of contact for the Bridge Inspection Section to use when requesting clarification or additional information on the BPR before finalization.

Procedure:

Enter the name of the individual reporting the BPR in narrative form. This should be the first and last name of the individual.

Examples:
James Johnson
Maria Garcia
William Smith
Clifford Taylor

BPR02 BPR Number – Sequential BPR Number

Other Links > Bridge Problem Report > Bridge Problem Report Detail

Description:

This item indicates the BPR Number assigned to the specific BPR by the system.

Procedure:

This field is **automatically calculated by the system**. A new BPR number is assigned when a new BPR after the user saves the report the first time. This number cannot be changed by the user. If the BPR is deleted from BMS2 and a subsequent BPR has already been created for this bridge or another bridge, the number will not be reused.

Coding:

A unique, numerical number assigned by the system.

BP03 BPR Date – Date of BPR Causing Incident

Other Links > Bridge Problem Report > Bridge Problem Report Detail

Description:

This item is used to record the date of the incident that caused the BPR.

Procedure:

Enter the date (month-day-year) on which the incident occurred that caused the BPR to be filed within BMS2.

Coding:

The date the incident occurred (month-day-year). Prefix with zeros where necessary.

Example:
The bridge was struck by an over height vehicle on April 30, 2020 and the report was entered into the system on May 1, 2020. Enter: 04/30/2020

BP04 Status – Status of the BPR

Other Links > Bridge Problem Report > Bridge Problem Report Detail

Description:

This item is used to indicate the status of the BPR.

Procedure:

This field is **automatically calculated by the system** based on the what stage the BPR is in. A BPR can be returned from "2 – Submitted for Review" to "1 – Draft" by Central Office to a District if more information is required or a change in status is requested by the District.

Coding:

1 – Draft	BPR is created by a District and remains editable by District staff.
2 – Submitted for Review	BPR has been submitted by the District to Central Office for review.
3 – Finalized	BPR has been reviewed and finalized by the Bridge Inspection Section.

BP05 Critical Finding – Is the result of the incident a Critical Finding?

Other Links > Bridge Problem Report > Bridge Problem Report Detail

Description:

This checkbox field indicates whether or not the result of the incident is a critical finding.

Procedure:

This box should be checked if the result of the incident is a critical finding. This box is only visible to Central Office staff and can only be edited by a Superuser.

Coding:

Unchecked	The result of the incident is not a critical finding.
Checked	The result of the incident is a critical finding.

BP06 Finalized By – Who finalized the BPR?

Other Links > Bridge Problem Report > Bridge Problem Report Detail

Description:

This item is used to record the name of the individual who finalized the BPR at Central Office.

Procedure:

Select the name of the individual who finalized the BPR from the dropdown list.

Coding:

Name of the individual who finalized the BPR.

BP07 Incident – Incident Narrative Comments

Other Links > Bridge Problem Report > Bridge Problem Report Detail

Description:

This item is used to record comments about the incident.

Procedure:

Enter the comments about the incident in narrative form. Each entry under this field will result in a new bulleted item on the finalized report. Each bullet should generally be one sentence.

BP08 Actions Taken to Date – Actions Taken to Date Narrative Comments

Other Links > Bridge Problem Report > Bridge Problem Report Detail

Description:

This item is used to record comments about the actions taken to date following the incident.

Procedure:

Enter the comments about the actions taken to date following the incident in narrative form. Each entry under this field will result in a new bulleted item on the finalized report. Each bullet should generally be one sentence.

BP09 Follow-Up – What Follow-up Actions are Planned?

Other Links > Bridge Problem Report > Bridge Problem Report Detail

Description:

This item is used to record comments about the actions taken to date following the incident.

Procedure:

Enter the comments about the follow-up actions planned to occur following the incident in narrative form. Each entry under this field will result in a new bulleted item on the finalized report. Each bullet should generally be one sentence.

BP10 Previous Repairs Recommended – What Previous Repairs were Recommended?

Other Links > Bridge Problem Report > Bridge Problem Report Detail

Description:

This item is used to record comments about the previous repair recommendations that may have existed for the structure.

Procedure:

Enter the comments about the previous repair recommendations relating to the incident. This field will generally be recorded as "N/A" for overheight vehicle strikes or similar irregular events not tied to the condition history of the bridge. This narrative field should be used to record history about proposed beam repairs for corrosion/section loss, or other similar deterioration that is proposed to be fixed. This will help Central Office identify if this is a newly found concern.

BP11 Cause Tag – Cause of the BPR Incident

Other Links > Bridge Problem Report > Bridge Problem Report Detail

Description:

Select the checkbox(es) that indicate the cause of the incident which led to the BPR to be entered.

Procedure:

Select the checkbox(es) that indicate the cause of the incident. At least one checkbox must be selected before the BPR can be submitted to Central Office for review. More than one box can be checked.

Coding:

Scour
Flooding
Corrosion
Fatigue
Overload
Height Exceeded Impact
Width Exceeded Impact
Other Impact
Fire
Seismic
Other

IA Inspection - Safety Features

The Safety Features Section captures and displays information related to safety features of structures. The Safety Features Screen is listed below the Inspection Links.

IA01 Location – Location of Traffic Safety Features

Inspection > Safety Features > Safety Feature Detail

Description:

This item indicates the location of the safety feature.

Procedure:

Select the code from the dropdown list that indicates the location of the safety feature. The location should match the controlling location for each rating for Item IA02.

Coding:

1	Left
2	Right
3	Near Left
4	Near Right
5	Far Left
6	Far Right

*IA02 Adequacy - Adequacy of Traffic Safety Features

Inspection > Safety Features > Safety Feature Detail; BMS3: Approach

Description:

This item indicates the adequacy of bridge railings, transitions, approach guide rail, and approach rail ends.

Procedure:

This code is comprised of 4 parts. Enter the appropriate code in the respective row for the item described below. Apply the codes only to the route on the bridge.

1 - Bridge Railings – **Refer to Appendix N, Item IA02/B.C.06 for coding guidance on Bridge Railings.**

~~Some factors that affect proper functioning of bridge railings are height, material, strength and geometric features. Railings must be capable of smoothly redirecting an impacting vehicle. Bridge railings should be evaluated using the AASHTO Standard Specifications for Highway Bridges as a guide for establishing an acceptable standard.~~

2 – Transition **Refer to Appendix N, Item IA02/B.C.06 for coding guidance on Bridge Railings.**

~~The transition from approach guide rails to bridge railing requires that the approach guide rail be firmly attached to the bridge railing. It also requires that the approach guide railing be gradually stiffened as it becomes closer to the bridge railing. The ends of curbs and safety wall need to be gradually tapered out or shielded. In addition to being capable of safely redirecting an impacting vehicle, the approach rail must also facilitate a transition to the bridge railing that will not cause snagging or pocketing of any impacting vehicle. This guide rail may not be required in urban environments. This is also applicable to approach guide rail.~~

3 - Approach Guide rail

Evaluate structural adequacy and compatibility of the approach guide rail with the transition. Rarely does the need for a barrier stop at the end of the bridge. Thus, approach with adequate length and structural qualities to shield motorists from the hazards at the bridge site needs to be evaluated.

Where the approach guide rail is not warranted and not provided, code an 8 for this subitem. Where the approach guide rail is required, but is not present, code a 2 for this subitem. If there is some substandard guide rail present, code the approach guide rail no lower than a 3.

4 - Approach Rail Ends

As with ends in general, the ends of the approach rails to bridges should be flared, buried, made breakaway or shielded. Approach rail ends out of the Clear Zone(1) and accepted impact attenuation devices in good condition should be coded 8.

The use of turned down end treatments no longer meets standards for the following installations on any roadways:

1 Within the clear zone, and
2 Posted speed ≥ 45 mph (ref. RC-52M 8-21-02) (high speed) and/or
3 ADT ≥ *4000* (high volume)
4 NHS

For bridges carrying high speed or high-volume roadways, accepted impact attenuators are required.

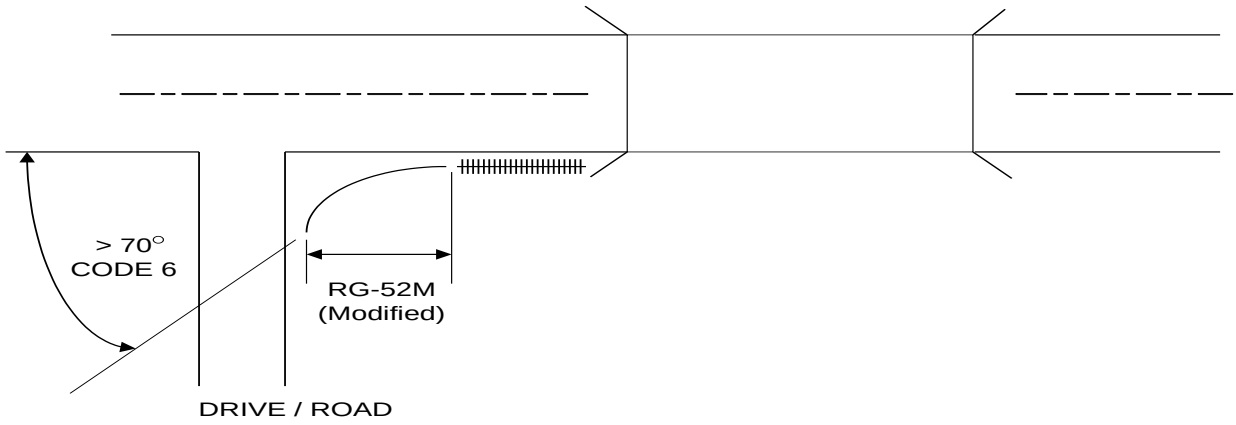
Reference RC-57M and RC-58M for Tapered Concrete End Treatments and code as follows. Where a sloped end Jersey barrier section (RC-58) without approach guide rail is used adjacent to the roadway, the coding should be 8222. This is because a blunt end impact is possible whether or not the roadway section is closed by barrier curbs (height ≥ 6”). For the RC-58 detail to be acceptable, the parapet end must be beyond the clear zone or provided with impact protection. If the parapet end sections are sloped in accordance with RC-57 and the posted speed is less than 40 mph current standards are met, and the coding should be 8888.

Where design exceptions have been granted for non-standard installations the coding should be 8666. The design exceptions should be in the bridge inspection file and in Item VN01.

*Turned down end treatments (RC-52M) and old standard end treatments including the SENTRE, MELT, and ELT systems not meeting NCHRP 350 criteria, but are in good condition that are within the clear zone on high speed or high-volume roadways are to be coded 6 (GUIDE RAIL maintenance item, priority 5). Damaged turned down ends requiring repair/replacement are to be coded 3 (GUIDE RAIL maintenance item, priority 1).

When Type 2S guide rail extends beyond the minimum required length of 87.5 ft, or where it transitions into weak post system, the purpose of protecting the motoring public from impacting the bridge parapet has been mitigated. The proper coding for this situation is 8.

When the bridge is adjacent to intersecting driveways or roads, a *turned down end treatment may be coded 6 when its orientation to the bridge roadway is > 70°.



The following systems are accepted impact attenuators and meet NCHRP 350 criteria for high speed, high volume roadways:

A	Brakemaster crash cushion end terminal
B	(C-A-T) Crash cushion/attenuating terminal
C	(ADIEM) Advanced dynamic impact extension module
E	(SKT-350) Sequentially kinking terminal
F	(REGENT) Redirecting gating end terminal
G	(FLEAT-350) Flared energy absorbing terminal
H	(SRT-350) Slotted rail terminal
I	(REACT-350) Reusable Energy Absorbing Crash Terminal
J	(BEST) Beam eating steel terminal
K	(ROSS-350) Guide rail terminal
L	(BEAT-SSCC) Box Beam Burster Energy Absorbing Terminal Single Sided Crash Cushion
M	WIDETRACC
O	SCI-100GM
P	Wide REACT

(1) For determination of clear zone, refer to DM2, Table 12.1, and Figures 12.3 and 12.4.

Coding: (Only applies to IA02 – Approach Guide Rail and Rail Ends)

8 When existing traffic safety feature meets current standards and is in good condition, requiring no repair.

Features have been crash-tested at a site-appropriate level and/or accepted are to be rated similarly to current standards.

When structure is under fill where standard roadway guide rails with adequate embedment are carried across the structure.

When the Type 2S guide rail extends substantially beyond minimum required length (87.5' in most cases), or where it transitions into weak post system.

When feature is not required and none is provided based on current standards. If not based on the current standards, justification when no feature is provided may include a design exception, waiver, or finding by the District Traffic Engineer. Supporting documentation MUST BE in the bridge file before the coding may be used for this purpose. There is no applicable maintenance priority for this coding.

7 When traffic safety feature meets code 8 and is functional except that it requires repair/replacement of deteriorated/damaged portions.

6 When the traffic safety feature is not in accordance with current standard but is considered adequate because of conformance to standards that have recently been updated or is an approved design exception. As a guideline, elements must satisfy the following conditions: transition must be firmly attached and gradually stiffened as it approaches the bridge railing; also approach guide rail and rail ends are deemed to have adequate length and structural qualities to shield motorists from the hazards at the bridge site.

5 When existing traffic safety feature meets code 6 and is functional except that it requires repair/replacement of deteriorated/damaged portions.

4 When existing traffic safety feature does not meet code 6 requirements but is considered adequate for the site conditions to be left as is. Examples include low ADT, low traffic speeds *or curbed sections*, and substandard approach rail ends because of parking lots and driveways, etc. For approach guide rail elements when a driveway is located near the approach end of the bridge having a rigid parapet, it is considered adequate for the site conditions to be left as is provided that no reduction in the roadway width at the bridge is encountered.

3 When existing traffic safety feature meets code 4 and is functional except that it requires repair/replacement of deteriorated/damaged portions.

When the bridge rail, transitions, connections, approach guide rail and rail ends are considered to be inadequate for site conditions. Examples include steel cable systems, "boxing glove" ends near roadway, damaged turned down ends on "busy NHS" routes, etc.

2 When traffic safety feature is required but none is provided.

When structural condition of existing barrier, its cross-section and/or its material properties, or its connection to the deck is so poor that it is unlikely to contain an errant vehicle.

N When highway traffic does not use the bridge (i.e., pedestrian or railroad bridge over a highway)

In cases where all of these safety features do not exist, each element must still be coded. Appraise the adequacy of the existing features or lack of them in meeting current standards and criteria.

REFERENCE: Department's Standards for Roadway Construction RC-50M, RC-51M and RC-53M and Standards for Bridge Construction, BC-706M, BC-709M, and BC-713. The following standards have recently been discontinued and are only referenced for historical purposes: RC-52M, BC-703M, BC-707M, BC-708M, BC-712M, BC-739M. Ref. RC & BC Handouts**.**

FOR MEDIAN TREATMENTS: Ref. RC-54M, dated 12/17/2019
For length of need, flare rate and end treatments

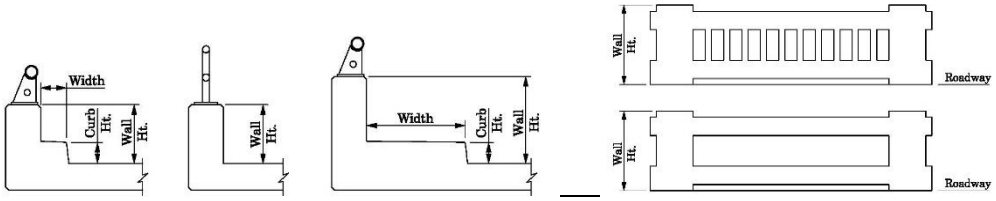
1 - Bridge Rail

BMS2 Item IA02-1 Bridge Railing Ratings

- *As depicted in the sketch below and*
- *Not in current PennDOT standards for barriers and not accepted by FHWA*

RC Wall or Stepped-wall Barriers

	IA02-1 Sketch	RC Wall Height	Speed limit	Curb Height	Curb/SW Width	IA02-1 CODE
SIDEWALK BETWEEN WALL AND BRIDGE ROADWAY	c	≥ 2'-3"	> 45 mph	All	All	2
			≤ 45 mph	> 4"	≥ 36"	6
					9"-36"	4
				≤ 4"	≥ 36"	2
					9"-36"	2
		< 2'-3"	All	All	All	2
NO SIDEWALK	a or b	≥ 2'-3"	All	All	< 9"	6 [Note 2]
		≥ 2'-0" to < 2'-3"	> 45 mph	All	< 9"	2
			≤ 45 mph	All	< 9"	4
		≤ 2'-0"	All	All	< 9"	2



(a) (b) (c) (d)

Metal Railing on Concrete Walls (Includes pipe railing or cable system)

Concrete Parapets

Note:

1. *The above ratings are for barriers that are structurally sound and appear to be sufficient to contain an errant vehicle.*
   a. *Downgrade IA02-1 rating from above values (Max. total reduction of 1) to consider:*
      - *Deteriorated or damaged structural condition.*
      - *For site-specific conditions that would elevate risk of collision with barrier, especially poor approach alignment, and to a lesser extent narrow deck width with ADT > 4000. Previous crash damage and history may indicate higher risk.*
   b. *The metal railing on top of barrier (if present) is not considered when assessing the barrier's performance and is not to be rated for condition and/or traffic safety. Damaged rail that presents a hazard to traffic should be noted as maintenance need.*
   c. *If structural condition of barrier or its connection to the deck is so poor that it is unlikely to contain an errant vehicle, CODE = 2.*
   d. *If parapets are old-style pigeon-hole or solid (Sketch d), rate using table above using values for a, b, or c (using appropriate sidewalk configuration) EXCEPT when:*
      - *Table value is 4 or greater, and*
      - *Parapets are structurally damaged or deteriorated, or*
      - *For site-specific conditions that would elevate risk of barrier collision, especially poor approach alignment, and to a lesser extent narrow deck with ADT > 4000. Previous crash damage and history may indicate higher risk.*

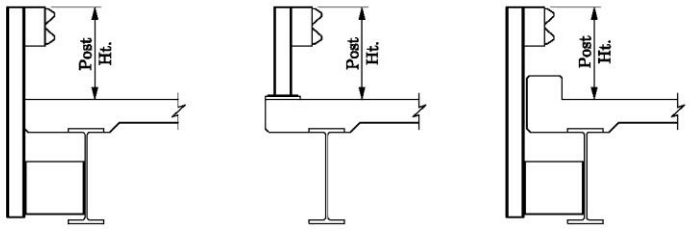
   Then CODE = 3 (due to poor performance of original design).
2. *No wall or barrier that has not been accepted by FHWA can be rated = 8. (This is a change from previous coding instructions.)*
3. *Where guide rail is placed below top of wall and above curb, curb width is measured from front face of guide rail to curb edge at roadway.*
4. *Code 2: if sidewalk is unprotected and speed limit is > 45 mph or bridge length > 200 ft.*
5. *Note: sidewalk protection required for posted speeds > 45 mph or bridge length > 200ft (see DM4, Part B, Sec 2.3.2.2 and associated commentary).*

BMS2 Item IA02-1 Bridge Railing Ratings

- *As depicted in sketches below and*
- *Not in current PennDOT standards for barriers and not accepted by FHWA.*

Structure-Mounted Guide-Rails

	IA02-1 Sketch	Post Height	Speed limit	POST SPACING	IA02-1 CODE
	e – g	≥ 2'-3"	All	≤ 3'-6"	6 [Note 2]
		≥ 2'-0" to < 2'-3"	> 45 mph	≤ 3'-6"	2
			≤ 45 mph		4
		≤ 2'-0"	All	All	2



(e) (f) (g)

Structure-Mounted Guide rail

Note:

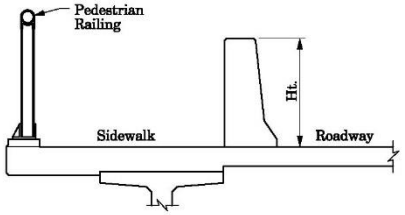
1. *The above ratings are for structure-mounted guide rail that is structurally sound and appears to be sufficient to contain an errant vehicle.*
   a. *Downgrade IA02-1 rating from above values (Max. reduction of 1) as needed to consider:*
      1. *Deteriorated or damaged structural condition.*
      2. *For site-specific conditions that would elevate risk of collision with barrier, especially poor approach alignment, and to a lesser extent narrow deck width and high ADT. Previous crash damage and history may be good indicators of higher risk.*
   b. *If structural condition of barrier or its connection to the deck is so poor that it is unlikely to contain an errant vehicle, CODE = 2.*
2. *No structure mounted guide rail that has not been accepted by FHWA can be rated = 8. (This is a change from previous coding instructions.)*

BMS2 Item IA02_1 Bridge Railing Ratings

– *As depicted in sketch below and*

– *Not in current PennDOT standards for barriers and not accepted by FHWA.*

Safety Shape Barriers

IA02-1 Sketch	Barrier Height	IA02-1 Code
 (h)	≥ 3’ 6”	8
	≥ 2’ 3” to < 3’ 6”	6
	≥ 2’ 0” to < 2’ 3”	4
	< 2’ 0”	2

Note:

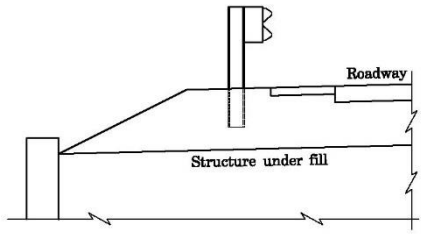
1. *Downgrade IA02-1 rating from above values (Max. reduction of 1) as needed to consider deteriorated or damaged structural condition.*
2. *If barrier is pre-cast concrete and located on the outside lane (not median barrier) and:*
   - *A. Shows any sign of deterioration, CODE = 2. Deterioration signs may include:*
     - *Map cracking or deterioration of concrete near base*
     - *Evidence of failed deck anchorage anchors – loss of grout bed and signs of rusting*
     - *Tilting or displacement of barrier*
   - *B. Does not show deterioration but is located on an Interstate or Expressway bridge where speed limit > 45 mph, CODE = 4.*

BMS2 Item IA02_1 Bridge Railing Ratings

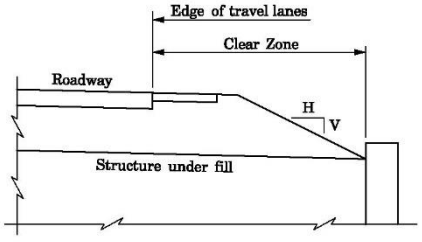
– *As depicted in sketch below and*

– *Not in current PennDOT standards for barriers and not accepted by FHWA.*

Culvert Embankments with and without Guide rail



With Roadway Guide rail



Without Roadway Guide rail

Criteria with Roadway Guide rail	IA02-1 Code: Meets Criteria	IA02-1 Code: Does Not Meet
Rate similarly to IA02-3. Guide rail posts must have adequate embedment.	8	4
Note: Downgrade IA02-1 rating by one if guide rail is damaged.		

Criteria without Roadway Guide rail

Criteria: Posted Speed	Criteria: ADT	Slope 1V:4H or flatter: Clear Zone	Slope 1V:4H or flatter: IA02-1 Code	Clear Zone	IA02-1 Code	Fails Slope or Clear Zone IA02-1
≥ 55	All	30’	8	24’	4	2
41 – 54	≥ 750	30’	8	24’	4	2
	< 750	20’	8	16’	4	2
≤ 40	≥ 750	20’	8	16’	4	2
	< 750	10’	8	8’	4	2

Note: Downgrade IA02-1 rating of 8 or 4 if site is particularly hazardous or if accident history indicates greater risk.

~~2 – Transition &~~ 3 - Approach Guide rail

Reference current standard drawings RC-50M, RC-52M and BC-703M, BC-707M, BC-708M, BC-712M, BC-739M.

Notes:

1. Approach end guide rail treatment is to be in place at both the approach and trailing ends of structure parapets on two lane facilities with two-way traffic. On four lane divided highways, guide rail is not required on trailing ends of parapets unless warranted by other obstructions.
2. Where transition or approach rail post do not have adequate embedment to re-direct errant vehicles, consider the element as damaged and reduce the rating by 1. Assign maintenance priority for guide rail work as follows:

   Item IM05 = 2 when appraisal ratings for Items 4A10 or 4A02 are less than 6.
   Item IM05 = 3 Otherwise.
3. DM2 Chapter 12 and the AASHTO "Roadside Design Guide" barrier guidelines recognize that the requirements for barrier are based on a roadside elements and conditions for each site. As such, sidewalk barrier, transition and approach guide rail for bridges having a curbed sidewalk may not be required based on a finding by an engineer qualified to evaluate and determine appropriate traffic safety features in accordance with the design documents. This finding must be maintained in the bridge file and should be the basis for the coding in Item IA02 and maintenance recommendations. Sources of qualified engineers may include District Traffic Units, Municipal engineers, or engineering firms specializing in highway traffic safety. Local owners should be strongly encouraged to obtain the traffic safety review and findings for their bridges as discussed above. In the absence of documentation to the contrary, safety feature installation recommendations based on strict interpretation of the standards using the appropriate maintenance priority codes must be made.

4 - Approach Rail End

Reference current standard drawings RC-52M and RC-54M.

Note:
Code 8 only when:

- Outside clear zone, OR
- Posted speed limit < 45 MPH AND ADT < 4,000

IA03 Description - Safety Feature Description

Inspection > Safety Features > Safety Feature Detail; BMS3: Approach

Description:

This item is used to record a narrative description of the safety feature.

Procedure:

Enter a description of the safety feature in narrative form.

IB Inspection - Bearings

The Inspection – Bearings Section is used to view and edit data and information regarding current and past bearing conditions.

IB01/B.C.07 Bridge Bearing Condition Rating

SNBI Field B.C.07
Inspection > Ratings & Schedule; BMS3: Ratings & Bearings

Description:

Report the bridge bearing condition rating using one of the code sin Table 20.

Procedure:

This item addresses the condition of all types and shapes of bridge bearings.

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. 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.

Report "N" for bridges without bearings. For guided examples, refer to FHWA's SNBI under Item B.C.07.

Coding:

Code	Condition	Description
9	EXCELLENT	Isolated inherent defects.
8	VERY GOOD	Some inherent defects.
7	GOOD	Some minor defects.
6	SATISFACTORY	Widespread minor or isolated moderate defects.
5	FAIR	Some moderate defects; strength and performance of the component are not affected.
4	POOR	Widespread moderate or isolated major defects; strength and/or performance of the component is affected.
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	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	IMMINENT FAILURE	Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service.
0	FAILED	Bridge is closed due to component condition, and is beyond corrective action. Replacement is required to restore service.
N	NOT APPLICABLE	Bridge does not have bearings.

Table IB-1: Bridge Bearing Condition Rating Code Definitions

Defect	Minor	Moderate	Major
Movement	Minor restriction.	Restricted.	For Major defects, a structural review must be performed to make a determination of strength and performance of the bearing and ultimately if a final finding of major defect is prudent.
Alignment	Lateral or vertical alignment that is inconsistent with temperature conditions, but is tolerable.	Approaching limits of lateral or vertical alignment for the bearing.	
Bulging, Splitting, Tearing	Bulging less than 15% of bearing thickness.	Bulging 15% or more of bearing thickness. Splitting or tearing. Bearing's surfaces are not parallel.	
Loss of Bearing Area	Up to 10%.	More than 10%.	
Corrosion	Freckled rust. Corrosion has initiated.	Section loss is evident.	
Connection	Loose fasteners, or pack rust without distortion. Connection is in place and functioning as intended.	Missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion.	

Table IB-2: Bridge Bearing Defect Severity Guide

IB02 Bearing Key

Inspection > Joints & Bearings; BMS3: Bearings

Description:

This display-only item indicates the bearing key number stored for each individual line of bearings on the bridge.

Procedure:

This item is **automatically filled in by the system** when a line of bearings is created in either BMS2 or BMS3.

Coding:

A numerical value greater than 0, created in numerical order.

IB03 Record Key

Inspection > Joints & Bearings; BMS3: Bearings

Description:

This display-only item indicates the record key number for each specific bearing key. This item differs from Item IB02 as this record will change when the bearing is replaced at a specific location on the bridge.

Procedure:

This item is **automatically filled in by the system** when a new bearing record is created in either BMS2 or BMS3 at each individual bearing location.

Coding:

A numerical value starting with 1 and increasing by 1 for each new record created for the specific Bearing Key in Item IB02.

IB04 Bearing Type – Type of Bearing Line

Inspection > Joints & Bearings; BMS3: Bearings

Description:

This item describes the type of bearing lines on the bridge at a specific location.

Procedure:

Select the type of bearing from the dropdown list being used at the specific location on the bridge.

Note:
When editing an existing bearing location, the previous Bearing Type in Item IB04 will be auto-populated. If changing the Bearing Type is necessary, add additional comments in Item IB18 about the reason for the change in Bearing Type.

Coding:

NN	Not applicable (for structures such as culverts, etc.)
01	Fixed through dowels
02	Expansion through dowels
03	Steel Plates
04	Lubrite Plates
05	Rockers
06	Rocker Nest
07	Rollers
08	Roller-Nest-Open
09	Roller-Nest-Enclosed
10	Neoprene (plain)
11	Neoprene (laminated)
12	Graphite Asbestos
13	Lead
14	Grout
15	Asphalt Felt/Tar Paper
16	Fabrica
17	Pot Bearings
18	Neoprene (plain) and Sliding Steel Plates
19	Neoprene (laminated) & Sliding Steel Plates
20	Preformed Fabric and Sliding Steel Plates
21	Spherical – Bronze or Steel
22	Disk Bearings
99	Other

IB05 Bearing Location – Location of Bearing Line

Inspection > Joints & Bearings; BMS3: Bearings

Description:

This item describes the location of the line of bearings on the structure identified in Item IB04.

Procedure:

Select the location on the structure using the standard language below. The available options for the bearing location must correspond to a substructure unit. If the substructure unit does not exist on the Structure Unit screen under the Inventory Links, it will not appear in the drop down for Item IB05.

The second part of this field indicates if the bearings at a substructure unit are for the back span, ahead span, or there is a single bearing line.

Note:
When editing an existing bearing location on a new record, the previous Bearing Location in Item IB05 will be auto-populated. If a significant change in location (i.e. P01 to P02) is necessary, create one record using the same location in Item IB05 and add the comment "Relocated" in Item IB18. Then add another record, edit the bearing location for this iteration and add additional comments in Item IB18 indicating the reason for the change in Bearing Location.

Coding:

Refer to the coding descriptions in Items 5D01 and 5D02 for the types of structure units. The second part of the field indicates the position of the bearings on the substructure unit (i.e. S – Single, A – Ahead, B – Back).

Part 1 (5D01-5D02)	Part 2	Combined	Examples
Abutment – FAB	S	Abutment FAB-S	Single line of bearings at the Far Abutment
Pier – P01	B	Pier P01-B	Bearing line for Span 1 at Pier 1
Pier – P01	A	Pier P01-A	Bearing line for Span 2 at Pier 1
Pier – P02	S	Pier P02-S	Single line of bearings at Pier 2

IB06 Bearing Count

Inspection > Joints & Bearings; BMS3: Bearings

Description:

This field indicates the number of bearings within the bearing line at a substructure unit of the same bearing type as described in Item IB04.

Procedure:

Enter the number of bearings within the bearing line at the specific substructure unit. If multiple bearing types exist within the bearing line, this count should be specific to the bearing type specified within Item IB04.

Coding:

A numerical value greater than 0.

IB07 Bearing Movement – Bearing Movement Type

Inspection > Joints & Bearings; BMS3: Bearings

Description:

This item indicates the movement type for the bearing identified in Item IB04.

Procedure:

Select the movement type for the bearing identified in Item IB04.

Coding:

E Expansion
F Fixed
G Guided
N Non-Guided

Items IB08 through IB11 can be coded "Yes" if the corrosion, alignment, anchor bolt or loss of bearing reflects any of the conditions provided in the defect table above. The severity of the condition will be described by the numerical value associated with the bearing condition rating.

IB08 Corrosion? – Is Corrosion Present on the Bearings?

Inspection > Joints & Bearings > Bearings Data Detail; BMS3: Bearings

Description:

This dropdown field is used to indicate if any of the bearings within the bearing line have corrosion.

Procedure:

Select an option from the dropdown box to indicate if any of the bearings within the bearing line have corrosion. The corrosion should either be a measurable section loss (> 1/16") or impact the bearings ability to move if the bearing line is for expansion.

Coding:

0 - No	No bearings within the bearing line have corrosion
1 - Yes, One	One bearing within the bearing line exhibits corrosion
2 - Yes, Mult	More than one bearing within the bearing line exhibits corrosion

IB09 Alignment Issues? – Are Bearing Alignment Issues Present?

Inspection > Joints & Bearings > Bearings Data Detail; BMS3: Bearings

Description:

This dropdown field is used to indicate if any of the bearings within the bearing line have alignment issues.

Procedure:

Select an option from the dropdown box to indicate if any of the bearings within the bearing line have alignment issues. For expansion bearings, measurements should be adjusted for temperature. If the bearing has potential to exceed the maximum allowable movement, mark as "Yes".

Coding:

0 - No	No bearings within the bearing line have alignment issues
1 - Yes, One	One bearing within the bearing line has alignment issues
2 - Yes, Mult	More than one bearing within the bearing line has alignment issues

IB10 Anchor Bolt Issues? – Are Bearing Anchor Bolt Issues Present?

Inspection > Joints & Bearings > Bearings Data Detail; BMS3: Bearings

Description:

This dropdown field is used to indicate if any of the bearings within the bearing line have anchor bolt issues.

Procedure:

Select an option from the dropdown box to indicate if any of the bearings within the bearing line have anchor bolt issues. Code "Yes" if one or more of the anchor bolts for a bearing are missing or bent. Code "No" if the nut for the anchor bolt is simply loose or missing.

Coding:

0 - No	No bearings within the bearing line have anchor bolt issues
1 - Yes, One	One bearing within the bearing line has anchor bolt issues
2 - Yes, Mult	More than one bearing within the bearing line has anchor bolt issues

IB11 Loss of Bearing Area?

Inspection > Joints & Bearings > Bearings Data Detail; BMS3: Bearings

Description:

This dropdown field is used to indicate if any of the bearings within the bearing line have moderate loss of bearing area.

Procedure:

Select an option from the dropdown box to indicate if any of the bearings within the bearing line have moderate loss of bearing area (10% or more).

Coding:

0 - No	No bearings within the bearing line have moderate loss of bearing area
1 - Yes, One	One bearing within the bearing line has moderate loss of bearing area
2 - Yes, Mult	More than on bearing within the bearing line has moderate loss of bearing area

IB12 Condition Rating – Individual Bearing Condition Rating

Inspection > Joints & Bearings; BMS3: Bearings

Description:

This item indicates the condition of the individual line of bearings.

Procedure:

Select the code which describes the overall condition of the individual bearing line. Refer to Tables IB-1 and IB-2 after Item IB01 for coding guidance.

Coding:

See Tables IB-1 and IB-2 after Item IB01.

IB13 Install Year – Bearing Installation Year

Inspection > Joints & Bearings > Bearings Data Detail; BMS3: Bearings

Description:

This item is used to record the year the bearing line was installed.

Procedure:

Enter the year of installation for the line of bearings.

Coding:

Enter the year in YYYY format.

IB14 ECMS ID – Bearing ECMS Project Number

Inspection > Joints & Bearings > Bearings Data Detail; BMS3: Bearings

Description:

This item is used to record the ECMS Number associated with the work to repair or replace the bearing.

Procedure:

Enter the ECMS Number associated with the work to repair or replace the bearing, otherwise leave blank.

Coding:

Enter the ECMS number up to six digits.

Example: 101395

IB15 Replacement Reason – Reason Why the Bearing Line was Replaced

Inspection > Joints & Bearings > Bearings Data Detail; BMS3: Bearings

Description:

This item is used to record the reason why the bearing line was replaced. This item is required when a subsequent record key is created.

Procedure:

Choose from the dropdown option below that best describes the reason for bearing replacement.

Coding:

A	Alignment Issues	E	Loss of Bearing Area
B	Anchor Bolt Issues	F	Preventative
C	Corrosion	G	Superstructure Replacement
D	Damaged Bearing	H	Other

Example:
An example of when to Code F would be rocker bearings that were proactively replaced with pot bearings.

IB16 Replacement Comment – Bearing Replacement Comment

Inspection > Joints & Bearings > Bearings Data Detail; BMS3: Bearings

Description:

This item is used to record notes about the bearing replacement in narrative form.

Procedure:

Record any narrative information about the bearing replacement.

IB17 Bearing Notes

Inspection > Joints & Bearings > Bearings Data Detail; BMS3: Bearings

Description:

This item is used to record notes about the bearing line in narrative form.

Procedure:

Record any narrative information about the bearing line from the current inspection or maintenance action. This should include if bearings were reset, if bearings were replaced at different times, or any other pertinent information to assist with future decision making and inspections.

[the remainder of this page is intentionally left blank]

IJ Inspection - Joints

The Inspection – Joints Section is used to view and edit data and information regarding current and past deck joint conditions. This section should only include the number of expansion devices on the bridge. Joints off the bridge (i.e. between the end of the deck/backwall and the approach pavement/slab) are not to be included. Construction joints are not to be included.

IJ01 Overall Joint Condition Rating

SNBI Field B.C.08
Inspection > Ratings & Schedule; BMS3: Ratings & Joints

Description:

This item is used to provide a condition rating for bridge joint(s) on a bridge.

Procedure:

Report the bridge deck joint condition using one of the codes in the table below. 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.

When a joint is designed as an open joint, leakage or lack of a seal is not considered a defect.

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.

In cases where the joint is not visible, the condition can be assessed based on other indirect indicators of the condition.

Coding:

Code	Condition	Description
9	EXCELLENT	Isolated inherent defects.
8	VERY GOOD	Some inherent defects.
7	GOOD	Some minor defects.
6	SATISFACTORY	Widespread minor or isolated moderate defects.
5	FAIR	Some moderate defects.
4	POOR	Widespread moderate or isolated major defects.
3	SERIOUS	Some major defects.
2	CRITICAL	Widespread major defects.
1	IMMINENT FAILURE	Joints have failed and are ineffective.
0	FAILED	Joints have failed and present a safety hazard.
N	NOT APPLICABLE	Bridge does not have deck joints.

Table IJ-1: Bridge Joint Condition Rating Code Definitions

Defect	Minor	Moderate	Major
Leakage*	Minimal. Minor dripping through the joint.	Moderate. More than a drip and less than free flow of water.	Free flow of water through the joint.
Seal Adhesion	Adhered for more than 50% of the joint height.	Adhered 50% or less of joint height but still some adhesion.	Complete loss of adhesion.
Seal Cracking	Surface Crack.	Crack that partially penetrates the seal.	Crack that fully penetrates the seal.
Seal Damage	Seal abrasion without punctures.	Punctured, torn, or partially pulled out.	Punctured completely through, pulled out, or missing.
Debris Impaction	Partially filled with hard-packed material, but still allowing free movement.	Completely filled; impacts joint movement.	Completely filled; prevents joint movement.
Adjacent Deck or Header	Edge delamination or spall 1″ or less deep or 6″ or less in diameter. No exposed rebar. Patched area that is sound.	Spall greater than 1″ deep or greater than 6″ diameter. Exposed rebar. Delamination or unsound patched area that makes the joint loose.	Spall, delamination, unsound patched area, or loose joint anchor that prevents the joint from functioning as intended.
Metal Deterioration or Damage	Freckled rust. Metal has no cracks or impact damage. Connection may be loose but functioning as intended.	Section loss, missing or broken fasteners, cracking of the metal, or impact damage. Joint still functioning.	Section loss, cracking of the metal, damage, or connection failure that prevents the joint from functioning as intended.

Table IJ-2: Bridge Joint Defect Severity Guide

* The leakage defect applies only to those joints that were designed to have a seal that is currently missing or damaged; not to joints designed as open joints.

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.

In cases where the joint is not visible, the condition can be assessed based on other indirect indicators of the condition.

IJ02 Joint Key

Inspection > Joints & Bearings; BMS3: Joints

Description:

This display-only item indicates the joint key number stored for each individual joint location.

Procedure:

This field is **automatically filled in by the system** when a joint is created in either BMS2 or BMS3.

Coding:

A numerical value greater than 0, created in numerical order.

IJ03 Record Key

Inspection > Joints & Bearings; BMS3: Joints

Description:

This display-only item indicates the record key number for each specific joint key. This item differs from Item IJ02 as this record will change when the joint is replaced at a specific location on the bridge.

Procedure:

This field is **automatically filled in by the system** when a new joint record is created in either BMS2 or BMS3 at each individual joint location.

Coding:

A numerical value starting with 1 and increasing by 1 for each new record created for the specific Joint Key in Item IJ02.

IJ04 Joint Type

Inspection > Joints & Bearings; BMS3: Joints

Description:

This item describes the type of deck expansion joint on the bridge at a specific location.

Procedure:

Select the type of joint from the dropdown list being used at the specific location on the bridge.

Note:
When editing an existing joint location, the previous Joint Type in Item IJ04 will be auto-populated. If changing the Joint Type is necessary, add additional comments in Item IJ19 about the reason for the change in Joint Type.

Coding:

A	Open Joint
B	Pre-molded Filler
C	Neoprene Sponge
D	Plate Dam
E	Plate Dam w/ Galv Gutter
F	Plate Dam w/ Neoprene Gutter
G	Tooth Dam
H	Tooth Dam w/ Galv Gutter
I	Tooth Dam w/ Neoprene Gutter
J	Preformed Neoprene Compression Seal
K	Reinforced Elastomeric/Neoprene Dam
L	Modular
M	Neoprene Strip Seal
N	Armored Preformed Neoprene Comp. Dam
O	Other
P	Asphaltic Plug
R	Preformed Silicone
S	Two Part Silicone
T	Two Part Silicone w/ Polymer Nosing
Z	Removed

IJ05 Joint Location

Inspection > Joints & Bearings; BMS3: Joints

Description:

This item describes the location of the deck expansion joint identified in Item IJ04.

Procedure:

Select the location on the structure using the standard language below. The available options for the joint location must correspond to a structure unit. If the structure unit does not exist on the Structure Unit

screen under the Inventory Links, it will not appear in the drop down for Item IJ05. For longitudinal joints, record the span the longitudinal joint begins in.

Note:
When editing an existing joint location on a new record, the previous Joint Location in Item IJ05 will be auto-populated. If a significant change in location (i.e. P01 to SP02) is necessary, create one record using the same location in Item IJ05 and add the comment "Relocated" in Item IJ19. Then add another record, edit the joint location for this iteration and add additional comments in Item IJ19 indicating the reason for the change in Joint Location.

Coding:

Refer to the coding descriptions in Items 5D01 and 5D02 for the structure units.

Examples:

Abutment – NAB	Joint at near abutment
Pier – P01	Joint over Pier 1
Main Span – 2	Pin and hanger system where the joint is 15′ away from Pier 1 in Span 2
Main Span – 1	Longitudinal joint runs between dual structures

IJ06 Joint Movement – Joint Movement Class

Inspection > Joints & Bearings; BMS3: Joints

Description:

This item describes the movement class of the deck expansion joint identified in Item IJ04.

Procedure:

Select the movement class for the joint.

Coding:

A	Up to 2″	D	Over 8″ and up to 12″	U	Unknown
B	Over 2″ and up to 4″	E	Over 12″		
C	Over 4″ and up to 8″	L	Longitudinal		

IJ07 Joint Manufacturer

Inspection > Joints & Bearings > Joint Data Detail; BMS3: Joints

Description:

This item indicates the manufacturer of the deck expansion joint identified in Item IJ04.

Procedure:

Select the manufacturer of the joint from the dropdown list.

Note: Please contact the Bridge Inspection Section to request other manufacturers that are not on the dropdown list so that they can be added to the parameter table.

Coding:

A	Acme	H	Not Applicable	N	LB Foster
B	Watson Bowman	I	Reserved	O	Other
C	Harris	J	Dow Corning	P	Kard
D	Felpro	K	R J Watson	Q	Pelet
E	D S Brown	L	SSI	R	RP Machinery
F	Royston	M	Amrod	S	Safety Guard
G	Unknown				

IJ08 Joint Length

Inspection > Joints & Bearings > Joint Data Detail; BMS3: Joints

Description:

This item is used to record the full length of the joint (including vertical surfaces along the barrier face).

Procedure:

Enter the measured length of the joint to the nearest foot.

Coding:

Length of the joint, to the nearest foot.

Items IJ09 through IJ11 can be checked if the debris impaction, leakage, or damage reflects any of the conditions provided in the defect table above. The severity of the condition will be described by the numerical value associated with the individual joint condition rating.

IJ09 Debris Impaction? – Does the Joint Exhibit Debris Impaction?

Inspection > Joints & Bearings > Joint Data Detail; BMS3: Joints

Description:

This checkbox field is used to indicate if the joint exhibits debris impaction.

Procedure:

Check or uncheck the box to indicate the appropriate code. If Item IJ12 is checked (joint is covered), leave this field unchecked unless there is clear evidence of debris impaction.

Coding:

Unchecked	The joint does not exhibit debris impaction
Checked	The joint exhibits debris impaction as defined in Table IJ-2 above

IJ10 Leaking? – Is Joint Leakage Present?

Inspection > Joints & Bearings > Joint Data Detail; BMS3: Joints

Description:

This checkbox field is used to indicate if the joint is leaking.

Procedure:

Check or uncheck the box to indicate the appropriate code. The joint does not need to be actively leaking for this box to be checked. Joints with signs of water leakage along superstructure and/or substructure elements that have not been rehabilitated should have this box checked.

Coding:

Unchecked	The joint is not leaking
Checked	The joint is leaking as defined by the defect codes in Table IJ-2 above

IJ11 Damage? – Is Joint Damage Present?

Inspection > Joints & Bearings > Joint Data Detail; BMS3: Joints

Description:

This checkbox field is used to indicate if the joint is damaged.

Procedure:

Check or uncheck the box to indicate the appropriate code.

Coding:

Unchecked	There is no damage to the joint that impacts the functionality of the joint
Checked	There is damage to the joint that impacts the functionality of the joint as defined by the defect codes in Table IJ-2 above

IJ12 Covered? – Is the Joint Covered?

Inspection > Joints & Bearings > Joint Data Detail; BMS3: Joints

Description:

This checkbox field is used to indicate if the joint is exposed to traffic and visible or if the joint is hidden (i.e., paved over).

Procedure:

Check or uncheck the box to indicate the appropriate code.

Coding:

Unchecked	The joint is visible
Checked	The joint is covered and is not visible (i.e., the joint is paved over)

IJ13 Condition Rating – Individual Joint Condition Rating

Inspection > Joints & Bearings; BMS3: Joints

Description:

This item indicates the condition of the individual joint.

Procedure:

Select the code which best describes the condition of the specific joint. Refer to Tables IJ-1 and IJ-2 after Item IJ01 for coding guidance. If Item IJ12 is checked, refer to previous inspection reports and the condition of adjacent elements to determine the condition rating for the covered joint.

Coding:

Refer to Tables IJ-1 and IJ-2 after Item IJ01.

IJ14 Extrusion Install Year – Joint Extrusion Install Year

Inspection > Joints & Bearings > Joint Data Detail; BMS3: Joints

Description:

This item is used to record the year the joint extrusion was installed. The extrusion is the part of the joint on the edges of the bridge deck. This is generally a piece of metal that the joint seal attaches to. For a plate or tooth dam, this includes the metal portion of the actual joint.

Procedure:

Enter the year of installation for the joint extrusion.

Coding:

Enter the year in YYYY format.

IJ15 Seal Install Year – Joint Seal Install Year

Inspection > Joints & Bearings > Joint Data Detail; BMS3: Joints

Description:

This item is used to record the year the joint seal was installed. The seal is the part of the joint that spans the opening. For a plate or tooth dam, this is the gutter beneath the joint.

Procedure:

Enter the year of installation for the joint seal.

Coding:

Enter the year in YYYY format.

IJ16 ECMS No – Joint ECMS Project Number

Inspection > Joints & Bearings > Joint Data Detail; BMS3: Joints

Description:

This item is used to record the ECMS Number associated with the work to repair or replace the joint.

Procedure:

Enter the ECMS Number associated with the work to repair or replace the joint, otherwise leave blank.

Coding:

Enter the ECMS number up to six digits.

Example: 101395

IJ17 Replacement Reason – Reason Why the Joint was Replaced

Inspection > Joints & Bearings > Joint Data Detail; BMS3: Joints

Description:

This item is used to record the reason why the joint was replaced. This item is required when a subsequent record key is created.

Procedure:

Choose from the dropdown option below that best describes the reason for joint replacement.

Coding:

A	Leaking	E	Preventative
B	Impact Damage	F	Seal Only Replaced
C	Corrosion	G	Other
D	Damaged Joint		

IJ18 Replacement Comment – Joint Replacement Comment

Inspection > Joints & Bearings > Joint Data Detail; BMS3: Joints

Description:

This item is used to record notes about the joint replacement in narrative form.

Procedure:

Record any narrative information about the joint replacement.

IJ19 Joint Comment

Inspection > Joints & Bearings > Joint Data Detail; BMS3: Joints

Description:

This item is used to record notes about the joint in narrative form.

Procedure:

Record any narrative information about the joint from the current inspection or maintenance action. This should include if notes on if the metal armoring is painted or galvanized, a reason for the joint removal, or any other pertinent information that will help future decision making.

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IR Inspection - Load Rating

The Load Rating Section allows a user to enter rating data for a structure. The Load Ratings Screen is listed under Inspection Links.

The Load Ratings Screen provides the ability to create or remove a load rating set from the history of load ratings for the structure corresponding to the Calculation date. **All load rating data for all structures shall be entered through this screen**. Load Rating details are displayed on the bottom of the screen for the selected record in this section. When the user clicks the Save button, the current load rating data is used to update the corresponding load rating data fields shown on the Load Rating Screen. The load rating values in the fields are overlaid with the updated values from this screen – the data created through this screen is the most current load rating information for the structure.

Adding New Load Rating Sets to BMS2

For the purposes of this process, a load rating set consists of Inventory and Operating Ratings for various load types with a corresponding analysis method (Items IR04 through IR21). In this process, load rating sets do not refer to the engineering datasets for PennDOT bridge analysis programs, such as BAR7.

Many bridges have existing rating analysis stored in BMS2 that are current and valid, but the calculation date (Item IR03) in BMS2 is incorrect. Due to database restrictions, users cannot simply edit the most recent calculation date (Item IR03). A new rating set must be created and assigned to the inspection. When a new rating set is created, all of the existing data is copied from the last rating set. To update the most recent calculation date for a valid load rating set, Districts must follow the procedure described below.

BMS2 is capable of storing several complete load rating sets for each bridge. Each inspection can only have one "assigned" load rating set that will be used for NBI purposes. When entering a new load rating set into BMS2, the "new" load rating set must be assigned or linked to its corresponding inspection as per Step 5 below.

Instructions for Entering New Load Rating Sets on the Inspection Load Rating Screen:

1. **Establish a new Calculation Date (Item IR03)** for the load rating set by clicking the "New Rating Set" button:
   - Enter the date the new load rating was performed into the Calculation Date (Item IR03) and hit save to allow further editing of the load rating set.

2. **Enter load ratings for various load types**. When a new load set is generated, the load ratings for the various load types from the prior Calculation Date are copied to the new data set as a convenience to the user. The user must verify and/or edit the load rating data as required.
   - Click the Add Item button to create a new load type for a rating set, if necessary.
   - Click the Delete Item button to remove the load types. Users may only select one Load Type at a time. BMS2 prompts users to confirm deletion before the load type records are removed.

3. **Save the preliminary Load Rating Set.** Once the new load ratings are entered, save the new ratings by clicking the Save button at the top right of the screen. Incomplete records may be edited at this time or later. This load rating set is considered preliminary until review/acceptance and assignment to an inspection. **Note: Saving a new rating set will lock the previous rating set from editing. Once saved, the rating set being entered can be edited until the entry of next new rating set, but it cannot be removed.**

4. **QC review of the Load Rating** The load rating reviewer must review and accept the preliminary re-rating for completeness and accuracy before the load rating set is assigned to the inspection in BMS2.
   - If acceptable, the reviewer changes Item IR01b to "3 Re-rating Completed" in BMS2.
   - This indicates that the load re-rating is in accordance with PennDOT policies.

5. **Assign the new load rating set to an inspection**. To link an inspection with its corresponding load rating, the load rating set must be assigned as follows:
   a. Select the desired inspection date in the Inspections field at the top of the screen. The inspection date will typically be the most recent NBI inspection.
   b. Once the appropriate inspection date is displayed, click the Assign Rating Set to Inspection button. Upon clicking the Assign Rating Set button, **BMS2 will save automatically:**

- Populate the Rating Date (Item IR02) with today's date.
- Populate the Rating Approval Engineer (Item IR02a) with the name of the user assigned the set.
- Link the load rating set to that inspection date. **An asterisk in Item IR03 will indicate the "assigned" load rating for the inspection**. This "assigned" load rating data will be used for all NBI calculations for that inspection.
- De-link any other load rating set previously associated to that inspection.
- Subsequent inspections created through BMS2 will also be initially linked to the last "assigned" load rating set.

6. **Save the assigned load rating.** After assigning the new load rating set to the desired inspection, click "Save".

Notes on multiple load rating sets for a single inspection:

- BMS2 can store more than one load rating set for an individual inspection date, but only one can be maintained as the "assigned" load rating.
- A second rating set may be needed for an inspection if loadings have changed (e.g. new deck overlay) since the last inspection.
- Another use of multiple ratings (albeit, probably very rare) may occur when the rater has developed different analysis/rating scenarios and wants to review them in BMS2. BOMO recommends reviewing the scenarios separately and then entering only the selected rating scenario into BMS2.

Re-Rating Bridges Due to Changes after the Inspection

If changes to the load ratings are required due to reasons other than inspection findings more than 30 days after the inspection, the inspection manager can record the need for re-rating in BMS2 by:

- **Setting Item IR01b = 5 - Re-Rate Other**
  Bridges with a Reviewer Action = 5 are not part of the Re-Rating Compliance report.

Changes in loadings noted less than the 30 days after the inspection are to be considered part of the most current inspection.

- Set Item IR01b = 2 - Re-Rating Scheduled

If bridge member conditions change, re-inspect and follow normal procedure outlined above.

IR01a Load Rating Review Recommended

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This checkbox field indicates whether or not a bridge inspector recommends a new load rating analysis based on findings during the inspection.

Procedure:

If a bridge inspector believes a new rating analysis is required, the box should be checked to indicate "yes". If a bridge inspector doesn't believe a new rating analysis is required, the box should be unchecked to indicate "no". This checkbox cannot be changed in BMS2. Based on the coding of Item IR01b, this field may be checked or unchecked when a new inspection is created in BMS3. The user should also explain why the review is recommended in the appropriate comment box.

To assist the inspection team and load rating engineer in determining if a new load rating is required, the following considerations have been added to BMS2 and BMS3:

- Has the dead load increased (e.g., additional wearing surface has been placed)?
- Has there been new or additional section loss to the main load carrying members in critical areas?[1]
- Has the existing capacity of the bridge been increased (e.g., bridge has been rehabilitated)?

- Has there been a change in the Live Load configuration (e.g., barriers have been installed to restrict vehicles from certain areas)?[2]
- Has the superstructure configuration changed (e.g., the bridge has been widened)?
- Has the substructure or superstructure deteriorated to a condition that may limit or further limit the load carrying capacity of the bridge (e.g., a substructure unit exhibits advanced section loss)?
- Has the condition code or distress level changed on a bridge load rated with the engineering judgement load rating method?[3]
- Has the deck deteriorated to a condition that may limit or further limit the load carrying capacity of the bridge?
- Has there been a change in the condition code of the superstructure or substructure, which would result in the need to apply an SLC factor? Apply 0.8 factor when Super/Sub = 4 (ADTT >= 500) or <= 3, 0.9 factor when Super/Sub = 4 (ADTT < 500).
- If the controlling super/culvert condition rating is = 5 for 15 years or more, is the current load rating >= 15 years old?[4]
- If the controlling super/culvert condition rating is <= 4, is the current load rating >= 10 years old?[4]

[1] This includes section loss to strands and/or reinforcing bars.

[2] This includes ensuring the temporary barrier is capable of restricting live load from the deteriorated sections of the bridge as modeled in the load rating for the bridge.

[3] This includes ensuring Engineering Judgment is an acceptable load rating method for the structure type.

[4] The elements associated with these condition ratings may result in a quantity in Condition State 4. An element in Condition State 4 requires a strength or serviceability check to determine if it should remain in that condition state. After the check is completed, notes about the check (i.e., the reason it moved to Condition State 3 or remained in Condition State 4) should be added to the elements 1A12 comment for reference by future inspectors

Coding:

Unchecked	A new analysis is not recommended
Checked	A new analysis is recommended

IR01b Reviewer Action

Inspection > Load Ratings; BMS3: Load Rating

Description:

This item allows the inspection reviewer to indicate their disposition of the Inspector recommendation.

Procedure:

Select the code from the dropdown list that indicates the reviewer's disposition of the Inspector recommendation. This value will not change unless an inspector changes the recommendation for load rating review.

Coding:

0 Not Reviewed – The most recent rating calculation rating has not been reviewed
1 Re-rating Not Reqd - No re-rating is required
2 Re-rating Scheduled – Re-rating is scheduled, but not completed
3 Re-rating Completed – Re-rating is completed
5 Re-rate Other – Re-rating is required due to changes that occurred after the most recent inspection
6 Re-rate Other Comp – Re-rating is completed for changes that occurred after the most recent inspection

Example 1: The previous inspection had Item IR01a unchecked and Item IR01b had a value of "1 – Re-rating Not Reqd". For the current inspection, an inspector checks Item IR01a. Item IR01b will be re-set to "0 – Not Reviewed".

Example 2: The previous inspection had Item IR01a unchecked and Item IR01b had a value of "1 – Re-rating Not Reqd". For the current inspection, an inspector does not check Item IR01a. Item IR01b will stay as "1 – Re-rating Not Reqd".

Example 3: After the previous inspection, Item IR01b was coded value of "3 – Re-rating Completed" or "6- Re-rate Other Comp" and Item IR01a was checked. Since the load rating was completed, the observed field conditions have not changed and therefore a re-rating is not required. When the next inspection is started in BMS3, IR01b will automatically change to 1 – Re-Rating Not Required and IR01a will uncheck. The inspector should verify this the codings of IR01a and IR01b after starting the next inspection.

IR02 Assigned Rating Approval Date

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This item indicates the date the ratings were assigned to the specific inspection record.

Procedure:

This date is **automatically entered by the system** based on the date the user clicked "Assign Rating Set". The rating set shall be assigned after all reviews are complete and the ratings are sealed. The date in Item IR02 shall match the seal date on the load rating calculations.

Note:
For bridges requiring a new or revised posting based on the new rating, the bridge posting must be installed or revised within 30 days of the calculation date in Item IR02.

IR02a Assigned Rating Approval Engineer

Inspection > Load Ratings

Description:

This item indicates the engineer who reviewed and approved the current assigned rating analyses.

Procedure:

This name is **automatically entered by the system** based on the user who clicked "Assign Rating Set".

IR03 Calc Date - Calculation Date

Inspection > Load Ratings; BMS3: Load Ratings

Description:

This item indicates the calculation date of the load rating set.

Procedure:

Enter the date the ratings were sealed by a Professional Engineer.

Coding:

Date the ratings were performed in MM/DD/YYYY format:

MM	2 digit month
DD	2 digit day of month
YYYY	4 digit year

Note:
Any one date may only be used once. Duplicate Calculation Dates are not allowed. If multiple ratings are to be entered and were performed on the same date, unique dates must be entered.

Example:
A rating was completed on April 16th, 2007 for a truss, floorbeam, stringer type bridge and the owner wants all ratings for each member type entered into BMS2. A truss member controls the rating.

Truss Calc Date:	04/16/2007
Floorbeam Calc Date:	04/17/2007
Stringer Calc Date:	04/18/2007

IR04 Load Type

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item indicates the loading type for the selected record.

Procedure:

Select the type of loading from the dropdown list.

For railroad loading only, code “7” for Item IR04 and "0" for Items IR10 and IR11. For pedestrian loading code Item IR04 as “8” and "0" for Items IR10 and IR11.

If the bridge is closed and/or will not carry live load, code Item IR04 a “9”, code Item IR06 a “7”, and code "0" for Items IR10 and IR11. The use or presence of a temporary bridge requires special consideration in coding. In such cases, since there is no permanent bridge, code Item IR04 a “9” and code "0" for Items IR10 and IR11 even though the temporary structure is rated for as much as full legal load. This will also apply to a temporary runaround condition.

Coding:

1	H Loading	8	Pedestrian or Special Loading (non-highway bridges); ML80 (highway bridges)
2	HS Loading		
3	Alternate Interstate Loading	9	Gross Load Only Given
4	Type 3 Unit	0	TK527
5	Type 3S2 Unit	D	PHL-93 Loading
6	Type 3-3 Unit	E	FastAct EV-2 Loading
7	Railroad Loading	F	FastAct EV-3 Loading

For bridges with 2 or more lanes and restricted to “One truck at a time” (Item VP02 = ”R” and Item VP03 = “1” or “2”), ratings for 1 lane of HS and ML80 should use the following code values:

A	H Loading
B	HS Loading
C	ML80 Truck

For coding examples, see IR EXAMPLES after Item IR21.

IR05 NBI – NBI Rating

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item records which rating will be sent to the FHWA for the NBI.

Procedure:

Select the code from the dropdown menu to indicate if the load rating is the NBI rating or not. For bridges carrying highways, the HS20 or PHL-93 load type is the NBI Rating.

Coding:

0 Not an NBI Rating
1 NBI Rating

For coding examples, see IR EXAMPLES after Item IR21.

*IR06 Load Rating Meth – Load Rating Method

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item records the method of analysis used in determining the inventory and operating ratings.

Procedure:

Select the code from the dropdown list that describes the method of analysis used in determining the inventory and operating rating.

Coding:

0 No Analysis Performed
1 Allowable Stress Method (AS)
2 Load Factor Method (LF)
3 Level 2 Analysis
4 Test Loading
5 Other
6 Load Resistance Factor Design Method (LRFD)
7 Field Evaluation and Documented Engineering Judgment
8 Load Resistance Factor Rating Method (LRFR)
A Assigned Rating Based on LFD reported in **tons**
B Assigned Rating Based on ASD reported in **tons**
C Assigned Rating Based on LRFD reported in **tons**
D Assigned Rating Based on LFD reported by **rating factor** using HS20 loading
E Assigned Rating Based on ASD by **rating factor** using HS20 loading
F Assigned Rating Based on LRFD reported by **rating factor** using PHL93 loading
G Automated Bridge Analysis System (ABAS)

Note:
If the bridge is closed and/or will not carry live load, code Item IR04 a “9”, code Item IR06 a “7”, and code "0" for Items IR10 and IR11. The use or presence of a temporary bridge requires special consideration in coding. In such cases, since there is no permanent bridge, code Item IR04 a “9” and code "0" for Items IR10 and IR11 even though the temporary structure is rated for as much as full legal load. This will also apply to a temporary runaround condition. For coding examples, see IR EXAMPLES after Item IR21.

IR07 Ctrl Memb Type - Type of Structural Member that Controls the Inventory Rating

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item is used to record the type of structural member controlling the inventory rating.

Procedure:

Select the code from the dropdown list that describes the type of structural member that controls or governs the inventory load rating.

Coding:

1	Beam or girder (longitudinal member)	5	Deck
2	Floorbeam (transverse member)	6	Substructure
3	Hanger	8	Stringer
4	Tension member in a truss or similar structure	9	Other

IR08 Fatigue Stress Cat - Fatigue Stress Category of the Controlling Member

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item is used to record the fatigue category in the controlling structural member.

Procedure:

If Item IR07 indicates that fatigue considerations control the inventory rating, enter the AASHTO fatigue stress category of the identified controlling structural member.

Coding:

A through E′ – Category as determined from structural analysis computations using the current AASHTO Standard Specifications for Highway Bridges. Category F was deleted by AASHTO in 1998 and will no longer be a coding option.

1	A	6	D
2	B	7	Reserved
3	B′	8	E
4	C	9	E′
5	C′	N	Not applicable

IR09 Fatigue Load Type - Type of Loading that Controls the Fatigue Inventory Rating

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item is used to record the type of loading that controls the fatigue inventory rating.

Procedure:

Select the code from the dropdown list that describes the type of loading that controls the fatigue inventory rating.

Coding:

1 H Loading
2 HS Loading
3 Interstate Highway Bridge Loading
8 Pedestrian or Special Loading (non-highway bridges)
9 ML80 (highway bridges)

*IR10 Inventory Rating (see IR11 Operating Rating for additional coding procedures)

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item is used to record the inventory rating. The inventory rating is that load which produces the inventory rating stresses specified in the current AASHTO Manual for Bridge Evaluation, generally the same allowable stresses used in the bridge design. The latter means that until a bridge has deteriorated structurally or is subjected to superimposed dead loads in excess of those used in the design, the inventory rating is at least equal to the design load. Additionally, it can be stated that inventory rating is that load which can safely utilize an existing bridge for an indefinite period. In determining inventory rating, the number of lanes to be loaded is the number of design traffic lanes in accordance with current AASHTO Standard Specifications for Highway Bridges.

Procedure:

Determine the inventory rating in accordance with the current AASHTO Manual for Bridge Evaluation.

For railroad loading only code “7” for Item IR04 and "0" for Item IR10. For pedestrian loading code Item IR04 as “8” and "0" for Item IR10.

If the bridge is closed and/or will not carry live load, code Item IR04 a “9”, code Item IR06 a “7”, and code "0" for Item IR10. The use or presence of a temporary bridge requires special consideration in coding. In such cases, since there is no permanent bridge, code Item IR04 a “9” and code "0" for Item IR10 even though the temporary structure is rated for as much as full legal load. This will also apply to a temporary runaround condition.*

A bridge shored up, repaired on a temporary basis, or one on which one or more lanes are barricaded to keep the bridge open is considered a temporary bridge condition and should be coded as if the temporary shoring or temporary width restriction were not in place.

It should be emphasized that for HS loading, the total weight in tons of the entire vehicle should be coded, i.e. code HS20 as 36 even though HS20 lane loading controls and is used to determine the rating.

H loading shall be treated similarly. In order to allow uniformity in the analysis of rating data, enter a rating for HS type loading whenever possible.

For reporting PHL-93, compute tonnage using the HS-20 weight (36T) and the PHL-93 rating factor based on current wearing surface.

*Temporary condition is to be identified in Item 5E03.

Coding:

Inventory rating in Tons.

For coding examples, see IR EXAMPLES after Item IR21.

*IR11 Operating Rating

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item is used to record the Operating Rating. The operating rating is that load which produces the operating rating stresses specified in the current AASHTO Manual for Bridge Evaluation. The operating rating is the maximum permissible weight of the load type being evaluated, to which the structure may be subjected occasionally. In determining the operating rating, the number of lanes to be loaded will be the number of design traffic lanes in accordance with current AASHTO Standard Specifications for Highway Bridges.

Procedure:

Determine the operating rating in accordance with the current AASHTO Manual for Bridge Evaluation.

For railroad loading only, code “7” for Item IR04 and "0" for Item IR11. For pedestrian loading code Item IR04 as “8” and "0" for Item IR11.

If the bridge is closed and/or will not carry live load, code Item IR04 a “9”, code Item IR06 a “7”, and code "0" for Item IR11. The use or presence of a temporary bridge requires special consideration in coding. In such cases, since there is no permanent bridge, code Item IR04 a “9” and code "0" for Item IR11 even though the temporary structure is rated for as much as full legal load. This will also apply to a temporary runaround condition.* A bridge shored up, repaired on a temporary basis, or one on which one or more lanes are barricaded to keep the bridge open is considered a temporary bridge condition and should be coded as if the temporary shoring or temporary width restriction were not in place.

It should be emphasized that for HS loading, the total weight in tons of the entire vehicle should be coded, i.e., HS20 should be coded as “36” even though the HS20 lane loading controls and is used to determine the rating. H loading shall be treated similarly in order to allow uniformity in the analysis of rating data, a rating for the HS type loading should be entered whenever possible.

Note:
If engineering judgment is used for gross load, (Item IR06=7), code type of vehicle loading considered.

For reporting PHL-93, compute tonnage using the HS-20 weight (36T) and the PHL-93 rating factor based on current wearing surface.

*Temporary condition is to be identified in Item 5E03.

Coding:

Operating rating in Tons.

For coding examples, see IR EXAMPLES after Item IR21.

IR11a SLC Rating – Safe Load Capacity (SLC) Rating

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item represents the safe load carrying capacity of a structurally deficient bridge. The SLC value is a percentage less than the Operating Rating for the bridge. It is intended to reflect the capacity that is determined for a bridge based on its superstructure or substructure condition rating and Average Daily Truck Traffic (ADTT) and is used for posting purposes when less than 100% of the Operating Rating is used and intended to aid in the extension of the useful life of the bridge. Refer to Publication 238, Section IP 4.3.2

Procedure:

Determine the SLC Rating for the bridge by applying the Safe Load Capacity Reduction Factor to the Operating Rating. Leave the field blank if a SLC factor is not applied and the SLC equals 100% of the OR.

*SLC = f * OR*

ADTT ≥ 500	*Superstructure, Culvert or Substructure*		
Condition Rating	*≥ 5*	*4*	*≤ 3*
f	*1.0*	*0.80*	*0.80*

ADTT < 500	*Superstructure, Culvert or Substructure*		
Condition Rating	*≥ 5*	*4*	*≤ 3*
f	*1.0*	*0.90*	*0.80*

Coding:

SLC Rating in Tons.

Leave Blank if SLC equals 100% of the Operating Rating.

IR12 Govern Crit Inv – Governing Criteria – Inventory

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item indicates the governing stress (shear or moment) for the inventory rating.

Procedure:

Select the governing stress from the dropdown list.

Coding:

M Moment Controls
S Shear Controls

IR13 Govern Crit Opr – Governing Criteria – Operating

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item indicates the governing stress (shear or moment) for the operating rating.

Procedure:

Select the governing stress from the dropdown list.

Coding:

M Moment Controls
S Shear Controls

IR14 AASHTO Man Yr - Year of AASHTO Manual Used in Determining Ratings

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item is used to record the year of the AASHTO Manual for Bridge Evaluation. Use year of "interim specifications" if it governs.

Procedure:

Enter the 4-digit year.

Note:
Current adopted AASHTO Manual for Bridge Evaluation (2011).

Example:
Year 2011 2011

IR15 AASHTO Spec Yr - Year of AASHTO Specifications Used in Determining Ratings

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item is used to record the year of the AASHTO Specifications. Use year of "interim specifications" if it governs.

Procedure:

Enter the 4-digit year.

Note:
Current adopted AASHTO Specification: LFD Bridge Design Specifications, 17th edition.

Example:
Year 2002 2002

IR16 Engineer

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item is used to record the name of the engineer who performed the load rating.

Procedure:

Enter the name of the rating engineer.

IR17 Rating Dataset

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item is used to record the name of the dataset utilized for the rating(s).

Procedure:

Enter the name of dataset used for the load rating.

IR18 Stress Range - Fatigue Stress Range

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item is used to record the stress range due to loading that controls the inventory fatigue rating.

Procedure:

Enter the stress range at inventory stress level due to the load type defined in Item IR09 as controlling the fatigue inventory rating.

Coding:

The live load stress range in kips per square inch to the nearest tenth.

IR19 Notes

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item is used to record notes about the load rating.

Procedure:

Enter notes about the assumptions used in the load rating in narrative form to assist inspectors on future inspections in determining if a load re-rating is necessary. These notes should include critical information such as controlling member identification and location as well as the limits of remaining section used in the rating for each vehicle.

IR20 IR Rating Factor – Inventory Rating Factor

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item is used to record the Inventory Rating Factor (IRF).

Procedure:

Determine the IRF in accordance with the current AASHTO Manual for Bridge Evaluation.

This field will only be editable if the coding of Item IR06 is 8, D, E, or F. Furthermore, rating factors should only be used with the coding of PHL93 loadings in Item IR04. For all other coding values for Item IR04, a tonnage shall be entered in Item IR10.

If the bridge is closed and/or will not carry live load, code Item IR04 a “9” and code "0" for Item IR20. The use or presence of a temporary bridge requires special consideration in coding. In such cases, since there is no permanent bridge, code Item IR04 a “9” and code "0" for Item IR20 even though the temporary structure is rated for as much as full legal load. This will also apply to a temporary runaround condition. The temporary condition is to be identified in Item 5E03.

A bridge shored up, repaired on a temporary basis, or one on which one or more lanes are barricaded to keep the bridge open is considered a temporary bridge condition and should be coded as if the temporary shoring or temporary width restriction were not in place.

Coding:

Input the rating factor to two (2) decimal places.

For coding examples, see IR EXAMPLES after Item IR21.

IR21 OR Rating Factor – Operating Rating Factor

Inspection > Load Ratings > Load Ratings Detail; BMS3: Load Ratings

Description:

This item is used to record the Operating Rating Factor (ORF).

Procedure:

Determine the ORF in accordance with the current AASHTO Manual for Bridge Evaluation.

This field will only be editable if the coding of Item IR06 is 8, D, E, or F. Furthermore, rating factors should only be used with the coding of PHL93 loadings in Item IR04. For all other coding values for Item IR04, a tonnage shall be entered in Item IR11.

If the bridge is closed and/or will not carry live load, code Item IR04 a "9" and code "0" for Item IR21. The use or presence of a temporary bridge requires special consideration in coding. In such cases, since there is no permanent bridge, code Item IR04 a "9" and code "0" for Item IR21 even though the temporary structure is rated for as much as full legal load. This will also apply to a temporary runaround condition. The temporary condition is to be identified in Item 5E03.

A bridge shored up, repaired on a temporary basis, or one on which one or more lanes are barricaded to keep the bridge open is considered a temporary bridge condition and should be coded as if the temporary shoring or temporary width restriction were not in place.

Coding:

Input the rating factor to two (2) decimal places.

For coding examples, see IR EXAMPLES after Item IR21.

IR22 – Legal Load Rating Factor

SNBI Field B.EP.02

Inspection > Load Rating Detail; BMS3: Load Ratings

Description:

This item displays the operating rating factor for the posting vehicles in Pennsylvania (H20, HS20, ML80, & TK527).

Procedure:

This item will be **automatically populated by the system** when Item IR04 is coded is 0 – TK527, 1 – H20, 2 – HS20, 8 – ML80, A – One Truck (H20), B – One Truck (HS20) or C – One Truck (ML80). For other vehicles, this value is not calculated.

Coding:

IR11 value divided by the vehicle weight OR IR21 value.

Vehicle weights are as follows:

H20	20 Tons
HS20	36 Tons
ML80	36.64 Tons
TK527	40 Tons

IR23 – Vehicle Posting Value

SNBI Field B.EP.02
Inspection > Load Rating Detail; BMS3: Load Ratings

Description:

This item displays the posting value for the posting vehicles in Pennsylvania (H20, HS20, ML80, & TK527).

Procedure:

This item will be **automatically populated by the system** when Item VP02 is set to a value of P – Posted and Item IR04 is coded is 0 – TK527, 1 – H20, 2 – HS20, 8 – ML80, A – One Truck (H20), B – One Truck (HS20) or C – One Truck (ML80). When the bridge is not posted and for other vehicles not listed above, this value is not calculated.

Coding:

When IR04 = 0, 1, 8, A, or C	Set equal to value of VP04
When IR04 = 2 or B	Set equal to value of VP05 when value is >0

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IR EXAMPLES:

Example 1: Bridge built in 2011 with plans, sealed by a professional engineer, indicating the design load is PHL-93. No changes to the loading conditions or the structure condition have occurred that would reduce the inventory rating below the design load level.

Controlling Design Rating Factors from the original sealed design plans:

	H20	HS20	ML-80	TK-527	PHL-93
IR	1.39	1.19	1.07	1.02	1.04
OR	2.32	1.98	1.78	1.70	1.73

Controlling Rating Tons from sealed load rating analysis:

	H20	HS20	ML-80	TK-527
IR	28	43	39	42
OR	48	72	66	70

Note: Based on this information, this will be an assigned load rating utilizing the existing design.

Method 1 – BMS2 coding when assigning all vehicles from existing design:
Item 4B01 Design Load: P – PHL-93

IR04 Load Type	IR05 NBI	IR06 Load Rating Method	IR10 IR	IR11 OR	IR20 IR RF	IR21 OR RF
D - PHL-93	1 - NBI Rating	F - Assigned LRFD RF	Blank	Blank	1.04	1.73
1 - H Loading	0 - Not an NBI Rating	C - Assigned LRFD Tons	27	46	Blank	Blank
2 - HS Loading	0 - Not an NBI Rating	C - Assigned LRFD Tons	42	71	Blank	Blank
8 - ML80	0 - Not an NBI Rating	C - Assigned LRFD Tons	39	65	Blank	Blank
0 - TK527	0 - Not an NBI Rating	C - Assigned LRFD Tons	40	68	Blank	Blank

Method 2 – BMS2 coding when assigning only the PHL-93 vehicle from existing design:
Item 4B01 Design Load: P – PHL-93

IR04 Load Type	IR05 NBI	IR06 Load Rating Method	IR10 IR	IR11 OR	IR20 IR RF	IR21 OR RF
D - PHL-93	1 - NBI Rating	F - Assigned LRFD RF	Blank	Blank	1.04	1.73
1 - H Loading	0 - Not an NBI Rating	2 – Load Factor Method	28	48	Blank	Blank
2 - HS Loading	0 - Not an NBI Rating	2 – Load Factor Method	43	72	Blank	Blank
8 - ML80	0 - Not an NBI Rating	2 – Load Factor Method	39	66	Blank	Blank
0 - TK527	0 - Not an NBI Rating	2 – Load Factor Method	42	70	Blank	Blank

Example 2: Bridge built in 2006 with plans, sealed by a professional engineer, indicating the design load is PHL-93. No changes to the loading conditions or the structure condition have occurred that could reduce the inventory rating below the design load level.

Controlling Design Rating Factors from the original sealed design plans:

	H20	HS20	ML-80	TK-527	PHL-93
IR	1.39	1.19	1.07	1.02	1.04
OR	2.32	1.98	1.78	1.70	1.73

Controlling Rating Tons from sealed load rating analysis:

	H20	HS20	ML-80	TK-527
IR	28	43	39	42
OR	48	72	66	70

Note: Based on this information, this can be an assigned load rating utilizing the existing design. In addition, a load factor method rating can be utilized as the current load rating set with HS20 as the NBI rating.

Method 1 – BMS2 coding when assigning all vehicles from existing design:
Item 4B01 Design Load: P – PHL-93

IR04 Load Type	IR05 NBI	IR06 Load Rating Method	IR10 IR	IR11 OR	IR20 IR RF	IR21 OR RF
D - PHL-93	1 - NBI Rating	F - Assigned LRFD RF	Blank	Blank	1.04	1.73
1 - H Loading	0 - Not an NBI Rating	C - Assigned LRFD Tons	27	46	Blank	Blank
2 - HS Loading	0 - Not an NBI Rating	C - Assigned LRFD Tons	42	71	Blank	Blank
8 - ML80	0 - Not an NBI Rating	C - Assigned LRFD Tons	39	65	Blank	Blank
0 - TK527	0 - Not an NBI Rating	C - Assigned LRFD Tons	40	68	Blank	Blank

Method 2 – BMS2 coding when assigning only the PHL-93 vehicle from existing design:
Item 4B01 Design Load: P – PHL-93

IR04 Load Type	IR05 NBI	IR06 Load Rating Method	IR10 IR	IR11 OR	IR20 IR RF	IR21 OR RF
D - PHL-93	1 - NBI Rating	F - Assigned LRFD RF	Blank	Blank	1.04	1.73
1 - H Loading	0 - Not an NBI Rating	2 – Load Factor Method	28	48	Blank	Blank
2 - HS Loading	0 - Not an NBI Rating	2 – Load Factor Method	43	72	Blank	Blank
8 - ML80	0 - Not an NBI Rating	2 – Load Factor Method	39	66	Blank	Blank
0 - TK527	0 - Not an NBI Rating	2 – Load Factor Method	42	70	Blank	Blank

Method 3 – BMS2 coding when utilizing the load factor method rating:
Item 4B01 Design Load: P – PHL-93

IR04 Load Type	IR05 NBI	IR06 Load Rating Method	IR10 IR	IR11 OR	IR20 IR RF	IR21 OR RF
1 - H Loading	0 - Not an NBI Rating	2 – Load Factor Method	28	48	Blank	Blank
2 - HS Loading	1 - NBI Rating	2 – Load Factor Method	43	72	Blank	Blank
8 - ML80	0 - Not an NBI Rating	2 – Load Factor Method	39	66	Blank	Blank
0 - TK527	0 - Not an NBI Rating	2 – Load Factor Method	42	70	Blank	Blank

Example 3: Bridge built in 2006 with plans, sealed by a professional engineer, indicating the design load is HS20. No changes to the loading conditions or the structure condition have occurred that could reduce the inventory rating below the design load level.

Controlling Design Rating Factors from the original sealed design plans:

	H20	HS20	ML-80	TK-527
IR	1.39	1.19	1.07	1.02
OR	2.32	1.98	1.78	1.70

Controlling Rating Tons from sealed load rating analysis:

	H20	HS20	ML-80	TK-527
IR	28	43	39	42
OR	48	72	66	70

Note: Based on this information, this can be an assigned load rating utilizing the existing design. In addition, a load factor method rating can be utilized as the current load rating set with HS20 as the NBI rating.

Method 1 – BMS2 coding when utilizing the existing design:
Item 4B01 Design Load: 5 – HS20

IR04 Load Type	IR05 NBI	IR06 Load Rating Method	IR10 IR	IR11 OR	IR20 IR RF	IR21 OR RF
1 - H Loading	0 - Not an NBI Rating	A - Assigned LFD Tons	27	46	Blank	Blank
2 - HS Loading	1 - NBI Rating	A - Assigned LFD Tons	42	71	Blank	Blank
8 - ML80	0 - Not an NBI Rating	A - Assigned LFD Tons	39	65	Blank	Blank
0 - TK527	0 - Not an NBI Rating	A - Assigned LFD Tons	40	68	Blank	Blank

Method 2 – BMS2 coding when utilizing the load factor method rating:
Item 4B01 Design Load: 5 – HS20

IR04 Load Type	IR05 NBI	IR06 Load Rating Method	IR10 IR	IR11 OR	IR20 IR RF	IR21 OR RF
1 - H Loading	0 - Not an NBI Rating	2 – Load Factor Method	28	48	Blank	Blank
2 - HS Loading	1 - NBI Rating	2 – Load Factor Method	43	72	Blank	Blank
8 - ML80	0 - Not an NBI Rating	2 – Load Factor Method	39	66	Blank	Blank
0 - TK527	0 - Not an NBI Rating	2 – Load Factor Method	42	70	Blank	Blank

Example 4: Bridge built in 2000 with plans, sealed by a professional engineer, indicating the design load is PHL-93. The bridge was re-rated using load factor method in 2017 to reflect changes observed, which reduced the load carrying capacity.

Controlling Rating Tons from sealed load rating analysis:

	H20	HS20	ML-80	TK-527
IR	24	37	28	38
OR	41	63	48	64

Note: Based on this information, this will not be an assigned load rating and must be based on the load factor method rating.

Proper BMS2 coding:
Item 4B01 Design Load: P – PHL-93

IR04 Load Type	IR05 NBI	IR06 Load Rating Method	IR10 IR	IR11 OR	IR20 IR RF	IR21 OR RF
1 - H Loading	0 - Not an NBI Rating	2 – Load Factor Method	24	41	Blank	Blank
2 - HS Loading	1 - NBI Rating	2 – Load Factor Method	37	63	Blank	Blank
8 - ML80	0 - Not an NBI Rating	2 – Load Factor Method	28	48	Blank	Blank
0 - TK527	0 - Not an NBI Rating	2 – Load Factor Method	38	64	Blank	Blank

Example 5: Bridge built in 1961 and designed by LFD for HS20 loading. The superstructure was replaced in 2014 and plans are available, sealed by a professional engineer, indicating the design load is PHL-93. No changes to the loading conditions or the structure condition have occurred since the superstructure replacement that could reduce the inventory rating below the design load level.

Controlling Design Rating Factors from the sealed superstructure replacement design plans:

	H20	HS20	ML-80	TK-527	PHL-93
IR	1.39	1.19	1.07	1.02	1.04
OR	2.32	1.98	1.78	1.70	1.73

Controlling Rating Tons from sealed load rating analysis:

	H20	HS20	ML-80	TK-527
IR	28	43	39	42
OR	48	72	66	70

Note: Based on this information, this can be an assigned load rating utilizing the superstructure replacement design. In addition, a load factor method rating can be utilized as the current load rating set with HS20 as the NBI vehicle.

Method 1 – BMS2 coding when utilizing the superstructure replacement design and assigning all vehicles from the design:
Item 4B01 Design Load: P – PHL-93

IR04 Load Type	IR05 NBI	IR06 Load Rating Method	IR10 IR	IR11 OR	IR20 IR RF	IR21 OR RF
D - PHL-93	1 - NBI Rating	F - Assigned LRFD RF	Blank	Blank	1.04	1.73
1 - H Loading	0 - Not an NBI Rating	C - Assigned LRFD Tons	27	46	Blank	Blank
2 - HS Loading	0 - Not an NBI Rating	C - Assigned LRFD Tons	42	71	Blank	Blank
8 - ML80	0 - Not an NBI Rating	C - Assigned LRFD Tons	39	65	Blank	Blank
0 - TK527	0 - Not an NBI Rating	C - Assigned LRFD Tons	40	68	Blank	Blank

Method 2 – BMS2 coding when assigning only the PHL-93 vehicle from existing design:
Item 4B01 Design Load: P – PHL-93

IR04 Load Type	IR05 NBI	IR06 Load Rating Method	IR10 IR	IR11 OR	IR20 IR RF	IR21 OR RF
D - PHL-93	1 - NBI Rating	F - Assigned LRFD RF	Blank	Blank	1.04	1.73
1 - H Loading	0 - Not an NBI Rating	2 - Load Factor Method	28	48	Blank	Blank
2 - HS Loading	0 - Not an NBI Rating	2 - Load Factor Method	43	72	Blank	Blank
8 - ML80	0 - Not an NBI Rating	2 - Load Factor Method	39	66	Blank	Blank
0 - TK527	0 - Not an NBI Rating	2 - Load Factor Method	42	70	Blank	Blank

Method 3 – BMS2 coding when utilizing the load factor method rating:
Item 4B01 Design Load: P – PHL-93

IR04 Load Type	IR05 NBI	IR06 Load Rating Method	IR10 IR	IR11 OR	IR20 IR RF	IR21 OR RF
1 - H Loading	0 - Not an NBI Rating	2 – Load Factor Method	28	48	Blank	Blank
2 - HS Loading	1 - NBI Rating	2 – Load Factor Method	43	72	Blank	Blank
8 - ML80	0 - Not an NBI Rating	2 – Load Factor Method	39	66	Blank	Blank
0 - TK527	0 - Not an NBI Rating	2 – Load Factor Method	42	70	Blank	Blank

Example 6: Bridge built in 2011 with plans, sealed by a professional engineer, indicating the design load is PHL-93. The bridge was impacted in 2019 by a vehicle and sustained damage which has reduced the inventory rating below the design load level.

Controlling Rating Factors from the sealed LRFD load rating analysis:

	H20	HS20	ML-80	TK-527	PHL-93
IR	1.11	0.85	0.85	0.81	0.83
OR	1.85	1.58	1.42	1.36	1.38

Note: Based on this information, this will not be an assigned load rating and must be based on the LRFD rating.

Proper BMS2 coding:
Item 4B01 Design Load: P – PHL-93

IR04 Load Type	IR05 NBI	IR06 Load Rating Method	IR10 IR	IR11 OR	IR20 IR RF	IR21 OR RF
D - PHL-93	1 - NBI Rating	6 - Load and Resistance Factor Method	Blank	Blank	0.83	1.38
1 - H Loading	0 - Not an NBI Rating	6 - Load and Resistance Factor Method	22	37	Blank	Blank
2 - HS Loading	0 - Not an NBI Rating	6 - Load and Resistance Factor Method	30	56	Blank	Blank
8 - ML80	0 - Not an NBI Rating	6 - Load and Resistance Factor Method	30	51	Blank	Blank
0 - TK527	0 - Not an NBI Rating	6 - Load and Resistance Factor Method	32	54	Blank	Blank

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IT Inspection – Load Rating

Tunnels

The Inspection – Load Rating - Tunnels Section allows users to view and/or edit information related to load rating and restrictions of tunnels. The Tunnel Load Rating Screen is listed below Inspection Links. The field names below are taken directly from the Specification for the National Tunnel Inventory (SNTI). The description, procedure, and coding are provided in SNTI.

Load Rating Items:

L.1 – Load Rating Method
Inspection > Load Ratings; BMS3: Load Rating

L.2 – Inventory Load Rating Factor
Inspection > Load Ratings; BMS3: Load Rating

L.3 – Operating Load Rating Factor
Inspection > Load Ratings; BMS3: Load Rating

L.4 – Tunnel Load Posting Status
Inspection > Load Ratings; BMS3: Load Rating

L.5 – Posting Load – Gross
Inspection > Load Ratings; BMS3: Load Rating

L.6 – Posting Load – Axle
Inspection > Load Ratings; BMS3: Load Rating

L.7 – Posting Load – Type 3
Inspection > Load Ratings; BMS3: Load Rating

L.8 – Posting Load – Type 3S2
Inspection > Load Ratings; BMS3: Load Rating

L.9 – Posting Load – Type 3-3
Inspection > Load Ratings; BMS3: Load Rating

L.10 – Height Restriction
Inspection > Load Ratings; BMS3: Load Rating

L.11 – Hazardous Material Restriction
Inspection > Load Ratings; BMS3: Load Rating

L.12 – Other Restrictions
Inspection > Load Ratings; BMS3: Load Rating

Items listed in a greyed box do not require input from the user. The fields are automatically populated by the system, if applicable. Refer to Appendix D for the BMS2 to SNTI conversion.

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IF Inspection – Non-Redundant Steel Tension Member/Fatigue

The Inspection – Non-Redundant Steel Tension Member (NSTM)/Fatigue Section captures and displays information about NSTM's and fatigue details for structures. The NSTM/Fatigue Screen is listed under Inspection Link. At the top of the screen is the Select Inspection section. It allows users to choose a specific structure inspection. The Create button is used to create new NSTM/Fatigue Detail records (green plus sign). The Remove button is used to remove NSTM/Fatigue Detail records. The user is prompted for confirmation before any record is removed. The Save button saves pending changes on the screen to the database.

NSTM's and/or Fatigue Details should be entered on a per span basis on the member type (IF02) and detail (IF04). Within the span, if the detail exists on multiple members (IF02) with the same detail (IF04) and fatigue category (IF05), the records can be combined with the location within the span being detailed in IF03 - Member Description. If one of those items deviates (IF02, IF04, IF05), a new record must be added per span. The inspection procedures (IF10) should cover inspection procedures for all members contained within the NSTM/Fatigue Detail record. At a minimum, all D, E and E' details should be entered. Otherwise, enter the controlling detail for the NSTM.

IF01 Location – Location of NSTM or Fatigue Detail

Inspection > NSTM/Fatigue > Detail; BMS3: NSTM/Fatigue & Substructure

Description:

This item is used to record the location of the NSTM or fatigue detail.

Procedure:

Select the structure unit where the NSTM or fatigue detail is located. The number of structure units will vary for each bridge depending on the number of spans. The available structure units to select from will be automatically populated based on the information from the Inventory – Structure Units Section (5D).

Coding:

Select the structure unit where the NSTM or fatigue detail is located.

Examples:

The NSTM detail is located in Span 1:	1 / Type=M
The fatigue detail is located on Pier 2:	P02 / Type=P

IF02 Member Type – NSTM or Fatigue Member Type

Inspection > NSTM/Fatigue > Detail; BMS3: NSTM/Fatigue & Substructure

Description:

This item indicates the NSTM or fatigue member type.

Procedure:

Select the type of NSTM or fatigue member from the dropdown list.

Coding:

01	Girder / Beam	08	Cross Girder	15	Catcher Beam
02	Suspended Hanger Assembly	09	Steel Pier	16	Other Retrofit
03	Truss – Bottom Chord	10	Tension Member	17	Other Pin
04	Truss – Diagonal	11	Floorbeam	18	Other Steel Box
05	Truss – Top Chord	12	Stringer	19	Segmental Concrete Box
06	Tied Arch	13	Gusset Plate	20	Movable Span
07	Cable	14	Pin and Hanger	21	Other Area

IF03 Member – NSTM or Fatigue Member Description

Inspection > NSTM/Fatigue > Detail; BMS3: NSTM/Fatigue & Substructure

Description:

This 255-character item is used to record the description of the member containing the NSTM or fatigue detail.

Procedure:

Enter the member identified in Items IF01 and IF02.

Coding:

Enter the description of the member that contains the NSTM or fatigue detail.

Examples:

The NSTM is the bottom chord of a single span through truss, member L_3L_4: L3L4

The NSTM is the upstream welded plate girder of a two-girder bridge: US GR TENSION ZONE

IF04 Member Detail – NSTM or Fatigue Detail

Inspection > NSTM/Fatigue > Detail; BMS3: NSTM/Fatigue & Substructure

Description:

This 50-character field is used to record the NSTM/Fatigue member's detail.

Procedure:

Enter the NSTM/Fatigue detail identified in Items IF01 and IF03.

Coding:

Enter the detail that contains the NSTM or fatigue detail.

The following codings were used for intersecting welds in BMS and may still be used at the District's discretion:

BMS Coding	Description
WEB/W_BRACE_CON	Girder web and wind bracing connection
WEB/FB_CONN	Girder web and Floorbeam connection
LONG/TRAN_STIFF	Intersection of longitudinal and transverse stiffeners
FLANGE/FB_CONN	Girder flange and Floorbeam connection
FL/W BRACE_CON	Flange and Wind Bracing Connection
T_STIFF /NO_COPE	Girder Web to Stiffener intersection
MISC	Other Details

Examples:

The fatigue detail is a welded lateral bracing connection plate: WELDED GUS PL

The NSTM detail is midspan at a weld toe termination of a longitudinal stiffener: WELD LG STIFF

IF05 Fatigue Stress Cat – Fatigue Stress Category of the NSTM or Fatigue Detail

Inspection > NSTM/Fatigue > Detail; BMS3: NSTM/Fatigue & Substructure

Description:

This item is used to record the fatigue category of the NSTM/Fatigue detail.

Procedure:

Select the AASHTO fatigue stress category of the identified NSTM/Fatigue detail from the dropdown list.

Coding:

A through E' Category as determined from Table 10.3.1B in Chapter 10 of the current AASHTO Standard Specification for Highway Bridges.

A
B
B'
C
C′
D
E
E'
N – Not Applicable

Note: For intersecting weld detail, Code E or E′.

IF06 Member Detail Condition – NSTM/Fatigue Member Detail Condition

Inspection > NSTM/Fatigue > Detail; BMS3: NSTM/Fatigue & Substructure

Description:

This item is used to record the NSTM/Fatigue member's detail condition.

Procedure:

Enter the NSTM/Fatigue detail condition identified in Items IF01, IF03, and IF04.

Coding:

Enter the condition of the detail that is a NSTM or is fatigue prone.

Note:
Concise narrative is required.

Examples:
The NSTM detail is a transverse web gusset plate: NO VISIBLE CRACKS

The fatigue detail is a transverse web gusset plate: NO VISIBLE CRACKS, ULTRASONIC USED

IF07 Fatigue Details – Are E or E′ Details Present?

SNBI Field B.IR.02

Inspection > Fracture Critical; BMS3: NSTM/Fatigue

Description:

This item is used to report whether the bridge has AASHTO fatigue category E or E′ details. Fatigue details E and E′ should be entered on the Fracture Critical screen, regardless if the bridge is categorized as Fracture Critical (6A44 < 5).

Procedure:

This item is **automatically filled in by the system** based on information entered in IF05 for each fatigue detail listed on the Fracture Critical screen.

Coding:

N No E/E′ Details Present
Y E/E′ Details are Present

IF08 NSTM's? – Are NSTM's present on the bridge?

Inspection > NSTM/Fatigue; BMS3: NSTM/Fatigue

Description:

This item is used to identify if the structure contains NSTM's. This field is evaluated at the "structure" level. Previously, this information was identified by the coding in Item 6A44.

Procedure:

This item is **automatically filled in by the system** based on information entered in IF09 for each detail listed on the NSTM/Fatigue page. If any IF09 value is set to "Y – NSTM and not Complex" or "B – NSTM and Complex," this field will be coded as "Y – NSTM's are Present". If all IF09 values are coded as "N – Not an NSTM", "C – Non-NSTM and Complex" or there are no details listed on the NSTM/Fatigue page, this field will be set to "N – No NSTM's Present."

Coding:

N No NSTM's Present
Y NSTM's are Present

IF09 Detail Indicator

Inspection > NSTM/Fatigue > Detail; BMS3: NSTM/Fatigue

Description:

This item is used to identify if the detail recorded on the NSTM/Fatigue page is a NSTM and/or Complex Feature or does the detail exist on an NSTM. This field is required for all NSTM/Fatigue details.

Procedure:

For each individual detail listed on the NSTM/Fatigue page, this field is used to identify if the detail itself is a NSTM, is a Complex Feature or if the detail is present on an NSTM. When the detail is initially created, this value will default to "Y – NSTM and not Complex" and should be adjusted as needed.

Coding:

B NSTM and Complex
C Non-NSTM and Complex
N Non-NSTM and not Complex
Y NSTM and not Complex

Non-redundant steel tension members include but are not limited to the following:

Structure Type	NSTM/Component/Detail
One Girder Bridge	Entire Girder, Tension Zone
Two Girder Bridge – Simple Span	Girder Tension Zone
Two Girder Bridge – Suspended Span	Suspended Hanger Assembly and Girder Tension Zone
Two Girder Bridge - Continuous	Girder Tension Zone
Truss Bridge – Simple Span	Tension Member (including Eye Bar if two (2) or less)
Truss Bridge – Suspended Span	Suspended Hanger Assembly, Tension Members and Certain Diagonals
Truss Bridge – Continuous	Tension Member (including Eye Bar if two (2) or less)
Tied Arch	Tension Tie
Cross-Girder Pier Cap	Tension Zone
Suspension Bridge	Eye Bar (2 or less) Chain or Cables
Rigid Frame Steel Pier	Tension Zone
Three Girder Bridge – Simple Span*	Girder Tension Zone
Three Girder Bridge – Suspended Span*	Suspended Hanger Assembly and Girder Tension Zone
Three Girder Bridge – Continuous Span*	Girder Tension Zone
Floorbeams (regardless of spacing)	Tension Zone

* Three girder bridges are deemed to be an NSTM unless proven by analysis to be redundant. The analysis should take into consideration the geometric properties of the bridge to determine if system redundancy exists. Before starting the analysis, consult with PennDOT's Bureau of Bridge on the analysis approach for concurrence.

IF10 Member Inspection Procedures

Inspection > NSTM/Fatigue > Detail; BMS3: NSTM/Fatigue

Description:

This item is used to record the inspection procedures for each individual detail listed for the structure within BMS. This field provides a permanent home for the inspection procedures that are also listed on the Fatigue and Fracture Plan. This field is required for all details.

Procedure:

Enter the inspection procedures for the detail listed on the NSTM/Fatigue page. These procedures should provide the following information specific to the individual detail record:

1. Guidance to the inspectors on what to look for
2. Special access requirements/needs*
3. Special inspection equipment needs
4. Any other pertinent information

* General inspection access equipment required (i.e. snooper, man-lift, etc.) at the bridge level should be covered on the F & F Plan cover sheet (Appendix IP-02H) and Inspection Planning screen of BMS2.

Coding Examples:

Inspect the tack welds along the edges of the gusset plate and document section loss. Use a dye penetrant kit if crack propagation is suspected.

Inspect the entire length of the floorbeams. Rigging is required for FB# 8 in each span.

Inspect entire length of truss bottom chord, including rolled steel shapes and riveted connections. Document any pack rust and section loss to the base steel and bolts. Due to the steel section loss in the tension members, fatigue stress category changes to an E (originally D).

Inspect the entire length of the cross-girder, including welds inside and outside of the cross-girder. Access to the inside of the cross-girder requires a right-of-entry from Norfolk Southern and entering via a man-hole cover with 3/8" bolts securing the door to the member. Personal lighting device required for visibility within the cross-girder.

B.IR.04 Complex Feature

Inspection > NSTM/Fatigue > Detail; BMS3: NSTM/Fatigue

Description:

This item is used to identify if the detail recorded on the NSTM/Fatigue page is a Complex Feature.

Procedure:

This item is **automatically filled in by the system** based on information entered in IF09 for each detail listed on the NSTM/Fatigue page. If any IF09 value is set to "B – NSTM and Complex" or "C – Non-NSTM and Complex," this field will be coded as "Y – Complex Feature Exists". If all IF09 values are coded as "N – Non-NSTM and not Complex", "Y – NSTM and not Complex" or there are no details listed on the NSTM/Fatigue page, this field will be set to "N – No Complex Features."

Coding:

N	No Complex Features
Y	Complex Features Exists

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IU Inspection - Underwater
Observed Scour Assessment (OSA) Tab

The Inspection - Underwater Scour - OSA Section is used to view and edit SAR calculation data and information regarding current and potential scour countermeasures. It also provides the capability to automatically calculate the OSA (Observed Scour Assessment) and SAR (Scour Assessment Rating) for the entire structure.

IU00a (Not Used – Reserved for Future Use)

IU00b (Not Used – Reserved for Future Use)

IU01 (Not Used – Reserved for Future Use)

IU02 Num Units – Number of Units Inspected with Divers

Inspection > Underwater; BMS3: Underwater

Description:

This item is used to record the number of units of the bridge that received an underwater (with divers) inspection. A unit would consist of a pier, abutment, and/or culvert.

Procedure:

Record the number of piers, abutments, or culverts that received an underwater (with divers) inspection.

Coding:

Enter the number of piers, abutments, and/or culverts that were inspected with divers.

Example:
A bridge with 10 piers was inspected. Five of the piers were inspected by divers: 5

IU03 SCBI Source

Inspection > Underwater; BMS3: Underwater

Description:

This item indicates the method used to determine the SCBI for the structure.

Procedure:

Select the method from the dropdown list that indicates the method used to determine the appropriate Scour Critical Bridge Indicator (SCBI) code for the structure. Only one of the two options can be chosen at a time for a specific structure.

Coding:

C Computed/H&H Analysis - The bridge foundations or scour measures have been designed to resist failure due to scour as determined by the calculated results of a formal Hydrologic and Hydraulic (H & H) Analysis. **Therefore, the appropriate SCBI code has been pre-determined based on this knowledge and the SCBI Scour Calculator should not be used for this bridge although it should be run to support the assessed conditions.**

O Observed - The bridge foundations or scour countermeasures have not been designed to resist failure due to scour; therefore, the SCBI code has been determined based on observed field conditions and the SCBI/SAR Scour Calculator.

Note: When Item IU03 = C, the bridge is still required to have an observed scour assessment and the scour calculator should be run. If Item IU04 is determined to be 5 or below, the inspector should review the SC inputs and determine if Item IU03 coding should be changed from "C" to "O" to reflect SC input changes from the designed condition determined through an H&H Analysis.

IU04 Overall SCBI - Observed Scour Assessment (OSA)

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This display only item indicates the Observed Scour Assessment (OSA) based on the current inspection data.

Procedure:

This field is **automatically calculated by the system** when the "Calculate" button is clicked. The calculator should be run during each inspection if IN fields changed. If IU04b is checked this field will automatically update each time scour data is changed on the Underwater subunit screen.

Coding:

Observed Scour Assessment. IU04 is the controlling value from the Item IU27 values of the substructure units for the bridge. The order of return for this field is 6, 1, 2, 3, 4, 7, 5, 8. A 7 is retuned before a 5 because a 7 is a previously scour critical bridge where countermeasures have been installed to repair a scour issue.

The Scour Critical Bridge Indicator (Item 4A08) should be set equal to Item IU04.

IU04b Calculate Indicator – Was the Scour Calculator run for this Inspection?

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This display only item indicates if the scour calculator button was clicked for the specific inspection record.

Procedure:

This field is **automatically calculated by the system** when the "Calculate" button is clicked.

Coding:

Checked	SCBI Calculator was run for this inspection record
Unchecked	SCBI Calculator was not run for this inspection record

IU05 (Not Use – Reserved for Future Use)

IU06 Stream Bed Material

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This two-part item correlates the stream bed material (native or paved) under the bridge with respect to its potential for general scour. The stream bed material is to be evaluated and coded in relation to its general ability to withstand degradation due to scour.

Procedure:

1st field: select the predominant type of stream bed material under the bridge from the dropdown list.

2nd field: select the 2nd most common type of streambed material from the dropdown list. The 2nd field is typically only utilized for wide channels and the streambed is different or if the distance between substructure units is greater than 150' apart.

The coding of this field, as well as Item IN15 consists of two components, the amount of scour present and the description of the material. Carefully read the scour description **AND** the material description. If there are two possibilities of stream material, then pick the one that best describes the **scour** description. Within each coding below, the scour description is provided first, and the material examples are provided in parenthesis.

Note: For rock streambeds, or those with paving or countermeasures that are fully or partially overlaid with alluvium, the rock, paving, or countermeasure is to be coded in the 1st field.

Coding:

Scour Measures – Designed Scour Protection

D9 Designed Scour Measures that were installed in accordance with design plans and/or an H&H report for the given structure. If the scour measures differ from documentation in plans or an H&H report, the streambed should be coded to reflect the conditions at the bridge and no longer "D9". For bridges with a D9 coding, the SCBI Source will likely be coded as "C-Computed". When measures are installed to correct a previous scour issue and are not designed, the streambed material should be coded as C7 or C8 as described below.

Countermeasures-Non-designed scour protection (used to correct a previous scour issue):

C8 Streambed paved in good condition and adequate to resist scour (concrete, stone masonry, gabion blankets, or grout bags).

C7 Streambed paved, however, minor problems exist. Scour protection is adequate. Refer to Publication 15M (DM-4), Chapter 7, and Publication 408, Section 850, for the required minimum size of rip-rap to qualify as a countermeasure (concrete gabions, grout bags, or rip-rap in good condition).

The coding of C8 and C7 should be reserved for substructure units where a previous scour issue has been corrected with the placement of a countermeasure. FHWA considers countermeasures as a corrective action. Bridges with countermeasures require a Plan of Action and are considered to be Scour Critical Category D.

Bedrock Streambeds (not riprap) (refer to DM-4, Chapter 7, for additional guidance on types of bedrock):

R9 Minor scour may be present near substructure, but the chance of undermining is remote. Minor scour holes may exist away from the substructure units. Minor faulting or weathering may be present (Non-erodible rock).

R8 Minor scour may exist, but undermining is not present. Scour holes may exist away from the substructure units. Rock may be faulted, weathered and/or soft (Erodible rock).

R7 Moderate scour is present and is adjacent to substructures. However, there is little risk that scour could cause structure instability during high flows. Moderate weathering and/or faulting may be present (Erodible rock).

R4 Moderate or serious scour that could advance and threaten substructures during high flows. Rock is highly –weathered, faulted, and/or soft (Highly erodible rock).

Alluvium Streambeds (Note: Low channel slope and low flood flow velocity may allow a sandy or gravelly streambed to remain stable and should be coded accordingly):
A6 Little to no potential for scour under high water flow conditions. Minor scour holes may exist mid-channel (Highly Stable Alluvium: large native cobbles and boulders (not riprap) with small amounts of fine material in voids.
A5 No moderate scour over a long time period. Potential for scour exists only under high water velocity. Scour holes may exist in mid-channel. Near substructures only minor scour may be present (Moderately Stable Alluvium: cobbles, boulders (not rip rap), and gravel with some fine material).
A4 Potential for scour during ordinary high water. Moderate scour may be present or has occurred in the past near the substructure units, but repair methods or materials do not protect the structure from future occurrences (Unstable Alluvium: mixture of fine particles with some larger aggregate).
A3 High scour potential at all water velocities. Serious scour (undermining) may be present or has occurred in the past at the substructure units but the repair methods or materials to correct past scour do not protect the structure from future occurrences (Highly Unstable Alluvium: very small particles, including clays, silts, and/or fine sands).

IU07 Stream Bed Material Desc - Stream Bed Material Description

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This item provides a description of the streambed material and/or countermeasure**.**

Procedure:

Enter description of the streambed and/or countermeasures identified in Item IU06 in narrative form.

IU08 (Not Used – Reserved for Future Use)

IU09 (Not Used – Reserved for Future Use)

IU10 (Not Used – Reserved for Future Use)

IU11 NAB Loc - Near Abutment Location

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This item is used to indicate whether the near abutment is located on the left or right side of the stream.

Procedure:

Select the appropriate location of the near abutment from the dropdown list. The left side of the stream is on the observer's left hand side as the observer stands on the bridge or in the stream facing downstream.

Coding:

1 Left, the near abutment is located on the left bank
2 Right, the near abutment is located on the right bank
N Not Applicable

IU12 FAB Loc - Far Abutment Location

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This item is used to indicate whether the far abutment is located on the left or right side of the stream.

Procedure:

Select the appropriate location of the far abutment from the dropdown list. The left side of the stream is on the observer's left hand side as the observer stands on the bridge or in the stream facing downstream.

Coding:

1 Left, the far abutment is located on the left bank
2 Right, the far abutment is located on the right bank
N Not Applicable

IU13 US Left WW Presence - Upstream Left Wingwall Presence

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This item indicates whether or not the upstream left wingwall is present.

Procedure:

Select "Yes" or "No" from the dropdown list to indicate whether the upstream left wingwall is present.

Coding:

0 No, the upstream left wingwall is not present
1 Yes, the upstream left wingwall is present
2 Not Necessary
N Not Applicable

IU14 Condition - Condition of Upstream Left Wingwall

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This item is used to indicate the condition of the upstream left wingwall, if present.

Procedure:

Select the code from the dropdown list that indicates the condition of the upstream left wingwall.

Coding:

1 Good – Wingwall has sufficient length, angle to flow and condition such that it provides adequate protection to the abutment.
2 Partial – Wingwall size, placement or condition is insufficient to provide adequate protection to the abutment.
3 Failed – Wingwall has evidence of movement or deterioration such that the wingwall is not providing adequate protection to the abutment, OR when the stream has significantly eroded behind the wingwall or there is significant loss of fill material from behind the wingwall.
N Not Applicable

IU15 US Right WW Presence - Upstream Right Wingwall Presence

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This item indicates whether or not the upstream right wingwall is present.

Procedure:

Select "Yes" or "No" from the dropdown list to indicate whether the upstream right wingwall is present.

Coding:

0 No, the upstream right wingwall is not present
1 Yes, the upstream right wingwall is present
2 Not Necessary
N Not Applicable

IU16 Condition - Condition of Upstream Right Wingwall

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This item is used to indicate the condition of the upstream right wingwall, if present.

Procedure:

Select the code from the dropdown list that indicates the condition of the upstream right wingwall.

Coding:

1 Good – Wingwall has sufficient length, angle to flow and condition such that it provides adequate protection to the abutment.
2 Partial – Wingwall size, placement or condition is insufficient to provide adequate protection to the abutment.
3 Failed – Wingwall has evidence of movement or deterioration such that the wingwall is not providing adequate protection to the abutment, OR when the stream has significantly eroded behind the wingwall or there is significant loss of fill material from behind the wingwall.
N Not Applicable

IU17 Horiz Debris Start - Horizontal Debris Blockage Start

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This item indicates the location along the span where the debris blockage starts, if present.

Procedure:

Enter the location along the span where the debris blockage starts in terms of percentage of span opening. The measurement is taken assuming the left abutment is the 0% point and the right abutment is the 100% point. The left abutment is on the observer's left hand side as the observer stands on the bridge or in the stream facing downstream. This field, along with Items IU18, IU19, and IU20 should be used to justify the coding of Item IN06.

Coding:

Location along the span where the debris blockage starts in terms of percentage of span opening, to the nearest percent. Use equivalent debris dimensions. See example in Figures 1 and 2 after Item IU20.

IU18 Horiz Debris End - Horizontal Debris Blockage End

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This item indicates the location along the span where the debris blockage ends, if present.

Procedure:

Enter the location along the span where the debris blockage ends in terms of percentage of span opening. The measurement is taken assuming the left abutment is the 0% point and the right abutment is the 100% point. The left abutment is on the observer's left hand side as the observer stands on the bridge or in the stream facing downstream. This field, along with Items IU17, IU19, and IU20 should be used to justify the coding of Item IN06.

Coding:

Location along the span where the debris blockage ends in terms of percentage of span opening, to the nearest percent. Use equivalent debris dimensions. See example in Figures 1 and 2 after Item IU20.

IU19 Vert Debris Start - Vertical Debris Blockage Start

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This item indicates the vertical location where the debris blockage starts, if present.

Procedure:

Enter the location where the debris blockage starts in terms of percentage of vertical clearance from the streambed. The measurement is taken assuming the streambed is the 0% point and the bottom beam is the 100% point. This field, along with Items IU17, IU18, and IU20 should be used to justify the coding of Item IN06.

Coding:

Location where the debris blockage starts in terms of percentage of vertical clearance from the streambed, to the nearest percent. Use equivalent debris dimensions. See example in Figures 1 and 2 after Item IU20.

IU20 Vert Debris End - Vertical Debris Blockage End

Inspection > Underwater > SCBI; BMS3: Underwater

Description:

This item indicates the vertical location where the debris blockage ends, if present.

Procedure:

Enter the location where the debris blockage ends in terms of percentage of vertical clearance from the streambed. The measurement is taken assuming the streambed is the 0% point and the bottom beam is the 100% point. This field, along with Items IU17, IU18, and IU19 should be used to justify the coding of Item IN06.

Coding:

Location where the debris blockage ends in terms of percentage of vertical clearance from the streambed, to the nearest percent. Use equivalent debris dimensions. See examples in Figures 1 and 2 after Item IU20.

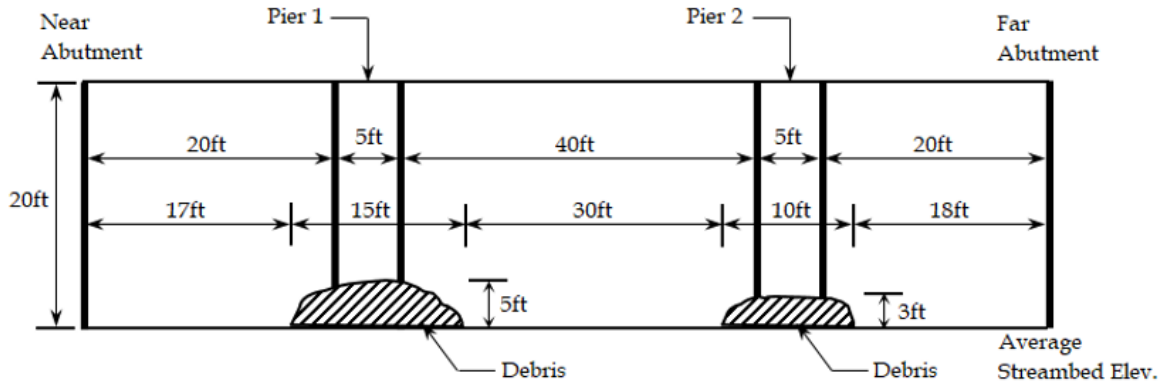

Figure 1 - Observed Debris

Total Opening Length = 20ft + 5ft + 40ft + 5ft + 20ft = **90ft**
Total Opening Height = **20ft**
Actual Debris Area = (5ft x 15ft) + (3ft x 10ft) = **105ft^2**
Modified Length of Blockage = 15ft + 30ft + 10ft = **55ft**
Equivalent Debris Height = 105ft^2 / 55ft = **1.9ft**

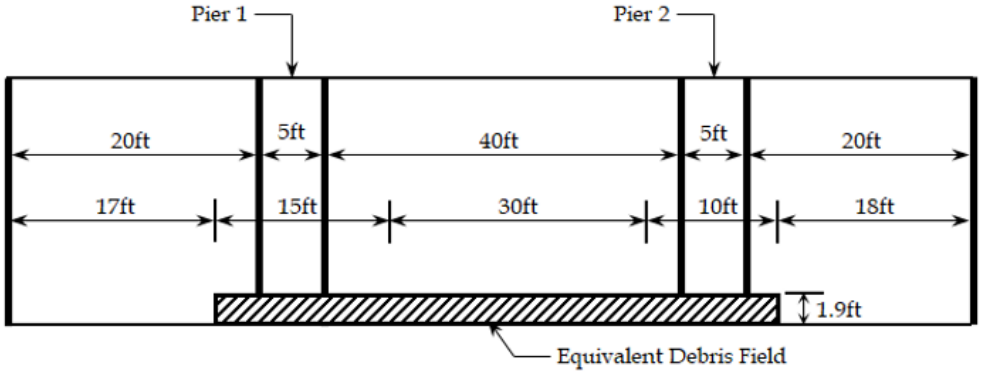

Figure 2 - Equivalent Debris

IU17 Horizontal Debris Blockage Start = 17ft / 90ft x 100% = **19%**
IU18 Horizontal Debris Blockage End = (17ft + 55ft) / 90ft x 100% = **80%**
IU19 Vertical Debris Blockage Start = **0%**
IU20 Vertical Debris Blockage End = (1.9ft / 20ft) x 100% = **10%**

IU21 Type - Current Scour Countermeasure Type

Inspection > Underwater > SCBI > Current Countermeasures Detail; BMS3: Underwater

Description:

This item indicates the type of scour measure(s) or countermeasure(s) currently in place at the structure, if any. Scour measures are designed to resist scour and countermeasures are installed to fix a previous scour issue and are not designed.

Procedure:

Select the type of measure or countermeasure currently in place from the dropdown list.

Coding:

0	None	3	Guidebanks
1	Riprap	4	Concrete Encasement
2	Gabions	5	Others

IU22 Location - Location of Current Scour Countermeasure

Inspection > Underwater > SCBI > Current Countermeasures Detail; BMS3: Underwater

Description:

This item is used to record the location where the current scour measure or countermeasure has been placed.

Procedure:

Select the location where the current scour measure or countermeasure has been placed from the dropdown list.

Coding:

1	Upstream left wingwall (USLWW)	6	Far Abutment (FAB)
2	Upstream right wingwall (USRWW)	7	Left Bank (LB)
3	Near Abutment (NAB)	8	Right Bank (RB)
4	Pier	9	Downstream left wingwall (DSLWW)
5	Channel	10	Downstream right wingwall (DSRWW)

IU23 Cond - Condition of Current Scour Countermeasure

Inspection > Underwater > SCBI > Current Countermeasures Detail; BMS3: Underwater

Description:

This item indicates the condition of the current scour measure or countermeasure selected in Item IU21.

Procedure:

Select the appropriate condition code from the dropdown list.

Coding:

1 Good – The measure or countermeasure is performing as intended.
2 Partial – The measure or countermeasure is present but not performing as intended.
3 Failed – The measure or countermeasure is no longer present or is completely ineffective.

IU24 Sub Unit - Subunit Number

Inspection > Underwater > SCBI > Current Countermeasures Detail; BMS3: Underwater

Description:

This item is used to record the subunit number, if applicable, where the current scour measure or countermeasure is located.

Procedure:

Select the subunit number, if applicable, where the current scour measure or countermeasure is located. This item is limited to the piers and abutments previously defined for the structure.

Coding:

Subunit number where the current scour measure or countermeasure is located.

IU25 Location – Location of Potential Scour Countermeasure

Inspection > Underwater > SCBI > Potential Countermeasures Detail; BMS3: Underwater

Description:

This item is used to record the location where potential scour countermeasures may need to be placed to correct an actual or potential scour issue.

Procedure:

Select the location where potential scour countermeasures may need to be placed from the dropdown list.

Coding:

See Item IU22 for the dropdown list.

IU26 Work Candidate

Inspection > Underwater > SCBI > Potential Countermeasures Detail; BMS3: Underwater

Description:

This item indicates the work candidate identifier from the list of work candidates for the structure.

Procedure:

Select the work candidate identifier from the dropdown list. The list is filtered by the Work Candidate status to exclude those candidates that have already been completed.

Coding:

22-E744803	Footing (Underpin)	11-C745301	Scour Hole (Backfill)
56-A745101	Abut. Slopewall (REP/REPL)	3-ECREMVG	Vegetation/Debris (Remove)
30-A705301	Streambed Paving (REP/CONSTR)	12-ECREMDP	Deposition (Remove)
13-B745301	Rock Protection	63-B745202	Apron/Cutoff Wall (REP/REPL)

IU27 SCBI Code

Inspection > Underwater > Sub Units; BMS3: Underwater & Substructure

Description:

This item indicates the SCBI code for an individual substructure unit.

Procedure:

This value is **automatically generated by the scour calculator**. If Item IU04b is checked, the scour calculator will automatically update this item when the IN items are updated and saved in either BMS2 or BMS3. The criteria used within the algorithm to calculate the SCBI is provided in Appendix M.

Coding:

Refer to Item 4A08 for coding descriptions.

IU28 SCBI Case

Inspection > Underwater > Sub Units; BMS3: Underwater & Substructure

Description:

This item indicates the case associated with the SCBI Code.

Procedure:

This value is **automatically generated by the scour calculator**. If Item IU04b is checked, the scour calculator will automatically update this item when the IN items are updated and saved in either BMS2 or BMS3. The criteria used within the algorithm to calculate the SCBI is provided in Appendix M.

Coding:

Refer to the Software User's Guide for Determining the Pennsylvania Scour Critical Indicator Code and Streambed Scour Assessment Rating for Roadway Bridges for coding descriptions.

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IU29 Scour Vulnerability

SNBI Field B.AP.03

Inspection > Ratings & Schedule, Inspection > Underwater; BMS3: Waterway

Description:

This item is used to report the scour vulnerability of the bridge.

Procedure:

This item is **automatically filled in by the system** based on information in Items IN13, IU27 and IU04 on the Underwater Screen. The field updates anytime the scour calculator is populate or rerun.

Coding:

The initial population of the values in this field were derived from the following table:

Condition	*IU29 Coding*	*Condition*	*IU29 Coding*
5A18 = 0, 1, 2, 3, 4	*N – Not Applicable*	*IU27 = 7*	*C – Scour Critical w/ CM*
Any subunit with IN13 = P/X	*U – Unknown Foundation*	*IU27 = 5 or 8*	*AB-T – Temporary A or B*
IU27 = 6	*0 – Appraisal NC w/o CM*	*IU27 = 4 and IN05 ≥ 6*	*AB-T – Temporary A or B*
IU27 = 0, 1, 2, 3	*D – Scour Critical w/o CM*	*IU27 = 9*	*A – Stable w/o SM*
IU27 = 4 and IN05 ≤ 5	*D – Scour Critical w/o CM*		

After the initial population, use the following table for the automated coding:

Code	Condition	Description	Criteria
0	Appraisal NC w/o CM	Scour appraisal has not been completed.	Any IU27 value = 6
A	Stable w/o SM	Scour appraisal completed. Bridge determined to be stable for scour without scour measures.	Any IU27 value = 9, OR Any IU27 value = 5 or 8 and IN15 ≠ D9, OR Any IU27 value = 4 and IN15 ≠ D9 and IN05 value ≥ 6
B	Stable w/ SM	Scour appraisal completed. Bridge determined to be stable for scour, dependent upon designed, and functioning scour measures.	Any IU27 value = 5 or 8 and IN15 = D9, OR Any IU27 value = 4, IN05 value ≥ 6 and IN15 = D9
C	Scour Critical w/ CM	Scour appraisal completed. Bridge could become unstable for scour. Temporary (not designed) countermeasure installed to mitigate scour. Bridge is scour critical.	Any IU27 value = 7
D	Scour Critical w/o CM	Scour appraisal completed. Bridge is, or may become, unstable for scour. Bridge is scour critical. No countermeasures present.	Any IU27 value of 0, 1, 2, 3, OR Any IU27 = 4 and IN05 ≤ 5
E	Appraisal NC w/CM	Scour appraisal has not been completed. Temporary (not designed) countermeasure installed to mitigate scour.	Not Used in Pennsylvania
U	Unknown Foundations	Scour appraisal has not been completed due to unknown foundations.	Any subunit on bridge with IN13 = P/X
N	Not Applicable	Bridge is not over water.	5A18 = 0, 1, 2, 3, 4

Commentary from FHWA is not provided on this field because PennDOT has automated the field rather than allow the individual inspector to determine the coding value.

IU30 – Is a Scour Plan of Action Required?

SNBI Field B.AP.04
Inspection > Underwater; BMS3: Waterway

Description:

This item is used to record if a Scour Plan of Action is required for a given bridge.

Procedure:

This item is **automatically filled in by the system** based on information in Item 4A08b. If Item 4A08b = A, B, C or D, this field will be marked as "Y". Otherwise, this field will be coded as a "0".

Coding:

0	Not Required
Y	Required and Implemented

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IN Inspection - Underwater
Sub Units Tab

The Inspection - Underwater Scour - Subunits Section is used to view and edit sub unit scour information and details. It also provides the capability to automatically calculate the OSA (Observed Scour Assessment) and SAR (Scour Assessment Rating) for each sub unit. **Those fields marked with an "(SC)" are required for each substructure unit in order to re-calculate the Scour Critical Bridge Indicator (SCBI) value.**

IN01 Sub Unit - Abutment, Pier, Culvert, Wingwalls Referencing

Inspection > Underwater > Sub Units; BMS3: Underwater & Substructure

Description:

This item is used to reference the piers, abutments, culvert inlets and outlets, and wingwalls.

Procedure:

For piers, the 1st digit is coded as "P" and the last 3 digits represent the number of the pier being referred to. For abutments, culvert inlets and outlets, and wingwalls, enter the appropriate code.

Note:
Wingwalls should be coded with the attached abutment or culvert end unless the scour problem relates solely to the wingwall. However, wingwalls are not used to determine the bridges value for Item IU04.

Use abutment and pier codes to locate scour inside of single and multi-cell culverts without floors. Culverts with bottoms, should be coded as CIN and COU. Additional guidance provided in Items 5D04 and 6A29.

Substructure units must be created in the Inventory – Structure Units Screen (Section 5D) in order for them to appear in the dropdown list. Only substructure units within the 100-year flood plain should be added to the underwater screen.

Coding:

NAB	Near abutment	WNL	Wingwall, near left	WFR	Wingwall, far right
FAB	Far abutment	WNR	Wingwall, near right	CIN	Culvert inlet
P01-P99	Number of pier	WFL	Wingwall, far left	COU	Culvert outlet

IN02 Curr Ind - Previous/Current Inspection Indicator

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item is used to indicate if underwater inspection data displayed in Items IN01-IN24 is information collected on the current inspection date or is information from a previous inspection.

BMS2 displays the most recent inspection data for all substructure units simultaneously to allow the user a complete view of the bridge. Many times, however, not all of the substructure units are inspected at the same time.

Procedure:

For each substructure unit inspected on the new inspection date, enter the data for Items IN01-IN24 by typing over existing data. Check the box in Item IN02 to indicate that the data is current for the new inspection. If one or more fields are updated, this box should be checked.

For substructure units not inspected with the new inspection, Item IN02 is to remain unchecked to indicate that the data for that unit is from a previous inspection.

Coding:

Unchecked	Previous inspection
Checked	Current inspection

Example:
Probing of abutments may be performed as part of an NBIS inspection, while the piers may be inspected by divers on a separate date. Item IN02 informs the viewer which items were performed as part of the current inspection and which were from a previous inspection.

IN03 Scour Rating - Observed Scour Rating

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item is provided for the inspector's on-site evaluation of each substructure unit's risk of failure due to scour.

Procedure:

Select the code from the dropdown list that indicates current status of the unit regarding its vulnerability to failure due to scour.

Whenever a rating factor of "4" or below is determined for this item, Item 1A02 may need to be revised to reflect the severity of actual scour and resultant damage to the bridge. The substructure condition may need to be revised when moderate or serious scour is present which has compromised the structural integrity of the abutment (i.e., the scour has undermined the footing and reduced the bearing capacity or the scour has caused settlement and cracking in the substructure).

Coding:

For ratings 2, 1, and 0, codings are the same as for Item 4A08. For ratings 3 through 9, refer to the table below.

	ITEM NUMBER							
	IN04	IN05	IN06	IN07	IN08	IN09	IN10	IN11
Code	Changes Since Last Inspection	Scour Hole	Debris Potential	Substructure Scourability	Opening Adequacy/ Channel	Sediment Deposits	Alignment	Velocity/ Stream Slope
9	None	None	None	NF/P9/R9/D9	Good	None	Good	Low
8	None	Insignificant	None	P8/C8/R8	Good	Minor	Good	Low
7	Minor	Minor	Minor	P7/C7/R7	Fair	Minor	Good	Medium
6	Minor	Minor/Moderate	Medium*	A6	Fair	Medium	Medium	Medium
5	Medium*	Moderate w/o Impact*	High*	A5	Fair	High	Medium	High
4	Medium	Moderate/Major w/ Impact*	Present*	R4*/A4*	Poor*	High	Poor*	High
3	High*	Major with Serious Impact*	Present SC*	A3	Overtopping*	High	Poor	High
2	Bridge is scour critical, IMMEDIATE action is required.*							
1	Bridge is scour critical, bridge is CLOSED.*							
0	Bridge has failed due to scour.*							

Notes:
Rating considerations given in highest to lowest level of importance from left to right.

* If an item is so marked, it cannot be given a higher rating. If a value above the value selected for an item has an *, the value for Item IN03 cannot exceed the asterisk value. For example, a structure with Item IN07 = 3 cannot have Item IN03 > 4.

Slashes ("/") between coding descriptions, such as P7/C7/R7, indicate "OR" not "AND". The overlapping of coding descriptions is intended to allow the inspector to differentiate between qualities of conditions at the site.

The coding guidance provided for a condition rating of a 2, 1, or 0 in the table for Item IN03 applies to Items IN04 through IN11. For example, when coding Item IN05, if the scour is extremely severe and requires immediate action, the coding for Item IN05 should be a 2 – Bridge is Scour Critical; immediate action is required. Coding's of 2, 1, or 0 are not specifically defined under each of these fields below.

IN04 Change Since Last Insp - Change Since Last Inspection (SC)

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item indicates the amount of change in channel banks or stream bottom or appearance of scour holes since last inspection.

Procedure:

Select the code from the dropdown list that indicates the change in scour since the last inspection. Inspectors should provide justification for the coding in Item IN24.

Coding:

Changes have less affect regarding a sub-unit's vulnerability to failure due to scour when the sub-unit is founded on rock or piles, or has designed countermeasures in place. This is to be considered when selecting an appropriate code using the descriptions below:

None	No change through visual inspection or probing
Minor	No significant changes
Medium	Some changes are apparent, but pose no threat to the structure (i.e., no undermining or instability)
High	Significant changes which could affect the structure

IN05 Scour Hole (SC)

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item indicates the presence of scour found through visual inspection and/or probing.

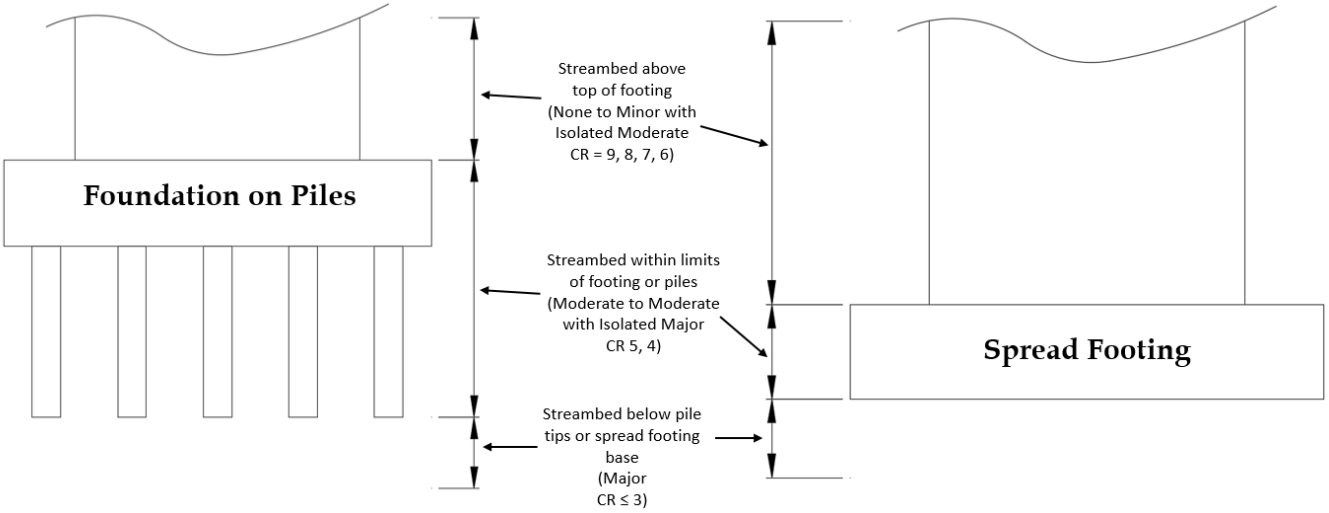
Procedure:

Select the code from the dropdown list that describes the scour condition at the sub-unit. Holes refilled with sediment dissimilar to the natural bed material should be considered as scour (see Item IN15). Inspectors should provide justification for the coding in Item IN24.

Coding:

Code	Condition	Description
N	NOT APPLICABLE	Bridge does not cross over water.
9	NO SCOUR	No scour.
8	INSIGNIFCANT SCOUR	Insignificant scour.
7	MINOR SCOUR	Some minor scour.
6	MINOR/MODERATE SCOUR	Widespread minor or isolated moderate scour.
5	MOD. SCOUR/NO IMPACT	Moderate scour; strength and stability of the bridge are not affected.
4	MOD/MAJ SCOUR W/IMP	Widespread moderate or isolated major scour; strength and/or stability of the bridge is affected.
3	MAJOR SCOUR; SER. IMP.	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; SEV. IMP.	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	CLOSED/SCOUR – REHAB	Bridge is closed to traffic due to scour condition. Channel rehabilitation may return the bridge to service.
0	CLOSED/SCOUR – REPL.	Bridge is closed due to scour condition and is beyond corrective action. Bridge replacement is needed to restore service.

See Scour Definition Diagram for illustration of the above descriptions. If greater than 20% of the footing is undermined, code as a 3 or lower.



For substructure units founded on bedrock: The footing may have been built without any cover and may be coded as minor scour or none as appropriate.

Pile foundations: Pile bents where a change in the stable bed elevation is noted and footings on piles where undermining has partially exposed the piles should be reviewed with the design computations to determine safe depth of exposure.

*For the purpose of the scour calculator, none and minor are considered as the same condition.

IN06 Debris Potn - Debris Potential

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item indicates the risk to the structure for blocking or partial blocking due to debris.

Procedure:

Select the code from the dropdown list that indicates the risk to the structure for blocking or partial blocking due to debris. If the opening is constricted, a greater potential for debris blockage may be present. Inspectors should provide justification for the coding in Items IU17, IU18, IU19, IU20, and IN24.

Coding:

None: Waterway opening capable of handling debris for small structures; no apparent debris sources.
Minor: Opening reasonably sized and debris can pass smoothly through the structure.
Medium: Increased risk of debris; apparent debris sources present.
High: High probability of debris OR debris present aligns with criteria set forth for a Priority Code 2.
Present Not SC: Debris presently blocking or partially blocking a significant portion of the adjoining span. (>30% of hydraulic opening for Item 4A08 ≥ 4 OR 10% to 20% of hydraulic opening for bridges with Item 4A08 ≤ 3 OR subunit with unknown foundation). These bridges require a High Priority Maintenance Item (Priority 1).
Present SC: Debris presently blocking or partially blocking a significant portion of the adjoining span. (>20% of hydraulic opening for Item 4A08 ≤ 3 OR subunit with unknown foundation). These bridges require a Critical Priority Maintenance Item (Priority 0).

IN07 Scourability - Substructure Scourability

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item describes the ability of substructure foundation to resist scour.

Procedure:

Select the code from the dropdown list that describes the ability of substructure foundation to resist scour. Inspectors should provide justification for the coding in Item IN24.

Coding:

Consider these attributes in descending order, at each substructure unit. **Note:** x = integer. *(1)*

NF No flow – No stream flow or tidal currents against substructure unit in excess of 1 fps is possible even during extreme HW.

Px Piles – Footing is on piles or caissons. If no serious scour, rate P9. If serious scour is predicted, rate P8 when calculated pile stability is sufficient, rate P7 when stability is not calculated but appears sufficient. Applicable for Item IN13 = B, C, D, E, F, G, H, I, J, or S.

Cx Countermeasures at a substructure unit is non-designed and can include streambed paving (Cx as defined in Item IN15), gabion blankets, grout bags, rip rap, etc.). If countermeasures are effective, code C8 or C7. If not effective, code natural streambed material. Use Item IN24 inspection findings, to document effectiveness. Cx is applicable on all foundation types for Item IN13. Countermeasures should only be coded as "Cx" if the countermeasures were installed to correct a previous issue. **For bridges with an H&H analysis and designed scour measures, the streambed material should be coded, ignoring the measure.**

Rx Rock – Footing (or concrete sub-footing) bears on competent Rock type x (see Item IN15 definition). If timber cribbing is between footing and on rock, code as "A6" to differentiate from footing directly on rock. Applicable for Item IN13 = A.

D9 Designed Scour Measures – Designed Scour Measures that were installed in accordance with design plans and/or an H&H report for the given structure.

Ax Alluvium – Footing bears on alluvium type "x" (see Item IN15 definition) or rock that is erodible or the erodibility has not been determined. Applicable for Item IN13=K, R, L, P, X, or O.

Corresponding number value for "x":

If the substructure is founded on competent rock or piles, then the coding for this item is based on the foundation and is coded a 9, 8, or 7.

If the substructure is protected by designed scour measures, then code 9.

Otherwise, the coding is based on the channel near the substructure unit and is dependent on several factors; the historical stability of the channel, the presence of scour holes at or near the substructure units, whether there is evidence of substructure settlement, and good engineering judgment.

If the channel is historically stable with no scour holes, and using good engineering judgment, code as high as a 5 or 6. Otherwise the channel is to be coded a 4 or lower. (Refer to Item IN15 for a more thorough description of A6, A5, A4, and A3).

IN08 Opening Adeq Channel – Opening Adequacy/Channel

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item describes the capacity of waterway opening or approach channel to handle anticipated flows.

Procedure:

Select the code from the dropdown list that describes the capacity of waterway opening or approach channel to handle anticipated flows. Inspectors should provide justification for the coding in Item IN24.

Coding:

Good	Approach channel appears capable of handling design flows with little or no out of bank flow and the structure opening also appears adequate to pass design flood.
Fair	There appears to be only a slight chance of overtopping the roadway or the majority of the flow remains in the approach channel during major storms.
Poor	There is a significant probability of flows passing over the roadway behind the abutments, or there is a large portion of the flow in the overbank area upstream of the bridge.
Overtopping	High probability of overtopping of the structure.

IN09 Sediment – Sediment Deposits

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item describes the accumulation of fine material blocking or partially blocking the structure.

Procedure:

Select the code from the dropdown list that best describes the accumulation of fine material blocking or partially blocking the structure. Inspectors should provide justification for the coding in Item IN24.

Coding:

None	Channel clear, no blockage during low flow.
Minor	Slight accumulation of sediment un-vegetated, will probably be removed by next high water.
Medium	Partial span blockage* under low flow, minimal vegetation.
High	Full span blockage* for multi-span structures, sediments are well vegetated.

*Identify item on maintenance needs sheet.

IN10 Alignment

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item describes the stream alignment at or near the structure.

Procedure:

Select the code from the dropdown list that describes the stream alignment at or near the structure. Inspectors should provide justification for the coding in Item IN24.

Coding:

Good	Relatively straight alignment, shallow skew angle for piers and abutments.
Medium	Smooth channel curve at or through the structure, skew angle in relation to the flood flow less than 30 degrees.
Poor	Sharp bend or turn, abutment or piers skewed against flood flow conditions. (For piers, shape of the ends is a significant factor. When selecting between higher or lower values of the same ranking, rounded shapes function best; square, blunt ends cause additional scour. Open bents have a greater potential than solid shaft piers.)

IN11 Velocity Stream Slope

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item indicates the assumed flood flow velocity and stream slope.

Procedure:

Select the code from the dropdown list that indicates the assumed flood flow velocity and stream slope. Stream slope is to be determined by water surface elevations or low flow channel elevations one bridge width or 100′ upstream and downstream of the structure. Also, consider restrictions which could accelerate the flow. Inspectors should provide justification for the coding in Item IN24.

Coding:

Low	Typically broad smooth flow, no sign of abrasion on the structure or banks, stream slope <1%.
Medium	Very little sediment remaining on channel bottom, some erosion on banks, stream slope $1\% \leq S < 5\%$.
High	Very rocky channel bottom with only large stones remaining, noticeable abrasion on structure and erosion of banks, stream slope ≥ 5%. Bridges exhibiting signs of pressure flow.

IN12 Pier/Abut Type – OSA Pier / Abutment Type (SC)

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item indicates the type of abutment or pier for the current substructure unit to be used in the scour calculator on the OSA tab.

Procedure:

Select the type of abutment or pier for the current substructure unit from the dropdown list. Culverts without a bottom cannot have a coding of 10 – Other.

Coding:

Abutments:

1 Stub
2 Cantilever*
3 Gravity Concrete
4 Spill-through
5 Unknown Concrete
6 Stone Masonry
7 Piles / Bents / Integral
8 Concrete without piles / bents
9 Mechanically Stabilized Earth (MSE)*
10 Other*

Piers:

21 Timber
22 Steel
23 Concrete
24 Stone Masonry
25 Other

**Frame culverts (those without a bottom, Item 6A29 = 30 or 32) are to be coded as "2-Cantilever" abutment types. Culverts with a bottom (Item 6A29 = 31, 33, 34, 35) are to be coded as "10-Other". An incorrect coding of this field will return a value of 6 for Item IU27, leading to a value of 6 for Item 4A08. GRS Abutments are to be coded as "9-Mechanically Stabilized Earth (MSE)".*

IN13 Inv Found Type – PA Foundation Type (SC)

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item indicates the foundation type at specific site(s).

Procedure:

Select the code from the dropdown list that represents the foundation type or material of the specific pier, abutment, culvert, or wingwall site referenced in Item IN01. Inspectors should provide justification for the coding in Item IN24.

Notes:

This coding system is also used in Items VD15 and VD17. Codings of R and S are provided to describe field observable conditions. Use only when more detailed or exact plan information does not exist.

Coding:

A	Footing on competent bedrock*	K	Footing or culvert with an integral bottom on erodible bedrock (such as claystone, clay shale, silt stone, shale, or weathered bedrock)
B	Cast-in-place concrete piles	L	Footing or culverts with an integral bottom on soil (sand-gravel, cobbles, silt, and clay)
C	Precast concrete piles	O	Other (describe in Item IN24)
D	Prestressed concrete piles	P	Foundation type has been researched; information is unknown or not available with confidence
E	Steel H-piles	R	Footing on bedrock – erodibility cannot be determined
F	Steel pipe piles	S	Pile or caissons, if determined by probing
G	Timber piles	X	Information is not available at this time
H	Drilled caisson		
I	Deep water caisson		
J	Pedestals		

*For scour purposes, good quality rock or competent bedrock is defined as rock with no significant ongoing erosion and a low risk of failure during an extreme event.

IN14 Found Type – OSA Foundation Type (SC)

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item indicates the foundation type at specific site(s) to be used in the scour calculator.

Procedure:

This field is **automatically filled in by the system** based on the value input for Item IN13.

Coding:

IN14	Material	IN13 Coding
1-	Bedrock	A
2-	Alluvium	R, K, L
3-	Piles/Caissons	B, C, D, E, F, G, H, I, J, S
4-	Other	O
5-	Not Observed	P, X
Blank		

The following combinations between abutments or piers and foundation types are invalid and will return a scour calculator code of "6". The inputs will need revised if one of these combinations is entered.

Abutment Type (IN12)	Foundation Type (IN14)
1 – Stub	2 – Alluvium
1 – Stub	5 – Not Observed
7 – Piles/Bents/Integral	1 – Bedrock
7 – Piles/Bents/Integral	2 – Alluvium
7 – Piles/Bents/Integral	5 – Not Observed
8 – Concrete w/o	3 – Piles/Caissons
10 – Other	1 – Bedrock
10 – Other	2 – Alluvium
10 – Other	3 – Piles/Caissons
10 – Other	5 – Not Observed

Pier Type	Foundation Type (IN14)
22 – Steel	1 – Bedrock
22 – Steel	2 – Alluvium
22 – Steel	5 – Not Observed
25 – Other	1 – Bedrock
25 – Other	2 – Alluvium
25 – Other	3 – Piles/Caissons
25 – Other	5 – Not Observed

IN15 Streambed Matl - Stream Bed Material (SC)

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item correlates the stream bed material with its potential for scour for a particular substructure unit.

Procedure:

Select the code from the field dropdown list that correlates to the stream bed material with its potential for scour for a particular substructure unit. Culverts with integral bottoms shall have the streambed adjacent to the inlet and outlet coded. Inspectors should provide justification for the coding in Item IN24.

Coding:

Scour Measures – Designed Scour Protection

D9 Designed Scour Measures that were installed in accordance with design plans and/or an H&H report for the given structure. If the scour measures differ from documentation in plans or an H&H report, the streambed should be coded to reflect the conditions at the bridge and no longer "D9". For bridges with a D9 coding, the SCBI Source will likely be coded as "C-Computed". When measures are installed to correct a previous scour issue and are not designed, the streambed material should be coded as C7 or C8 as described below.

Countermeasures-Non-designed scour protection (used to correct a previous scour issue):

C8 Streambed paved in good condition and adequate to resist scour (concrete, stone masonry, gabion blankets, or grout bags).

C7 Streambed paved, however, minor problems exist. Scour protection is adequate. Refer to Publication 15M (DM-4), Chapter 7, and Publication 408, Section 850, for the required minimum size of rip-rap to qualify as a countermeasure (concrete gabions, grout bags, or rip-rap in good condition).

The coding of C8 and C7 should be reserved for substructure units where a previous scour issue has been corrected with the placement of a countermeasure. FHWA considers countermeasures as a corrective action. Bridges with countermeasures require a Plan of Action and are considered to be Scour Critical Category D.

Bedrock Streambeds (not riprap) (refer to DM-4, Chapter 7, for additional guidance on types of bedrock):

R9 Minor scour may be present near substructure, but the chance of undermining is remote. Minor scour holes may exist away from the substructure units. Minor faulting or weathering may be present (Non-erodible rock).

R8 Minor scour may exist, but undermining is not present. Scour holes may exist away from the substructure units. Rock may be faulted, weathered and/or soft (Erodible rock).

R7 Moderate scour is present and is adjacent to substructures. However, there is little risk that scour could cause structure instability during high flows. Moderate weathering and/or faulting may be present (Erodible rock).

R4 Moderate or serious scour that could advance and threaten substructures during high flows. Rock is highly –weathered, faulted and/or soft (Highly erodible rock).

Alluvium Streambeds (Note: Low channel slope and low flood flow velocity may allow a sandy or gravelly streambed to remain stable and should be coded accordingly):

A6 Little to no potential for scour under high water flow conditions. Minor scour holes may exist mid-channel (Highly Stable Alluvium: large native cobbles and boulders (not riprap) with small amounts of fine material in voids.

A5 No moderate scour over a long time period. Potential for scour exists only under high water velocity. Scour holes may exist in mid-channel. Near substructures only minor scour may be present (Moderately Stable Alluvium: cobbles, boulders (not rip rap), and gravel with some fine material).

A4 Potential for scour during ordinary high water. Moderate scour may be present or has occurred in the past near the substructure units, but repair methods or materials do not protect the structure from future occurrences (Unstable Alluvium: mixture of fine particles with some larger aggregate).

A3 High scour potential at all water velocities. Serious scour (undermining) may be present or has occurred in the past at the substructure units but the repair methods or materials to correct past scour do not protect the structure from future occurrences (Highly Unstable Alluvium: very small particles, including clays, silts, and/or fine sands).

IN16 UW Insp Type - Underwater Inspection Type

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item is used to record the underwater inspection performed.

Procedure:

Select the appropriate code from the dropdown list. Inspectors should provide justification for the coding in Item IN24.

Coding:

A Underwater inspection performed by divers.
B Underwater inspection (probing) performed by divers or inspectors#.
C Inspection not completed. Underwater inspection by divers is required.
D Inspection not completed. Return to site during low water to perform probing by inspector*.
E No underwater inspection required. Probing performed by inspector during scheduled inspection.
F Inspection completed. Returned to site during low water and probing performed by inspector*.
G Substructure was probed and no significant changes were found; therefore, scour information was not updated. Complete probing inspection and scour documentation update completed during a prior inspection. Time between probing inspections shall not exceed the values listed in Publication 238, Appendix IP-02E.
S Partial inspection for USGS scour evaluation.

#During periods of low water, when inspectors (non-divers) completing a routine inspection are able to probe and properly inspect the subunit that normally requires divers to complete an underwater inspection, use Code B and Item 7A57 UW should remain checked. Once a subunit requires an underwater inspection, it will generally continue to require an underwater inspection until intentional changes are made to the streambed around the subunit or water levels continually allow for inspectors to probe the subunit each inspection. When this code (IN16 = B) is used during a routine inspection for **all** subunits that require an underwater inspection, reset the next inspection due date using the guidance provided for Item 7A60 (inspection end date + interval = next inspection due date).

*The period of time to return to the bridge site must not exceed 90 days from the date of the scheduled inspection. Bridge owners have two options to schedule the return for probing. The first option is to leave the inspection in submitted status with Item IN16 coded as "D" for each substructure unit that needs to be probed during low water. The second option is to accept the current inspection record and schedule an Other Special "Interim" Inspection for three months after the last inspection was started. Refer to the coding examples under Item 7A09.

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IN17 Ob Scour Depth - Observed Scour Depth

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item indicates the observed scour depth at or near a substructure unit at the time of inspection due to local scour, contraction scour, general scour or any combination thereof. General and contraction scour may be determined from the streambed profile, historic records, or visual indicators such as mud lines or bank cuts.

Procedure:

Enter the observed depth of scour to the nearest tenth of a foot at a substructure unit.

This value should be measured from the average stream bed depth to the bottom of the deepest scour hole.

For substructure units with defined scour holes, the observed scour depth should be measured from the average streambed in the vicinity of the substructure unit to the bottom of the deepest scour hole. (See Figure 1)

At substructure units where the streambed shows aggregation, degradation or local scour, it may be difficult to find the normal stream bed elevation immediately at the substructure unit. In these cases, elevation measurements should be taken upstream and downstream to determine the average streambed elevation and depth of scour. (see Figure 2)

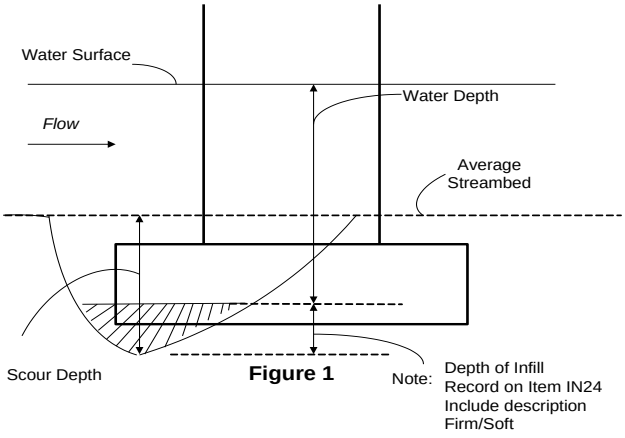

Figure 1

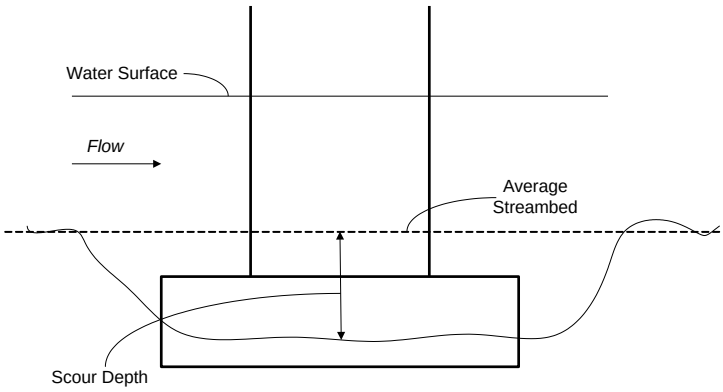

Figure 2

Note: Figures 1 and 2 above illustrate the presence of local and contraction scour respectively. If the average streambed elevation at the bridge is lowered due to general scour, this amount must be added to the scour shown.

Coding:

The depth of scour recorded to the nearest tenth of a foot.

Example:

The observed scour depth is 6′ 4″: 6.3

IN18 Water Depth

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item indicates maximum water depth at time of inspection at specific pier, abutment, culvert, and/or wingwall site(s).

Procedure:

Enter maximum water depth at a specific substructure unit to the nearest tenth of a foot.

Coding:

Maximum water depth recorded to the nearest tenth of a foot.

IN19 Movement Ind - Movement Indicator (SC)

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This checkbox field indicates whether or not there is any movement at the sub unit.

Procedure:

Check the box if there is movement at the sub unit. Otherwise, leave the box unchecked. Inspectors should provide justification for the coding in Item IN24.

Coding:

Unchecked	There has not been any movement at the sub unit
Checked	There has been movement at the sub unit

IN20 Scour / Undermine Ind – Scour / Undermining Indicator

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This checkbox field indicates whether or not scour is present at the substructure unit.

Procedure:

Check the box to indicate that scour is present at the substructure unit. Otherwise, leave the box unchecked. Inspectors should provide justification for the coding in Item IN24.

Coding:

Unchecked	Scour is not present
Checked	Scour is present

IN21 Countermeasures

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This checkbox field indicates whether or not effective scour measures or countermeasures are in place at a specific pier, abutment, culvert, and/or wingwall location.

Procedure:

Check the box to indicate that effective scour measures or countermeasures are in place at specific pier, abutment, culvert, and/or wingwall sites. Otherwise, leave the box unchecked. Inspectors should provide justification for the coding in Item IN24.

Coding:

Unchecked	No effective scour measures or countermeasures exist, or none are required
Checked	Effective scour measures or countermeasures are in place

Note: Scour countermeasures can only be considered effective to counter scour if they have proven to remain stable under flood conditions.

IN22 100 yr Flood Sc. Depth - Calculated Scour Depth w/100 Year Flood

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item indicates the 100-year flood calculated scour depth at specific pier, abutment, culvert, and/or wingwall sites.

Procedure:

Enter the 100-year flood calculated scour depth to the nearest tenth of a foot at specific pier, abutment, culvert, and/or wingwall sites.

Coding:

Depth of 100-year flood calculated scour recorded to the nearest tenth of a foot.

Examples:

The 100-year calculated scour depth is 6'4": 6.3

The 100-year calculated scour depth is 2'6": 2.5

IN23 500 yr Flood Sc. Depth - Calculated Scour Depth w/500 Year Flood

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item indicates the 500-year flood calculated scour depth at specific pier, abutment, culvert, and/or wingwall sites.

Procedure:

Enter the 500-year flood calculated scour depth to the nearest tenth of a foot at specific pier, abutment, culvert, and/or wingwall sites.

Coding:

Depth of 500-year flood calculated scour recorded to the nearest tenth of a foot.

IN24 Notes - Inspection Notes

Inspection > Underwater > Sub Units > Sub Unit Detail; BMS3: Underwater & Substructure

Description:

This item is used to record a narrative description of inspection findings at specific pier, abutment, culvert, and/or wingwall sites.

Procedure:

Enter a narrative description of inspection findings at specific pier, abutment, culvert, and/or wingwall sites. The narrative should also be used to provide extent of undermining or scour, including dimensions. Refer to Publication 238, Appendix IP-02E for additional documentation requirements that are required during a bridge safety inspection and can be entered in this field for each specific substructure unit.

Inspectors should use this field to justify the coding of other IN Items.

Coding:

A narrative description of inspection findings.

IN25 – Is subunit within 500-year flood plain?

Inventory > Structure Units > Structure Unit/Span Details; BMS3: Underwater & Substructure

Description:

This checkbox is used to indicate if the subunit is within the 500-year flood plain.

Procedure:

This checkbox is **automatically generated by the system** when a user adds the subunit to the underwater page. When this box is checked, all related IN fields for the subunit must be filled in to properly calculate the scour critical bridge indicator.

Coding:

Checked	Subunit is within the 500-year flood plain associated with the bridge
Unchecked	Subunit is not within the 500-year flood plain associated with the bridge

Scour Coding Clarification for Bridges with Scour Measures/Countermeasures

The following clarification is provided to assist inspectors understanding how bridges should be coded when scour measures or countermeasures are present at a bridge. The guidance below follows the methodology of the scour calculator. Inspectors should not use the coding examples provided to simply correct their inputs for a desired SCBI rating.

A newly constructed bridge, with a footing designed properly for scour in accordance with DM-4 with an H&H analysis completed, should have Item IU03 = C – Computed if the bridge was built in accordance with the design plans. From the H&H analysis, the theoretical scour depth was calculated. If the scour depth is above the footing, the appropriate SCBI code would be an "8" and if the scour depth is within the footing, the appropriate SCBI code would be a "5". Bridges designed and constructed in accordance with DM-4 will generally be coded with an SCBI of "8"; however, there will be some cases when an SCBI of "5" will be appropriate (the intent of coding an SCBI of "5" when the footing has been designed to be exposed or footing has been designed with computed scour within the limits of the footing is to inform the inspectors that the foundation has been designed to allow some footing exposure and is still likely in a stable condition when footing exposure is observed). Code the IN Items as the field conditions have been observed. If there are scour measures (designed through an H&H), code Item IN15 as "A6" and check Item IN21. The scour measures should also be coded using the IU Items (IU21, IU22, and IU23). After

entering this information, click the scour calculator to confirm the field inspection matches the designed condition. If they do not (Item IU04 ≤ 5), review the inputs to determine if Item IU03 = C – Computed is still valid. Document any changes to coding in Item IN24.

Over time, the natural deterioration of the waterway will cause Item IU03 to be changed from C – Computed to O – Observed because the field conditions no longer match the design conditions. If the scour measures are no longer in place or effective, Item IN15 should be changed from "A6" to the observed scour condition or actual material found beneath the previous scour measures.

When a bridge arrives at an SCBI value of a "4", planning for scour measures via an H&H analysis or countermeasures should begin with an appropriate maintenance item. Similarly, the urgency for scour measures or countermeasures increases when the SCBI value decreases to a "3" or below. If scour measures are installed, it would be appropriate to change the coding source from O – Observed to C – Computed because the theoretical scour depth has been recalculated with the scour measures in place (SCBI = "5" or "8"). If the bridge owner elects to install countermeasures, such as dumped rock, the SCBI rating will move to a "7" if the countermeasures have proven to be effective. Bridges with countermeasures in place still require a plan of action because the rock is not designed and possibly not the correct size to resist additional scour. When significant rain events occur, the countermeasures need to be evaluated to determine if they withstood the event.

As mentioned throughout the IN Items, when changes in coding are made by inspectors, the cause should be clearly documented in Item IN24. This is most important for Items IN04, IN05, IN13, IN15, and IN19 as these fields play into the scour calculator and are scrutinized by Districts, Central Office, and FHWA.

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IL Inspection - Underwater

Other Tab

The Inspection - Underwater Scour - Other Section is used to view and edit waterway adequacy and underclearance information about a structure.

IL01 (Not Used – Reserved for Future Use)

*IL02 Risk of Overtopping

Inspection > Underwater > Other; BMS3: Waterway

Description:

This item indicates the overtopping frequency.

Procedure:

Select the overtopping frequency from the dropdown list. Leave this item blank if information is not available.

Coding:

The initial population of this data was migrated using the initial IL02 coding along with Items 1A06, 5A18, 5C22, IL13 and IL14.

0	Never
1	Remote (once every 100 years or less frequently)
2	Very low (once every 51 to 99 years)
3	Low (once every 26 to 50 years)
4	Moderate (once every 11 to 25 years)
5	High (once every 3 to 10 years)
6	Very High (once every 2 years or more frequently)
N	N/A – Not Applicable (for non-bridges and bridges that do not cross a waterway)

Additional Coding Descriptions and Commentary from FHWA:

An overtopping occurrence is when the waterway overtops the riding surface carried on the bridge. Bridge overtopping likelihood, since the year built, 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. For newer bridges with limited historical inspection or o maintenance information, hydraulic design information can be used to establish an overtopping likelihood. This item does not apply to the likelihood of the waterway overtopping approach roadways.

*IL03 Traffic Delay

Inspection > Underwater > Other; BMS3: Waterway

Description:

This item indicates the severity of the traffic delay due to overtopping.

Procedure:

Select the code from the dropdown list that indicates the severity of the traffic delay for the structure.

Coding:

I	Insignificant - Minor inconvenience; highway passable in a matter of hours
S	Significant - Traffic delays of up to several days
X	Severe - Long term delays to traffic with resulting hardship

IL04 Not Used – Reserved for Future Use

IL05 Elevation - Maximum Known Water Surface Elevation

Inspection > Underwater > Other; BMS3: Waterway

Description:

This item is used to record the maximum known water surface elevation.

Procedure:

Enter the maximum known water surface elevation. If a maximum water surface elevation is not available, this item may be left blank.

Coding:

The maximum known water surface elevation to the nearest foot.

IL06 Date - Date of Maximum Known Water Surface Elevation 

Inspection > Underwater > Other; BMS3: Waterway

Description:

This item is used to record the date of the maximum known water surface elevation.

Procedure:

Enter the year in which the maximum water surface elevation occurred. If a maximum water surface elevation is not available, this item may be left blank.

Coding:

Date in MM/DD/YYYY format:

MM	2-digit month
DD	2-digit day of month
YYYY	4-digit year

IL07 New High Water - New Maximum Water Surface Status

Inspection > Underwater > Other; BMS3: Waterway

Description:

This item is used to display the status of a new high-water mark.

Procedure:

Select the status of the new high-water mark from the dropdown list.

Coding:

0 Not a new high-water mark
1 New high-water mark

IL08 High Water Notes - Maximum Water Surface Notes

Inspection > Underwater > Other; BMS3: Waterway

Description:

This item is used to record notes relating to the high-water mark.

Procedure:

Enter any notes relating the high-water mark in narrative form.

Coding:

Notes relating the high-water mark in narrative form.

IL09 Origin Desc - Underclearance Origin Description

Inspection > Underwater > Other > Underclearance Detail

Description:

This item is used to record a description of the origin from where the horizontal clearance measurement starts.

Procedure:

Enter a description of the origin from where the horizontal clearance measurement starts in narrative form. The origin should typically start from the near abutment for the bridge and the lower numbered pier for each span of a multi-span bridge.

Coding:

Description of the origin from where the horizontal clearance measurement starts in narrative form.

IL10 Horiz. ft – Horizontal Underclearance

Inspection > Underwater > Other > Underclearance Detail

Description:

This item is used to record the horizontal distance from the origin described in Item IL09 to the point of measurement.

Procedure:

Enter the horizontal distance from the origin described in Item IL09 to the point of measurement.

Coding:

Horizontal distance from the origin described in Item IL09 to the point of measurement to the nearest tenth of a foot.

IL11 Vert. ft – Vertical Underclearance

Inspection > Underwater > Other > Underclearance Detail

Description:

This item is used to record the vertical underclearance corresponding to horizontal distance in Item IL10.

Procedure:

Enter the vertical underclearance corresponding to horizontal distance in Item IL10.

Coding:

Vertical underclearance to the nearest tenth of a foot corresponding to horizontal distance in Item IL10.

IL12 Notes - Underclearance Notes

Inspection > Underwater > Other > Underclearance Detail

Description:

This item is used to record notes about the underclearance measurements.

Procedure:

Enter any notes about the underclearance measurements in narrative form.

Coding:

Notes about the underclearance measurements in narrative form.

IL13 Worst Flood Event – Worst Flood Event Occurrence

Inspection > Underwater > Other; BMS3: Waterway

Description:

This item indicates the worst (i.e. most severe) flood event that has occurred at the site and resulted in a closure. This field also indicates whether overtopping occurred during that flood event.

Procedure:

Select the code from the dropdown list that indicates the correct status of the occurrence. If the approaches have overtopped, but not the bridge itself, code "C". Once a bridge has been overtopped, the coding should remain "CO" and it is not necessary to update Item IL14 for each subsequent event.

Coding:

C	Closure due to flooding has occurred but the structure was not overtopped
CO	Closure due to flooding has occurred and the structure was overtopped
N	Flooding has not been known to cause closure of the bridge

IL14 Worst Flood Event Date – Date of Worst Flood Event Occurrence

Inspection > Underwater > Other; BMS3: Waterway

Description:

This item is used to record the date that the worst (i.e. most severe) flood event coded in Item IL13 occurred.

Procedure:

Enter the date in which the flood event coded in Item IL13 occurred. If the date is not known or unavailable, enter an estimate of the date that the event occurred. If such an event has never occurred at the site, this item should be left blank (i.e. 01/01/1901).

Coding:

Date in MM/DD/YYYY format:

MM	2-digit month
DD	2-digit day of month
YY	4-digit year

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ID Inspection - Signing Details

The Inspection – Signing Details Section allows the inspector to record any signing requirements for a structure during inspection. The Signing Details Screen is listed below Inspection Links. At the top of the screen is the select inspection field. Inspectors should refer to PennDOT Publication 236, Handbook of Approved Signs for additional guidance on the placement and/or need for specific signage at a bridge.

ID01 Type of Sign

Inspection > Signing Details > Signing Detail; BMS3: Approach

Description:

This item indicates the sign type.

Procedure:

Select the type of sign from the dropdown list.

Coding:

0	Bridge	5	Vertical Clearance - Under
1	Bridge Weight Limit	6	One Lane Bridge
2	Except Combination	7	Narrow Bridge
3	One Truck at a Time	8	Hazard Clearance
4	Vertical Clearance - On	9	Other

ID02 Sign Needed?

Inspection > Signing Details > Signing Detail; BMS3: Approach

Description:

This item indicates whether or not the corresponding sign type is needed for the structure.

Procedure:

Select the code from the dropdown list to indicate whether or not the corresponding sign type is needed for the structure.

Coding:

0	Sign not needed
1	Sign needed

ID03 Sign Message

Inspection > Signing Details > Signing Detail; BMS3: Approach

Description:

This item is used to record the sign message.

Procedure:

Enter the sign message in narrative form.

ID04 Near Advance

Inspection > Signing Details > Signing Detail; BMS3: Approach

Description:

This item indicates the condition of the posting at the near advance.

Procedure:

Select the code from the dropdown list that indicates the condition of the posting at the near advance.

Coding:

D Signs damaged / incorrect
G Good - Signs properly installed
M Signs missing
N Not Applicable

ID05 Far Advance

Inspection > Signing Details > Signing Detail; BMS3: Approach

Description:

This item indicates the condition of the posting at the far advance.

Procedure:

Select the code from the dropdown list that indicates the condition of the posting at the far advance.

Coding:

D Signs damaged / incorrect
G Good - Signs properly installed
M Signs missing
N Not Applicable

ID06 Bridge Site Near

Inspection > Signing Details > Signing Detail; BMS3: Approach

Description:

This item indicates the condition of the posting at the bridge site near.

Procedure:

Select the code from the dropdown list that indicates the condition of the posting at the bridge site near.

Coding:

D Signs damaged / incorrect
G Good - Signs properly installed
M Signs missing
N Not Applicable

ID07 Bridge Site Far

Inspection > Signing Details > Signing Detail; BMS3: Approach

Description:

This item indicates the condition of the posting at the bridge site far.

Procedure:

Select the code from the dropdown list that indicates the condition of the posting at the bridge site far.

Coding:

D	Signs damaged / incorrect
G	Good - Signs properly installed
M	Signs missing
N	Not Applicable

ID08 Notes - Signing Notes

Inspection > Signing Details > Signing Detail; BMS3: Approach

Description:

This item is used to record notes about the signing at the structure.

Procedure:

Enter comments about the signing at the structure in narrative form.

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IC Inspection - Comments

The Inspection – Comments Section provides a mechanism for viewing and updating any inspection related comments for a particular structure inspection entered by the inspector on different BMS3 screens.

The Notes & Comments Screen is listed beneath the inspection links. By default, the screen will display the comments in order of its availability. Users can erase a comment by clicking on the remove button after a particular comment type has been selected. At the top of the screen is the select inspection section. In the next section of the screen the user can click on a specific inspection comment type and modify the comment.

IC01 Comment Type - Inspection Comment Type

Inspection > Notes & Comments; BMS3: Notes

Description:

This item indicates the type of inspection comment for the structure.

Procedure:

Select the type of inspection comment from the dropdown list which are filtered based on structure type.

Coding:

Bridge and Other Comments

	Description
1	Approach Alignment
2	Approach Roadway / Pavement
3	Approach Roadway / Drainage
4	Approach Roadway / Shoulders
5	Approach Slab
6	Relief Joint
7	Safety Features / Bridge Railing
8	Safety Features / Transition
9	Safety Features / Approach Guide rail
10	Safety Features / Approach Rail Ends
11	Deck Geometry
12	Deck
13	Deck Drainage
14	Deck Wearing Surface
15	Superstructure
16	Superstructure / Diaphragms
17	Superstructure / Portals & Bracing
18	Superstructure / Drainage
19	Substructure
30	Super / Girders
31	Super / Floorbeams
32	Super / Stringers
33	Super / Truss Mem
34	Super / Bearings
35	Deck Top
36	Deck Underside
45	Channel
46	Banks
47	Streambed Movements
48	Debris, Vegetation
49	River (Stream) Control Devices
50	Embankment / Streambed Controls
51	Drift, Other
52	High Water Mark
53	Paint / Interior Beam / Girder
53	Paint / Interior Beam / Girder
54	Paint / Fascias
55	Paint / Splash Zone: Truss /Girder
56	Paint / Truss
57	Paint / Bearings
58	Paint / Other
59	Culvert / Top Slab
60	Culvert / Barrel
61	Culvert / Floor / Paving
62	Culvert / Headwall
63	Culvert / Wings
64	Culvert / Settlement
65	Culvert / Debris
66	Waterway Adequacy
67	Recalculate IR/OR Due to:
68	Approach Roadway
69	Bump at Bridge
70	Deck / Expansion Joint
71	Culvert
72	Controlling Lateral (for Item 4A11)
73	Actual Special Inspection Equipment required
74	Combustible Materials Under Bridge
75	Inaccessible Inspection Location
76	Bridge Posting Recommendation Summary
77	Overall Paint Notes
78	Culvert/Footing
79	Load Rating Reviewer Comment
80	Channel Protection Condition Rating
220	Inventory Data Review
478	Inspection Acceptance – BMS3
479	Inspection Acceptance – BMS2
480	Damage Inspection Notes
481	Future Inspection Notes*

Sign Comments

	Description
100	Sign / Column Base
101	Sign / Column
102	Sign / Guide Rail
103	Sign / Method of Access
104	Sign / Lights
105	Sign / Electrical System
106	Sign / Sign
107	Sign / Framework
108	Sign / Surface and Paint
109	Sign /Overall
110	Sign / Asset Tag

Wall Comments

	Description
130	Wall / Anchorage
131	Wall / Backfill
132	Wall / Wall
133	Wall / Drainage
134	Wall / Foundation
135	Wall / Parapets
136	Wall / Post
137	Wall / Panel
138	Wall / Overall
139	Wall / Architectural Treatments

Tunnel Comments

	Description
301	Tunnel / Ceiling Girders
302	Tunnel / Ceiling Panels
303	Tunnel / Ceiling Slabs
304	Tunnel / Columns & Piles
305	Tunnel / Conc Corrosion Prot Coat
306	Tunnel / Cross Passageway
307	Tunnel / Drain Pumping System
308	Tunnel / Egress Signs
309	Tunnel / Electrical Distribution System
310	Tunnel / Emergency Comm. System
311	Tunnel / Emer. Elec. Distribution Syst.
312	Tunnel / Emergency Generator System
313	Tunnel / Emergency Lighting Fixture
314	Tunnel / Emergency Lighting System
315	Tunnel / Expansion Joint
316	Tunnel / Fans
317	Tunnel / Fire Detection System
318	Tunnel / Fire Protection System
319	Tunnel / Fire Protective Coating
320	Tunnel / Gaskets
321	Tunnel / Hangers and Anchorages
322	Tunnel / Interior Walls
323	Tunnel / Invert Girders
324	Tunnel / Invert Slabs
325	Tunnel / Lane Signal
326	Tunnel / Lane Signal Fixture
327	Tunnel / Liners
328	Tunnel / Pedestrian Railing
329	Tunnel / Portal (General)
330	Tunnel / Pumps
331	Tunnel / Portal Beams/Girders
332	Tunnel / Slab-on-Grade
333	Tunnel / Steel Corrosion Prot. System
334	Tunnel / Traffic Barrier
335	Tunnel / Traffic Sign
336	Tunnel / Tunnel Lighting Fixture
337	Tunnel / Tunnel Lighting System
338	Tunnel / Tunnel Operations and Security Syst.
339	Tunnel / Variable Message Boards
340	Tunnel / Ventilation System
341	Tunnel / Wearing Surface
400	Tunnel / Portal Fascia Surface
401	Tunnel / Portal Panel Underside
402	Tunnel / Portal Retaining Walls
403	Tunnel / Portal Retaining Walls Backfill
404	Tunnel / Portal Retaining Walls Drainage
405	Tunnel / Portal Retaining Walls Foundation
406	Tunnel / Portal Retaining Walls Settlement
407	Tunnel / Portal Retaining Walls Overall
408	Tunnel / Portal Building Roof General
409	Tunnel / Portal Building Roof Drainage
410	Tunnel / Portal Building Roof Flashing
411	Tunnel / Portal Building Roof Downspouting
412	Tunnel / Portal Building Roof Drainage Outlet
413	Tunnel / Portal Building Roof Girders
414	Tunnel / Portal Building Roof Floorbeams
415	Tunnel / Portal Building Roof Beam Seats
416	Tunnel / Portal Building Roof Soffit
417	Tunnel / Portal Building Floor (General)
418	Tunnel / Portal Building Floor Girders
419	Tunnel / Portal Building Floor Floorbeams
420	Tunnel / Port. Bldg Floor Supports/Seat Conn
421	Tunnel / Portal Building Floor Slab Soffit
422	Tunnel / Portal Building Floor Drainage
423	Tunnel / Portal Building Facilities - Plumbing
424	Tunnel / Portal Building Facilities – Drainage
425	Tunnel / Portal Building Facilities – Fixtures
426	Tunnel / Portal Building Facilities – HVAC
427	Tunnel / Portal Building Facilities – Security
428	Tunnel / Emer. Dist. System Cable Conduit
429	Tunnel / Emer. Comm. Syst. Portal Bldg. Signs
430	Tunnel / Emer. Comm. Syst. Controller
431	Tunnel / Emer. Comm. Syst. Speakers
432	Tunnel / Emer. Comm. Syst. Input Equipment

Tunnel Comments (continued)

	Description
433	Tunnel / Em. Elec. Dist. Sys. Generator
434	Tunnel / EEDS Gen. Coolant System
435	Tunnel / EEDS Gen. Control Equip.
436	Tunnel / EEDS Control panels
437	Tunnel / EEDS Batteries and Chargers
438	Tunnel / EEDS Main Fuel Storage Tank
439	Tunnel / EEDS Day Fuel Tank
440	Tunnel / EEDS Circulating Fuel Pumps
441	Tunnel / EEDS Fuel Tank Ventilation
442	Tunnel / EEDS Fuel Tank Sensors
443	Tunnel / EEDS Exhaust Manifold
444	Tunnel / EEDS Ex. Louver/Damper
445	Tunnel / EEDS Supply Louv./Damper
446	Tunnel / OpSec CCTV
447	Tunnel / OpSec Cell Phone Antennas
448	Tunnel / OpSec Door Access
449	Tunnel / OpSec Controller
450	Tunnel / OpSec Radio
451	Tunnel / Fan Motors
452	Tunnel / Fan Motor Controllers
453	Tunnel / Airway
454	Tunnel / Sound Attenuators
455	Tunnel / Dampers
456	Tunnel / Damper Motors
457	Tunnel / Damper Controllers
458	Tunnel / Air Quality Monitoring Equipment
459	Tunnel / Fire Hydrants
460	Tunnel / Fire Prot. Syst. Main Fire Pump
461	Tunnel / Fire Prot. Syst. Jockey Pump
462	Tunnel / Fire Prot. Syst. Dry Pipe Valves
463	Tunnel / FPS Valves and Tamper Switches
464	Tunnel / FPS Storage Tanks
465	Tunnel / FPS Tunnel Standpipe
466	Tunnel / FPS Pressure/Air Release Valves
467	Tunnel / FPS System Backflow Protection
468	Tunnel / FPS Hose Stations
469	Tunnel / FPS Hose Reels
470	Tunnel / Tunnel Sprinkler System
471	Tunnel / Portal Building Sprinkler System
472	Tunnel / Fire Department Connections
473	Tunnel / Drain. & Pump. Sys. Pump Motors
474	Tunnel / Drain. & Pump. Sys. Pump Controllers
475	Tunnel / Drain. & Pump. Sys. Piping
476	Tunnel / Drain. & Pump. Sys. Drains and Inlets
477	Tunnel / Drain. & Pump. Sys. Water Treatment

* Comment Type 481 must be entered to document the scope of future “Special” inspections. For example, if the bridge is on a 6 or 12 month interval, document in Comment Type 481 the portions of the bridge to be inspected during the Special Inspection.

IC02 Comments - Inspection Comments

Inspection > Notes & Comments > Comment Detail; BMS3: Notes

Description:

This item is used to record inspection comments.

Procedure:

Enter comments about the inspection in narrative form. The “Comments Continued” field should be used when the comment is larger than can be entered into Field 1.

Example:

Laminar corrosion to bottom 6’’ of web and the top of bottom flange of Girder 3 for 8’ from CL bearing at Pier 1 into Span 2. Cleaned and measured web and flange loss with d-meter at multiple points, measured remaining section of 15/16’’, with 1/16” of section loss over this area (original section thickness was 1”).

IC03 Substructure Unit

Inspection > Notes & Comments; BMS3: Notes

Description:

This item indicates the substructure unit for which comments will be recorded in Item IC05.

Procedure:

Select the substructure unit for which comments will be recorded from the dropdown list.

IC04 Comment Type - Substructure Comment Type

Inspection > Notes & Comments; BMS3: Notes

Description:

This item indicates the type of comment for the substructure unit.

Procedure:

Select the type of comment from the dropdown list.

Coding:

20	Abutment / Backwall	29	Abutment / Wall Drainage
21	Abutment / Bridge Seats	38	Abutment / Combustible Material
22	Abutment / Cheekwalls	39	Pier / Combustible Material
23	Abutment / Stem	40	Pier
24	Abutment / Wings	41	Pier / Bridge Seats
25	Abutment / Footing	42	Pier / Cheekwalls
26	Abutment / Piles	43	Pier / Columns/Stems
27	Abutment / Settlement	44	Pier / Settlement
28	Abutment / Embankment Slopewall		

Example:

A 4 SF spall is present along the right face of the right pier column at Pier 1. The spall is directly beneath the pier cap and was previously recorded as 3 SF. The exposed reinforcing within the spall has a remaining thickness of 0.625" (originally 0.750", a #6 bar). A total of two vertical bars are exposed in the spall.

IC05 Comment - Structure Unit Comments

Inspection > Notes & Comments > Structure Unit Comment Detail; BMS3: Notes

Description:

This item is used to record comments about the substructure unit selected in Item IC03.

Procedure:

Enter comments about the substructure unit selected in Item IC03 in narrative form. The "Comments Continued" field should be used when the comment is larger than can be entered into Field 1.

LB – Local Bridge Inspection App

The Local Bridge Inspection (LBI) comments fields provide five comment fields to enter narrative information about the locally owned, non-NBIS structures, similar to the Inspection Comments section of BMS2 and BMS3. These fields will only appear on the Structure Home page if the bridge is locally owned and the NBIS indicator is set equal to "No". While users can add additional comment types in BMS2, these five comment types listed below are the only comment types that sync with and appear within the LBI application.

LB01 Structure Notes – LBI Structure Notes

Inventory > Structure Home

Description:

This item is used to record general structure notes about the structure in narrative form.

Procedure:

Record any narrative information about the structure that may be helpful for future planning and inspections.

LB02 Inventory Notes – LBI Inventory Notes

Inventory > Structure Home

Description:

This item is used to record inventory notes about the structure in narrative form.

Procedure:

Record any narrative information about the inventory related coding items for the bridge. This includes indicating that an inventory field shown in the LBI App requires a change.

LB03 Configuration Notes – LBI Configuration Notes

Inventory > Structure Home

Description:

This item is used to record configuration notes about the structure in narrative form.

Procedure:

Record any narrative information about the structural configuration of the bridge. The structural configuration notes should indicate the type of structure at a minimum (Refer to Item 6A29 for examples of structural configurations).

LB04 Material Notes – LBI Material Notes

Inventory > Structure Home

Description:

This item is used to record material notes about the structure in narrative form.

Procedure:

Record any narrative information about the materials that compose the structure. This should include notes on the material that composes the deck, superstructure and substructure.

LB05 Vertical Height Notes – LBI Vertical Height Notes

Inventory > Structure Home

Description:

This item is used to record notes about the vertical clearance beneath structure in narrative form.

Procedure:

Record the vertical clearance between the bottom of the bridge and the streambed in narrative form.

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IM Inspection - Maintenance

The Inspection - Maintenance Section is used to store recommended work candidates for a structure and to record completed maintenance.

All proposed work items (bridge, element, and flexible actions) will be listed on the Proposed Maintenance screen. The Proposed Maintenance screen allows users to view work activities and track their status. All bridge maintenance, except cyclical cleaning, should be initially created in BMS2 and then sent to SAP as detailed below. This function in BMS2 supplies SAP with minimum information to initiate the notification which then becomes a work order after further review and approval. After the bridge maintenance work is completed and the information is updated in SAP, BMS2 retrieves select information from SAP and stores it on the Completed work tab.

Once the District Bridge Maintenance Coordinators and County Maintenance crews have decided on which bridge maintenance activities are to be worked on, the Bridge Maintenance Coordinators shall send maintenance items to SAP through BMS2 by doing the following: BMS2 Procedure for creating Bridge work notifications in SAP:

1. Navigate to the Proposed Maintenance screen for the desired bridge.
2. Select the desired maintenance activity that is to be sent to SAP.
3. Set Item IM07 to "1 - Work planned/Dept".
4. Set Item IM08 to the applicable year.
5. Set Item IM11 to "0 – Agency".
6. Save the changes.
7. Ensure that the maintenance activity is highlighted and click on the "Submit to SAP" button. Item IM07 will change automatically to "3 – Work Sent to SAP".
8. Once Item IM07 displays "3-Work Sent to SAP", the maintenance activity will appear in SAP/Plant Maintenance as a notification the next day. Further information and approval are necessary within SAP to develop a work order.

Only planned maintenance work should be submitted to SAP. Districts should confirm that the notification has been sent to SAP and is ready to be generated into a work order.

When maintenance work is completed and a work order is closed in SAP/Plant Maintenance, BMS2 will receive notification. Item IM07 will change to "4 – Review Required" or "5 – Completed/Dept" depending on the maintenance item (return from SAP status for each maintenance item is provided in Item IM03 table). For items returned as "4 – Review Required," after District personnel reviews the item, they will change the IM07 status to "5-Completed/Dept". The date completed, actual quantities and costs (Items IM14a, IM18, and IM19) will be taken from SAP/Plant Maintenance.

When maintenance work is completed by contractor forces, Item IM07 must be changed to "6 – Completed/Contr". Users must also update Items IM04 and IM10 with actual values on the Proposed Maintenance screen. Once changes to these items have been made and saved, the work item will be stored in the Completed Maintenance Screen. When maintenance work has been superseded due to major rehabilitation or replacement work, then Item IM07 must be changed to "7 – superseded ", and the actual date of the work should be coded in Item IM14a.

Users may update completed maintenance work items by checking the "Show Completed Work Candidates" checkbox on the Proposed Maintenance screen. Completed maintenance work items will appear and users may then edit information as needed.

When a maintenance item is created within BMS2 or BMS3, it's given a unique identifier (Item 3A02). A maintenance item can only be submitted to SAP one time. Once the unique identifier shows up in SAP, it will not accept another maintenance item with the same identifier. If a maintenance item is deleted in SAP, it cannot be resent from BMS2. A new maintenance item with a unique identifier must be created and sent to SAP in place of the deleted item.

SAP only recognizes state bridges, 8' and greater as this aligns with state bridges that integrate with RMS. While bridges less than 8' may be inventoried in BMS2 for specific reasons, maintenance items associated with the bridge cannot be submitted to SAP.

IM01 Scope – Maintenance Scope

Other > Proposed Maintenance > Proposed Maintenance Detail; BMS3: Maintenance

Description:

This display only item indicates the type of work candidate.

Procedure:

Select the type of work candidate from the dropdown list.

Coding:

Bridge	Structure replacement or improvement actions
Element	Preservation action on a particular element
Flexaction	Agency defined flexible action (All recommendations from bridge inspectors must be Flexactions)

Note:
All BMS maintenance items from the old BMS AH screen have been converted as Flexaction work candidates.

IM02 Element – Structure Unit Element

Other > Proposed Maintenance > Proposed Maintenance Detail

Description:

This item is only active for Element work candidates and used to identify the element to which the work candidate applies.

Procedure:

Select the element to which the work candidate applies from the dropdown list.

Coding:

N/A will be displayed for Bridge and Flexaction work candidates. For Element work candidates, the dropdown list provides all available BMS2 elements used to define a bridge structure. Refer to Appendices H, I, & J for guidance on coding element quantities.

IM03 Action – Maintenance Action

Other > Proposed Maintenance > Proposed Maintenance Detail; BMS3: Maintenance

Description:

This item is used to select the action that should be performed for the work candidate.

Procedure:

Select the action that should be performed for the work candidate from the dropdown list. This is a required item for any maintenance activity recommended by an inspector. The number in front of the Flexaction selection represents the number assigned in the applet software.

Only one priority code may be entered for each maintenance activity. In the case of multiple instances of the same maintenance activity, enter only the highest priority code.

Coding:

When Item IM01 = "Bridge", the following actions are available to choose from:

ID	Description
11	Replace – Replace entire structure
12	Repl Super – Replace Superstructure
13	Remove – Remove entire structure
21	Widen – Widen structure
22	Raise – Raise superstructure
23	Strengthen – Strengthen structure
24	Scour – Install scour protection (Do not use)
25	Seismic – Install seismic retro-fit
26	Fatigue – Install fatigue retro-fit
50	Crib – Install Cribbing
60	Other – Other bridge actions

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When Item IM01 = "Flex Action", the following actions are available to choose from:

Group	Activity	Identifier (IM03)	Default SAP Assembly Number	Unit	Category*	Review Required after SAP?	Available on Other Structure Types?		
							Sign/ Light	Walls	Tunnels
APPR. ROADWAY	Pavement (Patch/Raise)	40-RDPAVMT	711-7442-01	SY	Other				X
APPR. ROADWAY	Pavement Relief Jt. (Rep/Repl)	41-RDRLFJT	711-7442-02	SY	Other				X
APPR. ROADWAY	Shoulders (Repair/Reconstr)	46-RDSHLDR	711-7442-01	SY	Other				X
APPR. ROADWAY	Drainage-Off Bridge (Improve)	47-RDDRAIN	711-7460-01	EA	Other			X	X
APPR. ROADWAY	Guide Rail (Connect to Bridge)	27-RDGDERL	711-7434-01	EA	Other		X	X	X
APPR. ROADWAY	Load Limit Signs (Replace)	70-RDLDSGN	713-7624-01	EA	Other	X			X
APPR. ROADWAY	Clearance Signs (Replace)	51-RDCLSGN	713-7624-01	EA	Other	X		X	X
APPR. ROADWAY	Cut Brush to Clear Signs	24-RDBRUSH	711-7457-01	EA	Other		X	X	X
APPR. ROADWAY	Approach Slab (Replace)	64-A744201	711-7442-01	SY	Other	X			X
CLEAN/FLUSH	Deck	23-A743101	711-7431-01	EB	Cleaning				X
CLEAN/FLUSH	Scupper/Down spouting	1-B743101	711-7431-01	EB	Cleaning				X
CLEAN/FLUSH	Bearing/Bearing Seat	8-C743102	711-7431-02	EB	Cleaning				
CLEAN/FLUSH	Steel-Horizontal Surfaces	34-D743102	711-7431-03	EB	Cleaning		X		
CLEAN/FLUSH	Brush Clearing	92-BRSHCLR	711-7423-01	EB	Cleaning		X	X	
DECK	Asphalt Deck W. Surf (Rep/Repl)	10-BITWRGS	711-7443-01	SY	Bridge	X			
DECK	Timber Deck (Rep/Repl)	35-B744301	711-7443-01	SY	Bridge	X			
DECK	Open Steel Grid (Rep/Repl)	37-C744302	711-7443-01	SY	Bridge	X			
DECK	Concrete Deck (Repair)	6-D744303	711-7443-04	SY	Bridge	X			
DECK	Concrete Sidewalk (Repair)	39-E744303	711-7443-02	SY	Bridge	X			
DECK	Concrete Curb/Parapet (Rep)	21-F744303 (5)	711-7443-02	SY	Other	X			
DECK	Install New PPC Overlay	97-New PPC Overlay	711-7449-02	SY	Bridge	X			
DECK	Install New Epoxy Overlay	98-New Epoxy Overlay	711-7449-01	SY	Bridge	X			
DECK JOINTS	Reseal	2-A743301 (3)	711-7433-01	LF	Bridge	X			
DECK JOINTS	Repair/Reseal	4-A744101 (3)	711-7433-02	LF	Bridge	X			
DECK JOINTS	Compression Seal (Rep/Rehab)	33-B744102	711-7433-02	LF	Bridge	X			
DECK JOINTS	Modular Dam (Rep/Rehab)	53-C744102	711-7433-02	LF	Bridge	X			
DECK JOINTS	Steel Dams (Rep/Rehab)	20-D744102	711-7433-02	LF	Bridge	X			
DECK JOINTS	Other Types (Rep/Rehab)	9-E744102	711-7433-02	LF	Bridge	X			
RAILING	Bridge/Parapet (Rep/Repl)	7-RLGBRPR (5)	711-7434-01	LF	Bridge		X	X	X
RAILING	Struct Mount (Rep/Repl)	17-RLGSTRM (5)	711-7434-01	LF	Bridge			X	X
RAILING	Pedestrian (Rep/Repl)	18-RLGPEDN	711-7434-01	LF	Bridge			X	X
RAILING	Median Barrier (Rep/Repl)	58-RLGMEDB	711-7434-01	LF	Other		X		X
DECK DRAIN	Scupper Grate (Replace)	52-DRNGRAT	711-7444-01	EA	Bridge	X		X	X
DECK DRAIN	Drain/Scupper (Install)	31-B744401	711-7444-01	EA	Bridge			X	X
DECK DRAIN	Down spouting (Rep/Repl)	14-C744402	711-7444-01	EA	Bridge			X	
BEARINGS	Lubricate	66-A743501	711-7435-01	EA	Other				
BEARINGS	Steel (Rep/Rehab)	44-A744501	711-7435-02	EA	Other	X			
BEARINGS	Steel (Replace)	61-B744501	711-7435-02	EA	Bridge	X			
BEARINGS	Expansion (Reset)	68-C744502	711-7435-02	EA	Bridge	X			
BEARINGS	Pedestal/Seat (Reconstruct)	45-D744503	711-7435-03	EA	Bridge	X			
TIMBER	Stringer (Rep/Repl)	62-A744601	711-7446-01	EA	Bridge	X			
TIMBER	Other Members (Rep/Repl)	60-B744601	711-7446-01	EA	Bridge	X		X	
STEEL	Stringer (Rep/Repl)	25-A744602 (4)	711-7446-01	EA	Bridge	X			
STEEL	Floorbeam (Rep/Repl)	50-B744602	711-7446-01	EA	Bridge	X			
STEEL	Girder (Repair)	49-C744602 (4)	711-7446-01	EA	Bridge	X			
STEEL	Diaph/Lat. Bracing (Rep/Repl)	54-D744602	711-7446-01	EA	Bridge	X			
REINF./P.S. CONC.	Stringer (Rep/Repl)	42-A744603	711-7446-01	EA	Bridge	X			
REINF./P.S. CONC.	Diaphragm (Rep/Repl)	69-B744603	711-7446-01	EA	Bridge	X			
REINF./P.S. CONC.	Other Members (Rep/Repl)	26-C744603	711-7446-01	EA	Bridge	X			
TRUSS	Members (Strengthen/Rep/Repl)	36-A744701	711-7447-01	EA	Bridge	X			
TRUSS	Portal (Modify)	82-B744701	711-7447-01	EA	Bridge	X			
TRUSS	Members (Tighten/Flame shorten)	71-C744702	711-7447-01	EA	Bridge	X			
PAINTING	Superstructure - Spot	57-A743201	711-7432-01	EB	Bridge				X
PAINTING	Substructure - Spot	16-B743201	711-7432-01	EB	Bridge				X
PAINTING	Superstructure - Full	65-C743201	711-7432-02	EB	Bridge	X			X
PAINTING	Substructure - Full	79-D743201	711-7432-02	EB	Bridge	X			X
SUBSTRUCTURE	Backwall (Rep/Repl)	38-A744801	711-7448-01	CY	Bridge	X			
SUBSTRUCTURE	Abutments (Repair)	28-B744802	711-7448-02	CY	Bridge	X			
SUBSTRUCTURE	Wing (Rep/Repl)	15-C744802	711-7448-02	CY	Bridge	X			
SUBSTRUCTURE	Piers (Repair)	32-D744802	711-7448-02	CY	Bridge	X			
SUBSTRUCTURE	Footing (Underpin)	22-E744803	711-7448-03	CY	Bridge	X		X	
SUBSTRUCTURE	Masonry (Repoint)	19-F744804	711-7450-01	LF	Bridge	X			
SUBSTRUCTURE	Abut. Slopewall (Rep/Repl)	56-A745101	711-7451-01	SY	Other	X			
SUBSTRUCTURE	Abut. Slopewall (Construct New)	43-B745102	711-7451-01	CY	Other	X			
SUBSTRUCTURE	Pile Repair	67-A745901	711-7448-02	EA	Bridge	X		X	

* Category: Bridge = Bridge Maintenance Tunnel = Tunnel Maintenance Cleaning = Bridge Cleaning Other = Other Structural Actions

Group	Activity	Identifier (IM03)	Default SAP Assembly Number	Unit	Category*	Review Required after SAP?	Available on Other Structure Types?		
							Sign/ Light	Walls	Tunnels
SCOUR CONTROL	Stream Bed Paving (Rep/Constr)	30-A745301	711-7453-01	CY	Bridge	X		X	
SCOUR CONTROL	Rock Protection	13-B745301 (1)	711-7453-01	CY	Bridge	X		X	
SCOUR CONTROL	Scour Hole (Backfill)	11-C745301 (1)	711-7453-02	CY	Bridge	X		X	
SCOUR CONTROL	Stream Deflector (Rep/Constr)	55-D745302	711-7453-01	CY	Bridge	X		X	
SCOUR CONTROL	Vegetation/Debris (Remove)	3-ECREMVG (2)	711-7453-03	CY	Bridge	X		X	
SCOUR CONTROL	Deposition (Remove)	12-ECREMDP (2)	711-7453-03	CY	Bridge	X		X	
CULVERT	Headwall/Wings (Rep/Repl)	29-A745201	711-7452-01	SY	Bridge	X			
CULVERT	Apron/Cutoff Wall (Rep/Repl)	63-B745202	711-7452-01	SY	Bridge				
CULVERT	Barrel (Repair)	48-C745203	711-7452-02	SY	Bridge	X			
SIGN STR.	Sign Struct (Rep/Repl)	75-SSSTRUC	713-7629-01	EA	Other	X	X		
SIGN STR.	Sign Attach (Rep/Repl)	74-SSATTAC	713-7629-01	EA	Other		X		
SIGN STR.	Sign Str Surface Spot	86-SSSURVS	713-7624-02	SF	Other		X		
SIGN STR.	Lighting Sys (Rep/Repl)	73-SSLIGHT	713-7671-01	EA	Other		X		
SIGN STR.	Sign Access (Rep/Repl)	87-SSACCES	713-7629-01	EA	Other		X		
SIGN STR.	Struct Connection (Repl)	78-SSCONNT	713-7629-01	EA	Other	X	X		
SIGN STR.	Foundation (Rep/Repl)	72-SSFOUND	713-7629-01	EA	Other	X	X		
RET. WALLS	Retaining Wall (Rep/Repl)	77-RTWALLR	711-7332-01	LF	Other	X		X	
RET. WALLS	Facing (Rep/Repl)	83-RTFACNG	711-7332-01	SY	Other			X	
RET. WALLS	Regrading	88-RTGRADE	711-7332-01	CY	Other			X	
RET. WALLS	Drainage (Rep/Repl)	85-RTDRAIN	711-7332-01	EA	Other			X	
RET. WALLS	Tie Back Connections (Rep/Repl)	84-RTTIEBK	711-7332-01	EA	Other			X	
PROT. COATING	Deck/Parapets/Sidewalk	80-A743401	711-7459-01	SY	Other			X	X
PROT. COATING	Substructure	5-B743401	711-7459-01	SY	Other			X	X
CONST. TEMP.	Support Bent	59-A745401	711-7454-01	SY	Other	X			
CONST. TEMP.	Pipes	81-B745401	711-7454-01	EB	Other	X			
CONST. TEMP.	Bridge	76-C745401	711-7454-01	EB	Other	X			
CONST. NEW	Bridge	90-A742501	711-7425-01	EB	Other	X			
CONST. NEW	Culvert	91-B742501	711-7455-01	EB	Other	X			
COMB. MATL.	On-Site Review Required by PennDOT	96-Combust	711-7490-01	EB	Other	X	X	X	X
RECOV. BRG DAM.	Recov. Bdg. Dam. – Known Accident	99-RECDAMG	612-2533-01	EB	Other	X	X		X

* Category: Bridge = Bridge Maintenance Tunnel = Tunnel Maintenance Cleaning = Bridge Cleaning Other = Other Structural Actions

The following notes are provided to assist inspectors with the selection of the correct maintenance items. This guidance is expanded upon with photographs in **Publication 55**.

(1) 11-C745301 (Scour Hole) vs 13-B745301 (Rock Protection); 11-C745301 should be used when a scour hole has been detected during a bridge inspection and requires repairs. This may include the installation of rip rap. 13-B745301 is for the installation of rock protection as a preventative measure to protect against scour or to replace rock protection that was washed away but a scour hole has not yet formed.

(2) 3-ECREMVG (Vegetation/Debris) vs 12-ECREMDP (Deposition); 3-ECREMVG is to be used when removing and disposing of vegetation and debris which is growing or has collected around substructure units. 12-ECREMDP is to be used when material is deposited during periods of high water, especially if the material is deposited in a manner that will change the direction or velocity of the flow increasing the possibility of scour.

(3) 2-A743301 (Reseal) vs 4-A744101 (Repair/Reseal); 2-A743301 should be used when only the seal portion of the joint requires repair. 4-A744101 should be used when the seal and the concrete header require repair.

(4) 25-A744602 (Stringer) vs 49-C744602 (Girder); 25-A744602 is specifically to be used for the repair of rolled sections. 49-C744602 is to be used for all built-up (riveted, welded, bolted) beams. These maintenance items should be coded based on the physical make-up of the material, not necessarily the structure type. For example, if the girder in a GFS structure type is rolled, it should be a 25-A744602 repair.

(5) 7-RLGBRPR (Bridge/Parapet) vs 17-RLGSTRM (Struct Mount) vs 21-F744303 (Concrete Curb); 7-RLGBRPR is to be used for repairing or replacing parapet mounted metal railing and for elimination of open deflection joints in the barriers of non-composite prestressed box beam structures. 17-RLGSTRM is to be used for repair or replacing all portions of a structure mounted metal railing, structure mounted guide rail, or concrete parapet. 21-F744303 is to be used for repairs of a concrete curb and repair/replacement of precast barrier.

When Item IM01 = "Flex Action" for a Tunnel, the following actions are available to choose from:

Group	Identifier (IM03)	Activity	Default SAP Assembly Number	Unit	Category*	Tunnels
CIVIL	101	Wearing Surface (Repair)	711-7422-02	EA	Tunnel	X
CIVIL	102	Roadway Traffic Barrier (Repair)	711-7422-03	EA	Tunnel	X
TRAFFIC	103	Lane Signal (Repair/Replace)	711-7422-04	EA	Tunnel	X
TRAFFIC	104	Traffic Sign (Repair/Replace)	711-7422-05	EA	Tunnel	X
TRAFFIC	105	Overheight Truck Warning System (Repair/Replace)	711-7422-06	EA	Tunnel	X
LIGHTING SYSTEM	106	Tunnel Light System (Repair)	711-7423-02	EA	Tunnel	X
ELECTRICAL SYSTEM	107	Switchgear (Repair/Replace)	711-7424-02	EA	Tunnel	X
ELECTRICAL SYSTEM	108	Motor Control Center (Repair/Replace)	711-7424-03	EA	Tunnel	X
ELECTRICAL SYSTEM	109	Transformer (Repair/Replace)	711-7424-04	EA	Tunnel	X
ELECTRICAL SYSTEM	110	Transfer Switch (Repair/Replace)	711-7424-05	EA	Tunnel	X
ELECTRICAL SYSTEM	111	Panelboard (Repair/Replace)	711-7424-06	EA	Tunnel	X
ELECTRICAL SYSTEM	112	UPS Unit (Repair/Replace)	711-7424-07	EA	Tunnel	X
STRUCTURAL	113	Liner (Repair)	711-7426-02	EA	Tunnel	X
STRUCTURAL	114	Tunnel Roof/Ceiling Girders (Repair)	711-7426-03	EA	Tunnel	X
STRUCTURAL	115	Cross-Passageway (Repair)	711-7426-04	EA	Tunnel	X
STRUCTURAL	116	Interior Walls (Repair)	711-7426-05	EA	Tunnel	X
STRUCTURAL	117	Tunnel Portal (Repair)	711-7426-06	EA	Tunnel	X
STRUCTURAL	118	Invert Slab/Slab-on-Grade (Repair)	711-7426-07	EA	Tunnel	X
STRUCTURAL	119	Invert Girders (Repair)	711-7426-08	EA	Tunnel	X
STRUCTURAL	120	Tunnel Joint (Repair/Replace)	711-7426-09	EA	Tunnel	X
STRUCTURAL	121	Other Structural Maintenance	711-7426-10	EA	Tunnel	X
MECHANICAL SYSTEM	122	Ventilation System/Fans (Repair/Replace)	711-7427-02	EA	Tunnel	X
MECHANICAL SYSTEM	123	Draining/Pumping System (Repair/Replace)	711-7427-03	EA	Tunnel	X
MECHANICAL SYSTEM	124	Emergency Generator System (Repair/Replace)	711-7427-04	EA	Tunnel	X
FIRE/LIFE SAFETY/SECURITY SYSTEMS	125	CO2 Monitoring System (Repair/Replace)	711-7428-02	EA	Tunnel	X
FIRE/LIFE SAFETY/SECURITY SYSTEMS	126	Fire Protection System (Repair/Replace)	711-7428-03	EA	Tunnel	X
FIRE/LIFE SAFETY/SECURITY SYSTEMS	127	Emergency Communication System (Repair/Replace)	711-7428-04	EA	Tunnel	X
FIRE/LIFE SAFETY/SECURITY SYSTEMS	128	Operations and Security System (Repair/Replace)	711-7428-05	EA	Tunnel	X
PROTECTIVE SYSTEMS	129	Fire Protective Coating (Repair/Replace)	711-7428-06	EA	Tunnel	X
PROTECTIVE SYSTEMS	130	Concrete Corrosion Protective Coating (Repair/Replace)	711-7428-07	EA	Tunnel	X
* Category: Bridge = Bridge Maintenance Tunnel = Tunnel Maintenance Cleaning = Bridge Cleaning Other = Other Structural Actions						

IM04 Est Quantity - Estimated Quantity

Other > Proposed Maintenance > Proposed Maintenance Detail; BMS3: Maintenance

Description:

This item is used to record the estimated quantity of the bridge maintenance activity.

Procedure:

Enter the estimated quantity of the maintenance activity. The unit of measure will depend on the activity selected in Items IM02 or IM03.

Coding:

Estimated quantity in whole numbers. Use standard rounding convention (0.5 and higher, round up; <0.5, round down) with a minimum estimated quantity value of "1".

IM05 Priority – Maintenance Priority

Other > Proposed Maintenance > Proposed Maintenance Detail; BMS3: Maintenance

Description:

This item is used to establish the urgency at which a selected action shall take place. The priority for an identified remedial action may evolve into a more urgent priority if the action is not completed as scheduled.

Procedure:

When a bridge inspector identifies Flexaction work candidates, each Action in Item IM03 must be assigned a Priority code. Select the code from the dropdown list for the Flexaction work candidate. This item is a required field for all Flexactions.

The priority for the Action identified may evolve into a more urgent priority if repairs are not completed.

Coding:

		Short Definition	Action Timeframe
0	**CRITICAL**	Immediate response required	(within 7 days)
1	**HIGH PRIORITY**	As soon as work can be scheduled	(within 6 months)
2	**PRIORITY**	Review work plan and re-prioritize schedule.	(routine inspection interval)
3	**SCHEDULE**	Add to scheduled work.	(Add to schedule)
4	**PROGRAM**	Add to programmed work	(when funds are available)
5	**ROUTINE**	Non-structural.	(can be delayed until programmed)

Notes:

1) The District Bridge Engineer (and owner for non-PennDOT bridges) must be advised of conditions that warrant a Priority code 0 or 1 Flexaction work candidate, and must accept this coding before Item 1A07 is changed to Approved. See Publication 238 Sections 2.13 and 2.14 for specific guidance and required actions for Priority Codes 0 and 1.
2) The action timeframe for a Priority 2 repair is the same as the routine inspection interval for the bridge (e.g., a bridge with a 48-month routine inspection interval will have a 4-year action timeframe but a bridge with a 24-month routine inspection interval will have a 2-year action timeframe).
3) All Flexactions must be recorded and input into BMS2 regardless of assigned Priority code.
4) If priority changes occur for a maintenance action that has not been sent to SAP, the previous priority(ies) along with original supporting information must be documented in the notes field.

5) If priority changes occur for a maintenance action that has already been sent to SAP, the item cannot be resent to SAP. The priority change should be documented in the IM15 notes field and county maintenance should be made aware of the new time frame.

Priority Code Guidelines:

Bridge inspectors and reviewers must use sound judgment when determining the Priority of Flexaction repairs / maintenance activities. To support this effort, Priority code rating definitions and application examples are provided below. **The priority code numbers below consist of two parts with the first part representing the priority and the second part is sequential numbering. The examples listed are organized by general location at the bridge site and are provided for guidance only. They should not be considered all inclusive, or comprehensive.**

Priority Code 0 – CRITICAL

If not addressed immediately, such deficiencies could directly or indirectly cause partial or total structure collapse resulting from component instability and/or localized element failure; or result in loss of vehicle operator control; or failure to contain errant vehicles on the bridge deck. Emergency Flexaction work (e.g. repair, replacement, posting/closing) is necessary to immediately mitigate the structural safety deficiencies with the required timeframe.

Examples for Priority Code 0 - CRITICAL

Selected condition examples for Flexaction work Priority code – 0 are provided below.

Bridge Signing Examples

0-1. **Deficient Legal Signing:** Includes missing, damaged, improperly located, or visually obstructed load posting or vertical clearance signs (includes relevant advance warning signs). This includes any deficiency that prevents the signs from functioning as intended. This priority 0 scenario only applies to posting signs established before the inspection. A posting timeframe of 30-days shall be used for all Priority 0 scenarios. A local bridge with a Priority 0 can be mitigated to a Priority 1 if the local owner provides documentation the signs were ordered and the documentation is available in BMS2. Use Priority 2 for supplemental signs, damaged signs which are still legible, and vertical clearance signs which do not include a 3" buffer.

Applicable Flexactions include:

APPROACH ROADWAY: 70-RDLDSGN - Load Limit Signs (Replace)
51-RDCLSGN - Clearance Signs Replace, and
24-RDBRUSH - Cut Brush to Clear Signs

Deck Examples

0-2. **Deteriorated NHS Route Bridge Railing:** Bridge parapet, median barrier or structure-mounted guide rail on NHS routes with structural components damaged or deteriorated to a point that the parapet/railing is in serious condition and may not contain and/or redirect an errant vehicle traveling at the posted speed limit. Use Priority code 1 for Non-NHS Routes. Use Priority code 3 for bridges with railings that are not adequate for the site that need upgraded to a current railing but are still functioning as designed.

Applicable Flexactions include (Refer to IM03 for clarification on when to use items 7 and 17):

RAILING: 7-RLGBRPR - Bridge/Parapet (Rep/Repl)
17-RLGSTRM - Struct Mount (Rep/Repl)
58-RLGMEDB - Median Barrier (Rep/Repl)

0-3. **Unacceptable Pedestrian Railing:** Missing or detached pedestrian rail that would allow an individual to fall off the structure.

Applicable Flexactions include:

RAILING: 18-RLGPEDN - Pedestrian (Rep/Repl)

0-4. **Hazardous Sidewalk Conditions:** Applicable to structural components of the sidewalk/sidewalk supports and the walking surface such that damage/deterioration presents a hazard to pedestrians due to load carrying capacity on the structure and not along approaches. Approach sidewalk defects should be addressed using approach roadway maintenance items. (Note that a minor height difference between the approach and bridge sidewalk should not dictate a Priority 0 code).

Applicable Flexactions include:

DECK: 39-E744303 - Concrete Sidewalk (Repair)

0-5. **Severely Deteriorated Expansion Joints:** Applicable to mechanical expansion devices when loose, damaged or deteriorated steel expansion joint armor or joint components present a hazard to vehicles.

Applicable Flexactions include:

DECK JOINTS: 33-B744102 - Compression Seal (Rep/Rehab)
53-C744102 - Modular Dam (Rep/Rehab)
20-D744102 - Steel Dams (Rep/Rehab)
9-E744102 - Other Types (Rep/Rehab)

0-6. **Traffic Obstructions:** Applies to guide rail connections to bridge rail, concrete barrier rebar, or metallic railing that has come detached and is in close proximity to traffic with the potential for impact.

Applicable Flexactions include (Refer to IM03 for clarification on when to use items 7, 17, and 21):

APPROACH ROADWAY: 27-RDGDERL - Guide rail (Connect to Bridge)
RAILING: 7-RLGBRPR - Bridge/Parapet (Rep/Repl)
17-RLGSTRM – Struct Mount (Rep/Repl)
21-F744303 – Concrete Curb/Parapet (Rep)

0-7. **Hazardous Deck Conditions:** Applicable to deficiencies within the traffic lanes or within 2 feet outside of travel lanes that pose a safety hazard to the traveling public, including, but not limited to:

a. Broken scupper grates where sufficient separation exists between bars to trap bicycle tires or cause loss of control.
b. Spalls in concrete decks extending below the top mat of reinforcement.
c. Holes in corrugated steel flooring for Asphalt-filled pan deck.

Applicable Flexactions include:

DECK: 35-B744301 - Timber Deck (Rep/Repl)
6-D744303 - Concrete Deck (Repair)
37-C744302 - Open Steel Grid (Rep/Repl)
DECK DRAIN: 52-DRNGRAT – Scupper Grate (Replace)

Note: Applies to bridges used for bicycle traffic in addition to vehicular traffic.

Superstructure Examples

0-8. **Severe Impact Damage:** Vehicular collision damage that compromises the structural capacity of a primary member, including, but not limited to:

a. Damage to steel beams where beam flanges have fractures, large gouges or where significant sweep, twisting or kinking of beams has been introduced by the collision impact.
b. Damage to timber beams where deep gouges or section loss have removed over 25% of the cross-section, and/or full length horizontal cracking is present.

c. Damage to P/S and CIP concrete beams where severed P/S tendons or reinforcing steel results in transverse flexure cracking and negative beam camber, and/or capacity of the damaged beam is less than sufficient to keep the bridge open.
d. Damage to truss compression members such that loss of cross-sectional area or damaged reinforcing steel results in the onset of buckling or severe flexural cracking that now threatens the safety of the bridge.

This applies to bridges that have been recently hit by over-height vehicles, and also existing impact damage.

Applicable Flexactions include(Refer to IM03 for clarification on when to use items 25 and 49):

TIMBER:	62-A744601 - Stringer (Rep/Repl)
STEEL:	25-A744602 - Stringer (Rep/Repl)
	50-B744602 - Floorbeam (Rep/Repl)
	49-C744602 - Girder (Repair)
REINF. CONC./ PRESTRESSED CONC.:	42-A744603 - Stringer (Rep/Repl)
TRUSS:	36-A744701 - Members (Strengthen/Rep/Repl)
	82-B744701 - Portal (Modify)

0-9. **Non-Redundant Steel Tension Members (NSTM):**

a. **Impact Damage**: Impact damage that results in gouging or tearing of NSTM components in tension. Since gouging/tearing are considered locations of stress risers and crack initiation points in a tension member, unexpected fracture could result.

b. **Direct Stress Cracks:** Direct stress cracks are those in the base metal or weld materials that are perpendicular to the tensile stress carried by the member. Use Priority code 1 if supported by a structural evaluation. NSTM examples include, but are not limited to:

- Truss members in direct tension or reversible tension/compression including welded or riveted members, eyebars, and loop rods.
- Tension zones of gusset plates connecting NSTMs.
- Tension component or tension zone of a girder, cross girder, steel pier cap, or floorbeam.

c. **Severe Corrosion:** Holes due to corrosion in NSTM girder flanges, webs or in truss members.

d. **Cracks Parallel to Stress in NSTMs:** Initial cracking found in the tension zone of NSTMs that is oriented parallel to the primary stress carried by the member. This type of cracking may be the result of out-of-plane distortion, bi-axial restraint or poor weld details, and could suddenly change direction under service conditions without mitigation and become more serious.

Applicable Flexactions include:

STEEL:	50-B744602 - Floorbeam (Rep/Repl)
	49-C744602 - Girder (Repair)
TRUSS:	36-A744701 - Members (Strengthen/Rep/Repl)

0-10. **Deteriorated Pin-Hanger Assemblies in NSTMs:** Severe deterioration to any components of the pin and hanger system or severe accumulation of debris or rust packing. Failure of pin hanger to expand or contract. Applies to pin-hanger assemblies without a redundant catcher system Retro-Fit.

Applicable Flexactions include:

STEEL:	49-C744602 - Girder (Rep/Repl)

0-11. **Non-NSTM Steel Fractures:** A steel member with a completely separated tension member component (I.E. the tension flange of a beam) due to fatigue cracking or vehicular impact.

Applicable Flexactions include:

STEEL:	25-A744602 - Stringer (Rep/Repl)
	50-B744602 - Floorbeam (Rep/Repl)
	49-C744602 - Girder (Repair)
TRUSS:	36-A744701 - Members (Strengthen/Rep/Repl)

0-12. **Severe Web Section Loss:** Severe web corrosion of adjacent beam ends on a steel multi-beam bridge or stringers on a Girder-Floorbeam-Stringer (GFS) or Truss-Floorbeam-Stringer (TFS) bridge or on individual GFS girders or floorbeams; that substantially reduces shear capacity or demonstrates the onset of web crippling (NOTE: the onset of web crippling is not required to make the priority a "0").

Applicable Flexactions include:

STEEL:	25-A744602 - Stringer (Rep/Repl)
	50-B744602 - Floorbeam (Rep/Repl)
	49-C744602 - Girder (Repair)

0-13. **Horizontal Web Cracks:** Web cracks on primary members due to out-of-plane bending and/or secondary stresses that substantially reduce shear capacity to levels less than sufficient to keep the bridge open.

Applicable Flexactions include:

STEEL:	25-A744602 - Stringer (Rep/Repl)
	50-B744602 - Floorbeam (Rep/Repl)
	49-C744602 - Girder (Repair)

0-14. **Cracked Cover Plate Welds:** One or more transverse cracks in the bottom flange at the end of a partial length welded cover plate of steel multi-girder, or steel floorbeam.

Applicable Flexactions include(Refer to IM03 for clarification on when to use items 25 and 49):

STEEL:	25-A744602 - Stringer (Rep/Repl)
	50-B744602 - Floorbeam (Rep/Repl)
	49-C744602 - Girder (Repair)

0-15. **Severe Deterioration of Timber Primary Members:** Timber members with multiple open cracks in high stress regions, or have locations where crushing has occurred or exhibit significant rot such that superstructure settlement has occurred or can be anticipated to occur.

Applicable Flexactions include:

TIMBER:	62-A744601 - Stringer (Rep/Repl)

0-16. **Deteriorated Non-Composite Adjacent Box Beam:** Serious deterioration where Item 1A04 is ≤ 3 due to strand loss, loss of camber or torsional cracking. For bridges already load posted due to this condition, use Priority 1.

Applicable Flexactions include:

REINF CONC./ PRESTRESSED CONC.:	42-A744603 - Stringer (Rep/Repl)

0-17. **Falling Concrete:** Delaminated or partially detached overhead concrete that may fall on vehicles and/or pedestrians under the bridge.

Applicable Flexactions include:

REINF CONC./ PRESTRESSED CONC.:	42-A744603 - Stringer (Rep/Repl)
	6-D744303 - Concrete Deck (Repair)

Culvert Examples

0-18. **Unacceptable Out-of-plane Distortion of Corrugated Metal Arch Culverts:** Distortion (e.g. bulging or flattening) of arch barrel greater than 3 inches out-of-plane caused by corrosion due to age and/or conditions.

Applicable Flexactions include:

CULVERT:	48-C745203 – Barrel (Repair)

0-19. **Severe Corrosion and Section Loss of Corrugated Metal Arch Culverts:** Severe corrosion, typically at longitudinal seams, resulting in visible holes/perforations in approximately 50% or more of the corrugations along a 4-foot length or in the loss or ineffectiveness of approximately 50% or more of the bolts/nuts along a 4-foot length of a longitudinal seam. In conjunction with corrosion, out of plane distortion or bulging may be present.

Applicable Flexactions include:

CULVERT:	48-C745203 – Barrel (Repair)

0-20. **Severe deterioration on stone masonry arch:** Applicable where stone masonry exhibits excessive loose and missing stones, loss of fill, wide cracks, unstable bulged areas, etc, that have severely reduced the capacity of the arch barrel.

Applicable Flexactions include:

CULVERT:	48-C745203 – Barrel (Repair)

Substructure Examples

0-21. **Severe Impact Damage:** Vehicular collision damage that compromises the structural capacity of a pier shaft, column, or cap wall.

Applicable Flexactions include:

ABUTMENT - WING - PIER, etc.:	32-D744802 - Piers (Repair)

0-22. **Severe NSTM Support Damage:** Severe structural cracking in a concrete pier column or cap supporting a NSTM bridge. (Ex. NSTM cross girder or pier cap supported by a concrete column/shaft).

- "Severe structural cracking" should be considered as cracks **≥ 1/2" wide** and that would be developed due to loss of bond or yielding of the reinforcement and possibly identified by movement between pieces of the cracked element segmented by the crack.

Applicable Flexactions include:

ABUTMENT - WING - PIER, etc.:	32-D744802 - Piers (Repair)

0-23. **Severe Bearing Seat Damage:** Severely deteriorated or undermined beam seat (loss of bearing area ≥ 40%).

Applicable Flexactions include:

BEARINGS:	45-D744503 - Pedestal/Seat (Reconstruct)

0-24. **Critical Rocker Bearing Tilt:** Applicable where one or more rocker bearings in a line exceed its maximum movement capacity, bearing on the outer one-quarter width of the rocker (Pier) or the outer one-tenth width of the rocker (Abutment). See Pub 238 for sample calculations. A spreadsheet is available on the BMS2 Home screen to perform the rocker bearing calculations.

Applicable Flexactions include:

BEARINGS:	68-C744502 - Expansion (Reset)

44-A744501 - Steel (Rep/Rehab)
61-B744501 - Steel (Replace)

Note: Include a note in Item IM15a such as – "Bearings exceed acceptable limit of tilt," or "Bearing on outer one-quarter width of rocker base."

0-25. **Severe timber pile, cribbing, and cap deterioration:** Applicable to timber substructures that have loss of bearing capacity or soil retention through crushing, rot, or infestation.

Applicable Flexactions include:

TIMBER: 60-B744601 - Other members (Rep/Repl)

Note: Include a note in Item IM15a indicating the type/cause, location, and extent of the damage.

0-26. **Excessive substructure (non-pier) rotation:** Applicable to abutments and their associated wingwalls, where rotation has resulted in one of the following:

a) Slope failure and subsidence adjacent to nearby roadways resulting in foundation damage
b) The abutment/wingwall is out-of-plumb by more than or equal to 3%(1.7 degrees)
c) Any rotation resulting in out-of-plane measurements greater than or equal to 6 inches.

A priority 1 may be considered if the abutment/wingwall has been stable for 6 years minimum (with evidence noted during previous inspections). Consideration shall be given to the flexibility of the wall when determining the proper maintenance code (For example, soldier pile walls are flexible and are designed to allow more rotation). In addition, the distance from the wall to the roadway and the type of roadway shall be considered when assigning the priority.

Applicable Flexactions include:

ABUTMENT - WING: 28-B744802 – Abutments (Repair)
15-C744802 – Wing (Rep/Repl)

Note: An angle gauge and some levels can be used to directly measure the degree of tilt. A plumb bob or a standard level could also be utilized and will require a calculation (For example, an inspector measures an abutment has rotated 2.5" over a 4' length. This corresponds to 2.5"/48" = 5.2% out of plumb.) Use the following table as a guide.

Wall Rotation		Wall Height	Lateral Movement	Maintenance
(Degrees)	(%)	(ft)	(in)	Priority
1.7	3.0%	10	3.6	Priority 0
1.7	3.0%	15	5.4	Priority 0
1.7	3.0%	20	7.2	Priority 0
1.7	3.0%	25	9.1	Priority 0
1.7	3.0%	30	10.9	Priority 0
1.7	3.0%	35	12.7	Priority 0
1.1	2.0%	10	2.4	Priority 1
1.1	2.0%	15	3.6	Priority 1
1.1	2.0%	20	4.8	Priority 1
1.1	2.0%	25	6.0	Priority 0
1.1	2.0%	30	7.2	Priority 0
1.1	2.0%	35	8.4	Priority 0

0-27. **Severe substructure deterioration on stone masonry substructures:** Applicable where stone masonry exhibits excessive loose and missing stones, loss of fill, wide cracks, unstable bulged areas, etc., that have severely reduced the capacity of the substructure unit.

Applicable Flexactions include:

ABUTMENT – WING -: PIER	28-B744802 – Abutments (Repair)
	15-C744802 – Wing (Rep/Repl)
	32-D744802 - Piers (Repair)

Sign Structure Examples

0-28. **Severe Impact Damage:** Vehicular collision damage to the connections and members for structure mounted signs, and cantilever or truss posts, chords or diagonals for overhead sign structures such that the cross section area results on the onset of buckling or flexural cracking that threatens the safety of the sign structure.

Applicable Flexactions include:

SIGN STRUCTURES:	75-SSSTRUC - Sign Struct (Rep/Repl)
	74-SSATTAC - Sign Attach (Rep/Repl)
	78-SSCONNT - Struct Connection (Repl)

0-29. **Severe Sign Structure Member or Attachment Section Loss:** Severe section loss of sign structure member, splice plates, or attachment such that the ability of the structure to carry the load is compromised to the point of imminent failure. Missing fasteners between the sign and the mount. Missing nuts or bolt attachment failures at the column base plate connection to the foundation. Loose or missing nuts and bolts on cantilevers are considered a critical deficiency.

Applicable Flexactions include:

SIGN STRUCTURES:	75-SSSTRUC - Sign Struct (Rep/Repl)
	74-SSATTAC - Sign Attach (Rep/Repl)
	78-SSCONNT - Struct Connection (Repl)

0-30. **Loss of Sign Structure Foundation Support:** Out of plumb condition for cantilever sign columns or twisting of trusses indicating differential settlement or bearing failure of sign structure foundations. Also, severe impact damage that compromises the structural capacity.

Applicable Flexactions include:

SIGN STRUCTURES:	72-SSFOUND - Foundation (Rep/Repl)

0-31. **Sign Structure Lighting System:** Serious deterioration of the light supports at the connections. Broken light supports exist and lights may be hanging only by electrical connections. Integrity of any associated junction box has been compromised.

Applicable Flexactions include:

SIGN STRUCTURES:	73-SSLIGHT - Lighting Sys (Rep/Repl)

Retaining Wall Examples

0-32. **Excessive Wall Rotation:** Applicable where wall rotation has permitted slope failure and subsidence adjacent to nearby structures or roadways resulting in foundation damage or differential deflection between any sections or the entire wall out-of-plumb exceeds 4 inches.

Applicable Flexactions include:

RETAINING WALLS:	77-RTWALLR - Retaining Wall (Rep/Repl)

Waterway Examples

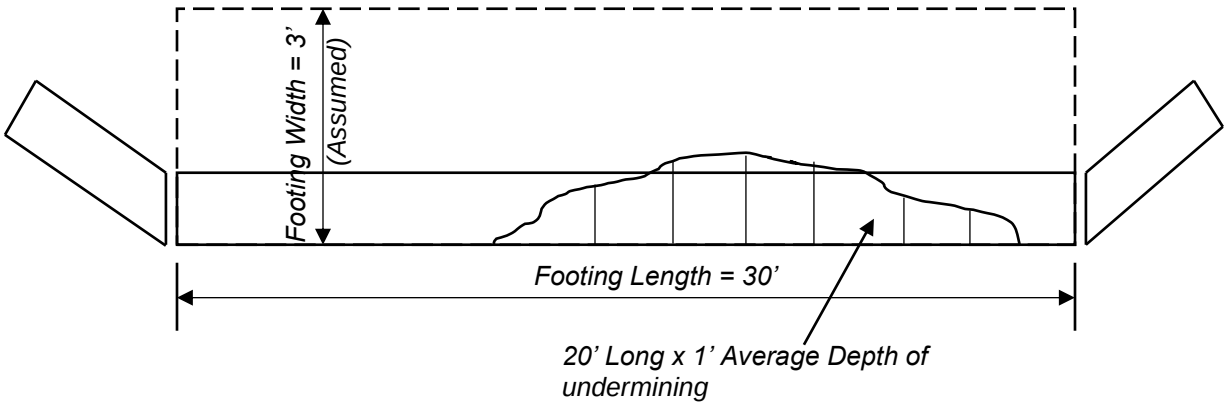
0-33. **Major Scour at Substructure Unit(s):** Scour with significant undermining of substructure foundations as defined in the Scour Definition Diagram for Scour Hole (Item IN05):

- Foundations on Piles/Caissons:
  1. Depth of undermining has affected the stability of piles for footings on piles (a pile stability analysis may be required), or
  2. Major scour and distress noted in the substructure above the scoured area regardless of the amount of undermining.
- All other Foundation Types:
  1. Undermining >= 20% of the foundation area. (Note: When the foundation area is unknown, a conservative footing width of 3' shall be assumed to compute a footing area), or
  2. Major scour and distress noted in the substructure above the scoured area regardless of the amount of undermining.

Applicable Flexactions include (Refer to IM03 for clarification on when to use items 11 and 13):

SCOUR CONTROL:	11-C745301 - Scour Hole (Backfill)
	13-B745301 - Rock Protection
ABUTMENT - WING -	
PIER, etc.:	22-E744803 - Footing (Underpin)

Example of Estimating Undermining: – Unknown foundation area with non-integral wings.



Undermining = 20' x 1' / (30' x 3') = 22.2%, SAY 23%

0-34. **Excessive Debris or Sediment Buildup:** For bridges with SCBI ≤ 3 or those with unknown foundations where debris or sediment buildup is impacting the hydraulic opening defined by the ordinary high-water elevation such that:

- > 20% of any individual span opening is blocked, or
- > 20% of the total hydraulic opening for multiple span bridges is blocked, or
- Major local scour has occurred adjacent to a substructure unit because of the debris or sediment build-up.

Applicable Flexactions include (Refer to IM03 for clarification on when to use each item):

SCOUR CONTROL:	3-ECREMVG - Vegetation/Debris (Remove)
	12-ECREMDP - Deposition (Remove)

Priority Code 1 – HIGH PRIORITY

This code is applicable to a serious structural deficiency to a primary bridge element that could lead to load restrictions, lane and/or bridge closures or, if not corrected, may jeopardize public safety. Flexactions to address these deficiencies should be performed independently of the normal work schedule to complete the Flexaction within the required timeframe.

The inspection interval will need to be reduced to ensure that conditions will not deteriorate to a Priority code 0 level and that safety of the traveling public will not be compromised. The bridge load rating should be re-evaluated to assure consideration of the cited deficiency.

Examples for Priority Code 1 – HIGH PRIORITY

Selected condition examples for Flexaction work Priority code – 1 are provided below.

Deck Examples

1-1. **Serious Deck Deterioration:** Applicable to holes/spalls in the top surface of concrete decks or concrete approach slabs that expose deck reinforcement with a minimum area of approximately 1 SF and located within the traffic lanes or within 2 feet outside of travel lanes.

Applicable Flexactions include:

DECK:	35-B744301 - Timber Deck (Rep/Repl)
	6-D744303 - Concrete Deck (Repair)
	37-C744302 - Open Steel Grid (Rep/Repl)

1-2. **Repair/Reseal Leaking Deck Joints:** Applicable to bridges on the Interstate, NHS, or Non-NHS bridges critical to commercial or emergency network (i.e. 5C28 = 1-3 or 5C33 =1) when the joint is no longer preventing water from wetting the superstructure or substructure. Leaking not yet resulting in moderate deterioration may be coded a Priority 3. Priority 1 is applicable to uncoated weathering steel bridges with leaking deck joints with unpainted ends of beams/girders regardless of deterioration. Priority 2 is applicable to uncoated weathering steel bridges with leaking deck joints with painted ends of beams/girders regardless of deterioaration.

Applicable Flexactions include(Refer to IM03 for clarification on when to use each item):

DECK JOINTS:	2-A743301 - Reseal
	4-A744101 - Repair/Reseal

1-3. **Deteriorated Non-NHS Route Bridge Railing:** Bridge parapet or structure-mounted guide rail on non-NHS routes with primary structural components damaged or deteriorated to a point that the parapet/railing is in serious condition and may not contain and/or redirect an errant vehicle traveling at the posted speed. Use Priority code 3 for bridges with railings that are not adequate for the site that need upgraded to a current railing but are still functioning as designed.

Applicable Flexactions include (Refer to IM03 for clarification on when to use items 7 and 17):

RAILING:	7-RLGBRPR - Bridge/Parapet (Rep/Repl)
	17-RLGSTRM - Struct Mount (Rep/Repl)
	58-RLGMEDB - Median Barrier (Rep/Repl)

1-4. **Hazardous Sidewalk Conditions:** Applicable to the sidewalk surface such that damage/deterioration presents a significant tripping hazard to pedestrians. (Note that a minor height difference between the approach and bridge sidewalk should not dictate a Priority 1 code).

Applicable Flexactions include:

DECK:	39-E744303 - Concrete Sidewalk (Repair)

Superstructure Examples

1-5. **Advanced Section Loss in NSTMs:** Corrosion conditions that indicate structural capacity and remaining fatigue life may be compromised and the structure may no longer support legal traffic loads.

Applicable Flexactions include:

STEEL:	50-B744602 - Floorbeam (Rep/Repl)
	49-C744602 - Girder (Repair)
TRUSS:	36-A744701 - Members (Strengthen/Rep/Repl)

1-6. **Deteriorated Pin-Hanger Assemblies w/Redundancy:** Severe deterioration to any components of the pin and hanger system or to the installed retro-fit. Severe deterioration to any components of the pin and hanger system or severe accumulation of debris or rust packing. Failure of pin hanger to expand or contract. Improper alignment or severe deterioration of the catcher-beam system. Applicable only to:

- Pin-Hanger Assemblies with Retro-Fit on Non-redundant Girders(Retro-Fit involves installation of redundant catcher system), or
- Pin-Hanger Assemblies without Retro-Fit on Redundant Girders

Applicable Flexactions include:

STEEL:	49-C744602 - Girder (Repair)

1-7. **Non NSTMs**

a. **Direct Stress Cracks in Primary Steel Members (Not NSTMs):** Active cracks in steel tension members or tension member components that reduce structural capacity and remaining fatigue life such that the capacity of the damaged member is just sufficient to keep the structure functional for traffic.

b. **Cracks Parallel to Stress in Primary Steel Members (Not-NSTMs):** Initial cracking found in the tension zone of steel members that is oriented parallel to the primary stress carried by the member. This type of cracking may be the result of out-of-plane distortion, bi-axial restraint or poor welding, and without mitigation, could suddenly change direction under service conditions and become more serious.

c. **Serious Steel Member Corrosion:** Multi-beam bridge with serious deterioration, web/flange with heavy section losses, no web crippling or crushing evident/no excessive deflection evident.

Applicable Flexactions include:

STEEL:	25-A744602 - Stringer (Rep/Repl)
	50-B744602 - Floorbeam (Rep/Repl)
	49-C744602 - Girder (Repair)

1-8. **Non -Composite Adjacent Box Beam:**

a. **Cracking:** Deterioration where the superstructure condition rating (Item 1A04) is ≤ 3 due to diagonal cracks in a fascia beam located under an open parapet joint.

- When cracks are in the middle ½ of the span, contact the Bridge Office for special analysis.
- Where the open joint parapet has been replaced using continuous reinforcement through the parapet joints, Priority 2 can be assigned.

b. **Loss of Prestress:** Serious deterioration where Item 1A04 is ≤ 3 due to strand loss or loss of camber and the bridge is already posted due to this condition.

Applicable Flexactions include:

REINF CONC./ PRESTRESSED CONC.:	42-A744603 - Stringer (Rep/Repl)

1-9. **Open Structural Cracks in P/S Concrete Beams:** Transverse flexure cracks across the bottom flanges at mid-span, and/or diagonal shear cracks at beam supports.

Applicable Flexactions include:

REINF CONC./ PRESTRESSED CONC.:	42-A744603 - Stringer (Rep/Repl)

Culvert Examples

1-10. **Visible Out-of-plane Distortion of Corrugated Metal Arch Culverts:** Visible distortion (e.g., bulging or flattening) of arch barrel greater than 2 inches and less than or equal to 3 inches out of plane caused by corrosion due to age and/or conditions.

Applicable Flexactions include:

CULVERT:	48-C745203 - Barrel (Repair)

1-11. **Serious Corrosion and Section Loss of Flexible Metal Culverts:** Serious corrosion, typically at longitudinal seams, resulting some minor holes/perforations along a 4-foot length or in the loss or ineffectiveness of consecutive bolts/nuts along a 1 foot or greater length of a longitudinal seam.

Applicable Flexactions include:

CULVERT:	48-C745203 - Barrel (Repair)

1-12. **Significant deterioration on stone masonry arches:** Applicable where stone masonry exhibits significant loose and missing stones, loss of fill, wide cracks, unstable bulged areas, etc., that have significantly reduced the capacity of the arch barrel.

Applicable Flexactions include:

CULVERT:	48-C745203 - Barrel (Repair)

1-13. **Significant deterioration of headwalls and associated wings:** Applicable where the headwall or associated wingwalls have significant deterioration including excessive loose and missing stones, loss of fill, wide cracks, excessive unstable bulged areas, or excessive rotation (See substructure rotation limit guidelines).

Applicable Flexactions include:

CULVERT:	29-A745201 – Headwall/Wings (Rep/Repl)

Substructure Examples

1-14. **Significant NSTM Support Damage:** Significant structural cracking in a concrete pier column or cap supporting a NSTM bridge. (Ex. Non-redundant cross girder or pier cap supported by a concrete column/shaft).

- "Significant structural cracking" should be considered as cracks **≥ 1/4" and < 1/2" wide** and that would be developed due to loss of bond or yielding of the reinforcement. Movement between pieces of the cracked element segmented by the crack may not be apparent at this time. Concrete shear interlock must be present based on the crack width and orientation.

Applicable Flexactions include:

ABUTMENT - WING - PIER, etc.:	32-D744802 - Piers (Repair)

1-15. **Serious Bearing Seat Damage:** Serious deterioration or undermined beam seat (loss of bearing area less than 40%). "Repair bearing seats" should be considered a priority code '1' only if the deficiencies are severe enough such that they are controlling Item 1A02 and results in Item 1A02 ≤ 3.

Applicable Flexactions include:

BEARINGS:	45-D744503 - Pedestal/Seat (Reconstruct)

1-16. **Non-Functioning Expansion Bearing:** Repair/replace frozen (non-functioning) expansion bearings (i.e. rollers, pot bearings, spherical, etc.) where the expansion length under consideration is 150 feet or greater feet. Heavy accumulation of pack rust, corrosion and/or debris is limiting or preventing the bearing from operating as intended during superstructure expansion and contraction. Substructure distress or movement is not evident.

Applicable Flexactions include:

BEARINGS:	44-A744501 - Steel (Rep/Rehab)
	61-B744501 - Steel (Replace)

1-17. **Excessive Rocker Bearing Tilt:** Applicable where one or more rocker bearings in a line exhibit the potential to exceed its maximum movement capacity, potentially bearing on the outer one-quarter width of the rocker (Pier) or the outer one-tenth width of the rocker (Abutment). Movement analysis indicates the rocker bearing(s) are currently within capacity limits, but calculations indicate the bearing(s) will exceed the maximum movement capacity under extreme temperature limits. See Pub 238 for sample calculations. A spreadsheet is available on the BMS2 Home screen to perform the rocker bearing calculations.

Applicable Flexactions include:

BEARINGS:	68-C744502 - Expansion (Reset)

Note: Include a note in Item IM15a such as – "Movement analysis indicates the bearings have the potential to exceed the maximum movement capacity."

1-18. **Rocker Bearing Debris Restriction:** Rocker bearings located on piers with heavy accumulations of pack rust, corrosion, and/or debris under the rocker could potentially limit or prevent the bearing from operating as it was intended during structure expansion and contraction.

Applicable Flexactions include:

CLEAN/FLUSH:	8-C743102 - Bearing/Bearing Seat

Note: Include a note in Item IM15a such as – "Pack rust, corrosion, and/or debris under the rocker could potentially be limiting or preventing the bearing from operating as it was intended during structure expansion and contraction. In addition to "flushing", it may be necessary to remove pack rust by mechanical means."

1-19. **Excessive substructure (non-pier) rotation:** Applicable to abutments and their associated wingwalls, where rotation has resulted in abutment/wingwall being out-of-plumb by 2% to 3% (1.1 to 1.7 degrees). A priority 2 may be considered if the abutment/wingwall has been stable for 6 years minimum (with evidence noted during previous inspections).

Applicable Flexactions include:

ABUTMENT-WING:	28-B744802 – Abutments (Repair)
	15-C744802 – Wing (Rep/Repl)

1-20. **Significant substructure deterioration on stone masonry substructures:** Applicable where stone masonry exhibits significant loose and missing stones, wide cracks, unstable bulged areas, etc., that have significantly reduced the capacity of the substructure unit.

Applicable Flexactions include:

ABUTMENT – WING -: PIER	28-B744802 – Abutments (Repair) 15-C744802 – Wing (Rep/Repl) 32-D744802 - Piers (Repair)

Sign Structure Examples

1-21. **Direct Stress Cracks in Primary Steel Members (Not NSTMs):** Active cracks in steel tension members or tension member components that reduce structural capacity and remaining fatigue life such that the capacity of the damaged member is just sufficient to keep the structure functional for traffic.

Applicable Flexactions include:

SIGN STRUCTURES:	75-SSSTRUC - Sign Struct (Rep/Repl)

1-22. **Serious Steel Member Corrosion:** Sign structure with serious deterioration, web/flange with heavy section losses, no web crippling or crushing evident/no excessive deflection evident.

Applicable Flexactions include:

SIGN STRUCTURES:	75-SSSTRUC - Sign Struct (Rep/Repl) 74-SSATTAC - Sign Attach (Rep/Repl) 78-SSCONNT - Struct Connection (Repl)

1-23. **Sign Structure Lighting System:** Advanced deterioration of the light supports at the connections over traffic.

Applicable Flexactions include:

SIGN STRUCTURES:	73-SSLIGHT - Lighting Sys (Rep/Repl)

1-24. **Loss of foundation Support for Sign Structures:** Applicable to truss and cantilever sign structures having severe spalling with exposed reinforcement and section loss in the pedestals. Towers may have rotated or twisted but the column connection anchorage is still intact.

Applicable Flexactions include:

SIGN STRUCTURES:	72-SSFOUND - Foundation (Rep/Repl)

Retaining Wall Examples

1-25. **Damage to Retaining Walls:** Applicable to retaining walls with out–of- plumb rotation between 1 ½ and 4 inches over the exposed height of the wall or spalling with complete loss of concrete through the wall or open cracks >1/2 inch indicating substantial differential settlement has occurred. Spill through of retained soil may be present.

Applicable Flexactions include:

RETAINING WALLS:	77-RTWALLR - Retaining Wall (Rep/Repl)

Waterway Examples

1-26. **Damaging Scour at Substructure Unit(s):** Moderate scour with minor undermining of substructure foundation as defined in the Scour Definition Diagram for Scour Hole (Item IN05). Applies to all foundations without Piles/Caissons:

a) Foundation Area is known:
   - Undermining is > 10% but < 20% of the foundation area.

b) Foundation Area is unknown:
   - Undermining is > 10% but < 20% of the foundation area (Note: Conservatively assume a footing width of 3′ to compute a foundation area).

Applicable Flexactions include (Refer to IM03 for clarification on when to use items 11 and 13):

SCOUR CONTROL:	11-C745301 - Scour Hole (Backfill)

	13-B745301 - Rock Protection
ABUTMENT - WING – PIER, etc.:	22-E744803 - Footing (Underpin)

1-27. **Serious Debris or Sediment Build-up:** Where debris or sediment buildup is impacting the hydraulic opening defined by the ordinary high-water elevation such that:

a. For bridges with SCBI ≤ 3 or those with unknown foundations:

- 10% to 20% of any individual span opening is blocked, or
- 10% to 20% of the total hydraulic opening is blocked, or
- Moderate local scour has occurred adjacent to a substructure unit because of the debris or sediment build-up.

b. For bridges with SCBI ≥ 4 or those with known foundations:

b. 30% of any individual span opening is blocked, or
c. 30% of the total hydraulic opening is blocked, or
d. Major local scour has occurred adjacent to a substructure unit because of the debris or sediment build-up.

Applicable Flexactions include (Refer to IM03 for clarification on when to use each item):

SCOUR CONTROL:	3-ECREMVG - Vegetation/Debris (Remove)
	12-ECREMDP - Deposition (Remove)

Note: The use of Priority 0 or 1 <u>is not</u> expected to be justifiable for the following items:

Component	**Maintenance Activity**
Deck	80-A743401- PROT.CTG.TO SUPERSTR
Deck	10-BITWRGS- RPR/RPL. BIT. W.S.
Drainage	31-B744401- INSTAL.DK.DRAIN
Drainage	14-C744402- RPR/RPL.DWNSPTG
Painting	57-A743201- SPOT PAINT SUPERSTR.
Painting	16-B743201- SPOT PAINT SUBSTR.
Painting	65-C743201- PAINT SUPERSTRUCTURE
Painting	79-D743201- PAINT SUBSTRUCTURE
Sign Structures	86-SSSURVS - Sign Str Surface Spot
Scour Control	55-D745302- RPR/CONSTRM.DEFLECT.
Substructure	5-B743401- PROT.CTG.TO SUBSTR.
Substructure	19-F744804- REPOINT MASONRY
Retaining Wall	88-RTGRADE - Regrading

Priority Code 2 - PRIORITY

This code is applicable to an advanced deficiency on a primary bridge element or appurtenance that may eventually lead to further deterioration, load restrictions, lane and/or bridge closures, or may compromise public safety if not corrected.

Examples for Priority Code 2 – PRIORITY

Selected condition examples for Flexaction work Priority code – 2 are provided below.

Approach Roadway Examples

2-1. **Missing / Incorrect / Damaged Approach Safety Features:** Applicable for all bridges and culverts and dependent on Item IA02, Traffic Safety Features 2 thru 4 condition appraisal, combined with Item 4A10.

- See the Priority code summary table for **RDGDERL Maintenance Priority (Item IM02)** after the examples for Priority Code 5.

2-2. **Missing / Incorrect Horizontal Clearance Markers (Z-Boards):** Applicable to certain one-lane bridges on two-lane roadways with deficient approach safety features.

- See the Priority code summary table for **Maintenance Priority Coding for Missing Horizontal Clearance Signs (Z-boards/ Hazard Clear Signs)** after the examples for Priority Code 5.

Bridge Signing Examples

2-3. **Deficient Legal Signing:** Includes certain missing signs or signs with minor damage (includes relevant advance warning signs). and supplemental signs. (Note that signs with non-standard color do not need a maintenance item to replace the sign if sign color is the only issue. The sign color can be updated as needed when the sign is replaced due to other issues).

- Missing W12-2A vertical clearance sign on the bridge when W12-2 signs are properly located on the shoulder at the bridge site.
- Damaged sign that is still functioning as intended.
- Vertical clearance signs which do not include a 3" buffer.

Applicable Flexactions include:

APPROACH ROADWAY:	70-RDLDSGN - Load Limit Signs (Replace)
	51-RDCLSGN - Clearance Signs Replace

Deck / Superstructure / Sign Structure / Substructure / Culvert / Retaining Wall Examples

2-4. **Advanced Deterioration on Primary Members:** Applicable to various material defects that are sufficiently advanced to warrant re-analysis of the bridge, sign structure member, or culvert for loss of capacity, and subsequent Load Posting. Specific conditions would include:

- Steel primary members with significant section loss in critical areas, especially beam webs at supports, flanges at mid-span, flanges at supports for continuous structures, and metal culvert shapes at the flow line.

Applicable Flexactions include:

STEEL:	25-A744602 – Stringer (Rep/Repl)
	50-B744602 - Floorbeam (Rep/Repl)
	49-C744602 - Girder (Repair)
SIGN STRUCTURES:	75-SSSTRUC - Sign Struct (Rep/Repl)
	74-SSATTAC - Sign Attach (Rep/Repl)
	78-SSCONNT - Struct Connection (Repl)

TRUSS:	36-A744701 - Members (Strengthen/Rep/Repl)

- CIP Concrete bridge members, walls, and rigid culvert shapes with exposed steel tension or shear reinforcement that has advanced section loss in high stress regions.
- CIP Concrete members, walls, and rigid culverts with open flexure cracks or shear cracks.
- P/S Concrete members with hairline flexure cracks and partial depth shear cracks.
- P/S Concrete members with exposed or severed P/S tendons and/or corroded shear reinforcement in critical locations.
- CIP Concrete pier column with significantly reduced cross-section due to deteriorated concrete.
- Stone masonry primary members with advanced deterioration that requires repairs beyond the scope of repointing.

Applicable Flexactions include:

REINF CONC./ PRESTRESSED CONC.:	42-A744603 - Stringer (Rep/Repl)
ABUTMENT - WING - PIER, etc.:	38-A744801 - Backwall (Rep/Repl)
	28-B744802 - Abutments (Repair)
	15-C744802 - Wing (Rep/Repl)
	32-D744802 - Piers (Repair)
CULVERT:	48-C745301 - Barrel (Repair)
RETAINING WALLS:	77-RTWALLR - Retaining Wall (Rep/Repl)

- Timber bridge primary members, with open horizontal shear or flexure cracking, that has advanced section loss due to rot or insect damage in high stress regions.

Applicable Flexactions include:

TIMBER:	62-A744601 – Stringer (Rep/Repl)

2-5. **Elimination of Open Joint in Parapet for Non-Composite Adjacent Box Beam Bridge:** Applicable to Non-composite adjacent box beam bridges with parapets that have open deflection joints (no cracks or crack length below the joint <3″):

Applicable Flexactions include:

RAILING:	7-RLGBRPR - Bridge/Parapet (Rep/Repl)

Culvert Examples

2-6. **Visible Out-of-plane Distortion of Corrugated Metal Arch Culverts:** Visible distortion (e.g., bulging or flattening) of arch barrel less than or equal to 2 inches out of plane caused by corrosion due to age and/or conditions.

Applicable Flexactions include:

CULVERT:	48-C745301 - Barrel (Repair)

2-7. **Advanced Corrosion and Section Loss of Corrugated Metal Arch Culverts:** Evidence of advanced section loss along a 4-foot length, typically at longitudinal seams or the flow line. Estimate the expected remaining useful life of the culvert based upon actual corrosion observed. See example below. Record this value in Item IM15a. A spreadsheet is available on the BMS2 Home screen to perform the remaining service life calculation.

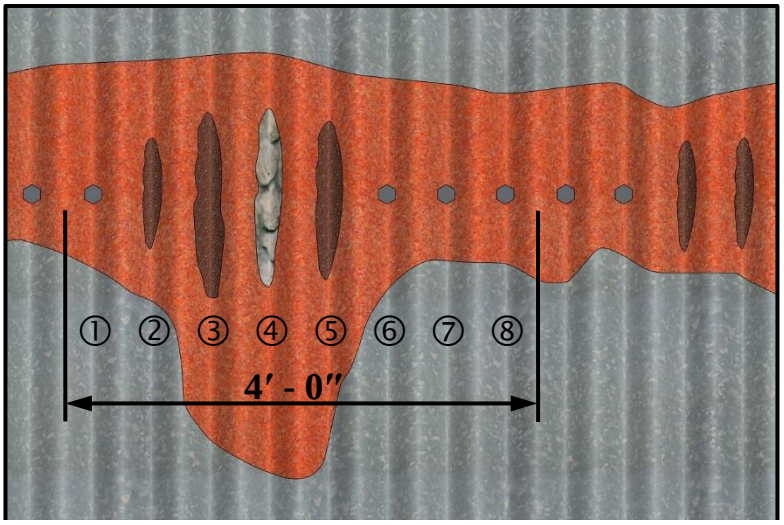
Applicable Flexactions include:

CULVERT:	48-C745301 - Barrel (Repair)

Example of Estimating Remaining Culvert Life

initial thickness, t_0 = 0.250 in.
acceptable avg. section loss, $S.L._{allow}$ = 50% = 0.125 in.
theoretical rate of loss, $R_{loss\ (theor)}$ = 0.002 in/yr

age at inspection, n = 40 yrs.
avg. remaining thickness, t_n = 0.160 in. (measured over most severe 4′ length)



In worst 4 ft. section (see figure above):
corrugations with 100% loss: 1
with 50% loss: 3
with 25% loss: 4

avg. section loss, S.L. = [1(100%) + 3(50%) + 4(25%)] / 8 = 43.8%
avg. section loss, $t_{loss} = t_0 \times S.L.$ = (0.250)(43.8%) = 0.109 in.
avg. rate of loss, $R_{loss\ (actual)} = t_{loss} / n$ = 0.109 / 40 = 0.0036 in/yr

acceptable remaining loss, $S.L._{allow\ (future)} = S.L._{allow} - t_{loss}$ = 0.125 - 0.109 = 0.016 in.
rate of future section loss, $R_{loss\ (future)}$ = max [$R_{loss\ (theor)}$,$R_{loss\ (actual)}$] = 0.003 in/yr

Estimated Remaining Useful Life = $S.L._{allow\ (future)} / R_{loss\ (future)}$ = 0.016 / 0.003 = 5.3 yrs.

Enter into Item IM15a: Remaining Useful Life 5.3 years as of [month, year].

2-8. **Advanced deterioration of masonry headwalls and associated wings:** Applicable where the headwall or associated wingwalls have advanced deterioration including loose and missing stones, minor loss of fill, bulged areas, or rotation.

Applicable Flexactions include:

CULVERT: 29-A745201 – Headwall/Wings (Rep/Repl))

Waterway Examples

2-9. **Moderate Scour at Substructure Unit(s):** Scour ranging from top of footing to slight undermining.

Applicable Flexactions include:
For bridges with SCBI of 4 and below:
SCOUR CONTROL: 13-B745301 - Rock Protection

2-10. **Advanced Debris Build-up:**

a) For bridges with SCBI ≤ 3 or those with unknown foundations – Advanced Debris buildup blockage is:

- 5% to 10% of the area below the ordinary high-water elevation of any span, or
- 5% to 10% or more of the span length, or
- any debris buildup which may cause local scour to occur.

b) For bridges with SCBI ≥ 4 or those with known foundations – Advanced Debris buildup blockage is:

- 15% to 30% of the area below the ordinary high-water elevation of any span, or
- 15% to 30% or more of the span length, or
- any debris buildup which is causing local scour to occur.

Applicable Flexactions include:

SCOUR CONTROL: 3-ECREMVG - Vegetation/Debris (Remove)

Advanced Secondary Element Damage

2-11. **Repair/Reseal Leaking Deck Joints:** Applicable to bridges not on the Interstate or NHS when the joint is no longer preventing water from wetting the superstructure elements and beam seats resulting in section loss or spalling to the superstructure or substructure. Leaking not yet resulting in moderate deterioration may be coded a Priority 3. Priorty 2 is applicable to uncoated weathering steel bridges with leaking deck joints regardless of section loss.

Applicable Flexactions include (Refer to IM03 for clarification on when to use each item):

DECK JOINTS: 2-A743301 - Reseal
4-A744101 - Repair/Reseal

2-12. **Defective Deck and Roadway Drainage Devices:** Applicable to bridges not on the Interstate or NHS when the defective system has resulted in accelerated deterioration of a primary structural member. Defective systems not yet resulting in deterioration should be coded Priority 3. Priority 2 is applicable to uncoated weathering steel bridges where the defective drainage device directs draining onto any weathering steel member regardless of presence of deterioration.

Applicable Flexactions include:

DECK DRAIN: 31-B744401 - Drain/Scupper (Install)
14-C744402 - Down spouting (Rep/Repl)

2-13. **Deteriorated Access Components in Sign Structures:** Section loss or broken welds on grating, walkways, or railings attached to sign structures used for access.

Applicable Flexactions include:

SIGN STRUCTURES: 87-SSACCES - Sign Access (Rep/Repl)

2-14. **Other Maintenance Actions for Uncoated Weathering Steel Bridges:** Unless conditions warrant a Maintenance Priority 0 or 1, Maintnance Priority 2 is established for the following maintenance actions when such actions are established as a need in response to respective adverse conditions found during an inspection:

- Clean/flush scupper and downspouting.
- Clean/flush bearings and bearing seats where there is a build-up of debris.
- Clean/flush horizontal surfaces where there is a build-up of debris.
- Spot paint steel superstructure and steel substructure surfaces to remediate localized corrosion or remidate a non-protective patina.
- Repair deck cracks that allow deck drainage to seep onto UWS surfaces.

- Remove vegetation/debris build-up in a waterway in contact with weathering steel surfaces.
- Remove vegetation in contact with weathering steel surfaces, brush clearing.
- Repair utility conditions leaking on weathering steel surfaces.
- Seal Crevices of weathering steel members.
- Add drip bars.

Applicable Flexactions include:

CLEAN/FLUSH:	1-B743101 – Clean/Flush Scuppers and Downspouting 8-C743102 – Clean/Flush Bearing/Bearing Seat 34-D743102 – Clean/Flush Steel Horizontal Surfaces 92-BRSHCLR – Brush Cleaning
DECK:	6-D744303 – Concrete Deck (Repair)
PAINTING:	57-A743201 – Spot Painting – Superstructure 16-B743201 – Spot Painting – Substructure
SCOUR CONTROL:	3-ECREMVG (2) – Vegetation/Debris (Remove)
STEEL:	89-E744602 – UWS Members (Repair)* *(use 89-E744602 for misc. weathering steel repairs to include crevice sealing)

Priority Code 3 - SCHEDULE

This code is applicable to a minor but documentation-worthy deficiency to a primary bridge element or appurtenance that may become more serious if left unaddressed for an extended period of time. Flexaction work candidates to address these deficiencies should be incorporated into the normal work schedule as resources permit. The cited deficiencies are not sufficient to warrant re-evaluation of the bridge load rating.

Examples for Priority Code 3 – SCHEDULE

Selected condition examples for Flexaction work Priority code – 3 are provided below.

Approach Roadway Examples

3-1. **Missing / Incorrect / Damaged Approach Safety Features:** Applicable for all bridges and culverts and dependent on Item IA02, Traffic Safety Features 2 thru 4 condition appraisal, combined with Item 4A10.

- See the Priority code summary table for **RDGDERL Maintenance Priority (Item IM02)** after the examples for Priority Code 5.

3-2. **Missing / Incorrect Horizontal Clearance Markers (Z-Boards):** Applicable to certain one-lane bridges on two-lane roadways with deficient approach safety features.

- See the Priority code summary table for **Maintenance Priority Coding for Missing Horizontal Clearance Signs (Z-boards/ Hazard Clear Signs)** after the examples for Priority Code 5.

Deck / Superstructure / Sign Structure / Substructure / Culvert / Retaining Wall Examples

3-3. **Minor Deterioration of Primary Structural Members:** Applicable to all bridge, retaining walls, sign structures, and culvert components. Candidate deficiencies include concrete spalls and structural cracks suitable for injection, minor section loss on primary steel members, loose structural fasteners, retaining wall tie back connection deterioration, and timber members with signs of insect damage, and active fungus rot and deterioration ongoing on the surface. Sign Structure corrosion is readily apparent with minor (<10%) section loss in the primary truss or cantilever members, connections, and attachments.

Applicable Flexactions include:

TIMBER:	62-A744601 - Stringer (Rep/Repl)
	60-B744601 – Other members (Rep/Repl) (Applicable to Substructure)
STEEL:	25-A744602 - Stringer (Rep/Repl)
	50-B744602 - Floorbeam (Rep/Repl)
	49-C744602 - Girder (Repair)
REINF. CONC./ PRESTRESSED CONC.:	42-A744603 - Stringer (Rep/Repl)
TRUSS:	36-A744701 - Members (Strengthen/Rep/Repl)
SIGN STRUCTURES:	75-SSSTRUC - Sign Struct (Rep/Repl)
	74-SSATTAC - Sign Attach (Rep/Repl)
	78-SSCONNT - Struct Connection (Repl)
	73-SSLIGHT – Lighting Sys (Rep/Repl)
	72-SSFOUND – Foundation (Rep/Repl)
DECK:	35-B744301 - Timber Deck (Rep/Repl)
	6-D744303 - Concrete Deck (Repair)
	37-C744302 - Open Steel Grid (Rep/Repl)
ABUTMENT - WING - PIER, etc.:	38-A744801 - Backwall (Rep/Repl)
	28-B744802 - Abutments (Repair)
	15-C744802 - Wing (Rep/Repl)
	32-D744802 - Piers (Repair)
CULVERT:	48-C745203 - Barrel (Repair)
	29-A745201 – Headwall/Wings (Rep/Repl)
RETAINING WALLS:	77-RTWALLR - Retaining Wall (Rep/Repl)
	84-RTTIEBK - Tie Back Connections (Rep/Repl)
BEARINGS:	45-D744503 – Pedestal/Seat (Reconstruction)

3-4. **Repointing Masonry:** Applicable to stone masonry structures with cracked, loose, and missing mortar, or vegetation growing between the stones.

Applicable Flexactions include:

ABUTMENT – WING – PIER, etc.:	19-F744804 - Masonry (Repoint)

3-5. **Substructure (non-pier) rotation:** Applicable to abutments and their associated wingwalls, where rotation has resulted in the abutment/wingwall being out-of-plumb by less than 2% (1.1 degrees). Monitoring alone may be sufficient if the abutment/wingwall rotation has remained stable over a period of 6 years minimum.

Applicable Flexactions include:

ABUTMENT-WING:	28-B744802 – Abutments (Repair)
	15-C744802 – Wing (Rep/Repl)

3-6. **Non-Functioning Expansion Bearings:** Repair/replace frozen (non-functioning) expansion bearings (i.e. rollers, pot bearings, spherical, etc.) where the expansion length under consideration is less than 150 feet. Heavy accumulation of pack rust, corrosion and/or debris is limiting or preventing the bearing from operating as intended during superstructure expansion and contraction. No distress in substructure is evident.

Applicable Flexactions include:

BEARINGS:	44-A744501 - Steel (Rep/Rehab)

3-7. **Rocker Bearing Reset:** Applicable when one or more rocker bearings in a line are tilted in the opposite direction than indicated by the ambient temperature (Abnormal tilt) or when movement analysis indicates one or more rocker bearings in a line are tilted in excess of 50% of

their capacity. See Pub 238 for sample calculations. A spreadsheet is available on the BMS2 Home screen to perform the rocker bearing calculations.

Applicable Flexactions include:

BEARINGS:	68-C744502 - Expansion (Reset)

3-8. **Deficient Bridge Railing:** Applicable to bridges with railings that are not adequate for the site that should be upgraded to a current standard but are still functioning as designed. Also applicable to structures without railing that have been determined should have railing installed to enhance safety.

Applicable Flexactions include (Refer to IM03 for clarification on when to use items 7 and 17):

RAILING:	7-RLGBRPR - Bridge/Parapet (Rep/Repl)
	17-RLGSTRM - Struct Mount (Rep/Repl)
	58-RLGMEDB - Median Barrier (Rep/Repl)

Waterway Examples

3-9. **Scour hole backfill:** Applicable to minor channel scour conditions in the channel. Minor scour conditions include simple streambed depressions in the channel profile up and downstream and underneath the bridge. Footings have not been exposed.

Applicable Flexactions include:

SCOUR CONTROL:	11-C745301 - Scour hole (Backfill)

3-10. **Placement of Rock Protection:** Applicable to restoration of minor embankment damage and protection of substructure units demonstrating vulnerability to scour.

Applicable Flexactions include:

SCOUR CONTROL:	13-B745301 - Rock Protection
	30-A745301 – Stream Bed Paving (Rep/Constr)

3-11. **Sediment Buildup:** Applicable to minor sediment deposits that do not warrant a Priority 0/1 maintenance item.

Applicable Flexactions include:

SCOUR CONTROL:	12-ECREMDP – Deposit (Remove)

Secondary Element Damage

3-12. **Advanced Deterioration of Secondary Members:** Applicable to secondary members of bridges and sign structures that can no longer resist the secondary forces they were designed to carry.

Applicable Flexactions include:

TIMBER:	60-B744601 - Other members (Rep/Repl)
STEEL:	54-D744602 - Diaph/Lat. Bracing (Rep/Repl)
	(Note: applicable to straight girder bridges)
REINF. CONC./	
PRESTRESSED CONC.:	69-B744603 - Diaphragm (Rep/Repl)
	26-C744603 - Other members (Rep/Repl)

3-13. **Deteriorated Deck Joints:** Applicable to deck joints with advanced deterioration.

Applicable Flexactions include:

DECK JOINTS:	33-B744102 - Compression Seal (Rep/Rehab)
	53-C744102 - Modular Dam (Rep/Rehab)
	20-D744102 - Steel Dams (Rep/Rehab)
	9-E744102 - Other Types (Rep/Rehab)

3-14. **Repair/Reseal Leaking Deck Joints:** Applicable to all bridges, except uncoated weathering steel bridges, with leaking deck joints that have not yet resulted in deterioration of the superstructure and substructure. Refer to Examples 1-2 and 2-11 for uncoated weathering steel bridges.

Applicable Flexactions include(Refer to IM03 for clarification on when to use each item):

DECK JOINTS:	2-A743301 - Reseal
	4-A744101 - Repair/Reseal

3-15. **Brush Clearing:** Applicable when the brush, trees, or other forms of vegetation limit the ability of the under bridge inspection crane or other inspection access equipment to access all portions of the bridge.

Applicable Flexactions include:

CLEAN/FLUSH:	92-BRSHCLR – Brush Clearing

4 – PROGRAM

This code is applicable to a noteworthy problem on a secondary bridge element, or appurtenance that may lead to a documentable defect if left unaddressed for an extended period of time. Flexaction work candidates to address these problems should be planned as additional work to the normal work schedule and completed as resources become available. The cited problems are not sufficient to warrant re-evaluation of the bridge load rating.

Examples for Priority Code 4 – PROGRAM

Selected condition examples for Flexaction work Priority code – 4 are provided on the following pages.

Approach Roadway Examples

4-1. **Missing / Incorrect / Damaged Approach Safety Features:** Applicable for all bridges and culverts and dependent on Item IA02, Traffic Safety Features 2 thru 4 condition appraisal, combined with Item 4A10.

- See the Priority code summary table for **RDGDERL Maintenance Priority (Item IM02)** after the examples for Priority Code 5.

4-2. **Missing / Incorrect Horizontal Clearance Markers (Z-Boards):** Applicable to certain one-lane bridges on two-lane roadways with deficient approach safety features.

- See the Priority code summary table for **Maintenance Priority Coding for Missing Horizontal Clearance Signs (Z-boards/ Hazard Clear Signs)** after the examples for Priority Code 5.

4-3. **Approach Roadway Repairs:** Includes patching approach slab spalls, sealing cracks, restoring shoulders, and restoring embankments.

Applicable Flexactions include:

APPROACH ROADWAY:	40-RDPAVMT - Pavement (Patch/Raise)
	41-RDRLFJT - Pavement Relief Jt. (Rep/Repl)
	46-RDSHLDR - Shoulders (Repair/Reconstr)
	47-RDDRAIN - Drainage-Off Bridge (Improve)

Deck / Superstructure / Substructure / Culvert / Retaining Wall Examples

4-4. **Minor Deterioration of Secondary Members:** Applicable to secondary members of bridges and sign structures that exhibit minor deficiencies but can still function as designed.

Applicable Flexactions include:

TIMBER:	60-B744601 - Other members (Rep/Repl)
STEEL:	54-D744602 - Diaph/Lat. Bracing (Rep/Repl) (Note: applicable to straight girder bridges)
REINF. CONC./ PRESTRESSED CONC.:	69-B744603 - Diaphragm (Rep/Repl) 26-C744603 - Other Members (Rep/Repl) 39-E744303 – Concrete Sidewalk (Repair)

4-5. **Abutment Slopewall Deterioration:** Applicable to bridges having slopewalls either monolithic reinforced concrete, stone or concrete block exhibiting heaving, open cracks, differential settlement, separation between sections that will allow erosion or scour to occur in front of the abutment. This also applies to evidence of loss of slope for abutments due to erosion or scour that do not presently have a slope wall.

Applicable Flexactions include:

ABUTMENT - WING - PIER, etc.:	56-B745101 - Abut. Slopewall (Rep/Repl) 43-B745102 - Abut. Slopewall (Construct New)

4-6. **Lubricate Corroded Bearings:** Lubrication of plates and or hinges of otherwise "normal" bearings as necessary to maintain proper bearing function.

Applicable Flexactions include:

BEARINGS:	66-A743501 - Lubricate

4-7. **Steel Painting:** Spot, zone, or full painting of structural steel.

Applicable Flexactions include:

PAINTING:	57-A743201 - Superstructure-Spot 16-B743201 - Substructure-Spot 65-C743201 - Superstructure-Full 79-D743201 - Substructure-Full
SIGN STRUCTURE:	86-SSSURVS - Sign Str Surface Spot

4-8. **Protective Coatings:** Apply protective coatings to bridge decks, parapets, sidewalks, and other portions of the bridge superstructure.

Applicable Flexactions include:

APPLY PROTECTIVE COATING:	80-A743401 - Deck/Parapets/Sidewalk 5-B743401 - Substructure

4-9. **Retaining Wall repair:** Applicable when the deteriorated area of the concrete facing exhibits concrete spalls and light cracking that require minor patching and sealing to prevent further deterioration. Also, applicable when the wall drainage is inhibited, or erosion has changed the grading along the front or rear faces of the wall.

Applicable Flexactions include:

RETAINING WALLS:	83-RTFACNG - Facing Rep/Repl 85-RTDRAIN - Drainage (Rep/Repl) 88-RTGRADE – Regrading

4-10. **Wearing Surface Replacement:** Patching or complete replacement.

Applicable Flexactions include:

DECK:	10-BITWRGS - Asphalt Deck W. Surf (Rep/Repl)

Priority Code 5 - ROUTINE

This code is applicable to a non-structural condition associated with the accumulation of roadway dirt and debris on or in bridge members, not affecting public safety, that occurs over time and with normal use of the structure for non-state-owned bridges. Such conditions if left unaddressed for an extended period of time may lead to deterioration of structural members.

Routine cleaning of state-owned bridges is handled through pre-scheduled cleaning program; therefore, do not schedule priority 5 maintenance for routine cleaning of state-owned bridges. If the amount of debris is causing other issues to bridge components, the appropriate maintenance item shall be scheduled.

Examples for Priority Code 5 – ROUTINE

Selected condition examples for Flexaction work Priority code – 5 are provided below. These include cleaning bridge components such as deck, scupper/downspout, steel surfaces, and bearing areas.

CLEAN/FLUSH:
23-A743101 - Deck
1-B743101 - Scupper/Down spouting
8-C743102 - Bearing/Bearing Seat
34-D743102 - Steel Horizontal Surfaces

Additional Priority coding guidelines for selected items:

The priority of approach guide rail work can be interpreted as a function of Deck Geometry Rating (Item 4A10) and Adequacy of Traffic Safety Features 2 thru 4 (Item IA02). Use the following table as a guide for the priority of RDGDERL.

Deck Geometry Rating (Item 4A10)	RDGDERL Maintenance Priority (Item IM02)	
	Lowest Condition Ratings for Traffic Safety Features 2 thru 4 (Item IA02)	
	IF IA02 = 2	IF IA02 = 3
6 – 9	3	4
4 and 5	2	3
≤ 3	2	2

The following items should also be considered in the coding of this maintenance needs priority and may raise or lower values given in the table above.

- Vehicle speed in the vicinity of the bridge
- Geometry of the roadway (including sight distance)
- Damage to existing components

For these bridges, do not code the priority of RDGDERL above a 3 without approval of the District Traffic Engineer.

Maintenance Priority Coding for Missing Horizontal Geometry Advisory Signs (Z-boards/ Hazard Clear Signs/Narrow Bridge/, etc.)

Case Description	Lowest Condition Ratings for Traffic Safety Features 2 thru 4 (Item IA02)	RDCLSGN Maintenance Priority (Item IM05)
(a). One lane bridges on two way roads (Item 5C27 - Bridge Roadway Width < 16 ft)(3)	IA02 < 6	2
	IA02 ≥ 6	3
(b). Narrow two lane bridges (Item 5C27 - Bridge Roadway Width ≤ 18 ft)	IA02 < 6	3
	IA02 ≥ 6	4
(c). All other bridges where Z-boards were installed but are now missing or damaged.	N/A	3

Note:

1. This table applies to signs related to geometric constraints of the bridge and can include signs such as one-lane bridge, hazard clearance, narrow bridge, etc.
2. Where collision damage is evident and/or accident history indicates the bridge is a potential accident site, the above Priority codings may be reduced.
3. One Lane Bridge signs may also be placed on bridges with a 5C27 value of less than 18' when commercial vehicles constitute a high proportion of the traffic, OR where sight distance is limited on the approach of the structure. Refer to Publication 236 for additional guidance.

Priority Code Guidelines for Tunnels:

Tunnel inspectors and reviewers must use sound judgment when determining the Priority of maintenance activities. To support this effort, PennDOT has defined sample critical findings that are provided below and on subsequent pages. The examples listed are organized by general location at the tunnel site and are provided for guidance only. They should not be considered all inclusive, or comprehensive.

Critical findings should be assigned as a Priority 0 or Priority 1 maintenance item. In either case, all critical findings must be reported to PennDOT and FHWA within 24 hours of the finding, regardless of if the finding was repaired within that window. The notification to FHWA will generally be made by PennDOT directly via the Chief Bridge Engineer to FHWA's Division Bridge Engineer.

Critical Findings

A critical finding is defined as a structural or safety related deficiency that requires immediate action to ensure public safety. If not addressed immediately, such deficiencies could directly or indirectly cause the tunnel to be closed due to component instability and/or localized element failure; or compromise the overall system functionality based on the specific needs of the tunnel as indicated in the tunnel specific inspection procedures. Maintenance work (e.g., repair,

replacement, posting/closing) is necessary to mitigate the structural and/or safety deficiencies within the required timeframe. Refer to mitigation timeframes at the beginning of this coding item. A sample list of critical findings is provided below:

Tunnel General Examples

CF-1. **Overhead Falling Hazard:** Conditions that pose an overhead falling hazard (e.g., an individual component or system is loose, dangling and/or missing anchor points) that warrants immediate action to ensure the serviceability of the tunnel is not affected. This critical finding applies to all tunnel components/flexactions that are prone to falling hazard.

Applicable Flexactions include:

121 – Other Maintenance

Tunnel Civil Examples

CF-2. **Exposed Blunt End:** An exposed blunt end or deterioration that could cause a vehicle to redirect within the travel lane or cause a travel disruption.

Applicable Flexactions include:

102 - Roadway Traffic Barrier (Repair)

CF-3. **Damaged Barrier:** Damaged or deteriorated barrier that warrants a detailed review to determine if the condition affects the strength of the element or serviceability of the tunnel.

Applicable Flexactions include:

102 - Roadway Traffic Barrier (Repair)

Tunnel Traffic Examples

CF-4. Non-functional Lane Signal / Fixtures: Non-functional Lane signals that warrants a detailed review to determine if the condition affects the serviceability of the tunnel.

Applicable Flexactions include:

103 - Lane Signal (Repair/Replace)

CF-5. Non-functional Traffic Sign: Missing or non-functional traffic signs (e.g., not legible, defaced) that warrants a detailed review to determine if the condition affects the serviceability of the tunnel.

Applicable Flexactions include:

104 - Traffic Sign (Repair/Replace)

CF-6. Non-functional Traffic VMS signs: Non-functional VMS signs (e.g., damaged lights, unable to change) that warrants a detailed review to determine if the condition affects the serviceability of the tunnel.

Applicable Flexactions include:

104 - Traffic Sign (Repair/Replace)

CF-7. Non-functional Overheight Truck Warning System: Missing or non-functional warning systems (e.g., not legible, defaced) that warrants a detailed review to determine if the condition affects the serviceability of the tunnel.

Applicable Flexactions include:

105 - Overheight Truck Warning System (Repair/Replace)

CF-8. Non-functional Overheight Truck Warning VMS Signs: Non-functional VMS signs (e.g., damaged lights, unable to change) that warrants a detailed review to determine if the condition affects the serviceability of the tunnel.

Applicable Flexactions include:

105 - Overheight Truck Warning System (Repair/Replace)

CF-9. Non-functional Overheight Truck Alert: The truck detection system is not alerting drivers their vehicle does not meet the size requirements of the tunnel.

Applicable Flexactions include:

105 - Overheight Truck Warning System (Repair/Replace)

CF-10. Non-functional Overheight Truck Detection System: The truck detection system is not detecting vehicles that do not meet the size requirements of the tunnel.

Applicable Flexactions include:

105 - Overheight Truck Warning System (Repair/Replace)

CF-11. Missing Overheight Truck Warning "Headache" Bar: A previously installed "headache" bar is missing or damaged that warrants a detailed review to determine if the condition affects the strength of the element or serviceability of the tunnel.

Applicable Flexactions include:

105 - Overheight Truck Warning System (Repair/Replace)

Tunnel Lighting System Examples

General Statement: A component is not functioning properly and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

CF-12. Non-functional Tunnel Lighting System and Fixtures: A component is not functioning properly and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

106 - Tunnel Light System (Repair)

CF-13. Insufficient Tunnel Lighting: The tunnel lighting system does not provide sufficient lighting for safe passage through the tunnel.

Applicable Flexactions include:

106 - Tunnel Light System (Repair)

CF-14. Insufficient Emergency Tunnel Lighting: The emergency lighting system does not provide sufficient lighting for safe passage through the tunnel when activated or is non-operational.

Applicable Flexactions include:

106 - Tunnel Light System (Repair)

Tunnel Electrical System Examples

General Statement: A component is not functioning properly and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures

CF-15. Non-functional Switchgear and Switchboard: A component is not functioning properly (e.g., non-operation, fails to distribute power to all critical components, etc.) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

107 - Switchgear (Repair/Replace)

CF-16. Non-functional Motor Control Center: A component is not functioning properly (e.g., nonoperational switches fail to control critical components, indication lights are nonfunctional, etc.) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

108 - Motor Control Center (Repair/Replace)

CF-17. Non-functional Transformer: A component is not functioning properly (e.g., the voltage is not properly stepping up or down on either side of the transformer, the transformer is not performing as designed, etc.) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

109 - Transformer (Repair/Replace)

CF-18. Non-functional Transfer Switch: A component is not functioning properly (e.g., source of power supply is not properly switched, switch is malfunctional/nonfunctional, etc.) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

110 Transfer Switch (Repair/Replace)

CF-19. Non-functional Panel Board: A component is not functioning properly (e.g., board is broken and wires are exposed, panel is not placed in a secured space prone to be damaged easily, panel does not operate as intended, etc.) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

111 - Panelboard (Repair/Replace)

CF-20. Non-functional UPS Unit: A component is not functioning properly (e.g., UPS is damaged and/or does not provide sufficient power in a time of need, etc.) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

112 - UPS Unit (Repair/Replace)

CF-21. Non-functional Starters: A component is not functioning properly (e.g., nonoperational starters failed to control use of electrical power to equipment) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

121 – Other Maintenance

CF-22. Non-functional Conduits and Raceways: A component is not functioning properly (e.g., severely deteriorated conduits and raceways exposing wires and cables) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

121 – Other Maintenance

Tunnel Structural Examples

CF-23. Structurally Unsound Liner: A portion of the tunnel liner is no longer structurally sound and poses an immediate hazard to the travelling public.

Applicable Flexactions include:

113 - Liner (Repair)

CF-24. Leakage in Liner: A leak within the liner has caused a severe ice build the causes traffic to slow beneath the build-up and causes traffic disruptions.

Applicable Flexactions include:

113 - Liner (Repair)

CF-25. Impact Damaged Tunnel Roof/Ceiling Girders: Vehicular collision damage that compromises the structural capacity of a primary member, including, but not limited to: damage to steel beams where beam flanges have fractures, large gouges or where significant sweep, twisting or kinking of beams has been introduced by the collision impact; damage to P/S and CIP concrete beams where severed P/S tendons or reinforcing steel results in transverse flexure cracking and negative beam camber, and/or capacity of the damaged beam is less than sufficient to keep the tunnel open.

Applicable Flexactions include:

114 - Tunnel Roof/Ceiling Girders (Repair)

CF-26. Severe Web Section Loss in Tunnel Roof/Ceiling Girders: Severe web corrosion of adjacent beam ends on a steel roof/ceiling girders that substantially reduces shear capacity or demonstrates the onset of web crippling (NOTE: the onset of web crippling is not required to make the priority a critical finding).

Applicable Flexactions include:

114 - Tunnel Roof/Ceiling Girders (Repair)

CF-27. Horizontal Web Cracks in Tunnel Roof/Ceiling Girders: Horizontal Web cracks on roof girders due to out-of-plane bending and/or secondary stresses that substantially reduce shear capacity to levels less than sufficient to keep the tunnel open.

Applicable Flexactions include:

114 - Tunnel Roof/Ceiling Girders (Repair)

CF-28. Cracked Cover Plate Welds in Tunnel Roof/Ceiling Girders: One or more transverse cracks in the bottom flange at the end of a partial length welded cover plate of steel multi-girder, or steel floorbeam.

Applicable Flexactions include:

114 - Tunnel Roof/Ceiling Girders (Repair)

CF-29. Open Structural Cracks in P/S Concrete Beams in Tunnel Roof/Ceiling Girders: Transverse flexure cracks across the bottom flanges at mid-span, and/or diagonal shear cracks at beam supports.

Applicable Flexactions include:

114 - Tunnel Roof/Ceiling Girders (Repair)

CF-30. Severe Bearing Seat Damage in Tunnel Roof/Ceiling Girders: Severe Bearing Seat Damage: Severely deteriorated or undermined beam seat (loss of bearing area ≥ 40%).

Applicable Flexactions include:

114 - Tunnel Roof/Ceiling Girders (Repair)

CF-31. Blocked Cross-Passageway: The cross-passageway is blocked and does not allow pedestrians to use as an emergency exit in the event of an incident.

Applicable Flexactions include:

115 - Cross-Passageway (Repair)

CF-32. Safety Hazards in Cross-Passageway: Within the cross-passageway, safety hazards (i.e. slips, trips, falls, lighting, etc.) exist that will slow or limit the ability of pedestrians to use the passageway in the event of an incident.

Applicable Flexactions include:

115 - Cross-Passageway (Repair)

CF-33. Structurally Unsound Interior Walls: A portion of the interior wall is no longer structurally sound and poses an immediate hazard to the travelling public.

Applicable Flexactions include:

116 - Interior Walls (Repair)

CF-34. Structurally Unsound Tunnel Portal: A portion of the tunnel liner is no longer structurally sound and poses an immediate hazard to the travelling public.

Applicable Flexactions include:

117 - Tunnel Portal (Repair)

CF-35. Leakage in Tunnel Portal: A leak within the liner has caused a severe ice build the causes traffic to slow beneath the build-up and causes traffic disruptions.

Applicable Flexactions include:

117 - Tunnel Portal (Repair)

CF-36. Unstable Settlement Tunnel Portal: The portal has recordable settlement that is unstable, continues to move and poses a life-safety threat to the travelling public.

Applicable Flexactions include:

117 - Tunnel Portal (Repair)

CF-37. Hazardous Deck Conditions in Invert Slab/Slab-on-Grade: Applicable to deficiencies within the traffic lanes or within 2 feet outside of travel lanes that pose a safety hazard to the traveling public, including, but not limited to: broken scupper grates where sufficient separation exists between bars to trap tires or cause loss of control; spalls in concrete decks extending below the top mat of reinforcement; holes in corrugated steel flooring for Asphalt-filled pan deck.

Applicable Flexactions include:

118 – Invert Slab/Slab-on-Grade (Repair)

CF-38.Impact Damaged Invert Girders: Vehicular collision damage that compromises the structural capacity of a primary member, including, but not limited to: damage to steel beams where beam flanges have fractures, large gouges or where significant sweep, twisting or kinking of beams has been introduced by the collision impact; damage to P/S and CIP concrete beams where severed P/S tendons or reinforcing steel results in

transverse flexure cracking and negative beam camber, and/or capacity of the damaged beam is less than sufficient to keep the tunnel open.

Applicable Flexactions include:

119 - Invert Girders (Repair)

CF-39. Severe Web Section Loss in Invert Girders: Severe web corrosion of adjacent beam ends on a steel roof/ceiling girders that substantially reduces shear capacity or demonstrates the onset of web crippling (NOTE: the onset of web crippling is not required to make the priority a critical finding).

Applicable Flexactions include:

119 - Invert Girders (Repair)

CF-40. Horizontal Web Cracks in Invert Girders: Web cracks on roof girders due to out-of-plane bending and/or secondary stresses that substantially reduce shear capacity to levels less than sufficient to keep the tunnel open.

Applicable Flexactions include:

119 - Invert Girders (Repair)

CF-41. Cracked Cover Plate Welds in Invert Girders: One or more transverse cracks in the bottom flange at the end of a partial length welded cover plate of steel multi-girder, or steel floorbeam.

Applicable Flexactions include:

119 - Invert Girders (Repair)

CF-42. Open Structural Cracks in P/S Concrete Beams in Invert Girders: Transverse flexure cracks across the bottom flanges at mid-span, and/or diagonal shear cracks at beam supports.

Applicable Flexactions include:

119 - Invert Girders (Repair)

CF-43. Severe Bearing Seat Damage in Invert Girders: Severely deteriorated or undermined beam seat (loss of bearing area ≥ 40%).

Applicable Flexactions include:

119 - Invert Girders (Repair)

CF-44. Severely Deteriorated Tunnel Expansion Joints: Applicable to mechanical expansion devices when loose, damaged or deteriorated steel expansion joint armor or joint components present a hazard to vehicles.

Applicable Flexactions include:

120 - Tunnel Joint (Repair/Replace)

CF-45. Unacceptable Pedestrian Railing: Missing or detached pedestrian rail that would allow an individual to fall off the structure.

Applicable Flexactions include:

121 - Other Maintenance

CF-46. Hazardous Sidewalk/Safety Walkway Conditions: Applicable to structural components of the sidewalk/safety walk/sidewalk supports and the walking surface such that damage/deterioration presents a hazard to pedestrians due to load carrying capacity on the structure and not along approaches. Approach sidewalk defects should be addressed using approach roadway maintenance items. (Note that a minor height difference between the approach and tunnel walkway should not dictate a critical finding).

Applicable Flexactions include:

121 - Other Maintenance

CF-47. Severe Impact Damage: Vehicular collision damage that compromises the structural capacity of a pier shaft, column, or cap wall.

Applicable Flexactions include:

121 - Other Maintenance

CF-48. Structurally Unsound Tunnel Ceiling Slab/Panel: A portion of the tunnel ceiling slab or panel is no longer structurally sound and poses an immediate hazard to the travelling public.

Applicable Flexactions include:

121 - Other Maintenance

CF-49. Deteriorated Hangers and Anchorages: Hangers and Anchorages with the presence of excess amount corrosion, cracking, connection, bowing and elongation, creep, and cracking around anchorage area, resulting structural deficiencies and possible safety hazard.

Applicable Flexactions include:

121 - Other Maintenance

CF-50. Deterioration in anchorage area: The presence of missing connectors, bowing and elongation, creep, poor general condition and cracking around anchorage area, resulting structural deficiencies and possible safety hazard.

Applicable Flexactions include:

121 - Other Maintenance

Tunnel Mechanical Examples

General Statement: A component is not functioning properly and is compromising the overall system functionality based on the specific tunnel needs as indicate in tunnel inspection procedures.

CF-51. Non-functional Ventilation System/Fans: A component is not functioning properly (e.g., system requires minimum 3 of 4 fans to be operational, but only 2 are functional, electrical surge/wiring issues for the system/fan, fans are operating in a reduced capacity, etc.) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

122 - Ventilation System/Fans (Repair/Replace)

CF-52. Non-functional Drainage/Pumping System: A component or the total system is not functioning properly (e.g., electrical surge/wiring issues for the system, drains are clogged and water is remaining in the bore or being redirected into critical operational room, etc.) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

123 - Draining/Pumping System (Repair/Replace)

CF-53. Non-functional Emergency Generator System: A component or the total system is not functioning properly (e.g., the generator is not operational or doesn't operate at a capacity required to maintain the minimum systems for the tunnel to be operational, the transfer switch does not automatically turn on if the tunnel is not staffed 24/7, etc.) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

124 - Emergency Generator System (Repair/Replace)

CF-54. Safety Hazard: A component or total system is posing a safety concern by not functioning accordingly (e.g., the generator causes a health hazard as it doesn't vent properly or causes a secondary issue) and is compromising the serviceability needs of the tunnel as indicated in tunnel inspection procedures.

Applicable Flexactions include:

121 – Other Maintenance

CF-55. Non-functional Flood Gate: A component or the total system is not functioning properly (e.g., damaged flood gate failed to stop pressure flow during and after storm event, resulting in reduced or no operational capacity of the tunnel) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

121 – Other Maintenance

Tunnel Fire/Life Safety/Security System Examples

General Statement: A component is not functioning properly and is compromising the overall system functionality based on the specific tunnel needs as indicate in tunnel inspection procedures.

CF-56. Non-functional CO2 Monitoring System: A component or the total system is not functioning properly (e.g., lack of operational monitors limits the ability of the user to safely exit the tunnel in an emergency, monitoring system doesn't relay to a control center or automatic alarm, etc.) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures. Applicable Flexactions include:

125 - CO2 Monitoring System (Repair/Replace)

CF-57. Non-functional Fire Protection System: A component or the total system is not functioning properly (e.g., sprinkler heads/piping is corroded to the point it doesn't work, system cannot be charged, system leaks to the point that it's not sufficient to limit/stop designed fire spread, valves in the system are non-operational, fire extinguishers in critical locations are missing or have out of date testing records, etc.) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

126 - Fire Protection System (Repair/Replace)

CF-58. Non-functional Emergency Communication System: A component or the total system is not functioning properly (e.g., system does not allow messages to be broadcast to the users of the tunnel, wiring issues, etc.) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

127 - Emergency Communication System (Repair/Replace)

CF-59. Non-functional Egress Sign: Non-functional egress signage (e.g., sign not working, not displayed according to safety standard, etc.) that warrants a detailed review to determine if the condition affects the serviceability of the tunnel.

Applicable Flexactions include:

127 - Emergency Communication System (Repair/Replace)

CF-60. Non-functional Operations and Security System: A component or the total system is not functioning properly (e.g., system does not operate as designed to allow the owner to monitor operations within the tunnel, system does not allow the tunnel to communicate with emergency communication centers or resources, etc.) and is

compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

128 - Operations and Security System (Repair/Replace)

CF-61. Non-functional Fire Detection System: A component or the total system is not functioning properly (e.g., alarms, detectors and pull stations do not work in multiple zones or failed to trigger notification to a communication center, strobe lights do not activate, wiring issues causing shock/fire hazards, etc.) and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

127 - Emergency Communication System (Repair/Replace)

Tunnel Protective Systems Examples

General Statement: A component is not functioning properly and is compromising the overall system functionality based on the specific tunnel needs as indicate in tunnel inspection procedures.

CF-62. Non-functional Fire Protective Coating A component is not providing required service (e.g., loss of coating that impacts the "fire rating") and is compromising the overall system functionality based on the specific tunnel needs as indicated in tunnel inspection procedures.

Applicable Flexactions include:

129 - Fire Protective Coating (Repair/Replace)

IM05b Date Maint Pri Changed - Date Maintenance Priority Changed

Other > Proposed Maintenance > Proposed Maintenance Detail

Description:

This item is used to record the date the priority (Item IM05) of a maintenance item was changed.

Procedure:

This date will be **automatically entered by the system** for all proposed maintenance items when the priority level changes. In addition to the date, the new priority level will also be recorded.

A history of the priority change can be viewed by clicking the button to the right of Item IM05. When clicked, a pop-up box will open and display the history.

Coding:

Date in MM/DD/YYYY and time in HH:MM:SS format:

MM	2-digit month
DD	2-digit day of month
YYYY	4-digit year
HH	2-digit hour
MM	2-digit minute
SS	2-digit second

IM06 Init Recm'd Date – Initial Recommended Date

Other > Proposed Maintenance > Proposed Maintenance Detail; BMS3: Maintenance

Description:

This item is used to record the date the work candidate was initially recommended.

Procedure:

Enter the date on which the work candidate was initially recommended. This date should not be changed. The date the maintenance priority was changed is tracked through Item IM05b.

Coding:

Date in MM/DD/YYYY format:

MM	2-digit month
DD	2-digit day of month
YYYY	4-digit year

IM07 Status – Status of Work Candidate

Other > Proposed Maintenance > Proposed Maintenance Detail; BMS3: Maintenance

Description:

This item is used to indicate status of the work candidate.

Procedure:

Select the appropriate status for the work candidate from the dropdown list.

When the status of a maintenance item is "3 – Work sent to SAP", only a District Poweruser or Central Office Superuser can change the status to Status 5, 6, or 7. This manual override should only be used when the maintenance item was deleted in SAP and cannot be sent back to BMS2.

Coding:

0 Work not planned or scheduled – Default status as maintenance activities are entered into BMS2.

1 Work planned/Dept – Work is planned for Department forces. When work is to be sent to SAP/PM, Districts will change the status from 0 to 1.

2 Work planned/Contr – Work is planned for Contractor forces.

3 Work sent to SAP – Automatically set once the "Submit to SAP" button has been selected for a maintenance item.

4 Review Required – Work has been completed by Department Forces and needs to be reviewed. When the Maintenance crews have completed and closed out the item, the status will be changed to "4" by SAP, depending on the work activity.

5 Completed/Dept – Work has been completed by Department forces. For selected work activities, the work has reviewed by the District Bridge Unit and has been completed satisfactorily.

6 Completed/Contr – Work has been completed by Contractor forces. To be entered by the Districts when a contractor has completed a maintenance item.

7 Superseded – Work items have been eliminated as a result of Rehabilitation or Replacement -To be entered by the Districts when a maintenance crew/contractor has eliminated a work item by replacing or rehab the unit.

D Deferred – Bridge Maintenance has been deferred because other remedial action will be taken.

IM08 Target Year

Other > Proposed Maintenance > Proposed Maintenance Detail; BMS3: Maintenance

Description:

This item is used to record the tentative implementation or actual program year the of the maintenance activity.

Procedure:

Enter the fiscal or calendar year when that includes the implementation of the individual maintenance activity.

Coding:

YYYY 4-digit year

IM09 Location – Maintenance Location

Other > Proposed Maintenance > Proposed Maintenance Detail; BMS3: Maintenance

Description:

This item is used to record the location where the bridge maintenance activity is required.

Procedure:

Enter the location of the maintenance activity.

Coding:

The location field is only capable of storing 25 characters. Users shall abbreviate whenever possible with the following terms:

N	Near	UP	Upstream
F	Far	DN	Downstream
LNR	Near Left or Right	UN	Under
LFR	Far Left or Right	OUT	Outlet
1, 2, 3	Span, Pier, or Sign #	IN	Inlet

IM10 Est Cost - Estimated Cost of Work Candidate

Other > Proposed Maintenance > Proposed Maintenance Detail

Description:

This item is used to record the estimated cost of the work candidate.

Procedure:

Enter the estimated cost of the work candidate in dollars. For a status of "6 – Completed/Contr", enter the actual cost of the work. For a status of "7 – Superseded", leave blank.

Coding:

Estimated cost of the work candidate to the nearest dollar.

*IM11 Work Assign

Other > Proposed Maintenance > Proposed Maintenance Detail; BMS3: Maintenance

Description:

This item is used to record if the maintenance activity is a candidate for completion by Department forces or by contract.

Procedure:

Select the code that indicates how the work could be completed.

Coding:

0 Agency
1 Contractor

IM12 Drawing Ind – Drawing Indicator

Other > Proposed Maintenance > Proposed Maintenance Detail

Description:

This item is used to indicate whether or not drawings are required and available to perform the maintenance activity.

Procedure:

If the drawings are required to perform the maintenance item, check the indicator box. Otherwise, the box should remain unchecked.

Coding:

Unchecked The maintenance item does not require design/repair drawings.
Checked The maintenance item does require design/repair drawings.

IM13 Permit Ind – Permit Indicator

Other > Proposed Maintenance > Proposed Maintenance Detail

Description:

This item is used to indicate whether or not permits are required to perform the maintenance activity.

Procedure:

If permit(s) are required to perform the maintenance item, check the indicator box. Otherwise, the box should remain unchecked.

Coding:

Unchecked The maintenance item does not require permit(s).
Checked The maintenance item does require design permit(s).

IM14a Comp Date - Date Completed

Other > Proposed Maintenance > Proposed Maintenance Detail; BMS3: Maintenance

Description:

This item is used to record the date the work candidate was completed.

Procedure:

Enter the date on which the work candidate was completed. This item will be automatically entered for completed work coming from Plant Maintenance/SAP (status = 5). For a status of "6 – Completed/Contr" or "7 – Superseded", enter the date the work was completed.

Coding:

Date in MM/DD/YYYY format:

MM	2-digit month
DD	2-digit day of month
YYYY	4-digit year

IM14b POA Date – Plan of Action Date

Other > Proposed Maintenance > Proposed Maintenance Detail

Description:

This item is used to record the date the Plan of Action for a priority 0 or 1 maintenance activity was developed.

Procedure:

Enter the date on which development of the Plan of Action was developed. This is a required field for all Flexactions with a Priority 0 or 1.

Coding:

Date in MM/DD/YYYY format:

MM	2-digit month
DD	2-digit day of month
YYYY	4-digit year

IM14c Mitigation Date

Other > Proposed Maintenance > Proposed Maintenance Detail

Description:

This item is used to record the date a priority 0 maintenance activity was mitigated.

Procedure:

Enter the date on which the priority 0 maintenance activity was mitigated. Mitigation of a priority 0 maintenance activity indicates that a temporary measure(s) has been installed to address the immediate safety concern until a permanent repair will be in place. Examples of mitigation measures are temporary shoring, lane restrictions, load posting, bridge closure, etc.

If mitigation measures are implemented, Item IM05 is to be revised to a priority 1, and the bridge owner is to record the mitigation procedures in Item IM15a. In addition, the bridge owner has 6 months to repair the priority 1 activity. If the new coded priority 1 maintenance activity is not to be completed until contract work, Item IM07 is to be coded “D-deferred”.

Coding:

Date in MM/DD/YYYY format:

MM	2-digit month
DD	2-digit day of month
YYYY	4-digit year

IM15a Notes

Other > Proposed Maintenance > Proposed Maintenance Detail; BMS3: Maintenance

Description:

This item is used to record any notes on the work recommended. This field is also required for Plan of Actions (POA) for maintenance activities that have a priority 0 or 1.

Procedure:

Inspector's and, if warranted, District notes entered to amplify upon, better describe, or more thoroughly document the maintenance actions and address priorities. All notes will be numbered in the following format: #N (where N = number of the note). This format will allow parsing of the large note field into individual notes.

Inspectors: Provide amplifying information as required to assist in the definition of the required level of effort and location(s) for the maintenance requirement.

Districts: The following notes are required and must be entered into BMS2 for all bridges with high priority bridge structure maintenance items.

Required Notes – Note #1: Note 1 is reserved for tracking priority code changes and providing justification for those changes. State what the previous code was and why it was revised.

Examples

- #1 Priority code was a 0 and was changed because of…
- #1 Not Applicable" (Used if no changes were made to the priority codes).

General Notes – Note #2, #3, etc.: Note #4 and higher are for general notes which provide detail for the maintenance action and status of key milestones. Provide as much detail as possible. Notes should be updated as new information is obtained.

Example 1: On December 12, 2007 a bridge inspector identified significant loss in the bearing seat under the bearing for beam 1 at the NAB and assigned a priority 1.

#1 Bearing seat loss previously identified as a priority 3, revised to priority 1.
#2 Temporary barriers have been placed on 12/13/2007 to prevent traffic travelling in the westbound lane.
#3 Notification was sent to SAP on 12/15/2007.
#4 County Maintenance crews will begin repairs on 12/21/2007.

Example 2: During an underwater bridge inspection on May 7, 2007 bridge inspectors identified new, significant undermining under the far abutment. A phone call was made to the District bridge unit.

#1 NA
#2 Bridge was closed on May 7th and barriers put in place.
#3 District contacted Contractor XYZ to mobilize for repairs.
#4 Contractor arrived on site on May 8th and began coffer dam construction. Expected to complete dam on May 9th.
#5 Expected to complete repairs on May 11th.

Note: After repairs have been made, the District must record the actual completion date in Item IM14a and status in Item IM07.

Example 3: During a routine bridge inspection on July 3, 2007 bridge inspectors noted that a far advance bridge posting sign was missing. A phone call was made to the District bridge unit.

#1 NA
#2 Bridge Unit called Traffic Unit requesting a new sign on July 3.
#3 Traffic Unit put in an order for load posting sign on July 3.
#4 Sign expected to arrive on July 10.

Note: After repairs have been made, the District must record the actual completion date in Item IM14a and status in Item IM07.

IM15b Deferred Notes

Other > Proposed Maintenance > Proposed Maintenance Detail

Description:

This item is used to record any notes on the deferred bridge maintenance work. This field is required for Plan of Actions (POA) for maintenance activities that have a priority 1 or higher and Item IM07 is set to D-Deferred.

Procedure:

This field is reserved for tracking items where action was deferred. State what the previous code was and why it is revised. **Priority 0 work actions cannot, by definition, be deferred.** Priority 1 work actions may be deferred provided they meet the following conditions: corrective action (rehabilitation or replacement) is scheduled; the condition of the bridge will not degrade to a point where a Priority 0 need would result prior to the scheduled action. Notes should be updated as new information is obtained. A deferred priority 1 should be addressed within two years of the date recommended. Exceptions to this rule should be submitted to the Bridge Inspection Section Chief by the District Bridge Engineer for approval.

All notes will be numbered in the following format: #N (where N = number of the note). This format will allow parsing of the large note field into individual notes. Notes should be updated as new information is obtained.

Coding:

Information that should be entered include:

- Work that was deferred due to a scheduled project – identify project number and scope.
- Bridge monitoring – record dates of monitoring.
- Bridge Restrictions such as lane restrictions, posting, and closures. Include dates that restrictions were implemented.

Example: During a routine bridge inspection on October 20, 2007 bridge inspectors noted that rocker bearings are exceeding the allowable angle of tilt and assigned a priority 0.

#1 Bridge inspectors immediately called District Bridge Engineer.
#2 County maintenance crew was notified on October 20, 2007 of problem.
#3 County placed temporary wood blocking at rocker bearings on October 21.
#4 Superstructure is scheduled for replacement in May 2008.
#5 Continue to monitor every 6 months until replacement.

Note: Permanent repairs were not made. Completed date in Item IM14a should not be entered, Item IM07 should be set to "D-Deferred", and Item IM05 should be set to Priority 1.

IM15c Bridge Appr – Authorized Bridge Approval

Other > Proposed Maintenance > Proposed Maintenance Detail

Description:

This ite is used to record the name of the responsible person in the District Bridge Unit to ensure the work activity gets completed. For Priority Codes 0 and 1, this will be the same person who approves the POA, typically the District Bridge Engineer.

Procedure:

Enter the name from the District Bridge unit who will oversee that the activity gets completed.

IM15d Maint Appr – Authorized Maintenance Approval

Other > Proposed Maintenance > Proposed Maintenance Detail

Description:

This item is used to record the name of the responsible person in the County Maintenance Unit or the District Construction Unit to ensure the work activity gets completed. For Priority Codes 0 and 1, this will be the same person who approves the POA in the County, typically the County Maintenance Manager.

Procedure:

Enter the name from the County who will oversee that the activity gets completed. If work is contracted out, enter the name from the District Construction unit who will oversee the work.

IM15e (Not Used – Reserved for Future Use)

IM16 SAP Closed Date

Other > Completed Maintenance

Description:

This item is used to record the date that the work item was closed out by Department maintenance forces.

Procedure:

This field is **automatically entered by the system** based on information obtained from SAP/Plant Maintenance.

IM17 SAP WO Num – SAP Work Order Number

Other > Completed Maintenance

Description:

This item is used to record the SAP Work Order Number assigned to the maintenance item. Procedure: This field is completed based on information obtained from SAP/Plant Maintenance.

Procedure:

This field is **automatically entered by the system** based on information obtained from SAP/Plant Maintenance.

IM18 Act Quan - Actual Quantity

Other > Completed Maintenance

Description:

This item is used to record the actual quantity of the work completed.

Procedure:

This item will be **automatically entered by the system** for completed work coming from SAP/Plant Maintenance (e.g. status = 3 or 4).

IM19 Act Cost - Actual Cost

Other > Completed Maintenance

Description:

This item is used to record the actual cost of the work completed.

Procedure:

This item will be **automatically entered by the system** for completed work coming from SAP/Plant Maintenance (e.g. status = 3 or 4).

IM20 MPMS

Other > Completed Maintenance

Description:

This item is used to record the MPMS # associated with the work.

Procedure:

Enter the MPMS # associated with the work, if applicable.

IM21 Notes

Other > Completed Maintenance

Description:

This item records any notes that were taken on the work recommended.

Procedure:

This item will be **automatically entered by the system** when the maintenance item is marked completed or superceded. This item copies the notes that were entered in Item IM15a prior to the maintenance item being marked completed or superceded.

IS Inspection - Signs / Lights

The Sign/High-Mast Light Inspection Section allows users to view and/or edit information related to sign structure and high-mast light inspections. The sign/lights screen is applicable only when the user selects a sign or high-mast light structure.

IS01 (Not Used – Reserved for Future Use)

Condition Rating Codes Used for Sign/High-Mast Light Structure Rating Only

In order to promote uniformity between inspectors, these guidelines will be used to rate and code Items IS02, IS03, IS04, IS05, IS06, IS07, IS08, IS09, and IS10.

Condition ratings are used to describe the existing in-place structure as compared to the as-built condition.

Condition codes are properly used when they provide an overall characterization of the general condition of the entire component being rated.

Do not rate condition based on localized or nominally occurring instances of deterioration or disrepair. Correct assignment of a condition code must, therefore, consider both the severity of the deterioration or disrepair and its extent throughout the component being rated.

The determination of which of the following ratings apply to each of the items will be based on an evaluation of all the relevant factors and information included in the detailed inspection reports. The rating chosen for each of these items will, in effect, be a composite of all of the relevant factors.

It should be recognized that this will require judgment, particularly for those items where the ratings seem not to apply. There are unique situations, but again, it is expected that some judgment will be used.

Rating Codes:

N **Not Applicable**.
8 **Good Condition** – No apparent problems.
6 **Satisfactory Condition** – Structural elements sound. Minor cracking, loose bolts, missing safety chains, broken lights.
4 **Poor Condition** – Moderate structural cracking, missing bolts, missing nuts, significant corrosion, minor collision damage.
2 **Critical** – Major structural defects, loose components that could fall on roadway. Loose or missing anchor bolts or nuts on cantilevers. Excessive weld cracking.

Note:
Codes of 1, 3, 5, 7, and 9 are acceptable, but not recommended.

IS02 Foundation - Column Base Condition Rating

Inspection > Signs and Lights; BMS3: Signs & Lights

Description:

This item indicates the condition of the base of the column of the sign structure or high mast light poles.

Procedure:

Select the code from the dropdown list which indicates the condition of the column base assembly anchor. This includes the relevant condition of the base assembly, anchor bolts, the column foundation, and the attachments for a structure mounted sign.

Coding:

Refer to CONDITION RATING CODES listed after Item IS01.

IS03 Guide Rail - Guide rail Condition Rating

Inspection > Signs and Lights; BMS3: Signs & Lights

Description:

This item indicates the condition of the guide rail in front of sign structure or high mast light poles.

Procedure:

Select the code from the dropdown list which indicates the condition of the guide rail, if applicable.

Coding:

Refer to CONDITION RATING CODES listed after Item IS01.

IS04 Column - Column Condition Rating

Inspection > Signs and Lights; BMS3: Signs & Lights

Description:

This item indicates the condition of the column(s) of the sign structure or high mast light poles.

Procedure:

Select the code from the dropdown list which indicates the condition of the column(s).

Coding:

Refer to CONDITION RATING CODES listed after Item IS01.

IS05 Method of Access - Access Condition Rating

Inspection > Signs and Lights; BMS3: Signs & Lights

Description:

This item indicates the condition of the means of access for inspection and maintenance.

Procedure:

Select the code from the dropdown list which indicates the condition of the access including supports. If no access exists on the structure, code "N".

Coding:

Refer to CONDITION RATING CODES listed after Item IS01.

IS06 Sign - Sign Condition Rating (Sign Structure Only)

Inspection > Signs and Lights; BMS3: Signs & Lights

Description:

This item indicates the structure condition of the sign(s). Do not rate legibility and visibility of the sign. This item does not apply to high mast light pole structures.

Procedure:

Select the code from the dropdown list which indicates the structural condition of the sign(s) and connections, if applicable. Code "N" for high-mast light pole structures.

Inspectors shall pay close attention to the use of aluminum lock nuts which attach the sign panels to the sign structure or bridge. Certain grades of aluminum lock nuts have resulted in cracking and eventual splitting. In addition, the proprietary High-Lock nuts that used non-galvanized steel nuts acted as a sacrificial metal on the sign structure and corroded rapidly. The use of aluminum nuts and High-Lock nuts has been discontinued. Previous sign structure inspection reports should be reviewed where aluminum bolts have been replaced. Additional cracking of the original nuts and the condition of the replacement nuts should be thoroughly checked.

Coding:

Refer to CONDITION RATING CODES listed after Item IS01.

IS07 Lights - Light Condition Rating

Inspection > Signs and Lights; BMS3: Signs & Lights

Description:

This item indicates the structural condition of the lights, if applicable.

Procedure:

Select the code from the dropdown list which indicates the structural condition of the lighting apparatus. If lights do not exist on the structure, code "N".

Coding:

Refer to CONDITION RATING CODES listed after Item IS01.

IS08 Surface Paint – Surface/Paint Condition Rating

Inspection > Signs and Lights; BMS3: Signs & Lights

Description:

This item indicates the condition of the surface of all structural members.

Procedure:

Select the code from the dropdown list which indicates the condition of the surface of all structural members. This includes columns, horizontal members, and cross members. If the structure is painted, then rate the condition of the paint.

Coding:

8, 7	**Good** – spot galvanizing and/or spot painting is required. Discoloration can be present due to early evidence of the breakdown of the galvanizing.
6, 5	**Fair** – program for galvanizing or painting. Discoloration is present indicating an intermediate stage of protection failure.
4	**Poor** – urgently in need of galvanizing or painting. Galvanizing failure is present and rust is beginning to form.
3, 2	**Critical** – structural repair may be required before applying protective coating. Loss of cross-section area has occurred.
0	**Intolerable** – beyond repair (painting or hot dip galvanizing is a waste of resources).

IS09 Horizontal Member/Frame - Horizontal Member Condition Rating (Sign Structures Only)

Inspection > Signs and Lights; BMS3: Signs & Lights

Description:

This item indicates the condition of the horizontal member. Code the framework for a structure mounted sign under this item.

Procedure:

Select the code from the dropdown list which indicates the condition of the horizontal member or the framework for a structure mounted sign. Code "N" for high mast light structures.

Coding:

Refer to CONDITION RATING CODES listed after Item IS01.

IS10 Overall - Overall Condition Rating of the Sign/Light Structure

Inspection > Signs and Lights; BMS3: Signs & Lights

Description:

This item indicates the condition of the structure.

The overall rating of the structure should reflect the structural safety condition of the structure. Some less critical items may be rated "4" while the overall condition rating could be "6" or vice versa. For example, a poorly performing galvanizing surface is not sufficient to rate as "poor" the overall condition.

Procedure:

Select the code from the dropdown list which indicates the condition of the structure.

Coding:

Refer to CONDITION RATING CODES listed after Item IS01.

IS11 Notes – Sign/Light Inspection Notes

Inspection > Signs and Lights; BMS3: Signs & Lights

Description:

This item is used to record any narrative information that the inspector feels is necessary or may assist in the next inspection of the structure. Critical deficiencies that are identified from the inspection report should be noted here in a brief abbreviated format.

Procedure:

Record any narrative information that is necessary to identify inspection findings.

IS12 (Not Used – Reserved for Future Use)

IS13 (Not Used – Reserved for Future Use)

IS14 (Not Used – Reserved for Future Use)

IS15 Sign Asset Tags - Exist/Cond – Tag Existence and Condition

Inspection > Signs and Lights; BMS3: Signs & Lights

Description:

This item is used to record whether or not the sign structure displays asset tag(s) and the condition of the tag(s).

Procedure:

Select the code from the dropdown list that describes the presence and condition of asset tag(s) on the sign structure. Record any narrative information that is necessary to identify inspection findings in the comment type for Sign Asset Tags in Item IC01.

Coding:

Present – Good Condition	All required tags are present and properly installed on the sign structure per Pub. 15M (DM-4), Section 3.6.3. The entire tag is intact, the BRKEY is readable, and the entire tag adheres properly to the structure.
Present - Damaged	All required tags are present. However, part of the asset tag may be missing, the BRKEY is not readable, tag(s) are not properly installed per Pub. 15M, and/or the adhesive is failing to adhere the entire tag to the sign structure.
Missing	One or both (if applicable) of the asset tags are missing.
Not Applicable	Structure mounted signs (Item 6A29 = 45) are not required to have asset tags.

IW Inspection - Walls

The Wall Inspection Section allows users to view and/or edit information related to retaining wall and noise wall inspections. The Walls screen is applicable only when the user selects a wall structure.

IW01 (Not Used – Reserved for Future Use)

Condition Rating Codes Used for Retaining Wall Rating Only

In order to promote uniformity between inspectors, these guidelines will be used to rate and code Items IW02, IW03, IW04, IW05, IW06, IW07, IW08, IW09, and IW10.

Condition ratings are used to describe the existing in-place structure as compared to the as-built condition.

Condition codes are properly used when they provide an overall characterization of the general condition of the entire component being rated.

Do not rate condition based on localized or nominally occurring instances of deterioration or disrepair. Correct assignment of a condition code must, therefore, consider both the severity of the deterioration or disrepair and the extent to which it is widespread throughout the component being rated.

The determination of which of the following ratings apply to each of the items will be based on an evaluation of all the relevant factors and information included in the detailed inspection reports. The rating chosen for each of these items will, in effect, be a composite of all of the relevant factors.

It should be recognized that this will require judgment, particularly for those items where the ratings seem not to apply. There are unique situations, but again, it is expected that some judgment will be used.

Rating Codes:

N **Not Applicable**.
8 **Good Condition –** No apparent problems.
6 **Satisfactory Condition –** Structural elements sound. Localized drainage problems, settlement, staining, washing of fines from backfill material.
4 **Poor Condition –** Localized buckling, deteriorated face panels, joint problems, major settlement, ice damage.
2 **Critical –** Major structural defects, components have moved to point of possible collapse.

Note:
Codes of 1, 3, 5, 7, and 9 are acceptable, but not recommended.

IW02 Anchorage - Anchorage Condition Rating

Inspection > Walls; BMS3: Walls

Description:

This item indicates the condition of the wall anchorage system.

Procedure:

Select the code from the dropdown list which indicates the condition of the wall anchorage.

Coding:

Refer to CONDITION RATING CODES listed after Item IW01.

IW03 Backfill/Damping - Backfill Condition Rating

Inspection > Walls; BMS3: Walls

Description:

This item indicates the condition of the backfill material.

Procedure:

Select the code from the dropdown list which indicates the condition of the backfill. This includes the relevant condition of settlement and washing of fines.

Coding:

Refer to CONDITION RATING CODES listed after Item IW01.

IW04 Wall - Wall Condition Rating

Inspection > Walls; BMS3: Walls

Description:

This item indicates the condition of the retaining wall.

Procedure:

Select the code from the dropdown list which indicates the condition of the wall. This will include bulging, joint conditions, deterioration of face panels, connection of the backs, etc.

Coding:

Refer to CONDITION RATING CODES listed after Item IW01.

IW05 Panel - Panel Condition Rating

Inspection > Walls; BMS3: Walls

Description:

This item indicates the condition of wall panels.

Procedure:

Select the code from the dropdown list which indicates the condition of the wall panel.

Coding:

Refer to CONDITION RATING CODES listed after Item IW01.

IW06 Post - Post Condition Rating

Inspection > Walls; BMS3: Walls

Description:

This item indicates the condition of wall posts.

Procedure:

Select the code from the dropdown list which indicates the condition of the wall posts.

Coding:

Refer to CONDITION RATING CODES listed after Item IW01.

IW07 Drainage - Drainage Condition Rating

Inspection > Walls; BMS3: Walls

Description:

This item indicates the condition of the drainage.

Procedure:

Select the code from the dropdown list which indicates the condition of the drainage of the wall. This will include the performance of the weep holes and drainage problems notes, staining, and ice damage.

Coding:

Refer to CONDITION RATING CODES listed after Item IW01.

IW08 Foundation - Foundation Condition Rating

Inspection > Walls; BMS3: Walls

Description:

This item indicates the condition of the foundation.

Procedure:

Select the code from the dropdown list which indicates the condition of the foundation. Overall stability and settlement should be considered here.

Coding:

Refer to CONDITION RATING CODES listed after Item IW01.

IW09 Parapets - Parapets Condition Rating

Inspection > Walls; BMS3: Walls

Description:

This item indicates the condition of parapets which are on top of the wall.

Procedure:

Select the code from the dropdown list which indicates the condition of the parapets.

Coding:

Refer to CONDITION RATING CODES listed after Item IW01.

IW10 Overall - Overall Condition Rating of the Wall

Inspection > Walls; BMS3: Walls

Description:

This item indicates the condition of the structure. The overall rating of the structure should reflect the safety condition of the structure as it relates to the public safety. Some items may be rated "4" while the overall condition rating could be "6". For example, water staining or slight settlement is not sufficient to rate the overall condition as "poor".

Procedure:

Select the code from the dropdown list which indicates the condition of the structure.

Coding:

Refer to CONDITION RATING CODES listed after Item IW01.

IW11 Notes – Wall Inspection Notes

Inspection > Walls; BMS3: Walls

Description:

This item is used to record any narrative information that the inspector feels is necessary or may assist in the next inspection of the structure. Critical deficiencies that are identified from the inspection report should be noted here in a brief abbreviated format.

Procedure:

Record any narrative information that is necessary to identify inspection findings.

IW12 (Not Used – Reserved for Future Use)

IW13 (Not Used – Reserved for Future Use)

IW14 (Not Used – Reserved for Future Use)

FT Features Intersected - Utility

The Features Intersected - Utility Section is used to capture and display information related to utility features.

New Utility Feature records can be added using the "Create" button. One or more existing records can be deleted by selecting the features and clicking on the "Remove" button. A confirm deletion prompt with be displayed by the system before the records are removed. The "Save" button is used to commit pending changes on the screen, if any, to the database.

FT01 Utility Name - Name of Utility Company

Inventory > Features > Utility Detail;

Description:

This item is used to record the name of the owner of the utility being referenced, relative to any utilities carried by the bridge.

Procedure:

Enter the name of the owner of the utility.

Coding:

Enter the name of the utility company in a narrative form.

FT02 Utility Type

Inventory > Features > Utility Detail

Description:

This item is used to record the type of utility being referenced.

Procedure:

Select the type of utility from the dropdown list.

Coding:

E	Electrical
G	Gas
S	Sewage
T	Telecommunications (includes Fiber optic cable, phone lines, cable lines, etc.)
W	Water

FT03 License Number - License Number of Utility Company Carried by Bridge

Inventory > Features > Utility Detail

Description:

This item is used to record the license number of the utility.

Procedure:

Enter the license number which allows the utility to occupy the bridge.

Coding:

License number.

FT04 License Issue Date - Date the License Number Was Approved

Inventory > Features > Utility Detail

Description:

This item is used to enter the date the license was approved.

Procedure:

Enter the date that the license was approved.

Coding:

Date approved in MM/DD/YYYY format:

MM	2-digit month
DD	2-digit day of month
YYYY	4-digit year

FT05 Utility Weight - Total Weight of Utility in Kips

Inventory > Features > Utility Detail

Description:

This item is used to record the total weight of the utility in kips to the nearest tenth.

Procedure:

Enter the total weight of the utility, including all hardware, attached to the bridge.

Coding:

Total weight in kips to the nearest tenth.

FT06 Utility Address - Address of Utility Company

Inventory > Features > Utility Detail

Description:

This item is used to record the address of the owner of the utility being referenced, relative to any utilities carried by the bridge.

Procedure:

Enter the address of the owner of the utility.

Coding:

The address of the utility company in a narrative form.

FT07 Hazmat - Hazmat Indicator

Inventory > Features > Utility Detail

Description:

This checkbox field is used to indicate whether or not the utility contains hazardous materials.

Procedure:

Check the box to indicate that the utility contains hazardous materials. Otherwise, the box should remain unchecked.

Coding:

Unchecked	Hazardous materials are not present
Checked	Hazardous materials are present

FT08 Location - Location of Utility on Structure

Inventory > Features > Utility Detail

Description:

This item is used to record a narrative description for the location of the utility on the structure.

Procedure:

Enter a narrative description for the location of the utility on the structure.

Coding:

Description for the location of the utility on the structure in narrative form.

Example:
Welded to diaphragms between Beams 3 and 4.

FT09 Contact Info - Contact Information

Inventory > Features > Utility Detail

Description:

This item is used to record information (name, phone number, etc.) about the point of contact for the utility.

Procedure:

Enter any known information for the point of contact for the utility.

Coding:

Point of contact information for the utility, such as name, phone number, or e-mail address.

FT10 Notes

Inventory > Features > Utility Detail

Description:

This item is used to record any additional information about the utility feature.

Procedure:

Enter any additional information about the utility feature in narrative form.

Coding:

Additional information about the utility feature in narrative form.

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FR Features Intersected - Railroad

The Features Intersected - Railroad Section is used to enter or edit data related to railroad features either on or under a structure.

New railroad feature records can be added using the "Create" button. Existing features can be deleted by selecting the desired feature from the grid list and clicking on the "Remove" button. A confirm deletion prompt with be displayed by the system before the records are removed. The "Save" button is used to commit pending changes on the screen, if any, to the database.

FR01 RR Name - Name of Railroad

Inventory > Features > Railroad Detail; BMS3: Features

Description:

This item is used to record the name of the railroad.

Procedure:

Select the code for the name of the railroad from the dropdown list.

If the Feature Intersected is not a railroad, leave this item blank.

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Coding:

	Railroad Name
01	Aliquippa & Southern Railroad Company
02	Baltimore & Ohio Railroad Company, CYS, Chessie (CSX)
03	Bellefonte Central Railroad Co.
04	Bessemer & Lake Erie Railroad Co.
05	Cambria & Indiana Railroad Co.
06	Chestnut Ridge Railway Co.
07	Conemaugh 7 Black Lick Railroad Co.
08	Commonwealth of Pennsylvania
09	Consolidated Rail Corporation (CONRAIL) Pennsylvania RR
10	Central Railroad Co. of Pennsylvania
11	Delaware & Hudson Railway Co.
12	East Erie Commercial Railroad
13	The Everett Railroad Co.
14	Gettysburg Railroad Co.
15	Johnstown & Stonycreek Railroad Co.
16	Stourbridge Railroad Co.
17	Lake Erie, Franklin, & Clarion Railroad Co.
18	Maryland & Pennsylvania Railroad Co.
19	McKeesport Connecting Railroad Co.
20	Middletown & Hummelstown Railroad Co.
21	The Monongahela Connecting Railroad Co.
22	The Monongahela Railway Co.
23	Montour Railroad Company
24	National Railroad Passenger Corporation (AMTRAK)
25	New Hope & Ivyland Railroad Company
26	Norfolk & Western Railway Co.
27	Northampton & Bath Railroad Co.
28	Octoraro Railway Co.
29	Philadelphia Belt Line Railroad
30	Philadelphia, Bethlehem, & New England Railroad Co.
31	Pittsburgh, Allegheny, & McKees Rocks Railroad Co.
32	Pittsburgh, Chartiers, & Youghiogheny Railway Co.
33	The Pittsburgh & Lake Erie Railroad Co.
34	Pittsburgh and Ohio Valley Railway Co.
35	The Pittsburgh & Shawmut Railroad Co.
36	Steelton & Highspire Railroad Co.
37	The Stewartstown Railroad Co. (not in service)
38	Strasburg Railroad Co.
39	Towanda & Monroeton Shippers' Lifeline, Inc.
40	Union Railroad Co. & Pennsylvania & West Virginia
41	Unity Railways Co.
42	Upper Merion & Plymouth Railroad Co.
43	Wanamaker, Kempton, & Southern Railroad
44	Waynesburg Southern
45	Waynesburg & Washington Railroad Co.
46	Wellsville, Addison, & Galeton Railroad Corp.
47	Western Maryland Railway Co.
48	Winfield Railroad Company
49	Youngstown & Southern Railway Co.

	Railroad Name (cont.)
50	Port Authority of Allegheny County (PAT)
51	Southeastern Pennsylvania Transportation Authority (SEPTA)
52	Central Railroad Co. of New Jersey
53	Erie, Lackawanna Railroad Co. – Trustees
54	Ironton Railroad Co.
55	Lackawanna & Wyoming Valley Railroad Company
56	Lehigh & Hudson River Railway Co.
57	Lehigh & New England Railway Co. – Trustees
58	Lehigh Valley Railroad – Trustees
59	Pen Central Transportation Co. – Trustees
60	Reading Company – Trustees
61	Allentown Terminal Railroad Co. – Trustees
62	East Broad Top Railroad & Coal Co.
63	Monessen Southwestern Railway Co.
64	Turtle Creek & Allegheny River Railroad Company
65	Wilkes-Barre Connecting Railroad
66	Lehigh Coal & Navigation Co.
67	Rail Tours, Inc.
68	Cumberland Mine Railroad
69	United States Steel Corporation (Private)
70	Con Agra (Private)
71	Alcoa
72	Berwick Industrial Development Assoc.
73	New York, Susquehanna & Western Railroad Co.
74	Can Do, Inc.
75	Consolidated Coal Company, Inc.
76	Kovalchick Properties
77	Lykens Valley Railroad Co.
78	Pocono North East Railway, Inc.
79	Allegheny RR or Centre Co. Railway Co.
80	Buffalo, Rochester, & Pittsburgh Railway Co.
81	Blue Mountain & Reading Railroad Co.
82	Buffalo & Pittsburgh R.R.
83	North Shore Railroad, Stourbridge Railroad Company
84	Knox & Kane
85	Shamokin Valley R.R.
86	York Rail
87	Pennswood
88	Nittany & Bald Eagle
89	Reading, Blue Mountain, & Northern R.R.
90	Carbon & Schuylkill R.R.
91	Canadian Pacific Railroad Co.
92	Lackawanna Railroad Authority
97	Other
98	Abandoned Properties – Owners Unknown
99	Inactive Private Properties

FR02 (Not Used – Use Item 5C03)

FR03 Service Status - Service Status of Railroad

Inventory > Features > Railroad Detail; BMS3: Features

Description:

This item is used to record the service status of the railroad.

Procedure:

Select the code from the dropdown list for the service status of the railroad.

If the feature intersected is not a railroad, leave this item blank.

Coding:

1 In Service
2 Out of Service – No PUC or ICC Abandonment Action
3 Out of Service – Under PUC or ICC
4 Officially Abandoned

Note:
Railroad information in the BMS2 System should not be deleted until a formal PUC order for elimination of crossing is issued.

FR04 RR Milepost - Railroad Milepost

Inventory > Features > Railroad Detail; BMS3: Features

Description:

This item is used to enter the railroad milepost at which the structure is located. Locating a structure by milepost is similar to the milepost system used on our Interstate Highway routes.

Procedure:

Enter the railroad milepost at which the structure is located, including the line abbreviation. This field will be read-only if a valid AAR DOT Number is entered in Item FR05.

Coding:

Railroad line abbreviation and railroad milepost to the nearest hundredth of a mile.

Example:
McClay Street Bridge in Harrisburg, crossing Norfolk Southern's Pittsburgh line at milepost 106.04. Code PT106.04.

FR05 AAR DOT Num - Association of American Railroads Identifying Number

Inventory > Features > Railroad Detail; BMS3: Features

Description:

This item indicates the unique identifying number for the specific railroad-highway crossing assigned during a previous inventory by railroad personnel.

Procedure:

Enter the AAR (Association of American Railroads) Number for the specific railroad-highway crossing. This number is comprised of 6 numbers plus a letter. If the number does not exist in Grade Crossing ECS (GCECS), a validation will pop-up and not allow the entry of the DOT number in the field. A valid DOT number will populate Items FR04 and FR17 through FR20 if the information is available from GCECS.

Coding:

Enter the AAR Number for the specific structure.

FR06 Num of Electrified Tracks - Number of Electrified Railroad Tracks

Inventory > Features > Railroad Detail; BMS3: Features

Description:

This item is used to record the number of electrified railroad tracks for each railroad feature being recorded.

Procedure:

Enter the number of electrified railroad tracks for each railroad feature being recorded.

Coding:

The number of electrified railroad tracks.

FR07 Total Num of Tracks - Total Number of Railroad Tracks

Inventory > Features > Railroad Detail; BMS3: Features

Description:

This item is used to record the total number of railroad tracks for the feature.

Procedure:

Enter the total number of tracks.

Coding:

The total number of railroad tracks.

FR08 Span Desc - Span Description

Inventory > Features > Railroad Detail; BMS3: Features

Description:

This item is used to record the description of which span(s) the railroad tracks cross under.

Procedure:

Enter description of which span(s) the railroad tracks cross under.

Coding:

Narrative description of the span(s) the railroad tracks cross under.

FR09 Additional Operator

Inventory > Features > Railroad Detail; BMS3: Features

Description:

This narrative item is used to record a description of other railroad companies that may use the feature.

Procedure:

Enter a description of any other railroad companies that may use the feature (e.g. lease of track rights).

Coding:

Description of any other railroad companies that may use the feature in narrative form.

> Items FR11 and FR13, clearance data for railroads, may be entered on this screen or the Agency – Roadways Screen, in Items 6C18 to 6C23.

FR10 (Not Used - Reserved for Future Use)

*FR11 Min Over Vert (Right) - Minimum Vertical Clearance for the Right Railroad

Inventory > Features > Railroad Detail; BMS3: Features

Description:

This item is used to record the actual minimum vertical clearance over the railroad to any restriction, to the nearest hundredth of a foot.

Procedure:

If the feature beneath the structure is a railroad(1), enter the vertical clearance from the railroad track to the underside of the superstructure.

Coding:

9990 When no restriction exists
9910 When a restriction is 100 feet or greater

Note:
Measurements should be from the edge of through lane for the under feature and from the curb line for the on feature.

(1) For Railroad Abandonment if there is no abandonment order for the railroad in the District files, the vertical clearance is to be coded even if the tracks have been removed.

FR12 (Not Used – Reserved for Future Use)

*FR13 Horiz (Right) - Total Horizontal Clearance for the Right Railroad

Inventory > Features > Railroad Detail; BMS3: Features

Description:

This item is used to record the total horizontal clearance for the railroad.

Procedure:

The total horizontal clearance should be the available clearance measured between the edge of the rail and the structural feature limiting the railroad(2).

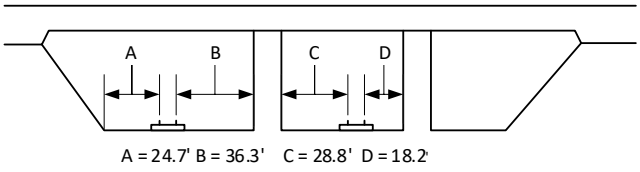
Coding:

The total horizontal clearance to the nearest tenth of a foot.

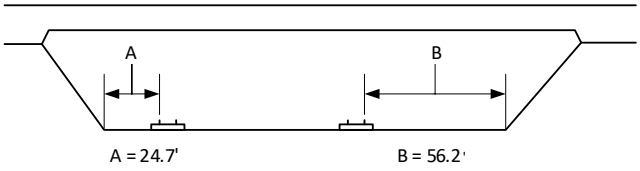
9990	When no restriction exists
9910	When a restriction is 100 feet or greater
Blank	Not applicable

Note:

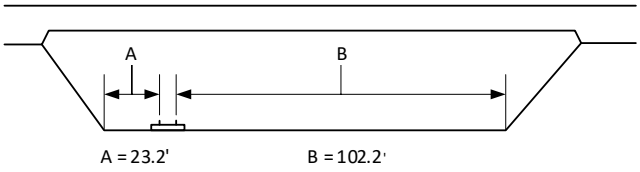
(2) For Railroad Abandonment if there is no abandonment order for the railroad in the District files, the horizontal clearance is to be coded even if the tracks have been removed.



Code 18.2' for FR13



Code 24.7' for FR13



Code 23.2' for FR13

FR14 (Not Used – Reserved for Future Use)

FR15 (Not Used – Reserved for Future Use)

FR16 Notes

Inventory > Features > Railroad Detail; BMS3: Features

Description:

This item is used to record any comments about the feature.

Procedure:

Enter any comments about the feature in narrative form.

FR17 RR Division – Railroad Division

Inventory > Features > Railroad Detail

Description:

This item is used to record the Railroad Division of the Owner listed in Item FR20.

Procedure:

This item will be **automatically filled in by the system** based on the AAR DOT number posted in Item FR05. If Item FR05 is not filled in, this field will remain blank. If Item FR05 is completed, this item will be populated if Grade Crossing ECS has a Railroad Division associated with the grade crossing identified in Item FR05.

FR18 RR Subdivision – Railroad Subdivision

Inventory > Features > Railroad Detail

Description:

This item is used to record the Railroad Subdivision of the Owner listed in Item FR20.

Procedure:

This item will be **automatically filled in by the system** based on the AAR DOT number posted in Item FR05. If Item FR05 is not filled in, this field will remain blank. If Item FR05 is completed, this item will be populated if Grade Crossing ECS has a Railroad Subdivision associated with the grade crossing identified in Item FR05.

FR19 RR Branch – Railroad Branch

Inventory > Features > Railroad Detail

Description:

This item is used to record the Railroad Branch of the Owner listed in Item FR20.

Procedure:

This item will be **automatically filled in by the system** based on the AAR DOT number posted in Item FR05. If Item FR05 is not filled in, this field will remain blank. If Item FR05 is completed, this item will be populated if Grade Crossing ECS has a Railroad Branch associated with the grade crossing identified in Item FR05.

FR20 RR Owner – Railroad Owner

Inventory > Features > Railroad Detail

Description:

This item is used to record the Railroad Owner recorded in Grade Crossing ECS.

Procedure:

This item will be **automatically filled in by the system** based on the AAR DOT number posted in Item FR05. If Item FR05 is not filled in, this field will remain blank. If Item FR05 is completed, this item will be populated if Grade Crossing ECS has a Railroad Owner associated with the grade crossing identified in Item FR05.

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FW Features Intersected - Waterway

The Features Intersected - Waterway Section is used to view or edit data related to waterways passing under a structure.

New waterway feature records can be added using the "Create" button. Existing features can be deleted by selecting the desired feature from the grid list and clicking on the "Remove" button. A confirm deletion prompt with be displayed by the system before the records are removed. The "Save" button is used to commit pending changes on the screen, if any, to the database.

FW01 Stream Name - Name of the Stream (Creek, River, etc.)

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the name of the stream in narrative form.

Procedure:

Enter the name of the stream which the bridge passes over. If the name of the stream is not known, it should be indicated as a tributary to a known stream name.

Coding:

A narrative description of the name of the stream.

FW02 Stream Classification 1

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the Department of Environmental Protection (DEP) stream classification.

Procedure:

Select the DEP stream classification from the dropdown list. If the stream has more than one classification, enter the one classification in this item and record the subsequent classification(s) in Items FW03 and FW05.

Coding:

Aquatic Life Classification

CWF	Cold Water Fishes
MIF	Migratory Fishes
TSF	Trout Stocking
WWF	Warm Water Fishes

Water Supply Classification

IRR	Irrigation
IWS	Industrial Water Supply
LWS	Livestock Water Supply
PWS	Potable Water Supply
WWS	Wildlife Water Supply

Recreation and Fish Consumption

AES	Aesthetics
BOA	Boating
FSH	Fishing
WCS	Water Contact Sports

Special Protection
- EVW Exceptional Value Waters
- HIQ High Quality

Other
- NAV Navigation

FW03 Stream Classification 2

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the second stream classification.

Procedure:

Select the second stream classification from the dropdown list.

Coding:

Refer to Item FW02 coding.

FW04 Timeframe

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is reserved for future use.

FW05 Stream Classification 3

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the third stream classification.

Procedure:

Select the third stream classification from the dropdown list.

Coding:

Refer to Item FW02 coding.

FW06 Permit Type

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the type of permit required based on the stream classification.

Procedure:

Enter a description of the type of permit required to perform work in the stream in narrative form.

Coding:

Type of permit required to perform work in the stream in narrative form.

FW07 Drainage Area - Drainage Area of Stream

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the drainage area of the stream passing under the bridge.

Procedure:

Enter the drainage area to the nearest tenth of a square mile for the stream passing under the bridge. The area may be obtained from the design drawings, measured, or may be estimated.

Coding:

The drainage area of the stream to the nearest tenth of a square mile.

FW08 Fishable - Is the Stream Fishable (Stockable)?

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This checkbox field indicates whether or not a stream is fishable. A fishable stream is one that is stockable.

Procedure:

A list of stockable streams can be found on the Pennsylvania Boat and Fish Commission's website. If the stream is fishable (stockable), check the box. If the stream is not fishable (stockable), or if this item is not applicable, leave the box unchecked.

Coding:

Unchecked	The stream is not fishable (stockable) or not applicable
Checked	The stream is fishable (stockable)

FW09 Waterflow Direction

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the direction of water flow looking segments ahead.

Procedure:

Select the direction of water flow from the dropdown list. The direction of water flow should be recorded looking segments ahead.

Coding:

L	Water flows from Right side of bridge to Left side of bridge
R	Water flows from Left side of bridge to Right side of bridge
U	Unknown water flow direction

FW10 Primary Waterway

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This checkbox field indicates whether or not the waterway is the primary waterway.

Procedure:

If the stream is the primary waterway, check the box. If the stream is not the primary waterway, leave the box unchecked. Only one waterway may be the primary waterway.

Coding:

Unchecked	The waterway is not the primary waterway
Checked	The waterway is the primary waterway

FW11 Vertical Clearance - Nominal Vertical Clearance Streambed to Structure

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the nominal vertical clearance from the streambed to the underside of the structure.

Procedure:

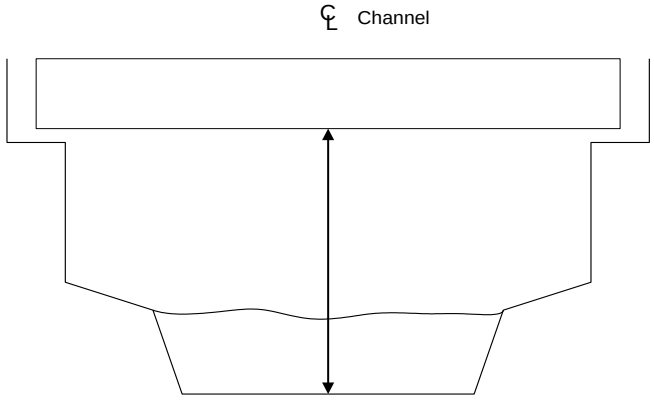
The nominal vertical clearance is the vertical clearance from the streambed, preferably at the centerline of the stream, to the underside of the structure.

Coding:

Enter the nominal vertical clearance to the nearest tenth of a foot. Enter 99.9 when restriction is >= 99.9′.

Example:
Assume a nominal vertical clearance of 11'-7"

11.6



FW12 Max W.S. Elevation - Maximum Known Water Surface Elevation

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the maximum known water surface elevation.

Procedure:

Enter the maximum known water surface elevation. If a maximum water surface elevation is not available, this item may be left blank.

Coding:

The maximum known water surface elevation to the nearest tenth of a foot.

FW13 Max W.S. Elevation Year - Maximum Known Water Surface Elevation Year

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the year in which the maximum known water surface elevation occurred.

Procedure:

Enter the year in which the maximum water surface elevation occurred. If a maximum water surface elevation is not available, this item may be left blank.

Coding:

The year in which the maximum known water surface elevation occurred.

FW14 Magnitude - Design Flood Magnitude

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the magnitude of the design flood for a stream passing under the structure.

Procedure:

Enter the magnitude of the flow. Refer to the Hydraulic Analysis of the structure if available.

Coding:

Magnitude of design flood in cubic feet per second (cfs).

FW15 Elevation - Design Flood Elevation

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the design flood elevation data for a stream passing under the structure.

Procedure:

Enter the pertinent water elevation. Refer to the Hydraulic Analysis of the structure if available.

Coding:

Design flood elevation to the nearest tenth of a foot.

FW16 Frequency - Design Flood Frequency

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record the frequency of the design flood for a stream passing under the structure.

Procedure:

Enter the design flood frequency. Refer to the Hydraulic Analysis of the structure if available.

Coding:

Design flood frequency in years.

FW17 Velocity - Design Flood Velocity

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record design flood velocity data for a stream passing under the structure.

Procedure:

Enter the velocity at design discharge. Refer to the Hydraulic Analysis of the structure if available.

Coding:

Design flood velocity to the nearest tenth of a foot per second (fps) as shown in the Hydraulic Analysis Report.

FW18 Pollutant Description

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record a description of any pollutants in the waterway.

Procedure:

Enter a description of any known pollutants in the waterway in narrative form.

Coding:

Narrative description of any known pollutants in the waterway.

FW19 Stream Restrict Desc - Stream Restrictions Description

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record a narrative description for any restriction on entering the waterway.

Procedure:

Enter a narrative description for any restriction on entering the waterway.

Coding:

Narrative description for any restriction on entering the waterway.

FW20 Notes

Inventory > Features > Waterway Detail; BMS3: Features

Description:

This item is used to record any notes on the waterway.

Procedure:

Enter a narrative description for any additional notes on the waterway.

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SP APRAS Span - Span

The APRAS Span - Span Section is used to enter and display information related to the spans for a specific structure.

The Span section lists the unique spans for the selected structure. By default, the span tab will display all records for a selected bridge in a tabular form. The records can be sorted for each column by clicking on the desired column heading. Clicking on the column heading a second time will sort the records in descending order.

New span or dataset/analysis information can be added using the "Create" button. Existing records can be deleted by selecting one or more span records and clicking on the "Remove" button. A confirm deletion prompt with be displayed by the system before the records are removed. The "Save" button is used to commit pending changes on the screen, if any, to the database.

When converting data from BMS to BMS2, identifying the approach and main spans in sequential order of increasing offsets/segments/mileposts for multi-span bridges was not possible from the data in old BMS item C16. For the data transfer of BMS to BMS2, BMS2 created the same number of lines as the total number of spans that was recorded in Item C16 of BMS. Each span was assigned a Span Type (Item SP01) of Main. Districts should review and revise Items SP01 to SP06 as required.

In addition to creating a line item for every span identified in old item C16, a line item for each APRAS Span Data from the old BMS PA screen was also created. The reason for this was because in BMS2 all spans must be linked to a specific structure unit. **Again, the data conversion from BMS to BMS2 was unable to associate the APRAS Span data to the corresponding spans identified in C16. All APRAS Span Types for bridges shall eventually be removed. Sign Structures, Walls, etc., will continue to use the APRAS Span Type. APRAS Span types shall only be removed after each APRAS Span ID on the APRAS Span tab has been assigned to a main or approach span.** See the APRAS Span – APRAS Span page for more information on span assignments.

Note that when any span is removed or added on this screen, the change will automatically occur in the Inventory – Structure Units Screen (5D Section).

SP01 Type – Span Type

Inventory > Structure Units

Description:

This item is used to record the span member and the main or approach span.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Item 5D04.

SP02 Unit ID

Inventory > Structure Units

Description:

This item is used to record the span label.

Procedure:

This item will be **automatically filled in by the system** based on information entered in Item 5D02.

SP03 Span Length

Inventory > Structure Units > Structure Unit/Span Detail

Description:

This item is used to record the center-to-center of bearing span length.

Procedure:

Enter the center to center of bearing span length in feet to the nearest hundredth.

For splayed beams or curved girder bridges enter the length which best represents the span length for permit load analysis.

Coding:

Enter the length of the span in feet to the nearest hundredth.

Examples:

96'-3" span	96.25
88.48' span	88.48

SP04 Span Deck Width

Inventory > Structure Units > Structure Unit/Span Detail

Description:

This item is used to record the width of the span measured as the out-to-out width of a bridge deck.

Procedure:

Enter the out-to-out width of the bridge deck. The measurement should be exclusive of flared areas for ramps, i.e., it should be the minimum or nominal width. For thru type (truss or girder) bridges, enter the width which represents the lateral clearance between superstructure members. Where traffic runs directly on the top slab (or wearing surface) of a culvert, e.g., an R/C box without fill, enter actual width (out-to-out). This also applies where fill is minimal and culvert headwalls affect the flow of traffic.

This item does not apply where the roadway is on a fill across a culvert where the culvert headwalls do not affect the flow of traffic. In this case, code “0” for not applicable.

For a highway tunnel (Item 6A29 = 29), enter the width between the wall of the tunnel.

See the sketches following Item 5B05.

Coding:

The out-to-out width, to the nearest tenth of a foot.

SP05 Span Flared - Flare Indicator

Inventory > Structure Units > Structure Unit/Span Detail

Description:

This checkbox field indicates whether or not the width of the bridge varies.

Procedure:

Generally, such variance will result from ramps converging with or diverging from the through lanes on the bridge, but there may be other causes. Minor flares at the ends of the structure should be ignored.

Coding:

Unchecked	Bridge width does not vary
Checked	Bridge width varies

SP06 Span Description

Inventory > Structure Units > Structure Unit/Span Detail

Description:

This item is used to record a description of the span.

Procedure:

Enter a narrative description of the span identified in Item SP01.

Coding:

Narrative description of the span identified in Item SP01.

SP07 to SP10 Dept Material Type, Dept Physical Type, Dept Span Inter, Dept Struc Config - Department Structure Type

Inventory > Structure Units > Structure Unit/Span Detail

Description:

This series of four fields is used to indicate the kind of material, whether or not there is composite action, continuity, and basic structural configuration for the span.

Procedure:

The general description of each field is as follows:

SP07	Material makeup of main load carrying members(1)
SP08	Physical makeup of primary load carrying members (when appropriate, or subcomponents of a major bridge)(2)
SP09	Type of span interaction of main members only
SP10	Structural Configuration

(1) Main Members are any primary load carrying members that span between substructure supports. Primary Load Carrying Members are any bridge members that receive vehicular live load. Secondary Members are bridge members that do not receive vehicular live load.

(2) Subcomponent Members include all primary load carrying members that are not main members.

Coding:

See coding for Items 6A26 to 6A29.

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SS APRAS Span - Apras Span

The APRAS Span – Apras Span Section is used to enter and display information related to the spans for a specific structure.

The APRAS Span section lists the unique spans for the selected structure. By default, the span tab will display all records for a selected bridge in a tabular form. The records can be sorted for each column by clicking on the desired column heading. Clicking on the column heading a second time will sort the records in descending order.

New span or dataset/analysis information can be added using the "Create" button. Existing records can be deleted by selecting one or more span records and clicking on the "Remove" button. A confirm deletion prompt with be displayed by the system before the records are removed. The "Save" button is used to commit pending changes on the screen, if any, to the database.

The data conversion from BMS to BMS2 was unable to assign the APRAS Span ID to the corresponding spans identified in old BMS item C16. Therefore, all APRAS Span IDs were assigned to an "APRAS" span type in Item SP01. The "APRAS" span type was to serve as a temporary assignment for bridges until the APRAS span IDs could be assigned to a "Main" or "Approach" Span Type. **APRAS Span ID assignments shall be changed to the applicable "Main" or "Approach" span number for bridges only. After the assignment has been changed and saved, the user must then remove each APRAS Span ID on the APRAS Span tab.** Sign Structures, Walls, etc. shall continue to utilize the APRAS Span ID. See the APRAS Span – Span Section for more information on span types.

SS01 Span ID – Apras Span ID

Other > APRAS Data > APRAS - Spans

Description:

This is a required 4-digit item used to individually identify each unique span of the bridge. The first two digits are used to designate the span number. The third digit is used to designate the engineering program used to analyze the span. The fourth digit is used to alert APRAS of special conditions or to identify different analysis datasets available for the span. Identical adjacent spans may be referenced in Item SS04 which will eliminate the need for duplicating data on separate lines.

Procedure:

Enter the four-digit APRAS Span ID.

Coding:

Each Span ID must be unique and all digits must be entered.

First-Second Digit: **Span No.**

These characters must be numeric. The first entry must be "01" and the following entries must be numbered sequentially with the exception of spans identified as identical spans. Each span should be identified one time only, with the exception of cases where the load carrying capacity of opposing lanes of traffic is significantly different. In such cases the span number may be repeated once and data may be input for the "back span" (decreasing segment direction). If this is done Item SS04 must be coded as BK for the back span. Spans coded as backspans must also have a unique SPAN ID. The 3rd and/or 4th digit must be different. The total number of spans listed including those identified as identical spans must not exceed the total number of Spans (Item SS13). Acceptable values are 01 to 99.

Third Digit: **Analysis Method**

This value identifies the PennDOT Engineering Program used to analyze the span of other rating methods as referenced were used.

A	Bridge Analysis and Rating, (BAR-7)
B	Prestressed Concrete Girder, (PS3)
C	Box Culvert, (BOX5)
D	LRFD Steel Girder Design and Rating (STLRFD)
E	LRFD Prestressed Concrete Girder Design and Rating (PSLRFD)
F	LRFD Box Culvert Design and Rating (BXLRFD)
G	LRFD Floorbeam Design and Rating (FBLRFD)
H	LRFD Truss Design and Rating (TRLRFD)
I-V	Reserved
W	Bridge capacity based on engineering judgment
X	Bridge capacity based on engineering computations or other software
Y	Bridge capacity based on higher order analysis (FEM, 2-Dimensional Grillage). Permit vehicles may be reviewed using live load distribution factors (see DM4 3.23, 2.1.1P)
Z	Other

Fourth Digit: **Data Set**

This value designates the version of the bridge analysis data set to be used by APRAS for "routine" analysis. This value is also used to instruct APRAS if any special procedures are required.

1-9	Reference data set versions.
A	Moment comparison check is to be performed by APRAS. No bridge rating datasets are to be used.
C	Clearance data only. No capacity review required. To be used for any obstruction that may restrict a permit vehicle. It may also be used in instances where spans have identical load carrying capacity and otherwise would have to be repeated to describe different clearance conditions.
M	Manual review required before APRAS may issue a permit for this span. APRAS will conduct all normal reviews based on the data available. If the automatic analysis fails, APRAS will not call for manual review.
N	No capacity review required by APRAS. To be used for structures under fill, or to avoid providing detailed load data for a span which is identical to one which has already been entered.
P	Bridge is posted. APRAS will not allow any permit vehicles to cross.
T	Bridge posted "One truck at a time". APRAS will not allow any permit vehicles to cross.

SS02 Actual Span

Other > APRAS Data > APRAS - Spans

Description:

The Actual Span item allows the user to specify which physical span / structure unit is to be associated with the APRAS Span ID.

Procedure:

For the APRAS Span ID select the span from the dropdown list.

Coding:

The dropdown list for the Actual Span will only have those that are defined in the Structure Units (5D02/5D04).

SS03 Back Span - Back Span Indicator

Other > APRAS Data > APRAS - Spans

Description:

This checkbox field indicates whether or not the span is a "back-span".

Procedure:

In such cases the data associated with the Span ID will be used by APRAS to describe the conditions of the span in the decreasing segment direction. Spans which are coded as "back-spans" may not be identical.

Coding:

Unchecked	Span is not a "back-span"
Checked	Span is a "back-span"

Note:
In BMS, if a back-span was being described, the letters "BK" were entered in the Identical Spans (PA05) item.

SS04 Ident Span - Identical Span No.

Other > APRAS Data > APRAS - Spans

Description:

This item is used to identify multiple identical adjacent spans (and rating files) to avoid repeating lines of data.

Procedure:

To identify a group of adjacent identical spans without coding each span individually, code the span number of the last span of the group. The total number of spans listed, including those identified under Item SS01, must not exceed the total number of spans from Item SS13.

Coding:

Enter the span number of the last span in a group of identical spans.

Leave blank if the span is not part of an identical adjacent group.

Note:
For spans to be identical they must be the same for length, load carrying capacity, and clearance data.

SS05 Beg Cont - Continuous Beginning Span

Other > APRAS Data > APRAS - Spans

Description:

This item is used to identify the beginning span number for a group of continuous spans.

Procedure:

For each Span ID, enter the beginning span number of the group of spans that are continuous.

Coding:

Number of the beginning span in a continuous group.

All coding is numeric. The numbers shown may not exceed the total number of spans. Coding should only be done for the first span in a group of continuous spans. This item should be left blank for all other spans in the group.

Leave blank if the span is simply supported.

For P/S bridges continuous for live load only, classify as simple span if rated as simple beams.

SS06 End Cont - Continuous End Span

Other > APRAS Data > APRAS - Spans

Description:

This item is used to identify the end span number for a group of continuous spans.

Procedure:

For each SPAN ID, enter the end span number of the group of spans that are continuous.

Coding:

Number of the end span in a continuous group.

All coding is numeric. The numbers shown may not exceed the total number of spans. Coding should only be done for the first span in a group of continuous spans. This item should be left blank for all other spans in the group.

Leave blank if the span is simply supported.

For P/S bridges continuous for live load only, classify as simple span if rated as simple beams.

[the remainder of this page is intentionally left blank]

Example 1: Simple Span Structure

SS01 APRAS Span ID	SS02 Actual Span	SS03 Back Span	SS04 Identical Span No.	SS05 Begin Continuous	SS06 End Continuous
01B1	Main 1		01		

Example 2: 4 Simple Spans, Identical for Spans 2 and 3, non-continuous.

SS01 APRAS Span ID	SS02 Actual Span	SS03 Back Span	SS04 Identical Span No.	SS05 Begin Continuous	SS06 End Continuous
01A1	Main 1		01		
02A1	Main 2		03		
04A1	Main 3		04		

Example 3: 5 Spans, Identical for Spans 2 and 3, Continuous for 2 to 4.

SS01 APRAS Span ID	SS02 Actual Span	SS03 Back Span	SS04 Identical Span No.	SS05 Begin Continuous	SS06 End Continuous
01A1	Main 1		01		
02A1	Main 2		03	02	04
04A1	Main 4		04		
05A1	Main 5		05		

Example 4: Two span structure, where Span 1 segments ahead and segments back have significantly different load carrying capacities. No back spans are required for Span 2.

SS01 APRAS Span ID	SS02 Actual Span	SS03 Back Span	SS04 Identical Span No.	SS05 Begin Continuous	SS06 End Continuous
01A1	Main 1		01		
01A2	Main 1	√			
02A2	Main 2		02		

Example 5: Two span structure, where Span 2 eastbound fascia beam has suffered collision damage and has a lower capacity than the westbound lane.

SS01 APRAS Span ID	SS02 Actual Span	SS03 Back Span	SS04 Identical Span No.	SS05 Begin Continuous	SS06 End Continuous
01W1	Main 1		01		
02W1	Main 2		02		
02W2	Main 2	√			

Example 6: Sign Structure.

SS01 APRAS Span ID	SS02 Actual Span	SS03 Back Span	SS04 Identical Span No.	SS05 Begin Continuous	SS06 End Continuous
01ZC	Apras 01ZC		01		

SS07 C-C-Len - Center to Center Span Length

Other > APRAS Data > APRAS - Spans

Description:

This item is used to record the center-to-center of bearing span length.

Procedure:

Enter the center to center of bearing span length in feet to the nearest hundredth.

For splayed beams or curved girder bridges enter the length which best represents the span length for permit load analysis.

Coding:

Enter the length of the span in feet to the nearest hundredth.

Examples:

106'-3" span	106.25
88.48' span	88.48

SS08 Mom Comp Len - Moment Comparison Span Length

Other > APRAS Data > APRAS - Spans

Description:

This item is used to record the portion of a simple span that is loaded to produce maximum stress in the controlling member when computing the Load Moment Comparison Factor. This portion represents the length of the contributing area on the span's influence line.

Procedure:

This is a numeric item and should be coded only when:

1. Moment Comparison Factor method is applicable.
2. If the analysis length is less than the full span length.
3. Span configuration is for a simple stringer or longitudinal girder.

Coding:

Enter the portion of a simple span that is loaded to produce maximum stress in the controlling member when computing the Load Moment Comparison Factor to the nearest hundredth of a foot.

Leave blank if not applicable.

SS09 Dept Struc Typ - Department Structure Type

Other > APRAS Data > APRAS - Spans

Description:

This item is **automatically filled in by the system**; it is used to indicate the kind of material, whether or not there is composite action, continuity, and basic structural configuration for the span.

Procedure:

The general description of each subfield is as follows:

First Field	Material makeup of main load carrying members(1) (from SP07)
Second Field	Physical makeup of primary load carrying members (when appropriate, or subcomponents of a major bridge)(2) (from SP08)
Third Field	Type of span interaction of main members only (from SP09)
Fourth Field	Structural Configuration (from SP10)

(1) Main Members are any primary load carrying members that span between substructure supports. Primary Load Carrying Members are any bridge members that receive vehicular live load. Secondary Members are bridge members that do not receive vehicular live load.

(2) Subcomponent Members include all primary load carrying members that are not main members.

Coding:

See coding for Items 6A26 to 6A29. Fields populated by values from SP07 through SP10.

SS10 Notes

Other > APRAS Data > APRAS - Spans

Description:

This item is used to record notes about the span.

Procedure:

Enter any notes about the span in narrative form.

Coding:

Notes about the span in narrative form.

SS11 APRAS Ref

Other > APRAS Data > APRAS - Spans

Description:

This item is optional to identify the feature intersected. It will be used in the APRAS bridge details screen.

Procedure:

Enter a brief description of the feature intersected.

Coding:

Brief description of the feature intersected.

Example:
Over Interstate 83 | Over I-83

SS12 Axle Weight (Kips)

Other > APRAS Data > APRAS - Spans

Description:

This item records the maximum axle weight allowed on the bridge.

Procedure:

Enter the maximum single axle weight allowed on the bridge (in kips).

Coding:

Maximum single axle weight in kips. Leave blank if there are no axle weight restrictions. 50 kips is the maximum allowable value.

Example:
A bridge whose maximum axle weight is 20 kips: 20

SS13 Total APRAS Span

Other > APRAS Data > APRAS - Spans

Description:

This item records the total number of spans.

Procedure:

Enter the total number of APRAS spans.

Coding:

Total number of spans.

[the remainder of this page is intentionally left blank]

SL APRAS Span - Load Capacity

The APRAS Span - Load Capacity Section records and displays load capacity data related to a Span/Dataset required to support APRAS and ABAS bridge analysis. The Load Capacity screen is viewed via the APRAS Data screen.

By default, the screen displays all the load rating information for the current Span/Dataset ID. The user can also view and enter load rating information for another span by selecting the Span/Dataset ID from the drop-down list. The Create button allows users to add a new load rating info for a span. After an add operation is performed the user must click on the Save button to save the records in the database. Users may only select one at a time and use the remove button to delete the records. Users will be prompted by the system to confirm deletion before the records are removed.

SL01 Rating Date - Date the Ratings Were Computed

Other > APRAS Data > APRAS - Spans

Description:

This item is used to record the date that the inventory and operating ratings were computed.

Procedure:

This date will be **automatically filled in by the system** with the current date when any data item is updated on the Load Capacity or Load Capacity Details screen.

Coding:

Date the ratings were computed in MM/DD/YYYY format.

SL02 DF Moment Norm - Multi-Lane Live Load Distribution Factors for Moment

Other > APRAS Data > APRAS - Spans

Description:

This item is used to record the live load distribution factors for moment at the point of maximum moment for multi-lane traffic. Refer to current AASHTO Standard Specifications for Highway Bridges for distribution factor equations.

Procedure:

Enter the live load moment distribution factor expressed as a fraction of the wheel load to be applied for multi-lane (normal) traffic.

Coding:

Fraction of the wheel load.

SL03 DF Moment Single - Single Vehicle Live Load Distribution Factors for Moment

Other > APRAS Data > APRAS - Spans

Description:

This item is used to record the live load distribution factors for moment at the point of maximum moment for a single vehicle. Refer to current AASHTO Standard Specifications for Highway Bridges for distribution factor equations.

Procedure:

Enter the live load moment distribution factors expressed as a fraction of the wheel load to be applied for traffic restricted to one truck at a time.

Coding:

Fraction of the wheel load.

Note:
For some narrow bridges and ramps the DF for normal traffic (Item SL02) may already be based on one truck at a time - In such cases, leave this item blank.

SL04 DF Shear Norm - Multi-Lane Live Load Distribution Factors for Shear

Other > APRAS Data > APRAS - Spans

Description:

This item is used to record the live load distribution factors for shear at the point of maximum shear for multi-lane traffic.

Procedure:

Enter the live load shear distribution factors expressed as a fraction of the wheel load to be applied for multi-lane (normal) traffic.

Coding:

Fraction of the wheel load.

SL05 DF Shear Single - Single Vehicle Live Load Distribution Factors for Shear

Other > APRAS Data > APRAS - Spans

Description:

This item is used to record the live load distribution factors for shear at the point of maximum shear for a single vehicle.

Procedure:

Enter the live load distribution factors expressed as a fraction of the wheel load to be applied for traffic restricted to one truck at a time.

Coding:

Fraction of the wheel load.

Note:
For some narrow bridges and ramps the DF for normal traffic (Item SL04) may already be based on one truck at a time - In such cases, leave this item blank.

SL06 Pos Mom Comp Factor - Positive Moment Comparison Factor Comment (Normal Traffic)

Other > APRAS Data > APRAS - Spans

Description:

This item is used to record the positive moment comparison factor for span capacity under normal traffic.

Procedure:

The Capacity Moment Comparison Factor (CMCF) is defined as the ratio of the moment capacity of the span to the maximum moment caused by the HS20 loading at the point of maximum moment.

Coding:

CMCF of span under normal traffic.

SL07 Pos Mom Comp Rest - Positive Moment Comparison Factor Comment (Restricted Traffic)

Other > APRAS Data > APRAS - Spans

Description:

This item is used to record the positive moment comparison factor for span capacity under restricted traffic.

Procedure:

The Capacity Moment Comparison Factor Comment (CMCFC) is the ratio of the moment capacity of the span to the maximum moment caused by the HS20 vehicle at the point of maximum moment modified to allow increased capacity. The conditions by which the span may be crossed are defined in Item SL10.

Coding:

CMCFC of span when restrictions (load conditions - see Item SL10) are placed on the permit vehicle.

SL08 Neg Mom Comp Factor Norm - Negative Moment Comparison Factor Comment (Normal Traffic)

Other > APRAS Data > APRAS - Spans

Description:

This item is used to record the negative moment comparison factors for span capacity under normal traffic.

Procedure:

The Capacity Moment Comparison Factor Negative (CMCF(-)) is defined as the ratio of the moment capacity of the span to the maximum moment caused by the HS20 loading at the point of maximum negative moment.

Coding:

CMCF(-) of span under normal traffic.

SL09 Neg Mom Comp Factor Rest - Negative Moment Comparison Factor Comment (Restricted Traffic)

Other > APRAS Data > APRAS - Spans

Description:

This item is used to record the negative moment comparison factors for span capacity under restricted traffic.

Procedure:

The Capacity Moment Comparison Factor Comment Negative (CMCFC(-)) is the ratio of the moment capacity of the span to the maximum moment caused by the HS20 vehicle at the point of maximum negative moment modified to allow increased capacity. The conditions by which the span may be crossed are defined in Item SL10-Load Conditions.

Coding:

CMCFC(-) of span when restrictions (load conditions - see Item SL10) are placed on the permit vehicle.

SL10 Load Condition - Load Conditions for the Permit

Other > APRAS Data > APRAS - Spans

Description:

This two-part item indicates the restricted conditions that are placed on the permit vehicle based upon the span's load carrying capacity.

Procedure:

Select the letter corresponding to a general restriction (see Item SC03) or select the number corresponding to a user specified site specific restriction from Item SC04.

Coding:

A	One Truck on Span at a time	J	Crawl Speed Only (10 mph) Under Bridge
B	Escort Vehicle Required	K	Caution, restricted vertical clearance
C	Truck to Straddle Centerline of Road	L	Truck to straddle two lanes
D	Truck to Travel in Left Lane	M	Call PA Turnpike Commission
E	Truck to Travel in Right Lane	1	Special Condition
F	Truck to Travel in Center Lane	2	Special Condition
G	Truck to Travel on Right Shoulder	3	Special Condition
H	Truck to Travel on Left Shoulder	4	Special Condition
I	Crawl Speed Only (10 mph) Across Bridge		

Note: If special condition 1 thru 4 is selected, then the restriction to be printed on the permit is to be entered in the corresponding field of Item SC04.

SL11 Single Lane Span ID

Other > APRAS Data > APRAS - Spans

Description:

This is an optional item used to identify a bridge rating dataset prepared specifically for single lane analysis and the restrictions listed in Item SL10. This item should match Item SS01 except for the fourth digit. In no instance, may a span ID be repeated on a bridge.

See Item SS01 for Procedure, Coding, and additional Commentary.

SL12 Restrict Span ID - Restricted Span ID (1)

Other > APRAS Data > APRAS - Spans

Description:

This is an optional item used to identify a bridge rating dataset prepared specifically for the restrictions listed in Item SL13. This item should match Item SS01 except for the fourth digit. In no instance, may a Span ID be repeated on a bridge.

See Item SS01 for Procedure, Coding, and additional Commentary.

SL13 Restrict Code - Restriction Codes 1, 2, & 3

Other > APRAS Data > APRAS - Spans

Description:

This series of three fields indicate the restriction code(s) for the span identified in Item SL12.

Procedure:

Select the letter corresponding to a general restriction (see Item SC03) or select the number corresponding to a user specified site specific restriction from Item SC04.

Coding:

See Item SL10 for code values.

SL14 Restrict Span ID - Restricted Span ID (2)

Other > APRAS Data > APRAS - Spans

Description:

This is an optional item used to identify a bridge rating dataset prepared specifically for the restrictions listed in Item SL15. This item should match Item SS01 except for the fourth digit. In no instance may a span ID be repeated on a bridge.

See Item SS01 for Procedure, Coding, and additional Commentary.

SL15 Restrict Code - Restriction Codes 4, 5, 6, & 7

Other > APRAS Data > APRAS - Spans

Description:

This series of four fields indicate the restriction code(s) for the span identified in Item SL14.

Procedure:

Select the letter corresponding to a general restriction (see Item SC03) or select the number corresponding to a user specified site specific restriction from Item SC04.

Coding:

See Item SL10 for code values.

SL16 Notes – Rating Notes

Other > APRAS Data > APRAS - Spans

Description:

This item is used to record any notes or comments.

Procedure:

Record any narrative information that is necessary to identify ratings information.

[the remainder of this page is intentionally left blank]

SC APRAS Span – Clearance
(Permit Conditions)

The APRAS Span - Clearance Section is used to enter and display clearance information and permit conditions related to each unique span on a bridge.

The permit conditions are displayed based upon the span highlighted in the Span Clearance section. The system supports a maximum of 7 permit conditions for each span/roadway reference. To be consistent with the current APRAS processing, BMS2 will limit the entry of permit conditions for each span/dataset to 7, with this screen displaying the 7 positions at all times.

By default, the clearance screen will display all the clearance records for a selected Bridge in a tabular form. The records can be sorted for each column by clicking on the desired column heading. Clicking on the column heading a second time will sort the records in descending order.

A new set of clearance information for the roadways on and under the span can be added using the "Create" button The SR ID field will be populated when the Span ID is entered. If there are multiple SR ID's, the appropriate SR ID can be selected from the dropdown list. Existing records can be deleted by selecting one or more span records and clicking on the "Remove" button. A confirm deletion prompt with be displayed by the system before the records are removed. The "Save" button is used to commit pending changes on the screen, if any, to the database.

SC01 Span ID Suffix

Other > APRAS Data > APRAS - Spans > Clearance

Description:

This item indicates the unique span ID. The list of Span IDs will match the spans created in the APRAS Span tab. See Item SS01 for description of the ID.

Procedure:

Select the Span ID Suffix from the dropdown list.

Coding:

Span ID Suffix from available entries.

SC02 RMS Route

Other > APRAS Data > APRAS - Spans > Clearance

Description:

This item is comprised of a one-digit reference number and a 14 digit RMS Route designation, for the bridge itself or for the route(s) under.

The RMS Route is comprised of four parts. They are: COUNTY, STATE ROUTE, SEGMENT, and OFFSET. See Item 5A01 for a description of each part.

Procedure:

Select the appropriate entry from the dropdown list. The entries in this item are limited to the on and under roadways that are already defined for the structure in the Inventory Roads screen (Section 5C) and the Agency Roadways screen (Section 6C).

Do not include a reference line for non-state routes either on or "under" the span. If no state route exists "on" the bridge, add "under" state routes accordingly.

Coding:

County/SR/Segment/Offset associated with the clearance values from available entries.

SC03 Permit – Permit Conditions

Other > APRAS Data > APRAS - Spans > Clearance

Description:

This item is used to describe restricted conditions that are to be placed on all permits.

Procedure:

Select the letter corresponding to a general restriction or the number corresponding to a user specified specific condition.

Coding:

A	One Truck on Span at a time	J	Crawl Speed Only (10 mph) Under Bridge
B	Escort Vehicle Required	K	Caution, restricted vertical clearance
C	Truck to Straddle Centerline of Road	L	Truck to straddle two lanes
D	Truck to Travel in Left Lane	M	Call PA Turnpike Commission
E	Truck to Travel in Right Lane	1	Special Condition
F	Truck to Travel in Center Lane	2	Special Condition
G	Truck to Travel on Right Shoulder	3	Special Condition
H	Truck to Travel on Left Shoulder	4	Special Condition
I	Crawl Speed Only (10 mph) Across Bridge		

Note:
If special condition 1 thru 4 is selected, then the restriction to be printed on the permit is to be entered in the corresponding field of Item SC04.

SC04 Permit Condition Descriptions

Other > APRAS Data > APRAS - Spans > Clearance > Permit Condition Detail

Description:

This item is used to record specific permit conditions to be read by the APRAS system. These conditions will be printed on all permits that cross this span.

Procedure:

Record narrative information to be read by the APRAS system and written on the permit. This item must be completed if Item SC03 is specified as a special condition.

Coding:

Record permit condition in narrative form.

SC APRAS Span - Clearance
(Clearance Details)

The APRAS Span – Clearance, Clearance Details sub-tab is used to enter and display clearance information related to each unique span on a bridge.

By default, the screen will display all the clearance details for a selected span in a tabular form, in ascending/descending order of the Clearance Sequence No. The "Create" button allows the addition of a new clearance detail record. Existing records can be deleted by selecting one or more span records and clicking on the "Remove" button. A confirm deletion prompt with be displayed by the system before the records are removed. The "Save" button is used to commit pending changes on the screen, if any, to the database.

The clearance values are assumed to be positional moving from left to right across the roadway looking segments ahead. Therefore, they must be entered in the proper sequence. An edit will be implemented to ensure that the horizontal distance being specified is greater than the distance for the prior Clearance Sequence Number, except for Clearance Sequence Number 1.

The Span Clearance Detail screen is a subscreen of the Inventory Clearance screen – the clearance details window needs to be closed in order to get access to other windows in the application.

SC05 Non Res Vert Clear - Non-Restricted Vertical Clearance

Other > APRAS Data > APRAS - Spans > Clearance

Description:

This item is used to record the minimum vertical clearance on or under the structure, within the travel width specified in Items SC07 and SC08 available to permit vehicles.

Procedure:

Enter the minimum vertical clearance available.

If a District wishes to allow APRAS to evaluate a span's vertical clearance without the 0.25' (3") safety tolerance, then mark the checkbox in Item SC06. If a District wished to allow APRAS to evaluate a span's vertical clearance without the 0.25' (3") safety tolerance in the old BMS, then this item would have been coded as "RE". If Item SC06 is checked, then the bridge opening must then be described in Items SC09 and SC10.

Coding:

Enter the minimum vertical clearance available. Measurements may be entered to the nearest hundredth of a foot.

Example:
Assume a structure clearance of 14.00'.

1) Evaluated with 0.25 (3") safety tolerance.

Truck Height	Result
> 13.75'	Fail
≤ 13.75'	Pass

2) Evaluated without the 0.25' (3") safety tolerance (Item SC06 is checked).

Truck Height	Result
> 14.00'	Fail
≤ 14.00' and > 13.75'	Manual Review
≤ 13.75'	Pass

SC06 Non Res Review - Non-Restricted Clearance Review Indicator

Other > APRAS Data > APRAS - Spans > Clearance

Description:

This checkbox field indicates whether or not APRAS is to evaluate a span's vertical clearance without the 0.25' (3") safety tolerance.

Procedure:

Check the box if the APRAS is to evaluate the span's vertical clearance without the 0.25' (3") safety tolerance. Otherwise, leave the box unchecked.

Coding:

Unchecked	APRAS is to evaluate the span's vertical clearance with the 0.25' (3") safety tolerance.
Checked	APRAS is to evaluate the span's vertical clearance without the 0.25' (3") safety tolerance.

SC07 Min Travel Width Left - Minimum Travel Width – Left

Other > APRAS Data > APRAS - Spans > Clearance

Description:

This item is used to record the minimum width of the left pavement available to permit vehicles. Where a bridge obstruction reduces the normal width, paved shoulders capable of sustaining wheel loads may be included.

Procedure:

The left and right directions are determined looking ahead in stations (or increasing segments).

Coding:

Measurements should be taken from the centerline for undivided highway, or from the inside edge of pavement or shoulders for divided highway or one direction traffic, to the outside edge of the paved shoulder looking ahead in stations. Record measurements to the nearest hundredth of a foot.

Enter total minimum width of the pavement including paved shoulders if appropriate capable of sustaining wheel loads for the left roadway.

If there is no usable roadway to the left of a baseline code that value as "0000". This item may not be left blank.

SC08 Min Travel Width Right - Minimum Travel Width – Right

Other > APRAS Data > APRAS - Spans > Clearance

Description:

This item is used to record the minimum width of the right pavement available to permit vehicles. Where a bridge obstruction reduces the normal width, paved shoulders capable of sustaining wheel loads may be included.

Procedure:

The left and right directions are determined looking ahead in stations (or increasing segments).

Coding:

Measurements should be taken from the centerline for undivided highway, or from the inside edge of pavement or shoulders for divided highway or one direction traffic, to the outside edge of the paved shoulder looking ahead in stations. Record measurements to the nearest hundredth of a foot.

Enter total minimum width of the pavement including paved shoulders if appropriate capable of sustaining wheel loads for the right roadway.

If there is no usable roadway to the right of a baseline code that value as "0000". This item may not be left blank.

SC09 Horizontal Distance (ft) – Horizontal Clearance Detail

Other > APRAS Data > APRAS - Spans > Clearance > Clearance Detail

Description:

This item is used to record the horizontal distance from the centerline or baseline of the roadway to the point of vertical clearance described in Item SC10.

Procedure:

Enter all measurements looking ahead in stations (or increasing segments) from left to right.

For the RMS route on or under the span, enter a horizontal distance from the centerline for undivided highway or baseline of the roadway.

Measurements may be entered to the nearest hundredth of a foot.

Coding:

Horizontal distance from the centerline for undivided highway or baseline of the roadway in feet to the nearest hundredth of a foot. Horizontal Distance at the centerline or baseline is zero. Enter a vertical clearance at each change in elevation of either the roadway or the obstruction over the route.

SC10 Vertical Distance (ft) – Vertical Clearance Detail

Description:

This item is used to record the actual minimum vertical clearance at the horizontal distance entered in Item SC09.

Procedure:

Enter all measurements looking ahead in stations (or increasing segments) from left to right.

For the RMS route on or under the span, enter a minimum vertical clearance at each change in elevation of either the roadway or the obstruction over the roadway.

Measurements may be entered to the nearest hundredth of a foot.

If data is entered in Item SC10, then the entire travel width should be described as entered in Items SC07 and SC08.

Coding:

Actual minimum vertical clearance corresponding to the horizontal distance (Item SC09), in feet to the nearest hundredth of a foot.

Appendix A

Create New Structures Form

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APPENDIX A
CREATE NEW STRUCTURES FORM

CREATE NEW STRUCTURE

ITEMS REQUIRED TO CREATE A NEW STRUCTURE PRIOR TO THE INITIAL INSPECTION

(shaded fields required for NBIS length structures, shaded fields with an * not required for local < 20')

IDENTIFICATION

5A01	Structure ID		
5A02	Name		
5A03	NBI Structure No.		(BRKEY - automatically generated)
		Local Under 20ft?	Yes or No

LOCATION/SERVICE/MANAGEMENT

5A04	District		5A05	County	
5A06	City/Town/Place		5A07	Feature Intersect	
5A08	Facility Carried		5A09	Location	
5A10	Latitude		5A11	Longitude	
5A15	Year Built		5A17	Type of Service On	
5A18	Under		5A19	# Lanes Under*	
5A20	Maint. Resp.		5A21	Owner	

DECK/SPAN INFORMATION

5B02	Deck Surface Type*		5B03	Deck Mem. Type*	
5B04	Deck Protection*		5B05	Left Curb Width*	
5B06	Right Curb Width*		5B07	Deck Width*	
5B09	Skew*		5B10	Structure Flared*	
5B11	No. of Main Spans*		5B14	No. of Appr. Spans*	
5B17	Max Span Length*		5B18	Structure Length	
5B20	Total Length				

Notes:

CLASSIFICATION

5E01	NBIS Bridge Length*		5E02	Parallel Structure*	
5E03	Temporary Struc.*		5E04	Historical Significance*	

GENERAL

4A08	SCBI*		VP02	Posting Status	
6A06	Sub Agency		6A19	Bus. Plan Ntwk.*	
6A23	Owner Desc.*			Culvert?	Yes or No

STRUCTURE TYPE

		Main	Approach
6A26	Material		
6A27	Physical		
6A28	Span Interact		
6A29	Struct. Config.		

DECK INFO

6A38	Dept. Struct. Type*		6A41	No. of Joints*	
6A42	Rebar Type		6A43	Appr. Pav. Width	

NSTM

		Main	Approach
6A44	Group No.*		
6A45	Mem. Type*		
6A46	Fatig. Sus.*		
6A47	Material*		
6A48	ADTT*		

ROADWAY

5C15	Detour Length*	
5C26	Appr. Road*	
5C27	Roadway*	

LOAD RATING

IR03	Calculation Date*		IR06	Load Rating Method*	
IR04	Load Type*		IR10	Inventory Rating*	
IR05	NBI*		IR11	Operating Rating*	

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Appendix B

County, City, Borough, and Township Codes

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APPENDIX B
Coding for Item 5A06

ADAMS - 01
District 8-0

Boroughs:
- 401 ABBOTTSTOWN
- 402 ARENDTSVILLE
- 403 BENDERSVILLE
- 404 BIGLERVILLE
- 405 EAST BERLIN
- 406 FAIRFIELD
- 407 GETTYSBURG
- 408 LITTLESTOWN
- 409 MCSHERRYSTOWN
- 410 NEW OXFORD
- 411 YORK SPRINGS
- 412 BONNEAUVILLE
- 413 CARROLL VALLEY

Townships, 2nd Class:
- 201 BERWICK
- 202 BUTLER
- 203 CONEWAGO
- 204 CUMBERLAND
- 205 FRANKLIN
- 206 FREEDOM
- 207 GERMANY
- 208 HAMILTON
- 209 HAMILTONBAN
- 210 HIGHLAND
- 211 HUNTINGTON
- 212 LATIMORE
- 213 LIBERTY
- 214 MENALLEN
- 215 MOUNT JOY
- 216 MOUNT PLEASANT
- 217 OXFORD
- 218 READING
- 219 STRABAN
- 220 TYRONE
- 221 UNION

ALLEGHENY - 02
District 11-0

Cities:
- 301 PITTSBURGH
- 302 CLAIRTON
- 303 DUQUESNE
- 304 MCKEESPORT

Boroughs:
- 401 ASPINWALL
- 402 AVALON
- 403 BALDWIN
- 404 BELLEVUE
- 405 BEN AVON
- 406 BEN AVON HEIGHTS
- 407 BETHEL PARK
- 408 BLAWNOX
- 409 BRACKENRIDGE
- 410 BRADDOCK
- 411 BRADDOCK HILLS
- 412 BRADFORD WOODS
- 413 BRENTWOOD
- 414 BRIDGEVILLE
- 415 CARNEGIE
- 416 CASTLE SHANNON
- 417 CHALFANT
- 418 CHESWICK
- 419 CHURCHILL
- 420 CORAOPOLIS
- 421 CRAFTON
- 422 DORMONT
- 423 DRAVOSBURG
- 424 EAST MCKEESPORT
- 425 EAST PITTSBURGH
- 426 EDGEWOOD
- 427 EDGEWORTH
- 428 ELIZABETH
- 429 EMSWORTH
- 430 ETNA
- 431 FOREST HILLS
- 432 FOX CHAPEL
- 433 GLASSPORT
- 434 GLENFIELD
- 435 GREEN TREE
- 436 HAYSVILLE
- 437 HEIDELBERG
- 438 HOMESTEAD
- 439 INGRAM
- 440 JEFFERSON HILLS
- 441 LEETSDALE
- 442 LIBERTY
- 443 LINCOLN
- 444 MCKEES ROCKS
- 445 MILLVALE
- 446 MONROEVILLE
- 447 MT OLIVER
- 448 MUNHALL
- 449 NORTH BRADDOCK
- 450 OAKDALE
- 451 OAKMONT
- 452 GLEN OSBORNE
- 453 PITCAIRN
- 454 PLEASANT HILLS
- 455 PORT VUE
- 456 RANKIN
- 457 ROSSLYN FARMS
- 458 SEWICKLEY
- 459 SEWICKLEY HEIGHTS
- 460 SEWICKLEY HILLS
- 461 SHARPSBURG
- 462 SPRINGDALE
- 463 SWISSVALE
- 464 TARENTUM
- 465 THORNBURG
- 466 PLUM
- 467 TURTLE CREEK
- 468 VERONA
- 469 VERSAILLES
- 470 WALL
- 471 WEST ELIZABETH
- 472 WEST HOMESTEAD
- 473 WEST MIFFLIN
- 474 WEST VIEW
- 475 WHITAKER
- 476 WHITEHALL
- 477 WHITE OAK
- 478 WILKINSBURG
- 479 WILMERDING
- 480 BELL ACRES
- 481 FRANKLIN PARK
- 482 PENNSBURY VILLAG
- 490 MCDONALD
- 491 TRAFFORD

Townships, 1st Class:
- 101 BALDWIN
- 102 COLLIER
- 103 CRESCENT
- 104 EAST DEER
- 105 ELIZABETH
- 106 HARRISON
- 107 LEET
- 108 MCCANDLESS
- 109 MT LEBANON
- 110 NEVILLE
- 111 NORTH VERSAILLES
- 112 OHARA
- 113 PENN HILLS
- 114 RESERVE
- 115 ROBINSON
- 116 ROSS
- 117 SCOTT
- 118 SHALER
- 119 SOUTH FAYETTE
- 120 SOUTH VERSAILLES
- 121 SPRINGDALE
- 122 STOWE
- 123 UPPER ST CLAIR
- 124 WILKINS
- 125 ALEPPO
- 126 KENNEDY

Townships, 2nd Class:
- 202 FAWN
- 203 FINDLAY
- 204 FORWARD
- 206 FRAZER
- 207 HAMPTON
- 208 HARMAR
- 209 INDIANA
- 211 KILBUCK
- 212 MARSHALL
- 213 MOON
- 214 NORTH FAYETTE
- 215 OHIO
- 216 PINE
- 217 RICHLAND
- 219 SOUTH PARK
- 220 WEST DEER

ARMSTRONG - 03
District 10-0

Cities:
- 301 PARKER

Boroughs:
- 401 APOLLO
- 402 APPLEWOLD
- 403 ATWOOD
- 404 DAYTON
- 405 ELDERTON
- 406 FORD CITY
- 407 FORD CLIFF
- 408 FREEPORT
- 409 KITTANNING
- 410 LEECHBURG
- 411 MANORVILLE
- 412 NORTH APOLLO
- 414 RURAL VALLEY
- 415 SOUTH BETHLEHEM
- 416 WEST KITTANNING
- 417 WORTHINGTON

Townships, 2nd Class:
- 201 BETHEL
- 202 BOGGS
- 203 BRADYS BEND
- 204 BURRELL
- 205 CADOGAN
- 206 COWANSHANNOCK
- 207 EAST FRANKLIN
- 208 GILPIN
- 209 HOVEY
- 210 KISKIMINETAS
- 211 KITTANNING
- 212 MADISON
- 213 MAHONING
- 214 MANOR
- 215 NORTH BUFFALO
- 216 PARKS
- 217 PERRY
- 218 PINE
- 219 PLUMCREEK
- 220 RAYBURN
- 221 REDBANK
- 222 SOUTH BEND
- 223 SOUTH BUFFALO
- 224 SUGARCREEK
- 225 VALLEY
- 226 WASHINGTON
- 227 WAYNE
- 228 WEST FRANKLIN

BEAVER - 04
District 11-0

Cities:
- 301 BEAVER FALLS
- 302 ALIQUIPPA

Boroughs:
- 402 AMBRIDGE
- 403 BADEN
- 404 BEAVER
- 405 BIG BEAVER
- 406 BRIDGEWATER
- 407 CONWAY
- 408 DARLINGTON
- 409 EAST ROCHESTER
- 410 EASTVALE
- 411 ECONOMY
- 412 FALLSTON
- 413 FRANKFORT SPRINGS
- 414 FREEDOM
- 415 GEORGETOWN
- 416 GLASGOW
- 417 HOMEWOOD
- 418 HOOKSTOWN
- 419 INDUSTRY
- 420 KOPPEL
- 421 MIDLAND
- 422 MONACA
- 423 NEW BRIGHTON
- 424 NEW GALILEE
- 425 PATTERSON HEIGHTS
- 426 ROCHESTER
- 427 SHIPPINGPORT
- 428 SOUTH HEIGHTS
- 429 WEST MAYFIELD
- 430 OHIOVILLE
- 440 ELLWOOD CITY

Townships, 1st Class:
- 101 VANPORT
- 102 HARMONY
- 103 HOPEWELL
- 104 PATTERSON
- 105 ROCHESTER

Townships, 2nd Class:
- 201 BRIGHTON
- 202 CENTER
- 203 CHIPPEWA
- 204 DARLINGTON
- 205 DAUGHERTY
- 206 FRANKLIN
- 207 GREENE
- 208 HANOVER
- 209 INDEPENDENCE
- 210 MARION
- 211 NEW SEWICKLEY
- 212 NORTH SEWICKLEY
- 214 POTTER
- 215 PULASKI
- 216 RACCOON
- 217 SOUTH BEAVER
- 218 WHITE

BEDFORD - 05
District 9-0

Boroughs:
- 401 BEDFORD
- 402 COALDALE
- 403 EVERETT
- 404 HOPEWELL
- 405 HYNDMAN
- 406 MANNS CHOICE
- 407 NEW PARIS
- 408 PLEASANTVILLE
- 409 RAINSBURG
- 410 ST CLAIRSVILLE
- 411 SAXTON
- 412 SCHELLSBURG
- 413 WOODBURY

Townships, 2nd Class:
- 201 BEDFORD
- 202 BLOOMFIELD
- 203 BROAD TOP
- 204 COLERAIN
- 205 CUMBERLAND VALLE
- 206 EAST PROVIDENCE
- 207 EAST ST CLAIR
- 208 HARRISON
- 209 HOPEWELL
- 210 JUNIATA
- 211 KIMMEL
- 212 KING
- 213 LIBERTY
- 214 LINCOLN
- 215 LONDONDERRY
- 216 MANN
- 217 MONROE
- 218 NAPIER
- 219 SNAKE SPRING
- 220 SOUTHAMPTON
- 221 SOUTH WOODBURY
- 222 PAVIA
- 226 WEST PROVIDENCE
- 227 WEST ST CLAIR
- 228 WOODBURY

BERKS - 06
District 05-0

Cities:
- 301 READING

Boroughs:
- 401 BALLY
- 402 BECHTELSVILLE
- 403 BERNVILLE
- 404 BIRDSBORO
- 405 BOYERTOWN
- 406 CENTERPORT
- 407 FLEETWOOD
- 408 HAMBURG
- 409 KENHORST
- 410 KUTZTOWN
- 411 LAURELDALE
- 412 LENHARTSVILLE
- 413 LYONS
- 414 MOHNTON
- 415 MT PENN
- 416 ROBESONIA
- 417 ST LAWRENCE
- 418 SHILLINGTON
- 419 SHOEMAKERSVILLE
- 420 SINKING SPRING
- 423 TOPTON
- 424 WERNERSVILLE
- 426 LEESPORT
- 427 WEST READING
- 428 WOMELSDORF
- 429 WYOMISSING
- 431 NEW MORGAN
- 440 ADAMSTOWN

Townships, 1st Class:
- 101 COLEBROOKDALE
- 102 MUHLENBERG
- 103 CUMRU

Townships, 2nd Class:
- 201 ALBANY
- 202 ALSACE
- 203 AMITY
- 204 BERN
- 205 BETHEL
- 206 BRECKNOCK

APPENDIX B
Coding for Item 5A06

BERKS - 06 (cont)
District 05-0

Townships, 2nd Class:
207 CAERNARVON
208 CENTRE
211 DISTRICT
212 DOUGLASS
213 EARL
214 EXETER
215 GREENWICH
216 HEIDELBERG
217 HEREFORD
218 JEFFERSON
219 LONGSWAMP
220 LOWER ALSACE
221 LOWER HEIDELBERG
222 MAIDENCREEK
223 MARION
224 MAXATAWNY
226 NORTH HEIDELBERG
227 OLEY
228 ONTELAUNEE
229 PENN
230 PERRY
231 PIKE
232 RICHMOND
233 ROBESON
234 ROCKLAND
235 RUSCOMBMANOR
236 SOUTH HEIDELBERG
237 SPRING
238 TILDEN
239 TULPEHOCKEN
240 UNION
241 UPPER BERN
242 UPPER TULPEHOCKEN
243 WASHINGTON
244 WINDSOR

BLAIR - 07
District 09-0

Cities:
301 ALTOONA

Boroughs:
401 BELLWOOD
402 DUNCANSVILLE
403 HOLLIDAYSBURG
404 MARTINSBURG
405 NEWRY
406 ROARING SPRING
407 TYRONE
408 WILLIAMSBURG
409 TUNNELHILL

Townships, 2nd Class:
201 ALLEGHENY
202 ANTIS
203 BLAIR
204 CATHARINE
205 FRANKSTOWN
206 FREEDOM
207 GREENFIELD
208 HUSTON
209 JUNIATA
210 LOGAN
211 NORTH WOODBURY
212 SNYDER
213 TAYLOR
214 TYRONE
215 WOODBURY

BRADFORD - 08
District 03-0

Boroughs:
401 ALBA
402 ATHENS
403 BURLINGTON
404 CANTON
405 LE RAYSVILLE
406 MONROE
407 NEW ALBANY
408 ROME
409 SAYRE
410 SOUTH WAVERLY
411 SYLVANIA
412 TOWANDA
413 TROY
414 WYALUSING

Townships, 2nd Class:
201 ALBANY
202 ARMENIA
203 ASYLUM
204 ATHENS
206 BURLINGTON
207 CANTON
208 COLUMBIA
209 FRANKLIN
210 GRANVILLE
211 HERRICK
212 LEROY
213 LITCHFIELD
214 MONROE
215 NORTH TOWANDA
216 ORWELL
217 OVERTON
218 PIKE
219 RIDGEBURY
220 ROME
221 SHESHEQUIN
222 SMITHFIELD
223 SOUTH CREEK
224 SPRINGFIELD
225 STANDING STONE
226 STEVENS
227 TERRY
228 TOWANDA
229 TROY
230 TUSCARORA
231 ULSTER
232 WARREN
233 WELLS
234 WEST BURLINGTON
235 WILMOT
236 WINDHAM
237 WYALUSING
238 WYSOX

BUCKS - 09
District 06-0

Boroughs:
401 BRISTOL
402 CHALFONT
403 DOYLESTOWN
404 DUBLIN
405 HULMEVILLE
406 IVYLAND
407 LANGHORNE
408 LANGHORNE MANOR
409 MORRISVILLE
410 NEW BRITAIN
411 NEW HOPE
412 NEWTOWN
413 PENNDEL
414 PERKASIE
415 QUAKERTOWN
416 RICHLANDTOWN
417 RIEGELSVILLE
418 SELLERSVILLE
419 SILVERDALE
420 TRUMBAUERSVILLE
421 TULLYTOWN
422 YARDLEY
430 TELFORD

Townships, 1st Class:
101 BRISTOL

Townships, 2nd Class:
201 BEDMINSTER
202 BENSALEM
203 BRIDGETON
204 BUCKINGHAM
205 DOYLESTOWN
206 DURHAM
207 EAST ROCKHILL
208 FALLS
209 HAYCOCK
210 HILLTOWN
211 LOWER MAKEFIELD
212 LOWER SOUTHAMPT
213 MIDDLETOWN
214 MILFORD
215 NEW BRITAIN
216 NEWTOWN
217 NOCKAMIXON
218 NORTHAMPTON
219 PLUMSTEAD
220 RICHLAND
221 SOLEBURY
222 SPRINGFIELD
223 TINICUM
224 UPPER MAKEFIELD
225 UPPER SOUTHAMPT
226 WARMINSTER
227 WARRINGTON
228 WARWICK
229 WEST ROCKHILL
230 WRIGHTSTOWN

BUTLER - 10
District 10-0

Cities:
301 BUTLER

Boroughs:
401 BRUIN
402 CALLERY
403 CHERRY VALLEY
404 CONNOQUENESSING
405 EAST BUTLER
406 EAU CLAIRE
407 EVANS CITY
408 FAIRVIEW
409 HARMONY
410 HARRISVILLE
411 KARNS CITY
412 MARS
413 CHICORA
414 PETROLIA
415 PORTERSVILLE
416 PROSPECT
417 SAXONBURG
418 SLIPPERY ROCK
419 VALENCIA
420 WEST LIBERTY
421 WEST SUNBURY
422 ZELIENOPLE
423 SEVEN FIELDS

Townships, 1st Class:
101 BUTLER

Townships, 2nd Class:
201 ADAMS
202 ALLEGHENY
203 BRADY
204 BUFFALO
205 CENTER
206 CHERRY
207 CLAY
208 CLEARFIELD
209 CLINTON
210 CONCORD
211 CONNOQUENESSING
212 CRANBERRY
213 DONEGAL
214 FAIRVIEW
215 FORWARD
216 FRANKLIN
217 JACKSON
218 JEFFERSON
219 LANCASTER
220 MARION
221 MERCER
222 MIDDLESEX
223 MUDDY CREEK
224 OAKLAND
225 PARKER
226 PENN
227 SLIPPERY ROCK
228 SUMMIT
229 VENANGO
230 WASHINGTON
231 WINFIELD
232 WORTH

CAMBRIA - 11
District 09-0

Cities:
301 JOHNSTOWN

Boroughs:
401 ASHVILLE
403 BROWNSTOWN
404 CARROLLTOWN
405 CASSANDRA
406 CHEST SPRINGS
407 CRESSON
408 DAISYTOWN
409 DALE
410 EAST CONEMAUGH
411 EBENSBURG
412 EHRENFELD
413 FERNDALE
414 FRANKLIN
415 GALLITZIN
416 GEISTOWN
417 HASTINGS
418 LILLY
419 LORAIN
420 LORETTO
421 NANTY GLO
422 PATTON
423 PORTAGE
424 SANKERTOWN
425 SCALP LEVEL
426 SOUTH FORK
427 SOUTHMONT
429 SUMMERHILL
430 TUNNELHILL
431 VINTONDALE
432 WESTMONT
433 WILMORE
434 NORTHERN CAMBRIA

Townships, 1st Class:
101 STONYCREEK

Townships, 2nd Class:
201 ADAMS
202 ALLEGHENY
203 BARR
204 BLACKLICK
205 CAMBRIA
206 CHEST
207 CLEARFIELD
208 CONEMAUGH
209 CRESSON
210 CROYLE
211 DEAN
212 EAST CARROLL
213 EAST TAYLOR
214 ELDER
215 GALLITZIN
216 JACKSON
217 LOWER YODER
218 MIDDLE TAYLOR
219 MUNSTER
220 PORTAGE
221 READE
222 RICHLAND
223 SUMMERHILL
224 SUSQUEHANNA
225 UPPER YODER
226 WASHINGTON
227 WEST CARROLL
228 WEST TAYLOR
229 WHITE

CAMERON - 12
District 02-0

Boroughs:
401 DRIFTWOOD
402 EMPORIUM

Townships, 2nd Class:
201 GIBSON
202 GROVE
203 LUMBER
204 PORTAGE
205 SHIPPEN

CARBON - 13
District 05-0

Boroughs:
401 BEAVER MEADOWS
402 BOWMANSTOWN
403 EAST SIDE
404 JIM THORPE
405 LANSFORD
406 LEHIGHTON
407 PALMERTON
408 PARRYVILLE
409 SUMMIT HILL
410 WEATHERLY
411 WEISSPORT
412 NESQUEHONING

Townships, 2nd Class:
201 BANKS
202 EAST PENN
203 FRANKLIN
204 KIDDER
205 LAUSANNE
206 LEHIGH
207 LOWER TOWAMENSI
208 MAHONING
210 PACKER
211 PENN FOREST
212 TOWAMENSING

APPENDIX B
Coding for Item 5A06

CENTRE - 14
District 02-0

Boroughs:
401 BELLEFONTE
402 CENTRE HALL
403 HOWARD
404 MILESBURG
405 MILLHEIM
406 PHILIPSBURG
407 PORT MATILDA
408 SNOW SHOE
410 STATE COLLEGE
411 UNIONVILLE

Townships, 2nd Class:
201 BENNER
202 BOGGS
203 BURNSIDE
204 COLLEGE
205 CURTIN
206 FERGUSON
207 GREGG
208 HAINES
209 HALFMOON
210 HARRIS
211 HOWARD
212 HUSTON
213 LIBERTY
214 MARION
215 MILES
216 PATTON
217 PENN
218 POTTER
219 RUSH
220 SNOW SHOE
221 SPRING
222 TAYLOR
223 UNION
224 WALKER
225 WORTH

CHESTER - 15
District 06-0

Cities:
301 COATESVILLE

Boroughs:
401 ATGLEN
402 AVONDALE
403 DOWNINGTOWN
404 ELVERSON
405 HONEY BROOK
406 KENNETT SQUARE
407 MALVERN
408 MODENA
409 OXFORD
410 PARKESBURG
411 PHOENIXVILLE
412 SOUTH COATESVILLE
413 SPRING CITY
414 WEST CHESTER
415 WEST GROVE

Townships, 1st Class:
101 CALN

Townships, 2nd Class:
201 BIRMINGHAM
202 CHARLESTOWN
203 EAST BRADFORD
204 EAST BRANDYWINE
205 EAST CALN
206 EAST COVENTRY
207 EAST FALLOWFIELD
208 EAST GOSHEN
209 EAST MARLBOROUG
210 EAST NANTMEAL
211 EAST NOTTINGHAM
212 EAST PIKELAND
213 EAST VINCENT
214 EAST WHITELAND
215 EASTTOWN
216 ELK
217 FRANKLIN
218 HIGHLAND
219 HONEY BROOK
220 KENNETT
221 LONDON BRITAIN
222 LONDON GROVE
223 LONDONDERRY
224 LOWER OXFORD
225 NEW GARDEN
226 NEW LONDON
227 NEWLIN
228 NORTH COVENTRY
229 PENN
230 PENNSBURY
231 POCOPSON
232 SADSBURY
233 SCHUYLKILL
234 SOUTH COVENTRY
235 THORNBURY
236 TREDYFFRIN
237 UPPER OXFORD
238 UPPER UWCHLAN
239 UWCHLAN
240 VALLEY
241 WALLACE
242 WARWICK
243 WEST BRADFORD
244 WEST BRANDYWINE
245 WEST CALN
246 WEST FALLOWFIELD
247 WEST GOSHEN
248 WEST MARLBOROUG
249 WEST NANTMEAL
250 WEST NOTTINGHAM
251 WEST PIKELAND
252 WEST SADSBURY
253 WEST VINCENT
254 WEST WHITELAND
255 WESTTOWN
256 WILLISTOWN

CLARION - 16
District 10-0

Boroughs:
401 CALLENSBURG
402 CLARION
403 EAST BRADY
404 FOXBURG
405 HAWTHORN
406 KNOX
407 NEW BETHLEHEM
408 RIMERSBURG
409 ST PETERSBURG
410 SHIPPENVILLE
411 SLIGO
412 STRATTANVILLE

Townships, 2nd Class:
201 ASHLAND
202 BEAVER
203 BRADY
204 CLARION
205 ELK
206 FARMINGTON
207 HIGHLAND
208 KNOX
209 LICKING
210 LIMESTONE
211 MADISON
212 MILLCREEK
213 MONROE
214 PAINT
215 PERRY
216 PINEY
217 PORTER
218 REDBANK
219 RICHLAND
220 SALEM
221 TOBY
222 WASHINGTON

CLEARFIELD - 17
District 02-0

Cities:
301 DUBOIS

Boroughs:
401 BRISBIN
402 BURNSIDE
403 CHESTER HILL
404 CLEARFIELD
405 COALPORT
406 CURWENSVILLE
407 GLEN HOPE
408 GRAMPIAN
409 HOUTZDALE
410 IRVONA
412 MAHAFFEY
413 NEWBURG
414 NEW WASHINGTON
415 OSCEOLA MILLS
416 RAMEY
417 TROUTVILLE
418 WALLACETON
419 WESTOVER
430 FALLS CREEK

Townships, 2nd Class:
201 BECCARIA
202 BELL
203 BIGLER
204 BLOOM
205 BOGGS
206 BRADFORD
207 BRADY
208 BURNSIDE
209 CHEST
210 COOPER
211 COVINGTON
212 DECATUR
213 FERGUSON
214 GIRARD
215 GOSHEN
216 GRAHAM
217 GREENWOOD
218 GULICH
219 HUSTON
220 JORDAN
221 KARTHAUS
222 KNOX
223 LAWRENCE
224 MORRIS
225 PENN
226 PIKE
227 PINE
228 SANDY
229 UNION
230 WOODWARD

CLINTON - 18
District 02-0

Cities:
301 LOCK HAVEN

Boroughs:
401 AVIS
402 BEECH CREEK
403 FLEMINGTON
404 LOGANTON
405 MILL HALL
406 RENOVO
407 SOUTH RENOVO

Townships, 2nd Class:
201 ALLISON
202 BALD EAGLE
203 BEECH CREEK
204 CASTANEA
205 CHAPMAN
206 COLEBROOK
207 CRAWFORD
208 DUNNSTABLE
209 EAST KEATING
210 GALLAGHER
211 GREENE
212 GRUGAN
213 LAMAR
214 LEIDY
215 LOGAN
216 NOYES
217 PINE CREEK
218 PORTER
219 WAYNE
220 WEST KEATING
221 WOODWARD

COLUMBIA - 19
District 03-0

Boroughs:
401 BENTON
402 BERWICK
404 BRIAR CREEK
405 CATAWISSA
406 CENTRALIA
407 MILLVILLE
408 ORANGEVILLE
409 STILLWATER

Town:
501 BLOOMSBURG

Townships, 2nd Class:
201 BEAVER
202 BENTON
203 BRIAR CREEK
204 CATAWISSA
205 CLEVELAND
206 CONYNGHAM
207 FISHING CREEK
208 FRANKLIN
209 GREENWOOD
210 HEMLOCK
211 JACKSON
212 LOCUST
213 MADISON
214 MAIN
215 MIFFLIN
216 MONTOUR
217 MT PLEASANT
218 NORTH CENTRE
219 ORANGE
220 PINE
221 ROARING CREEK
222 SCOTT
223 SOUTH CENTRE
224 SUGARLOAF

CRAWFORD - 20
District 01-0

Cities:
301 MEADVILLE
302 TITUSVILLE

Boroughs:
401 BLOOMING VALLEY
402 CAMBRIDGE SPRIN
403 CENTERVILLE
404 COCHRANTON
405 CONNEAUT LAKE
406 CONNEAUTVILLE
407 HYDETOWN
408 LINESVILLE
409 SAEGERTOWN
410 SPARTANSBURG
411 SPRINGBORO
412 TOWNVILLE
413 VENANGO
414 WOODCOCK

Townships, 2nd Class:
201 ATHENS
202 BEAVER
203 BLOOMFIELD
204 CAMBRIDGE
205 CONNEAUT
206 CUSSEWAGO
207 EAST FAIRFIELD
208 EAST FALLOWFIELD
209 EAST MEAD
210 FAIRFIELD
211 GREENWOOD
212 HAYFIELD
213 NORTH SHENANGO
214 OIL CREEK
215 PINE
216 RANDOLPH
217 RICHMOND
218 ROCKDALE
219 ROME
220 SADSBURY
221 SOUTH SHENANGO
222 SPARTA
223 SPRING
224 STEUBEN
225 SUMMERHILL
226 SUMMIT
227 TROY
228 UNION
229 VENANGO
230 VERNON
231 WAYNE
232 WEST FALLOWFIELD
233 WEST MEAD
234 WEST SHENANGO
235 WOODCOCK

CUMBERLAND - 21
District 08-0

Boroughs:
401 CAMP HILL
402 CARLISLE
403 LEMOYNE
404 MECHANICSBURG
405 MOUNT HOLLY SPRI
406 NEWBURG
407 NEW CUMBERLAND
408 NEWVILLE
409 SHIPPENSBURG
410 SHIREMANSTOWN
412 WORMLEYSBURG

APPENDIX B
Coding for Item 5A06

CUMBERLAND - 21 (cont)
District 08-0

Townships, 1st Class:
101 EAST PENNSBORO
102 LOWER ALLEN
103 HAMPDEN
104 UPPER ALLEN

Townships, 2nd Class:
201 COOKE
202 DICKINSON
203 HOPEWELL
204 LOWER FRANKFORD
205 LOWER MIFFLIN
206 MIDDLESEX
207 MONROE
208 NORTH MIDDLETON
209 NORTH NEWTON
210 PENN
211 SHIPPENSBURG
212 SILVER SPRING
213 SOUTH MIDDLETON
214 SOUTH NEWTON
215 SOUTHAMPTON
217 UPPER FRANKFORD
218 UPPER MIFFLIN
219 WEST PENNSBORO

DAUPHIN - 22
District 08-0

Cities:
301 HARRISBURG

Boroughs:
401 BERRYSBURG
402 DAUPHIN
403 ELIZABETHVILLE
404 GRATZ
405 HALIFAX
406 HIGHSPIRE
407 HUMMELSTOWN
408 LYKENS
409 MIDDLETOWN
410 MILLERSBURG
411 PAXTANG
412 PENBROOK
413 ROYALTON
414 STEELTON
415 PILLOW
416 WILLIAMSTOWN

Townships, 1st Class:
101 SUSQUEHANNA
102 SWATARA
103 LOWER SWATARA

Townships, 2nd Class:
201 CONEWAGO
202 DERRY
203 EAST HANOVER
204 HALIFAX
205 JACKSON
206 JEFFERSON
207 LONDONDERRY
208 LOWER PAXTON
210 LYKENS
211 MIDDLE PAXTON
212 MIFFLIN
213 REED
214 RUSH
215 SOUTH HANOVER
216 UPPER PAXTON
217 WASHINGTON
218 WAYNE
219 WEST HANOVER
220 WICONISCO
221 WILLIAMS

DELAWARE - 23
District 06-0

Cities:
301 CHESTER

Boroughs:
401 ALDAN
402 BROOKHAVEN
403 CHESTER HEIGHTS
404 CLIFTON HEIGHTS
405 COLLINGDALE
406 COLWYN
407 DARBY
408 EAST LANSDOWNE
409 EDDYSTONE
410 FOLCROFT
411 GLENOLDEN
412 LANSDOWNE
413 MARCUS HOOK
414 MEDIA
415 MILLBOURNE
416 MORTON
417 NORWOOD
418 PARKSIDE
419 PROSPECT PARK
420 RIDLEY PARK
421 ROSE VALLEY
422 RUTLEDGE
423 SHARON HILL
424 SWARTHMORE
425 TRAINER
426 UPLAND
427 YEADON

Townships, 1st Class:
101 ASTON
102 DARBY
103 HAVERFORD
104 LOWER CHICHESTER
105 NETHER PROVIDENCE
106 RADNOR
107 RIDLEY
108 SPRINGFIELD
109 TINICUM
110 UPPER CHICHESTER
111 UPPER DARBY
112 MARPLE

Townships, 2nd Class:
201 BETHEL
202 CHADDS FORD
203 CHESTER
204 CONCORD
205 EDGMONT
207 MIDDLETOWN
208 NEWTOWN
209 THORNBURY
210 UPPER PROVIDENCE

ELK - 24
District 02-0

Cities:
301 ST MARYS

Boroughs:
401 JOHNSONBURG
402 RIDGWAY

Townships, 2nd Class:
201 BENEZETTE
203 FOX
204 HIGHLAND
205 HORTON
206 JAY
207 JONES
208 MILLSTONE
209 RIDGWAY
210 SPRING CREEK

ERIE - 25
District 01-0

Cities:
301 CORRY
302 ERIE

Boroughs:
401 ALBION
402 CRANESVILLE
404 EDINBORO
405 ELGIN
407 GIRARD
408 LAKE CITY
409 MCKEAN
410 MILL VILLAGE
411 NORTH EAST
412 PLATEA
413 UNION CITY
414 WATERFORD
415 WATTSBURG
416 WESLEYVILLE

Townships, 1st Class:
101 LAWRENCE PARK

Townships, 2nd Class:
201 AMITY
202 CONCORD
203 CONNEAUT
204 ELK CREEK
205 FAIRVIEW
206 FRANKLIN
207 GIRARD
208 GREENE
209 GREENFIELD
210 HARBORCREEK
211 LE BOEUF
212 MCKEAN
213 MILLCREEK
214 NORTH EAST
215 SPRINGFIELD
216 SUMMIT
217 UNION
218 VENANGO
219 WASHINGTON
220 WATERFORD
221 WAYNE

FAYETTE - 26
District 12-0

Cities:
301 CONNELLSVILLE
302 UNIONTOWN

Boroughs:
401 BELLE VERNON
402 BROWNSVILLE
403 DAWSON
404 DUNBAR
405 EVERSON
406 FAIRCHANCE
407 FAYETTE CITY
408 MARKLEYSBURG
409 MASONTOWN
410 NEWELL
411 OHIOPYLE
412 PERRYOPOLIS
413 POINT MARION
414 SMITHFIELD
415 SOUTH CONNELLSVI
416 VANDERBILT
430 SEVEN SPRINGS

Townships, 2nd Class:
201 BROWNSVILLE
202 BULLSKIN
203 CONNELLSVILLE
204 DUNBAR
205 FRANKLIN
206 GEORGES
207 GERMAN
208 HENRY CLAY
209 JEFFERSON
210 LOWER TYRONE
211 LUZERNE
212 MENALLEN
213 NICHOLSON
214 NORTH UNION
215 PERRY
216 REDSTONE
217 SALTLICK
218 SOUTH UNION
219 SPRINGFIELD
220 SPRINGHILL
221 STEWART
222 UPPER TYRONE
223 WASHINGTON
224 WHARTON

FOREST - 27
District 01-0

Boroughs:
401 TIONESTA

Townships, 2nd Class:
201 BARNETT
202 GREEN
203 HARMONY
204 HICKORY
205 HOWE
206 JENKS
207 KINGSLEY
208 TIONESTA

FRANKLIN - 28
District 08-0

Boroughs:
401 CHAMBERSBURG
402 GREENCASTLE
403 MERCERSBURG
404 MONT ALTO
405 ORRSTOWN
406 WAYNESBORO
409 SHIPPENSBURG

Townships, 2nd Class:
201 ANTRIM
202 FANNETT
203 GREENE
204 GUILFORD
205 HAMILTON
206 LETTERKENNY
207 LURGAN
208 METAL
209 MONTGOMERY
210 PETERS
211 QUINCY
212 ST THOMAS
213 SOUTHAMPTON
214 WARREN
215 WASHINGTON

FULTON - 29
District 09-0

Boroughs:
401 MCCONNELLSBURG
402 VALLEY-HI

Townships, 2nd Class:
201 AYR
202 BELFAST
203 BETHEL
204 BRUSH CREEK
205 DUBLIN
206 LICKING CREEK
207 TAYLOR
208 THOMPSON
209 TODD
210 UNION
211 WELLS

GREENE - 30
District 12-0

Boroughs:
401 CARMICHAELS
402 CLARKSVILLE
403 GREENSBORO
404 JEFFERSON
405 RICES LANDING
406 WAYNESBURG

Townships, 2nd Class:
201 ALEPPO
202 CENTER
203 CUMBERLAND
204 DUNKARD
205 FRANKLIN
206 FREEPORT
207 GILMORE
208 GRAY
209 GREENE
210 JACKSON
211 JEFFERSON
212 MONONGAHELA
213 MORGAN
214 MORRIS
215 PERRY
216 RICHHILL
217 SPRINGHILL
218 WASHINGTON
219 WAYNE
220 WHITELEY

HUNTINGDON - 31
District 09-0

Boroughs:
401 ALEXANDRIA
402 BIRMINGHAM
403 BROAD TOP CITY
404 CASSVILLE
405 COALMONT
406 DUDLEY
407 HUNTINGDON
408 MAPLETON
409 MARKLESBURG
410 MILL CREEK
411 MOUNT UNION
412 ORBISONIA
413 PETERSBURG
414 ROCKHILL
415 SALTILLO
416 SHADE GAP
417 SHIRLEYSBURG
418 THREE SPRINGS

Townships, 2nd Class:
201 BARREE
202 BRADY
203 CARBON
204 CASS
205 CLAY
206 CROMWELL
207 DUBLIN
208 FRANKLIN

APPENDIX B
Coding for Item 5A06

HUNTINGDON - 31 (cont)
District 09-0

Townships, 2nd Class:
209 HENDERSON
210 HOPEWELL
211 JACKSON
212 JUNIATA
213 LINCOLN
214 LOGAN
215 MILLER
216 MORRIS
217 ONEIDA
218 PENN
219 PORTER
220 SHIRLEY
221 SMITHFIELD
222 SPRINGFIELD
223 SPRUCE CREEK
224 TELL
225 TODD
226 UNION
227 WALKER
228 WARRIORS MARK
229 WEST
230 WOOD

INDIANA - 32
District 10-0

Boroughs:
401 ARMAGH
402 BLAIRSVILLE
403 CHERRY TREE
404 CLYMER
405 CREEKSIDE
406 GLEN CAMPBELL
407 HOMER CITY
408 INDIANA
410 MARION CENTER
411 PLUMVILLE
412 SALTSBURG
413 SHELOCTA
414 SMICKSBURG
415 ERNEST

Townships, 2nd Class:
201 ARMSTRONG
202 BANKS
203 BLACKLICK
204 BRUSH VALLEY
205 BUFFINGTON
206 BURRELL
207 CANOE
208 CENTER
209 CHERRYHILL
210 CONEMAUGH
211 EAST MAHONING
212 EAST WHEATFIELD
213 GRANT
214 GREEN
215 MONTGOMERY
216 NORTH MAHONING
217 PINE
218 RAYNE
219 SOUTH MAHONING
220 WASHINGTON
221 WEST MAHONING
222 WEST WHEATFIELD
223 WHITE
224 YOUNG

JEFFERSON - 33
District 10-0

Boroughs:
401 BIG RUN
402 BROCKWAY
403 BROOKVILLE
404 CORSICA
405 FALLS CREEK
406 PUNXSUTAWNEY
407 REYNOLDSVILLE
408 SUMMERVILLE
409 SYKESVILLE
410 TIMBLIN
411 WORTHVILLE

Townships, 2nd Class:
201 BARNETT
202 BEAVER
203 BELL
204 CLOVER
205 ELDRED
206 GASKILL
207 HEATH
208 HENDERSON
209 KNOX
210 MCCALMONT
211 OLIVER
212 PERRY
213 PINE CREEK
214 POLK
215 PORTER
216 RINGGOLD
217 ROSE
218 SNYDER
219 UNION
220 WARSAW
221 WASHINGTON
222 WINSLOW
223 YOUNG

JUNIATA - 34
District 02-0

Boroughs:
401 MIFFLIN
402 MIFFLINTOWN
403 PORT ROYAL
404 THOMPSONTOWN

Townships, 2nd Class:
201 BEALE
202 DELAWARE
203 FAYETTE
204 FERMANAGH
205 GREENWOOD
206 LACK
207 MILFORD
208 MONROE
209 SPRUCE HILL
210 SUSQUEHANNA
211 TURBETT
212 TUSCARORA
213 WALKER

LACKAWANNA - 35
District 04-0

Cities:
301 CARBONDALE
302 SCRANTON

Boroughs:
401 ARCHBALD
402 BLAKELY
403 CLARKS GREEN
404 CLARKS SUMMIT
405 DALTON
406 DICKSON CITY
407 DUNMORE
408 JERMYN
409 MAYFIELD
410 MOOSIC
411 MOSCOW
412 OLD FORGE
413 OLYPHANT
414 TAYLOR
415 THROOP
416 VANDLING
417 JESSUP

Townships, 2nd Class:
201 WAVERLY
202 BENTON
203 CARBONDALE
204 CLIFTON
205 COVINGTON
206 ELMHURST
207 FELL
208 GLENBURN
209 GREENFIELD
210 JEFFERSON
211 LA PLUME
212 THORNHURST
213 MADISON
214 NEWTON
215 NORTH ABINGTON
216 RANSOM
217 ROARING BROOK
218 SCOTT
219 SOUTH ABINGTON
220 SPRING BROOK
221 WEST ABINGTON

LANCASTER - 36
District 08-0

Cities:
301 LANCASTER

Boroughs:
401 ADAMSTOWN
402 AKRON
403 CHRISTIANA
404 COLUMBIA
405 DENVER
406 EAST PETERSBURG
407 ELIZABETHTOWN
408 EPHRATA
409 LITITZ
410 MANHEIM
411 MARIETTA
412 MILLERSVILLE
413 MT JOY
414 MOUNTVILLE
415 NEW HOLLAND
416 QUARRYVILLE
417 STRASBURG
418 TERRE HILL

Townships, 1st Class:
101 MANHEIM

Townships, 2nd Class:
201 BART
202 BRECKNOCK
203 CAERNARVON
204 CLAY
205 COLERAIN
206 CONESTOGA
207 CONOY
208 DRUMORE
209 EARL
210 EAST COCALICO
211 EAST DONEGAL
212 EAST DRUMORE
213 EAST EARL
214 EAST HEMPFIELD
215 EAST LAMPETER
216 EDEN
217 ELIZABETH
218 EPHRATA
219 FULTON
220 LANCASTER
221 LEACOCK
222 LITTLE BRITAIN
223 MANOR
224 MARTIC
225 MOUNT JOY
226 PARADISE
227 PENN
228 PEQUEA
229 PROVIDENCE
230 RAPHO
231 SADSBURY
232 SALISBURY
233 STRASBURG
234 UPPER LEACOCK
235 WARWICK
236 WEST COCALICO
237 WEST DONEGAL
238 WEST EARL
239 WEST HEMPFIELD
240 WEST LAMPETER

LAWRENCE - 37
District 11-0

Cities:
301 NEW CASTLE

Boroughs:
401 BESSEMER
402 ELLPORT
403 ELLWOOD CITY
404 ENON VALLEY
405 NEW WILMINGTON
406 SOUTH NEW CASTLE
407 VOLANT
408 WAMPUM
409 NEW BEAVER
410 S.N.P.J.

Townships, 2nd Class:
202 HICKORY
203 LITTLE BEAVER
204 MAHONING
205 NESHANNOCK
206 NORTH BEAVER
207 PERRY
208 PLAIN GROVE
209 PULASKI
210 SCOTT
211 SHENANGO
212 SLIPPERY ROCK
213 TAYLOR
214 UNION
215 WASHINGTON
216 WAYNE
217 WILMINGTON

LEBANON - 38
District 08-0

Cities:
301 LEBANON

Boroughs:
401 CLEONA
402 CORNWALL
403 JONESTOWN
404 MOUNT GRETNA
405 MYERSTOWN
406 PALMYRA
407 RICHLAND

Townships, 1st Class:
101 ANNVILLE
102 WEST LEBANON

Townships, 2nd Class:
201 BETHEL
202 COLD SPRING
203 EAST HANOVER
204 HEIDELBERG
205 JACKSON
206 MILLCREEK
207 NORTH ANNVILLE
208 NORTH CORNWALL
209 NORTH LEBANON
210 NORTH LONDONDER
211 SOUTH ANNVILLE
212 SOUTH LEBANON
213 SOUTH LONDONDER
214 SWATARA
215 UNION
216 WEST CORNWALL

LEHIGH - 39
District 05-0

Cities:
301 ALLENTOWN
302 BETHLEHEM

Boroughs:
401 ALBURTIS
402 CATASAUQUA
403 COOPERSBURG
404 COPLAY
405 EMMAUS
406 FOUNTAIN HILL
407 MACUNGIE
408 SLATINGTON

Townships, 1st Class:
101 SALISBURY
102 WHITEHALL
103 SOUTH WHITEHALL
104 LOWER MACUNGIE

Townships, 2nd Class:
201 HANOVER
202 HEIDELBERG
204 LOWER MILFORD
205 LOWHILL
206 LYNN
207 NORTH WHITEHALL
209 UPPER MACUNGIE
210 UPPER MILFORD
211 UPPER SAUCON
212 WASHINGTON
213 WEISENBERG

LUZERNE - 40
District 04-0

Cities:
301 HAZLETON
302 NANTICOKE
303 PITTSTON
304 WILKES-BARRE

Boroughs:
401 ASHLEY
402 AVOCA
403 CONYNGHAM
404 COURTDALE
405 DALLAS
406 DUPONT
407 DURYEA
408 EDWARDSVILLE
409 EXETER
410 FORTY FORT
411 FREELAND

APPENDIX B
Coding for Item 5A06

LUZERNE - 40 (cont)
District 04-0

Boroughs:
412 HUGHESTOWN
413 JEDDO
414 KINGSTON
415 LAFLIN
416 LARKSVILLE
417 LAUREL RUN
418 LUZERNE
419 NESCOPECK
420 NEW COLUMBUS
421 NUANGOLA
422 PLYMOUTH
423 PRINGLE
424 SHICKSHINNY
425 SUGAR NOTCH
426 SWOYERSVILLE
427 WARRIOR RUN
428 WEST HAZLETON
429 WEST PITTSTON
430 WEST WYOMING
431 WHITE HAVEN
432 WYOMING
433 YATESVILLE
434 HARVEYS LAKE
435 PENN LAKE PARK
436 BEAR CREEK VILLAG

Townships, 1st Class:
101 HANOVER
102 NEWPORT
103 PLAINS
104 WILKES-BARRE

Townships, 2nd Class:
201 BEAR CREEK
202 BLACK CREEK
203 BUCK
204 BUTLER
205 CONYNGHAM
206 DALLAS
207 DENNISON
208 DORRANCE
209 EXETER
210 FAIRMOUNT
211 FAIRVIEW
212 FOSTER
213 FRANKLIN
214 HAZLE
215 HOLLENBACK
216 HUNLOCK
217 HUNTINGTON
218 JACKSON
219 JENKINS
220 KINGSTON
221 LAKE
222 LEHMAN
223 NESCOPECK
224 PITTSTON
225 PLYMOUTH
226 RICE
227 ROSS
228 SALEM
229 SLOCUM
230 SUGARLOAF
231 UNION
232 WRIGHT

LYCOMING - 41
District 03-0

Cities:
301 WILLIAMSPORT

Boroughs:
401 DUBOISTOWN
402 HUGHESVILLE
403 JERSEY SHORE
404 MONTGOMERY
405 MONTOURSVILLE
406 MUNCY
407 PICTURE ROCKS
408 SALLADASBURG
409 SOUTH WILLIAMSPOR

Townships, 2nd Class:
201 ANTHONY
202 ARMSTRONG
203 BASTRESS
204 BRADY
205 BROWN
206 CASCADE
207 CLINTON
208 COGAN HOUSE
209 CUMMINGS
210 ELDRED
211 FAIRFIELD
212 FRANKLIN
213 GAMBLE
214 HEPBURN
215 JACKSON
216 JORDAN
217 LEWIS
218 LIMESTONE
219 LOYALSOCK
220 LYCOMING
221 MCHENRY
222 MCINTYRE
223 MCNETT
224 MIFFLIN
225 MILL CREEK
226 MORELAND
227 MUNCY
228 MUNCY CREEK
229 NIPPENOSE
230 OLD LYCOMING
231 PENN
232 PIATT
233 PINE
234 PLUNKETTS CREEK
235 PORTER
236 SHREWSBURY
237 SUSQUEHANNA
238 UPPER FAIRFIELD
239 WASHINGTON
240 WATSON
241 WOLF
242 WOODWARD

McKEAN - 42
District 02-0

Cities:
301 BRADFORD

Boroughs:
401 ELDRED
402 KANE
403 LEWIS RUN
404 MOUNT JEWETT
405 PORT ALLEGANY
406 SMETHPORT

Townships, 2nd Class:
201 ANNIN
202 BRADFORD
203 CERES
204 CORYDON
205 ELDRED
206 FOSTER
207 HAMILTON
208 HAMLIN
209 KEATING
210 LAFAYETTE
211 LIBERTY
212 NORWICH
213 OTTO
214 SERGEANT
215 WETMORE

MERCER - 43
District 01-0

Cities:
301 FARRELL
302 SHARON
303 HERMITAGE

Boroughs:
401 CLARK
402 FREDONIA
403 GREENVILLE
404 GROVE CITY
405 JACKSON CENTER
406 JAMESTOWN
407 MERCER
408 NEW LEBANON
409 SANDY LAKE
410 SHARPSVILLE
411 SHEAKLEYVILLE
412 STONEBORO
413 WEST MIDDLESEX
414 WHEATLAND

Townships, 2nd Class:
201 COOLSPRING
202 DEER CREEK
203 DELAWARE
204 EAST LACKAWANNO
205 FAIRVIEW
206 FINDLEY
207 FRENCH CREEK
208 GREENE
209 HEMPFIELD
210 JACKSON
211 JEFFERSON
212 LACKAWANNOCK
213 LAKE
214 LIBERTY
215 MILL CREEK
216 NEW VERNON
217 OTTER CREEK
218 PERRY
219 PINE
220 PYMATUNING
221 SALEM
222 SANDY CREEK
223 SANDY LAKE
224 SHENANGO
225 SOUTH PYMATUNING
226 SPRINGFIELD
227 SUGAR GROVE
228 WEST SALEM
229 WILMINGTON
230 WOLF CREEK
231 WORTH

Mifflin - 44
District 02-0

Boroughs:
401 BURNHAM
402 KISTLER
403 LEWISTOWN
404 MCVEYTOWN
405 NEWTON HAMILTON
406 JUNIATA TERRACE

Townships, 2nd Class:
201 ARMAGH
202 BRATTON
203 BROWN
204 DECATUR
205 DERRY
206 GRANVILLE
207 MENNO
208 OLIVER
209 UNION
210 WAYNE

MONROE - 45
District 05-0

Boroughs:
401 DELAWARE WATER G
402 EAST STROUDSBURG
403 MT POCONO
404 STROUDSBURG

Townships, 1st Class:
101 POCONO

Townships, 2nd Class:
201 BARRETT
202 CHESTNUTHILL
203 COOLBAUGH
204 ELDRED
205 HAMILTON
206 JACKSON
207 MIDDLE SMITHFIELD
208 PARADISE
210 POLK
211 PRICE
212 ROSS
213 SMITHFIELD
214 STROUD
215 TOBYHANNA
216 TUNKHANNOCK

MONTGOMERY - 46
District 06-0

Boroughs:
401 AMBLER
402 BRIDGEPORT
403 BRYN ATHYN
404 COLLEGEVILLE
405 CONSHOHOCKEN
406 EAST GREENVILLE
407 GREEN LANE
408 HATBORO
409 HATFIELD
410 JENKINTOWN
411 LANSDALE
412 NARBERTH
413 NORRISTOWN
414 NORTH WALES
415 PENNSBURG
416 POTTSTOWN
417 RED HILL
418 ROCKLEDGE
419 ROYERSFORD
420 SCHWENKSVILLE
421 SOUDERTON
422 TELFORD
423 TRAPPE
424 WEST CONSHOHOCK

Townships, 1st Class:
101 ABINGTON
102 CHELTENHAM
103 HATFIELD
104 LOWER MERION
105 LOWER MORELAND
106 LOWER POTTSGROV
107 PLYMOUTH
108 SPRINGFIELD
109 UPPER DUBLIN
110 UPPER MORELAND
111 WEST NORRITON
112 WEST POTTSGROVE
113 UPPER GWYNEDD
114 UPPER POTTSGROVE

Townships, 2nd Class:
201 DOUGLASS
202 EAST NORRITON
203 FRANCONIA
204 HORSHAM
205 LIMERICK
206 LOWER FREDERICK
207 LOWER GWYNEDD
208 LOWER PROVIDENCE
209 LOWER SALFORD
210 MARLBOROUGH
211 MONTGOMERY
212 NEW HANOVER
213 PERKIOMEN
214 SALFORD
215 SKIPPACK
216 TOWAMENCIN
217 UPPER FREDERICK
219 UPPER HANOVER
220 UPPER MERION
222 UPPER PROVIDENCE
223 UPPER SALFORD
224 WHITEMARSH
225 WHITPAIN
226 WORCESTER

MONTOUR - 47
District 03-0

Boroughs:
401 DANVILLE
402 WASHINGTONVILLE

Townships, 2nd Class:
201 ANTHONY
202 COOPER
203 DERRY
204 LIBERTY
205 LIMESTONE
206 MAHONING
207 MAYBERRY
208 VALLEY
209 WEST HEMLOCK

NORTHAMPTON - 48
District 05-0

Cities:
301 BETHLEHEM
302 EASTON

Boroughs:
401 BANGOR
402 BATH
403 CHAPMAN
404 EAST BANGOR
405 FREEMANSBURG
406 GLENDON
407 HELLERTOWN
408 NAZARETH
409 NORTHAMPTON
410 NORTH CATASAUQU
411 PEN ARGYL
412 PORTLAND
413 ROSETO
414 STOCKERTOWN
415 TATAMY
416 WALNUTPORT
417 WEST EASTON
418 WILSON
419 WIND GAP

Townships, 1st Class:
101 BETHLEHEM

APPENDIX B
Coding for Item 5A06

NORTHAMPTON - 48 (cont)
District 05-0

Townships, 2nd Class:
- 201 ALLEN
- 203 BUSHKILL
- 204 EAST ALLEN
- 205 FORKS
- 206 HANOVER
- 207 LEHIGH
- 208 LOWER MT BETHEL
- 209 LOWER NAZARETH
- 210 LOWER SAUCON
- 211 MOORE
- 212 PALMER
- 213 PLAINFIELD
- 214 UPPER MT BETHEL
- 215 UPPER NAZARETH
- 216 WASHINGTON
- 217 WILLIAMS

NORTHUMBERLAND - 49
District 03-0

Cities:
- 301 SHAMOKIN
- 302 SUNBURY

Boroughs:
- 401 HERNDON
- 402 KULPMONT
- 403 MARION HEIGHTS
- 404 MCEWENSVILLE
- 405 MILTON
- 406 MOUNT CARMEL
- 407 NORTHUMBERLAND
- 408 RIVERSIDE
- 409 SNYDERTOWN
- 410 TURBOTVILLE
- 411 WATSONTOWN

Townships, 1st Class:
- 101 COAL

Townships, 2nd Class:
- 201 DELAWARE
- 202 EAST CAMERON
- 203 EAST CHILLISQUAQU
- 204 JACKSON
- 205 JORDAN
- 206 LEWIS
- 207 LITTLE MAHANOY
- 208 LOWER AUGUSTA
- 209 LOWER MAHANOY
- 210 MT CARMEL
- 211 POINT
- 212 RALPHO
- 213 ROCKEFELLER
- 214 RUSH
- 215 SHAMOKIN
- 216 TURBOT
- 217 UPPER AUGUSTA
- 218 UPPER MAHANOY
- 219 WASHINGTON
- 220 WEST CAMERON
- 221 WEST CHILLISQUAQU
- 222 ZERBE

PERRY - 50
District 08-0

Boroughs:
- 401 BLAIN
- 402 BLOOMFIELD
- 403 DUNCANNON
- 404 LANDISBURG
- 405 LIVERPOOL
- 406 MARYSVILLE
- 407 MILLERSTOWN
- 408 NEW BUFFALO
- 409 NEWPORT

Townships, 2nd Class:
- 201 BUFFALO
- 202 CARROLL
- 203 CENTRE
- 204 GREENWOOD
- 205 HOWE
- 206 JACKSON
- 207 JUNIATA
- 208 LIVERPOOL
- 209 MILLER
- 210 NORTHEAST MADISO
- 211 OLIVER
- 212 PENN
- 213 RYE
- 214 SAVILLE
- 215 SOUTHWEST MADISO
- 216 SPRING
- 217 TOBOYNE
- 218 TUSCARORA
- 219 TYRONE
- 220 WATTS
- 221 WHEATFIELD

PIKE - 51
District 04-0

Boroughs:
- 401 MATAMORAS
- 402 MILFORD

Townships, 2nd Class:
- 201 BLOOMING GROVE
- 202 DELAWARE
- 203 DINGMAN
- 204 GREENE
- 205 LACKAWAXEN
- 206 LEHMAN
- 207 MILFORD
- 208 PALMYRA
- 209 PORTER
- 210 SHOHOLA
- 211 WESTFALL

POTTER - 52
District 02-0

Boroughs:
- 401 AUSTIN
- 402 COUDERSPORT
- 403 GALETON
- 404 ULYSSES
- 405 OSWAYO
- 406 SHINGLEHOUSE

Townships, 2nd Class:
- 201 ABBOTT
- 202 ALLEGANY
- 203 BINGHAM
- 204 CLARA
- 206 EULALIA
- 207 GENESEE
- 208 HARRISON
- 209 HEBRON
- 210 HECTOR
- 211 HOMER
- 212 KEATING
- 213 OSWAYO
- 214 PIKE
- 215 PLEASANT VALLEY
- 216 PORTAGE
- 217 ROULETTE
- 218 SHARON
- 219 STEWARDSON
- 220 SUMMIT
- 221 SWEDEN
- 222 SYLVANIA
- 223 ULYSSES
- 224 WEST BRANCH
- 225 WHARTON

SCHUYLKILL - 53
District 05-0

Cities:
- 301 POTTSVILLE

Boroughs:
- 401 ASHLAND
- 402 AUBURN
- 403 COALDALE
- 404 CRESSONA
- 405 DEER LAKE
- 406 FRACKVILLE
- 407 GILBERTON
- 408 GIRARDVILLE
- 409 GORDON
- 410 LANDINGVILLE
- 411 MAHANOY CITY
- 412 MCADOO
- 413 MECHANICSVILLE
- 414 MIDDLEPORT
- 415 MINERSVILLE
- 416 MOUNT CARBON
- 417 NEW PHILADELPHIA
- 418 NEW RINGGOLD
- 419 ORWIGSBURG
- 420 PALO ALTO
- 421 PINE GROVE
- 422 PORT CARBON
- 423 PORT CLINTON
- 424 RINGTOWN
- 425 SAINT CLAIR
- 426 SCHUYLKILL HAVEN
- 427 SHENANDOAH
- 428 TAMAQUA
- 429 TOWER CITY
- 430 TREMONT

Townships, 2nd Class:
- 201 BARRY
- 202 BLYTHE
- 203 BRANCH
- 204 BUTLER
- 205 CASS
- 206 DELANO
- 207 EAST BRUNSWICK
- 208 EAST NORWEGIAN
- 209 EAST UNION
- 210 ELDRED
- 211 FOSTER
- 212 FRAILEY
- 213 HEGINS
- 214 HUBLEY
- 215 KLINE
- 216 MAHANOY
- 217 NEW CASTLE
- 218 NORTH MANHEIM
- 219 NORTH UNION
- 220 NORWEGIAN
- 221 PINE GROVE
- 222 PORTER
- 224 REILLY
- 225 RUSH
- 226 RYAN
- 227 SCHUYLKILL
- 228 SOUTH MANHEIM
- 229 TREMONT
- 230 UNION
- 231 UPPER MAHANTONG
- 232 WALKER
- 233 WASHINGTON
- 234 WAYNE
- 235 WEST BRUNSWICK
- 236 WEST MAHANOY
- 237 WEST PENN

SNYDER - 54
District 03-0

Boroughs:
- 401 BEAVERTOWN
- 402 FREEBURG
- 403 MIDDLEBURG
- 404 SELINSGROVE
- 405 SHAMOKIN DAM
- 406 MCCLURE

Townships, 2nd Class:
- 201 ADAMS
- 202 BEAVER
- 203 CENTER
- 204 CHAPMAN
- 205 FRANKLIN
- 206 JACKSON
- 207 MIDDLECREEK
- 208 MONROE
- 209 PENN
- 210 PERRY
- 211 SPRING
- 212 UNION
- 213 WASHINGTON
- 214 WEST BEAVER
- 215 WEST PERRY

SOMERSET - 55
District 09-0

Boroughs:
- 401 ADDISON
- 402 BENSON
- 403 BERLIN
- 404 BOSWELL
- 405 CASSELMAN
- 406 CENTRAL CITY
- 407 CONFLUENCE
- 408 GARRETT
- 409 HOOVERSVILLE
- 410 JENNERSTOWN
- 411 MEYERSDALE
- 412 NEW BALTIMORE
- 413 NEW CENTERVILLE
- 414 PAINT
- 415 ROCKWOOD
- 416 SALISBURY
- 417 SHANKSVILLE
- 418 SOMERSET
- 419 STOYSTOWN
- 420 URSINA
- 421 WELLERSBURG
- 422 WINDBER
- 423 SEVEN SPRINGS
- 424 INDIAN LAKE
- 425 CALLIMONT

Townships, 2nd Class:
- 201 ADDISON
- 202 ALLEGHENY
- 203 BLACK
- 204 BROTHERSVALLEY
- 205 CONEMAUGH
- 206 ELK LICK
- 207 FAIRHOPE
- 208 GREENVILLE
- 209 JEFFERSON
- 210 JENNER
- 211 LARIMER
- 212 LINCOLN
- 213 LOWER TURKEYFOOT
- 214 MIDDLECREEK
- 215 MILFORD
- 216 NORTHAMPTON
- 217 OGLE
- 218 PAINT
- 219 QUEMAHONING
- 220 SHADE
- 221 SOMERSET
- 222 SOUTHAMPTON
- 223 STONYCREEK
- 224 SUMMIT
- 225 UPPER TURKEYFOOT

SULLIVAN - 56
District 03-0

Boroughs:
- 401 DUSHORE
- 402 EAGLES MERE
- 403 FORKSVILLE
- 404 LAPORTE

Townships, 2nd Class:
- 201 CHERRY
- 202 COLLEY
- 203 DAVIDSON
- 204 ELKLAND
- 205 FORKS
- 206 FOX
- 207 HILLSGROVE
- 208 LAPORTE
- 209 SHREWSBURY

SUSQUEHANNA - 57
District 04-0

Boroughs:
- 401 FOREST CITY
- 402 FRIENDSVILLE
- 403 GREAT BEND
- 404 HALLSTEAD
- 405 HOP BOTTOM
- 406 LANESBORO
- 407 LITTLE MEADOWS
- 408 MONTROSE
- 409 NEW MILFORD
- 410 OAKLAND
- 411 SUSQUEHANNA DEP
- 412 THOMPSON
- 413 UNION DALE

Townships, 2nd Class:
- 201 APOLACON
- 202 ARARAT
- 203 AUBURN
- 204 BRIDGEWATER
- 205 BROOKLYN
- 206 CHOCONUT
- 207 CLIFFORD
- 208 DIMOCK
- 209 FOREST LAKE
- 210 FRANKLIN
- 211 GIBSON
- 212 GREAT BEND
- 213 HARFORD
- 214 HARMONY
- 215 HERRICK
- 216 JACKSON
- 217 JESSUP
- 218 LATHROP
- 219 LENOX
- 220 LIBERTY
- 221 MIDDLETOWN
- 222 NEW MILFORD
- 223 OAKLAND
- 224 RUSH
- 225 SILVER LAKE
- 226 SPRINGVILLE
- 227 THOMPSON

APPENDIX B
Coding for Item 5A06

TIOGA - 58
District 03-0

Boroughs:
401 BLOSSBURG
402 ELKLAND
403 KNOXVILLE
404 LAWRENCEVILLE
405 LIBERTY
406 MANSFIELD
407 ROSEVILLE
408 TIOGA
409 WELLSBORO
410 WESTFIELD

Townships, 2nd Class:
201 BLOSS
202 BROOKFIELD
203 CHARLESTON
204 CHATHAM
205 CLYMER
206 COVINGTON
207 DEERFIELD
208 DELMAR
209 DUNCAN
210 ELK
212 FARMINGTON
213 GAINES
214 HAMILTON
215 JACKSON
216 LAWRENCE
217 LIBERTY
218 MIDDLEBURY
219 MORRIS
220 NELSON
221 OSCEOLA
222 PUTNAM
223 RICHMOND
224 RUTLAND
225 SHIPPEN
226 SULLIVAN
227 TIOGA
228 UNION
229 WARD
230 WESTFIELD

UNION - 59
District 03-0

Boroughs:
401 HARTLETON
402 LEWISBURG
403 MIFFLINBURG
404 NEW BERLIN

Townships, 2nd Class:
201 BUFFALO
202 EAST BUFFALO
203 GREGG
204 HARTLEY
205 KELLY
206 LEWIS
207 LIMESTONE
208 UNION
209 WEST BUFFALO
210 WHITE DEER

VENANGO - 60
District 01-0

Cities:
301 FRANKLIN
302 OIL CITY

Boroughs:
401 CLINTONVILLE
402 COOPERSTOWN
403 EMLENTON
404 PLEASANTVILLE
405 POLK
406 ROUSEVILLE
407 UTICA
408 BARKEYVILLE
409 SUGARCREEK

Townships, 2nd Class:
201 ALLEGHENY
202 CANAL
203 CHERRYTREE
204 CLINTON
205 CORNPLANTER
206 CRANBERRY
207 FRENCHCREEK
208 IRWIN
209 JACKSON
210 MINERAL
211 OAKLAND
212 OIL CREEK
213 PINEGROVE
214 PLUM
215 PRESIDENT
216 RICHLAND
217 ROCKLAND
218 SANDYCREEK
219 SCRUBGRASS
220 VICTORY

WARREN - 61
District 01-0

Cities:
301 WARREN

Boroughs:
401 BEAR LAKE
402 CLARENDON
403 SUGAR GROVE
404 TIDIOUTE
406 YOUNGSVILLE

Townships, 2nd Class:
201 BROKENSTRAW
202 CHERRY GROVE
203 COLUMBUS
204 CONEWANGO
206 DEERFIELD
207 ELDRED
208 ELK
209 FARMINGTON
210 FREEHOLD
211 GLADE
213 LIMESTONE
214 MEAD
215 PINE GROVE
216 PITTSFIELD
217 PLEASANT
218 SHEFFIELD
219 SOUTHWEST
220 SPRING CREEK
221 SUGAR GROVE
222 TRIUMPH
223 WATSON

WASHINGTON - 62
District 12-0

Cities:
301 MONONGAHELA
302 WASHINGTON

Boroughs:
401 ALLENPORT
402 BEALLSVILLE
403 BENTLEYVILLE
404 BURGETTSTOWN
405 CALIFORNIA
406 CANONSBURG
407 CENTERVILLE
408 CHARLEROI
409 CLAYSVILLE
410 COAL CENTER
411 COKEBURG
412 DEEMSTON
413 DONORA
414 DUNLEVY
415 EAST WASHINGTON
416 ELCO
417 ELLSWORTH
418 FINLEYVILLE
419 HOUSTON
420 LONG BRANCH
421 MARIANNA
422 MCDONALD
423 MIDWAY
424 NEW EAGLE
425 NORTH CHARLEROI
426 ROSCOE
427 SPEERS
428 STOCKDALE
429 TWILIGHT
431 WEST BROWNSVILLE
432 WEST MIDDLETOWN
433 GREEN HILLS

Townships, 1st Class:
101 EAST BETHLEHEM

Townships, 2nd Class:
201 AMWELL
202 BLAINE
203 BUFFALO
204 CANTON
205 CARROLL
206 CECIL
207 CHARTIERS
208 CROSS CREEK
209 DONEGAL
210 EAST FINLEY
211 FALLOWFIELD
212 HANOVER
213 HOPEWELL
214 INDEPENDENCE
215 JEFFERSON
216 MORRIS
217 MOUNT PLEASANT
218 NORTH BETHLEHEM
219 NORTH FRANKLIN
220 NORTH STRABANE
221 NOTTINGHAM
222 PETERS
223 ROBINSON
224 SMITH
225 SOMERSET
226 SOUTH FRANKLIN
227 SOUTH STRABANE
228 UNION
229 WEST BETHLEHEM
230 WEST FINLEY
231 WEST PIKE RUN

WAYNE - 63
District 04-0

Boroughs:
401 BETHANY
402 HAWLEY
403 HONESDALE
404 PROMPTON
405 STARRUCCA
406 WAYMART

Townships, 2nd Class:
201 BERLIN
202 BUCKINGHAM
203 CANAAN
204 CHERRY RIDGE
205 CLINTON
206 DAMASCUS
207 DREHER
208 DYBERRY
209 LAKE
210 LEBANON
211 LEHIGH
212 MANCHESTER
213 MOUNT PLEASANT
214 OREGON
215 PALMYRA
216 PAUPACK
217 PRESTON
218 SALEM
219 SCOTT
220 SOUTH CANAAN
221 STERLING
222 TEXAS

WESTMORELAND - 64
District 12-0

Cities:
301 ARNOLD
302 GREENSBURG
303 JEANNETTE
304 MONESSEN
305 NEW KENSINGTON
306 LOWER BURRELL

Boroughs:
401 ADAMSBURG
402 ARONA
403 AVONMORE
404 BOLIVAR
405 DERRY
406 DONEGAL
407 EAST VANDERGRIFT
408 EXPORT
409 HUNKER
410 HYDE PARK
411 IRWIN
412 LATROBE
413 LIGONIER
414 MADISON
415 MANOR
416 MOUNT PLEASANT
417 NEW ALEXANDRIA
418 NEW FLORENCE
419 DELMONT
420 NORTH BELLE VERNO
421 NORTH IRWIN
422 OKLAHOMA
423 PENN
424 SCOTTDALE
425 SEWARD
426 SMITHTON
427 SOUTH GREENSBURG
428 SOUTHWEST GREENS
429 SUTERSVILLE
430 TRAFFORD
431 VANDERGRIFT
432 WEST LEECHBURG
433 WEST NEWTON
434 YOUNGSTOWN
435 YOUNGWOOD
436 NEW STANTON
437 MURRYSVILLE
438 LAUREL MOUNTAIN

Townships, 1st Class:
101 NORTH HUNTINGDON
102 PENN
103 ROSTRAVER

Townships, 2nd Class:
201 ALLEGHENY
202 BELL
203 COOK
204 DERRY
205 DONEGAL
206 EAST HUNTINGDON
207 FAIRFIELD
209 HEMPFIELD
210 LIGONIER
211 LOYALHANNA
212 MOUNT PLEASANT
213 ST CLAIR
214 SALEM
215 SEWICKLEY
216 SOUTH HUNTINGDON
217 UNITY
218 UPPER BURRELL
219 WASHINGTON

WYOMING - 65
District 04-0

Boroughs:
401 FACTORYVILLE
402 LACEYVILLE
403 MESHOPPEN
404 NICHOLSON
405 TUNKHANNOCK

Townships, 2nd Class:
201 BRAINTRIM
202 CLINTON
203 EATON
204 EXETER
205 FALLS
206 FORKSTON
207 LEMON
208 MEHOOPANY
209 MESHOPPEN
210 MONROE
211 NICHOLSON
212 NORTH BRANCH
213 NORTHMORELAND
214 NOXEN
215 OVERFIELD
216 TUNKHANNOCK
217 WASHINGTON
218 WINDHAM

YORK - 66
District 08-0

Cities:
301 YORK

Boroughs:
401 CROSS ROADS
402 DALLASTOWN
403 DELTA
404 DILLSBURG
405 DOVER
406 EAST PROSPECT
407 FAWN GROVE
408 FELTON
409 FRANKLINTOWN
410 GLEN ROCK
411 GOLDSBORO
412 HALLAM
413 HANOVER

YORK - 66 (cont)
District 08-0

Boroughs:

414	JACOBUS
415	JEFFERSON
416	LEWISBERRY
417	LOGANVILLE
418	MANCHESTER
419	MOUNT WOLF
420	NEW FREEDOM
421	NEW SALEM
422	NORTH YORK
423	RAILROAD
424	RED LION
425	SEVEN VALLEYS
426	SHREWSBURY
427	SPRING GROVE
428	STEWARTSTOWN
429	WELLSVILLE
430	WEST YORK
431	WINDSOR
432	WINTERSTOWN
433	WRIGHTSVILLE
434	YOE
435	YORKANA
436	YORK HAVEN

Townships, 1st Class:

101	SPRING GARDEN
102	YORK
103	PENN

Townships, 2nd Class:

201	CARROLL
202	CHANCEFORD
203	CODORUS
204	CONEWAGO
205	DOVER
206	EAST HOPEWELL
207	EAST MANCHESTER
208	FAIRVIEW
209	FAWN
210	FRANKLIN
211	HEIDELBERG
212	HELLAM
213	HOPEWELL
214	JACKSON
215	LOWER CHANCEFOR
216	LOWER WINDSOR
217	MANCHESTER
218	MANHEIM
219	MONAGHAN
220	NEWBERRY
221	NORTH CODORUS
222	NORTH HOPEWELL
223	PARADISE
224	PEACH BOTTOM
226	SHREWSBURY
227	SPRINGETTSBURY
228	SPRINGFIELD
229	WARRINGTON
230	WASHINGTON
231	WEST MANCHESTER
232	WEST MANHEIM
233	WINDSOR

PHILADELPHIA - 67
District 06-0

Cities:

301	PHILADELPHIA

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Appendix C

BMS2, BMS, and FHWA Item Conversion Chart

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APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
A01	5A01		Structure Identification Number	8
A01	5A01		Structure Identification Number	5D
A01	5A05		County Code	3
A01	VW21		County - Begin and End - Wall Location	
A01	VW22		SR - Begin and End - State Route Number	
A01	VW23		Segment - Begin and End - Segment Designation	
A01	VW24		Offset - Begin and End - Offset Designation	
A02	6A01		State Senatorial District	
A03	6A02		United States Congressional District	
A04	6A03		Legislative District	
A04A	5A12		Name of Border State/FHWA Region/Share Percentage	98A
A04B	5A12		Name of Border State/FHWA Region/Share Percentage	98B
A04C	5A13		Border Bridge Structure Number	99
A05	6A06		Agency Submitting Structure Inventory Record	
A06	5A02		Structure Name	9
A06	5A09		Location of Structure	9
A07	5A10		Latitude of Bridge Location	16
A08	5A11		Longitude of Bridge Location	17
A09	5A06		City/Town/Place Code	4
A10	6A04		State, County, or Municipal Boundary Intersecting Bridge	
A12	6A07		Federal Funding Code	
A12A	VN01		Design Exception Codes	
A13	VM05		PUC Docket Number	
A14	VN05		Design Drawing Numbers	
A15	VN06		Shop Drawing Numbers	
A16	5A15		Year the Bridge Was Built	27
A17	5A16		Year of Last Major Reconstruction on the Bridge	106
A17	VS10		Not Used - Reserved for Future Use	
A17	VW14		Not Used - Reserved for Future Use	
A18	5C30		School Bus Route	
A19	5C32		Transit Bus Route	
A20	5A21		Owner or Principal Custodian of the Bridge	22
A20	6A23		Owner Description	22
A21	VM01		Legislative Act Number which Transferred Ownership	
A22	VM02		Maintenance Responsibility for the Bridge	21
A23	5A20	VM03, VM04	Maintenance Responsibility for Bridge	
A23	VM03		Agency Responsible for Bridge Maintenance	21
A23	VM04		Portion of Bridge	21
A25	5C21		Toll Facility	20
A26	5A17		Type of Service On Bridge	42A
A26	5A18		Type of Service Under Bridge	42B
A27	5E03		Temporary Structure	103
A28	6A09		Critical Facility	
A29	6A43		Width of Pavement on the Approach to the Bridge	
A30	5C26		Width of Approach to the Bridge	32
A31	5C27		Bridge Roadway Width, Curb to Curb	51
A32	5B10		Is the Structure Flared?	35
A33	5B07		Out-to-Out Width of the Bridge Deck	52
A34	5B05		Curb / Sidewalk Width on Left	50A
A34	5B06		Curb / Sidewalk Width on Right	50B
A34	VI05		Left Sidewalk Type	
A34	VI06		Right Sidewalk Type	
A34	VI07	5B05	Left Sidewalk Width	
A34	VI08	5B06	Right Sidewalk Width	
A35	5C15		Bypass Detour Length	19
A36	VI09		Is the Bridge on a Horizontal Curve?	
A36	VI10		Is the Bridge on a Vertical Curve?	
A37	5A14		FIPS State / Region	1
AL Screen	2A01		Structure Notes	
B01	5C03		Is the Feature Intersected On or Under the Bridge?	5A
B01	FR02		Not Used - Reserved for Future Use	
B02	6C02		State Route Number - State Roadway Location	5D
B02	6C03		Segment - State Roadway Location	
B03	5C01		Road / Route Name	
B03	FW01		Name of the Stream (Creek, River, etc.)	
B04	5C03		Is the Feature Intersected On or Under the Bridge?	5A
B05	5C06		State Traffic Route / Suffix	5D
B06	5C06		State Traffic Route / Suffix	5E
B07	5C04		Route Signing Prefix	5B
B08	5C05		Designated Level of Service	5C
B09	5B09		Skew Angle	34
B10	5B08	6C25	Bridge Median Type	33
B10	5E02		Parallel Structure	101
B10	6C25		Median Type	33
B10	6C26		Median Width	

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
B11	5A19	5C08	Number of Lanes Under the Structure	28B
B11	5C08		Lanes On and Under the Structure / Medians on Structure / Speed	28A
B11	FR07		Total Number of Railroad Tracks	
B11	VS29		Not Used - Reserved for Future Use	
B12	FR06		Number of Electrified Railroad Tracks	
B13	FR01		Name of Railroad	
B13	FR03		Service Status of Railroad	
B14	FR05		Association of American Railroads Identifying Number	
B15	FR04		Railroad Milepost	
B16	6C05		Administrative Jurisdiction	
B17	6C10		Highway System	
B17A	5C29		National Highway System	104
B17A	6C15		RMS National Highway System (NHS) Indicator	
B18	5C22		Functional Classification	26
B18	IL04	5C22	Functional Classification	
B19	6C11		State Highway Network	
B19A	5C33		National Truck Network	110
B20	4A19		Minimum Lateral Underclearance on the Right Side	55B
B20	4A20		Minimum Lateral Underclearance on the Left Side	56
B21	6C18		Total Horizontal Clearance for the Left Roadway	47
B21	6C19		Total Horizontal Clearance for the Right Roadway	47
B21	FR12		Not Used - Reserved for Future Use	
B21	FR13		Total Horizontal Clearance for the Right Railroad	47
B22	4A15	6C20, 6C21, FR11	Minimum Vertical Clearance Over Bridge Feature	53
B22	4A17	6C20, 6C21, FR11	Minimum Vertical Underclearance	54B
B22	6C20		Minimum Vertical Clearance for the Left Roadway	54B
B22	6C21		Minimum Vertical Clearance for the Right Roadway	54B
B22	FR10		Not Used - Reserved for Future Use	
B22	FR11		Minimum Vertical Clearance for the Right Railroad	54B
B23	5C24	6C22, 6C23	Vertical Clearance Over 10 Ft Width (Defense Highways)	
B23	6C22		Vertical Clearance Over 10 Ft Width (Defense Highways) for Left Roadway	
B23	6C23		Vertical Clearance Over 10 Ft Width (Defense Highways) for Right Roadway	
B23	FR14		Not Used - Reserved for Future Use	
B23	FR15		Not Used - Reserved for Future Use	
B24	5C28		Defense Highway Designation	100
B27	5C10		Recent Average Daily Traffic	29
B27	6B17		Average Daily Traffic	
B28	5C11		Year of Average Daily Traffic	30
B29	6C27		Average Daily Truck Traffic	
B30	6C28		Year of Average Daily Truck Traffic	
B30A	5C14		Average Daily Truck Traffic (Percent)	109
B31	6C35		Vertical Clearance Signing Left	
B31	6C36		Vertical Clearance Signing Right	
B32	5A07		Feature Intersected	6A
B33	5A08		Facility Carried by Structure	7
B34	5A19	5C08	Number of Lanes Under the Structure	28B
B34	5C08		Lanes On and Under the Structure / Medians on Structure / Speed	28A
B35	6A19		Business Plan Network	
C01	5E04		Historical Significance	37
C01A	6A11		Covered Bridge Indicator	
C02	6A53		Estimated Cumulative Truck Traffic for Fatigue Damage	
C03	4B01		Design Load	31
C04	VD01		Design Method	
C05	5B12	6A26, 6A28	Material and Span Interaction of Main Unit (FHWA)	43A
C05	5B13	6A29	Structural Configuration of Main Unit (FHWA)	43B
C05	5B15	6A26, 6A28	Material and Span Interaction of Approach Spans (FHWA)	44A
C05	5B16	6A29	Structural Configuration of Approach Spans (FHWA)	44B
C05	6A26		Material Used for Main Unit, Approach Unit, Sign Structure, and Walls (Department)	
C05	6A27		Physical Makeup of Primary Load Carrying Members for Main Unit, Approach Unit, Sign Structure, and Walls (Department)	
C05	6A28		Type of Span Interaction for Main Unit, Approach Unit, Sign Structure, and Walls (Department)	
C05	6A29		Structural Configuration Used for Main Unit, Approach Unit, Sign Structure, and Walls (Department)	
C06	VD19		Length of Culvert Barrel Along Its Centerline	
C07	5B18		Structure Length	49
C07	6A08		Not Used - Reserved for Future Use	
C07A	5E01		NBIS Bridge Length	112
C08	5B17		Maximum Span Length	48
C09	5B01	6A38	Bridge Deck Structure Type	107
C09	6A38		Bridge Deck Type	107
C10	5B02	6A30	Bridge Deck Wearing Surface Type (Main Span)	108A
C10	5B03	6A31	Bridge Deck Membrane Type (Main Span)	108B
C10	5B04	6A32	Bridge Deck Protection Type (Main Span)	108C
C10	6A30	5B02	Wearing Surface Type on Approach Spans	
C10	6A31	5B03	Type of Membrane Used for Approach Spans	
C10	6A32	5B04	Type on Deck Corrosion Protection Used for Approach Spans	
C10A	6A33		Wearing Surface Thickness for Main and Approach Units	

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
C11	VD03		Geometry of Main Beams or Girders	
C12	VD05		Types of Steel & Other Metals Used in Bridge Members	
C14	6A52		Estimated Cumulative Truck Traffic in Thousands	
C15	6A54		Month and Year of Estimated Cumulative Truck Traffic	
C16	5B11		Total Number of Spans in Main Unit	45
C16	5B14		Total Number of Approach Spans	46
C17	SP03		Span Length	
C18	6A44		NSTM Group Number for Main Unit and Approach Spans	
C18A	6A45		Critical Ranking Factor Type of Member for Main Unit and Approach Spans	
C18A	6A46		Critical Ranking Factor Fatigue Susceptibility for Main Unit and Approach Spans	
C18A	6A47		Critical Ranking Factor Material for Main Unit and Approach Spans	
C18A	6A48		Critical Ranking Factor Cumulative Truck Traffic for Main Unit and Approach Spans	
C19	6A39		Are There Pavement Relief Joints?	
C19A	6A41		Number of Deck Joints on Bridge	
C20	6A40		Type of Deck Forms Used	
C21	6A42		Type of Deck Reinforcement Bar Protection	
C22	VD25		Expansion Joint Type	
C22	VD26		Expansion Joint Movement Class	
C22	VD27		Expansion Joint Manufacturer	
C23	VD30		Type of Bearings	
C24	VD04		Type of Field Splice Used for Steel Beams	
C25	6A50		Do Plug Welds exist on Bridge Superstructure?	
C26	VD09		Compressive Strength of Beam Concrete at Release	
C27	VD08		Compressive Strength of Beam Concrete at 28 Days	
C28	VD13		Size of Prestressed Strands	
C29	VD11		Prestressed Design Tensioning Methods	
C30	VD07		Are the Strands Straight or Draped?	
C31	VD06		Were the Prestressed Girders Cured by Vacuum Process?	
C32	VD28		Haunch Type	
C33	VD12		Void Types	
C34	6A05		Utilities Present on the Structure	
C35	VD02		Beams Designed for Live Load Continuity?	
C36	VD10		Type of Field Splice Prestressed Girders	
C37	VD14		Abutment Type	
C38	VD15		Abutment Foundation Type	
C39	VD16		Pier Material and Configuration	
C40	VD17		Pier Foundation Types	
C41	VD29		Type of Special Pier Cap	
C42	VD23		Type of Tie for Tied Arch Culverts	
C43	6A51		Do Plug Welds exist on Bridge Substructure?	
D01			Not Used	
D02	FT01		Name of Utility Company	
D02	FT06		Address of Utility Company	
D03	FT03		License Number of Utility Company Carried by Bridge	
D04	FT04		Date the License Number Was Approved	
D05	FT05		Total Weight of Utility in Kips	
D06	5C01		Road / Route Name	
D06	FW01		Name of the Stream (Creek, River, etc.)	
D07	FW07		Drainage Area of Stream	
D08	FW11		Nominal Vertical Clearance Streambed to Structure	
D09	FW14		Design Flood Magnitude	
D09	FW15		Design Flood Elevation	
D09	FW16		Design Flood Frequency	
D09	FW17		Design Flood Velocity	
D10	FW12		Maximum Known Water Surface Elevation	
D10	FW13		Maximum Known Water Surface Elevation Year	
D11	FW08		Is the Stream Fishable (Stockable)?	
D12	4A21		Does Navigation Control Exist?	38
D12	4A22		Navigation Vertical Clearance	39
D12	4A23		Navigation Horizontal Clearance	40
D12	4A24		Minimum Navigation Vertical Clearance - Vertical Lift Bridge	116
D12A	4A07		Pier Protection - Dolphins & Fenders	111
D12B	IN22		Calculated Scour Depth w/100 Year Flood	
D12B	IN23		Calculated Scour Depth w/500 Year Flood	
D13	4A01	VP02	Is the Bridge Open, Posted, or Closed?	41
D13	VP02		Posting Status	41
D14	VP03		Special Restrictive Posting	
D15	VP04		Posted Weight Limit	
D15	VP05		Posted Limit Combination	
D16	VP01		Status Date	
D17	VP01		Status Date	
D18	VP06		Reason for Posting or Closing the Bridge	
D19	VP07		Field Conditions	
D20	VP08		Special Conditions	
D21	VP09		AASHTO Impact Code	

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
E01	7A09		Inspection Frequency	91
E02	7A14		Next Inspection Performed By	
E02A	6A10		Flood Inspection	
E03	VI12		Special Equipment Type	
E04	6B01		Type of Special Inspection That Is Needed	
E05	7A10		Next Inspection Date	
E05A	VI02		High Voltage Power Line Indicator	
E06	7A01		Inspection Date	90
E06	7A01		Inspection Date	93C
E07	7A03		Primary Type of Inspection	
E07	7A06		Type of Compliance Inspections Performed	
E07	IS01		Sign/Light Inspection Type	
E07	IW01		Inspection Type for Wall Structure	
E08	7A05		Inspection Performed By	
E09	6B26		NBI Crew Hours (Actual)	
E09	7A12		NBI Inspection Crew Hours	
E10	6B27		Crane Hours (Actual)	
E10	7A13		Bridge Inspection Crane Hours	
E11	6B32		Inspection Engineering Cost	
E11	6B33		Inspection Rigging Cost	
E11	6B34		Inspection Office Cost	
E12	7A05		Inspection Performed By	
E13	6B24		Agency that Hired the Consultant	
E14	6B38		Approach Slab Condition Rating	
E15	6B39		Approach Roadway Condition Rating	
E16	6B40		Deck Wearing Surface Condition Rating	
E17	1A01		Deck Condition Rating	58
E18	1A04		Superstructure Condition Rating	59
E19	6B36		Paint Condition Rating	
E19	6B37		Extent of the Paint Condition	
E19	VA02		Extent of Paint Applied to the Structure	
E20	1A02		Substructure Condition Rating	60
E21	1A05		Channel and Channel Protection Condition Rating	61
E22	1A03		Culvert Condition Rating	62
E23			Not Used	
E24	4A09		Structural Evaluation	67
E25	4A10		Deck Geometry Appraisal	68
E26	4A11		Underclearance Appraisal	69
E27	1A06		Waterway Adequacy Appraisal	71
E27	IL02		Risk of Overtopping	71
E27	IL03		Traffic Delay	71
E28	4A02		Approach Roadway Alignment Appraisal	72
E28A	4A03		Not Used. Reserved for Future Use.	
E28A	4A04		Not Used. Reserved for Future Use.	
E28A	4A05		Not Used. Reserved for Future Use.	
E28A	4A06		Not Used. Reserved for Future Use.	
E28A	IA02		Adequacy of Traffic Safety Features	36A, B, C, D
E29	4B03	IR06, IR11, IR21	Bridge Posting	70
E29A	4A08		Scour Critical Bridge Indicator	113
E30	4B07	IR10	Inventory Rating	66
E30	4B11	IR10	H20 Inventory Rating	
E30	6B18		Inventory Rating	
E30	IR04		Load Type	
E30	IR10		Inventory Rating	66
E31	4B05	IR11	Operating Rating	64
E31	4B09	IR11	H20 Operating Rating	
E31	IR04		Load Type	
E31	IR11		Operating Rating	64
E32	4B04	IR06	Operating Rating Type	63
E32	4B06	IR06	Inventory Rating Type	65
E32	4B08	IR06	H20 Operating Rating Type	
E32	4B10	IR06	H20 Inventory Rating Type	
E32	IR06		Load Rating Method	63
E32	IR06		Load Rating Method	65
E32	IR12		Governing Criteria - Inventory	
E32	IR13		Governing Criteria - Operating	
E33	IR07		Type of Structural Member that Controls the Inventory Rating	
E34	IR08		Fatigue Stress Category of the Controlling Member	
E35	IR09		Type of Loading that Controls the Fatigue Inventory Rating	
E36	IR18		Fatigue Stress Range	
E37	IR15		Year of AASHTO Specifications Used in Determining Ratings	
E38	IR14		Year of AASHTO Manual Used in Determining Ratings	
F01	3B07		Year of Improvement Cost Estimate	97
F02	3B01		Proposed Deck/Super Work	75A
F02	3B02		Proposed Sub Work	75A

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
F02	6A55		Proposed Major Deck Reconstruction	
F02	6A56		Proposed Major Superstructure Reconstruction	
F02	6A57		Proposed Major Substructure Reconstruction	
F03			Not Used	
F04	3B03		Improvement Length	76
F05	3B03		Improvement Length	76
F06			Not Used	
F07			Not Used	
F08			Not Used	
F09			Not Used	
F10	5C12		Future Average Daily Traffic	114
F11	5C13		Year of Future Average Daily Traffic	115
F12			Not Used	
F13			Not Used	
F14			Not Used	
F15	3B04		Bridge Improvement Cost	94
F16	3B04		Bridge Improvement Cost	94
F17	3B04		Bridge Improvement Cost	94
F18	3B04		Bridge Improvement Cost	94
F19			Not Used	
F20	3B04		Bridge Improvement Cost	94
F21	3B05		Roadway Improvement Cost	95
F22			Not Used	
F23			Not Used	
F24	3B06		Estimated Total Cost of Overall Improvement Project	96
F24A			Not Used	
F25			Not Used	
F26			Not Used	
F27			Not Used	
G01			Not Used	
G02			Not Used	
G03	VN07		Drawing Number for the Repair	
G04			Not Used	
G05			Not Used	
G06			Not Used	
G07	VN07		Drawing Number for the Repair	
G08			Not Used	
G09	VA01		Date the Bridge Was Painted	
G10	VA03		Tons of Steel Painted	
G11	VA04		Estimated Surface Area in Square Feet Requiring Painting	
G12	VA09		Number of Coats of Paint Applied	
G13	VA11		Gallons of Paint Applied	
G14	VA08		Color Number of Paint	
G15	VA12		Type of Cleaning Used	
G16	VA02		Extent of Paint Applied to the Structure	
G16	VA05		Type of Primer Coat Applied to the Structure	
G16	VA06		Type of Intermediate Coat Applied to the Structure	
G16	VA07		Type of Finish Coat Applied to the Structure	
G16	VA10		Thickness of Paint Applied to the Structure	
G17	VA13		Cost of Painting	
H01	IM03		Maintenance Action	
H02	IM03		Maintenance Action	
H03	3A03		Structure Unit	
H03	IM09		Maintenance Location	
H04	IM03		Maintenance Action	
H05	IM04		Estimated Quantity	
H06	IM10		Estimated Cost of Work Candidate	
H07			Not Used	
H08	IM05		Maintenance Priority	
H09	IM11		Work Assign	75B
H10	IM06		Initial Recommended Date	
H10A			Not Used	
H11			Not Used	
H12	IM08		Target Year	
J01	7A01		Inspection Date	93A
J02	6A44		NSTM Group Number for Main Unit and Approach Spans	
J03	6A45		Critical Ranking Factor Type of Member for Main Unit and Approach Spans	
J03	6A46		Critical Ranking Factor Fatigue Susceptibility for Main Unit and Approach Spans	
J03	6A47		Critical Ranking Factor Material for Main Unit and Approach Spans	
J03	6A48		Critical Ranking Factor Cumulative Truck Traffic for Main Unit and Approach Spans	
J04	6A49	6A45-48	Total NSTM Critical Ranking Factor for Main Unit and Approach Spans	
J05	7A09		Inspection Frequency	92A
J06	6A44		Fracture Critical Group Number for Main Unit and Approach Spans	
J07	6A45		Critical Ranking Factor Type of Member for Main Unit and Approach Spans	
J07	6A46		Critical Ranking Factor Fatigue Susceptibility for Main Unit and Approach Spans	

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
J07	6A47		Critical Ranking Factor Material for Main Unit and Approach Spans	
J07	6A48		Critical Ranking Factor Cumulative Truck Traffic for Main Unit and Approach Spans	
J08	6A49	6A45-48	Total NSTM Critical Ranking Factor for Main Unit and Approach Spans	
J09	5D02		Structure Unit ID	
J09	5D03		Structure Unit Description	
J09	5D04		Structure Unit Type	
J09	IF01		NSTM/Fatigue Member Location	
J10	IF03		NSTM/Fatigue Member	
J11	IF04		NSTM/Fatigue Detail	
J11A	IF05		Fatigue Stress Category of the NSTM/Fatigue Detail	
J12	IF06		NSTM/Fatigue Detail Condition	
M01	6B42		Structural Adequacy and Safety Component	
M02	6B43		Serviceability and Functional Obsolescence Component	
M03	6B44		Essentiality for Public Use Component	
M04	6B45		Special Reductions Component	
M05	4A13		Federal Sufficiency Rating of the Structure	
M06	6B41		Eligibility of Bridge FCB Funds	
M07			Not Used	
M08	4A12	1A01-4	Structurally Deficient/Functionally Obsolete	
M09			Not Used	
M10			Not Used	
M11			Not Used	
M12			Not Used	
M13			Not Used	
M14			Not Used	
M15			Not Used	
M16			Not Used	
M17			Not Used	
M18			Not Used	
M19			Not Used	
M20			Not Used	
M21			Not Used	
M22			Not Used	
M23			Not Used	
M24			Not Used	
M25			Not Used	
M26			Not Used	
M27			Not Used	
M28			Not Used	
M29			Not Used	
M30			Not Used	
M31			Not Used	
M32			Not Used	
M33			Not Used	
M34	6B46		Total Maintenance Deficiency Points Assigned to the Bridge	
M35			Not Used	
M36			Not Used	
M37			Not Used	
N01	IM14a		Date Completed	
N02			Not Used	
N03	IM15a		Notes	
N04			Not Used	
N05	IM18		Actual Quantity	
N06	IM19		Acutal Cost	
N07			Not Used	
N08			Not Used	
O01			Not Used	
O02			Not Used	
O03			Not Used	
O04			Not Used	
O05			Not Used	
O06			Not Used	
O07			Not Used	
O08			Not Used	
O09			Not Used	
O10			Not Used	
O11			Not Used	
O12			Not Used	
O13			Not Used	
O14			Not Used	
O15			Not Used	
O16			Not Used	
O17			Not Used	
O18			Not Used	
O19			Not Used	

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
O20			Not Used	
PA01	SS11		APRAS Ref	
PA02	SS13		Total APRAS Span	
PA03	SS12		Axle Weight (Kips)	
PA04	5D02		Structure Unit ID	
PA04	SS01		Apras Span ID	
PA04	SS03		Back Span Indicator	
PA05	SS04		Identical Span No.	
PA06	SS05		Continuous Beginning Span	
PA06	SS06		Continuous End Span	
PA07	5D04		Structure Unit Type	
PA08	SS07		Center to Center Span Length	
PA09	SP07		Material Makeup of Main Load Carrying Members	
PA09	SP08		Physical Makeup of Primary Load Carrying Members	
PA09	SP09		Type of Span Interaction of Main Members Only	
PA09	SP10		Structural Configuration	
PA09	SS09		Department Structure Type	
PA10	SS08		Moment Comparison Span Length	
PA11	SL11		Single Lane Span ID	
PB01			Not Used	
PB02			Not Used	
PB03	SL02		Multi-Lane Live Load Distribution Factors for Moment	
PB03	SL03		Single Vehicle Live Load Distribution Factors for Moment	
PB04	SL04		Multi-Lane Live Load Distribution Factors for Shear	
PB04	SL05		Single Vehicle Live Load Distribution Factors for Shear	
PB05	SL06		Positive Moment Comparison Factor Comment (Normal Traffic)	
PB05	SL07		Positive Moment Comparison Factor Comment (Restricted Traffic)	
PB06	SL08		Negative Moment Comparison Factor Comment (Normal Traffic)	
PB06	SL09		Negative Moment Comparison Factor Comment (Restricted Traffic)	
PB07	SL10		Load Conditions for the Permit	
PB08	6C01		County - State Roadway Location	3
PB08	6C02		State Route Number - State Roadway Location	5D
PB08	6C03		Segment - State Roadway Location	
PB08	6C04		Offset - State Roadway Location	
PB08	SC02		RMS Route	
PB09	5C03		Is the Feature Intersected On or Under the Bridge?	5A
PB10	SC05		Non-Restricted Vertical Clearance	
PB11	SC09		Horizontal Clearance Detail	
PB11	SC10		Vertical Clearance Detail	
PB12	SC03		Permit Conditions	
PB13	SC07		Minimum Travel Width - Left	
PB13	SC08		Minimum Travel Width - Right	
PB14	SC04		Permit Condition Descriptions	
PC01			Not Used	
PC02			Not Used	
PC03	IR07		Type of Structural Member that Controls the Inventory Rating	
PC04	IR15		Year of AASHTO Specifications Used in Determining Ratings	
PC05			Not Used	
PC06	IR08		Fatigue Stress Category of the Controlling Member	
PC07			Not Used	
PC08	SL01		Date the Ratings Were Computed	
PC09	4B07	IR10	Inventory Rating	66
PC09	4B11	IR10	H20 Inventory Rating	
PC09	IR10		Inventory Rating	66
PC10	4B05	IR11	Operating Rating	64
PC10	4B09	IR11	H20 Operating Rating	
PC10	IR11		Operating Rating	64
PC11	SL16		Rating Notes	
PC12	SL12		Restricted Span ID (1)	
PC13	SL13		Restriction Codes 1, 2, & 3	
PC14	SL14		Restricted Span ID (2)	
PC15	SL15		Restriction Codes 4, 5, 6, & 7	
PR Screen	6C30		General Segment Ahead Label	
PR Screen	6C31		User Segment Ahead Label	
PR Screen	6C32		General Segment Back Label	
PR Screen	6C33		User Segment Back Label	
R01	6C01		County - State Roadway Location	3
R01	6C02		State Route Number - State Roadway Location	5D
R01	6C03		Segment - State Roadway Location	
R01	6C04		Offset - State Roadway Location	
R02	5C03		Is the Feature Intersected On or Under the Bridge?	5A
R03	5C04		Route Signing Prefix	5B
R03	5C06		State Traffic Route / Suffix	
R04	5C10		Recent Average Daily Traffic	29
R05	5C11		Year of Average Daily Traffic	30

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
R06	6C27		Average Daily Truck Traffic	
R07	6C28		Year of Average Daily Truck Traffic	
R07A	5C14		Average Daily Truck Traffic (Percent)	109
R08	6C07		Government Level of Control	
R09	6C06		Federal Aid	
R10	5C22		Functional Classification	26
R10	IL04	5C22	Functional Classification	
R11	6C08		Urban/Rural Designation	
R12	6C09		Highway Indicator	
R12	6C12		Interstate Network (INT) Indicator	
R12	6C13		Not Used - Reserved for Future Use	
R12	6C14		Access Tandem Trailer Truck Network (ATTT) Indicator	
R12	6C15		RMS National Highway System (NHS) Indicator	
R12	6C16		Tandem Trailer Truck Network (TTTN) Indicator	
R13	6A01		State Senatorial District	
R14	6A02		United States Congressional District	
R15	6A03		Legislative District	
S01	7A01		Inspection Date	
S01A	7A03		Primary Type of Inspection	
S01A	7A06		Type of Compliance Inspections Performed	
S01A	IS01		Sign/Light Inspection Type	
S02	7A09		Inspection Frequency	
S02	IS13		Inspection Frequency of Sign/Light Structure	
S02A	6B20		Next Inspection Type	
S02A	IS12		Next Inspection Type for Sign/Light Structure	
S03	7A05		Inspection Performed By	
S04	VI12		Special Equipment Type	
S05	VS25		Total Area of Signs on the Structure	
S06	VS12		Number of Lights on Structure	
S12	5B12	6A26, 6A28	Material and Span Interaction of Main Unit (FHWA)	43A
S12	5B13	6A29	Structural Configuration of Main Unit (FHWA)	43B
S12	6A26		Material Used for Main Unit, Approach Unit, Sign Structure, and Walls (Department)	
S12	6A27		Physical Makeup of Primary Load Carrying Members for Main Unit, Approach Unit, Sign Structure, and Walls (Department)	
S12	6A28		Type of Span Interaction for Main Unit, Approach Unit, Sign Structure, and Walls (Department)	
S12	6A29		Structural Configuration Used for Main Unit, Approach Unit, Sign Structure, and Walls (Department)	
S12A	5A15		Year the Bridge Was Built	
S13	VS11		Number of Signs Displayed on Sign Structure	
S14	7A12		NBI Inspection Crew Hours	
S19	VS26		Height of Highest Column	
S20	VS28		Number of Spans	
S20A	5A19	5C08	Number of Lanes Under the Structure	28B
S20A	VS29		Not Used - Reserved for Future Use	
S21	5B18		Structure Length	
S21	VS27	5B18	Length of Sign Structure	
S21A	VS30		Median Width Under Sign Structure	
S22	IS02		Column Base Condition Rating	
S23	IS03		Guide rail Condition Rating	
S24	IS04		Column Condition Rating	
S25	IS05		Access Condition Rating	
S26	IS06		Sign Condition Rating (Sign Structure Only)	
S27	IS07		Light Condition Rating	
S28	IS08		Surface/Paint Condition Rating	
S29	IS09		Horizontal Member Condition Rating (Sign Structures Only)	
S30	IS10		Overall Condition Rating of the Sign/Light Structure	
S31	IS11		Sign/Light Inspection Notes	
S32	IS11		Sign/Light Inspection Notes	
S33	IS11		Sign/Light Inspection Notes	
S34	IS11		Sign/Light Inspection Notes	
S35	IS11		Sign/Light Inspection Notes	
S36	IS11		Sign/Light Inspection Notes	
S37	IS11		Sign/Light Inspection Notes	
T01	7A01		Inspection Date	
T02	7A09		Inspection Frequency	
T02	IW13		Inspection Frequency of Wall Structure	
T03	7A05		Inspection Performed By	
T04	VW28		Minimum Wall Height	
T05	VW29		Maximum Wall Height	
T06	5B18		Structure Length	
T06	VW30		Not Used - Reserved for Future Use	
T07	VW31		Approximate Area of the Wall	
T08	5B12	6A26, 6A28	Material and Span Interaction of Main Unit (FHWA)	43A
T08	5B13	6A29	Structural Configuration of Main Unit (FHWA)	43B
T08	6A26		Material Used for Main Unit, Approach Unit, Sign Structure, and Walls (Department)	
T08	6A27		Physical Makeup of Primary Load Carrying Members for Main Unit, Approach Unit, Sign Structure, and Walls (Department)	
T08	6A28		Type of Span Interaction for Main Unit, Approach Unit, Sign Structure, and Walls (Department)	

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
T08	6A29		Structural Configuration Used for Main Unit, Approach Unit, Sign Structure, and Walls (Department)	
T08	VW01		Not Used - Reserved for Future Use	
T08	VW02		Not Used - Reserved for Future Use	
T08	VW03		Not Used - Reserved for Future Use	
T08	VW04		Not Used - Reserved for Future Use	
T09	7A12		NBI Inspection Crew Hours	
T10	VW10		Wall Use	
T11	VW06		Primary Backfill Material	
T11	VW07		Secondary Backfill Material	
T12	VW26		Backfill Slope	
T13	IW03		Backfill Condition Rating	
T14	IW04		Wall Condition Rating	
T15	IW07		Drainage Condition Rating	
T16	IW08		Foundation Condition Rating	
T17	IW10		Overall Condition Rating of the Wall	
T18	2A02		Inspection Notes	
T18	IW11		Wall Inspection Notes	
W01	7A01		Inspection Date	
W01A	7A01		Inspection Date	93B
W02	7A03		Primary Type of Inspection	
W02	7A06		Type of Compliance Inspections Performed	
W02A	7A03		Primary Type of Inspection	
W02A	7A06		Type of Compliance Inspections Performed	
W03	7A09		Inspection Frequency	92B
W04	7A09		Inspection Frequency	92B
W06	4A08		Scour Critical Bridge Indicator	113
W07	IN15		Stream Bed Material (SC)	
W07	IU06		Stream Bed Material	
W07	IU07		Stream Bed Material Description	
W09	5D02		Structure Unit ID	
W09	IN01		Abutment, Pier, Culvert, Wingwalls Referencing	
W10	IN13		PA Foundation Type (SC)	
W10	IN14		OSA Foundation Type (SC)	
W11	IN18		Water Depth	
W11A	IN03		Observed Scour Rating	
W11B	IN16		Underwater Inspection Type	
W11C	IN17		Observed Scour Depth	
W11D	IN22		Calculated Scour Depth w/100 Year Flood	
W11E	IN23		Calculated Scour Depth w/500 Year Flood	
W11F	IN21		Countermeasures	
W12	IN24		Inspection Notes	
W13	IN02		Previous/Current Inspection Indicator	
W14	IU02		Number of Units Inspected with Divers	
W15			Not Used	
W16			Not Used	
W17	6B24		Agency that Hired the Consultant	
	1A07		Unrepaired Spalls	
	1A08		Not Used - Reserved for Future Use	
	1A09		Inspection Status	
	1A09a		Inspection Reviewer	
	1A10		Element Quantity	
	1A11		Condition State Quantities	
	1A12		Element Condition Notes	
	1B01		Element ID	
	1B02		Structure Unit	
	1B03		Environment	
	1B04		Not Used - Use Item 1A10	
	1B05		Scale Factor	
	1B06		Not Used - Reserved for Future Use	
	1B07		Element Description	
	3A01		Not Used - Reserved for Future Use	
	3A02		Work Candidate ID	
	3A04 - 3A14		Not Used - Reserved for Future Use	
	4A08b		Scour Critical Category	
	4A14	1A01-4	Bridge Condition	
	4A16	6C20, 6C21, FR11	Minimum Vertical Underclearance Reference Feature	54A
	4A18		Minimum Lateral Underclearance Reference Feature	55A
	4B02	IR03	Rating Date and Initials	
	4B12	IR10, IR11	ML80	
	4B13	IR10, IR11	TK527	
	4B14		Not Used - Reserved for Future Use	
	4B15		Not Used - Reserved for Future Use	
	4B16		Not Used - Reserved for Future Use	
	5A03		NBI Structure Number	
	5A04		District Number	2

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
	5A22		Not Used - Reserved for Future Use	
	5A23		Agency Administration Area	
	5A24		Reporting Group	
	5B19	5B07, 5B18	Deck Area	
	5B20		Total Length	
	5C02		Not Used - Reserved for Future Use	
	5C07		Not Used - Reserved for Future Use	
	5C09		ADT Class	
	5C16		Detour Speed	
	5C17		Accident Count and Rate	
	5C18		Mile Point	11
	5C19		National Base Highway Network	12
	5C20		LRS Inventory Route and Subroute Number	13A
	5C20		LRS Inventory Route and Subroute Number	13B
	5C23		Traffic Direction	102
	5C25	6C18, 6C19	Total Horizontal Clearance	47
	5C31		Federal Lands Highway	105
	5C34		Emergency Route Indicator	
	5C35		RMS Roadway BPN	
	5C36		Adjoining Feature	
	5C37		Not Used - Reserved for Future Use	
	5C38		Not Used - Reserved for Future Use	
	5C39		Not Used - Reserved for Future Use	
	5D01		Unit Key	
	5D05		Default Bridge Unit Indicator	
	5E05		State Historic Preservation Office Key Number	
	5E06		Not Used - Reserved for Future Use	
	5E07		Not Used - Reserved for Future Use	
	5E08		Not Used - Reserved for Future Use	
	5E09		Not Used - Reserved for Future Use	
	5E10		Asbestos Containing Material (ACM) Status	
	5E11		ACM Inspections Required	
	5E12		ACM Inspections Completed	
	5E13		ACM Inspection Date	
	5E14		ACM Quantity	
	5E15		ACM Number of Locations	
	5E16		ACM Location Descriptions	
	5E17		ACM Location Descriptions	
	5E18		Not Used - Reserved for Future Use	
	5E19		Not Used - Reserved for Future Use	
	5E20		Not Used - Reserved for Future Use	
	5E21		Not Used - Reserved for Future Use	
	5E22		Not Used - Reserved for Future Use	
	5E23		Not Used - Reserved for Future Use	
	5E24		Bridge Group	
	6A12		Demolished / Replaced Indicator	
	6A13		Demolished / Replaced Date	
	6A14		Historic District Contribution Indicator	
	6A15		Historic District	
	6A16		Preservation Candidate Indicator	
	6A17		Future Bridge Bill Candidate Indicator	
	6A18		Not Used - Reserved for Future Use	
	6A20		Watershed Name	
	6A21		Deicing Equipment Installed	
	6A22		Corridor	
	6A24		Turnback Description	
	6A25		Not Used - Reserved for Future Use	
	6A34		Date Wearing Surface Thickness for Main and Approach Units was Recorded	
	6A35		Surface Thickness Over and Under	
	6A36		Year Protection System was Installed	
	6A37		Protection System Note	
	6A58		Contextual Preservation	
	6B02		New Wearing Surface Under the Bridge Indicator	
	6B03		Inventory Correction Indicator	
	6B04		Bump at Bridge Indicator	
	6B05		Deck Overlay Measurement Date	
	6B06		Utility Repair Required	
	6B07		Estimated Spall or Delamination Percent	
	6B08		Estimated Spall or Delamination Percent Date	
	6B09		Weather Condition	
	6B10		Estimated Chloride Content Percent	
	6B11		Estimated Chloride Content Date	
	6B12		Temperature	
	6B13		Underclearance Controlling Vertical	
	6B14		Table Used for Deck Geometry Appraisal	

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
	6B15		Not Used - Reserved for Future Use	
	6B16		Appraisal Based On	
	6B19		Capacity Appraisal Control	
	6B21		Crane Inspection Date	
	6B22		Not Used - Reserved for Future Use	
	6B23		Team Helper	
	6B25		Inspection Contract Number	
	6B28		NSTM Hours (Actual)	
	6B29		Other 1	
	6B30		Underwater Hours (Actual)	
	6B31		Other 2	
	6B35		New Paint Since Last Inspection	
	6B47		Deck Cracking Metric	
	6B48		Combustible Material Stored Under the Bridge	
	6B49		Inaccessible Area of the Bridge during Inspection	
	6C17		Not Used - Reserved for Future Use	
	6C24		Not Used - Reserved for Future Use	
	6C29		Not Used - Reserved for Future Use	
	6C34		Feature Type	
	6C37		Vertical Clearance Sign Posting Left	
	6C38		Vertical Clearance Sign Posting Right	
	7A02		Team Leader	
	7A04		Review Required	
	7A05a		Inspection Organization Name	
	7A07		Required Inspections	92, 93
	7A08		Last Inspection Date	93
	7A11		Next Team Leader	
	7A15		NSTM Inspection Hours	
	7A16		Other 1 Hours	
	7A17		Underwater Inspection Hours	
	7A18		Other 2 Hours	
	7A19		Extended Inspection Interval Eligibility	
	7A20		Extended Inspection Interval Concurrence	
	BP01		Reported By	
	BP02		BPR Number	
	BP03		Date	
	BP04		Status	
	BP05		Critical Finding	
	BP06		Finalized By	
	BP07		Incident	
	BP08		Actons Taken to Date	
	BP09		Follow Up	
	BP10		Previous Repairs Recommended	
	BP11		Cause Tags	
	FR08		Span Description	
	FR09		Additional Operator	
	FR16		Notes	
	FR17	FR05	Railroad Division	
	FR18	FR05	Railroad Subdivision	
	FR19	FR05	Railroad Branch	
	FR20	FR05	Railroad Owner	
	FT02		Utility Type	
	FT07		Hazmat Indicator	
	FT08		Location of Utility on Structure	
	FT09		Contact Information	
	FT10		Notes	
	FW02		Stream Classification 1	
	FW03		Stream Classification 2	
	FW04		Timeframe	
	FW05		Stream Classification 3	
	FW06		Permit Type	
	FW09		Waterflow Direction	
	FW10		Primary Waterway	
	FW18		Pollutant Description	
	FW19		Stream Restrictions Description	
	FW20		Notes	
	IA01		Location of Traffic Safety Features	
	IA03		Safety Feature Description	
	IB01		Overall Bearing Condition Rating	
	IB02		Bearing Key	
	IB03		Record Key	
	IB04		Bearing Type	
	IB05		Bearing Location	
	IB06		Bearing Count	
	IB07		Bearing Movement	

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
	IB08		Corrosion?	
	IB09		Alignmenet Issues?	
	IB10		Anchor Bolt Issues?	
	IB11		Loss of Bearing Area?	
	IB12		Condition Rating	
	IB13		Install Year	
	IB14		ECMS ID	
	IB15		Replacement Reason	
	IB16		Replacement Comment	
	IB17		Bearing Comment	
	IC01		Inspection Comment Type	
	IC02		Inspection Comment	
	IC03		Substructure Unit	
	IC04		Substructure Comment Type	
	IC05		Structure Unit Comments	
	ID01		Type of Sign	
	ID02		Sign Needed?	
	ID03		Sign Message	
	ID04		Near Advance	
	ID05		Far Advance	
	ID06		Bridge Site Near	
	ID07		Bridge Site Far	
	ID08		Signing Notes	
	IJ01		Overall Joint Condition	
	IJ02		Joint Key	
	IJ03		Record Key	
	IJ04		Joint Type	
	IJ05		Joint Location	
	IJ06		Joint Movement	
	IJ07		Joint Manufacturer	
	IJ08		Joint Length	
	IJ09		Debris Imaction?	
	IJ10		Leaking	
	IJ11		Damage	
	IJ12		Covered	
	IJ13		Condition Rating	
	IJ14		Extrusion Install Year	
	IJ15		Seal Install Year	
	IJ16		ECMS No	
	IJ17		Replacement Reason	
	IJ18		Replacement Comment	
	IJ19		Joint Comment	
	IF02		NSTM/Fatigue Member Type	
	IL01		Not Used - Reserved for Future Use	
	IL05		Maximum Known Water Surface Elevation	
	IL06		Date of Maximum Known Water Surface Elevation	
	IL07		New Maximum Water Surface Status	
	IL08		Maximum Water Surface Notes	
	IL09		Underclearance Origin Description	
	IL10		Horizontal Underclearance	
	IL11		Vertical Underclearance	
	IL12		Underclearance Notes	
	IL13		Worst Flood Event Occurrence	
	IL14		Date of Worst Flood Event Occurrence	
	IM01		Maintenance Scope	
	IM02		Structure Unit Element	
	IM05b		Date Maintenance Priority Changed	
	IM07		Status of Work Candidate	
	IM12		Drawing Indicator	
	IM13		Permit Indicator	
	IM14b		Plan of Action Date	
	IM14c		Mitigation Date	
	IM15b		Deferred Notes	
	IM15c		Authorized Bridge Approval	
	IM15d		Authorized Maintenance Approval	
	IM15e		Not Used - Reserved for Future Use	
	IM16		SAP Closed Date	
	IM17		SAP Work Order Number	
	IM20		MPMS #	
	IM21	IM15a	Notes	
	IN04		Change Since Last Inspection (SC)	
	IN05		Scour Hole (SC)	
	IN06		Debris Potential	
	IN07		Substructure Scourability	
	IN08		Opening Adequacy/Channel	

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
	IN09		Sediment Deposits	
	IN10		Alignment	
	IN11		Velocity Stream Slope	
	IN12		OSA Pier / Abutment Type (SC)	
	IN19		Movement Indicator (SC)	
	IN20		Scour / Undermining Indicator	
	IR01a		Load Rating Review Recommended	
	IR01b		Reviewer Action	
	IR02		Assigned Rating Approval Date	
	IR02a		Assigned Rating Approval Engineer	
	IR03		Calculation Date	
	IR05		NBI Rating	
	IR11a		Safe Load Capacity (SLC) Rating	
	IR16		Engineer	
	IR17		Rating Dataset	
	IR19		Notes	
	IR20		Inventory Rating Factor	
	IR21		Operating Rating Factor	
	IS14		Next Inspection Date of Sign/Light Structure	
	IS15		Tag Existence and Condition	
	IT (L.1)		Load Rating Method	
	IT (L.10)		Height Restriction	
	IT (L.11)		Hazardous Material Restriction	
	IT (L.12)		Other Restrictions	
	IT (L.2)		Inventory Load Rating Factor	
	IT (L.3)		Operating Load Rating Factor	
	IT (L.4)	VP02	Tunnel Load Posting Status	
	IT (L.5)		Posting Load - Gross	
	IT (L.6)		Posting Load - Axle	
	IT (L.7)		Posting Load - Type 3	
	IT (L.8)		Posting Load - Type 3S2	
	IT (L.9)		Posting Load - Type 3-3	
	IU00a		Not Used - Reserved for Future Use	
	IU00b		Not Used - Reserved for Future Use	
	IU01		Recalculate Scour Critical Bridge Indicator (SCBI)	
	IU03		SCBI Source	
	IU04		Observed Scour Assessment (OSA)	
	IU04b		Was the Scour Calculator run for this Inspection?	
	IU05		Scour Assessment Rating (SAR)	
	IU08		Debris Potential	
	IU09		Trapping Potential	
	IU10		Pressure Flow	
	IU11		Near Abutment Location	
	IU12		Far Abutment Location	
	IU13		Upstream Left Wingwall Presence	
	IU14		Condition of Upstream Left Wingwall	
	IU15		Upstream Right Wingwall Presence	
	IU16		Condition of Upstream Right Wingwall	
	IU17		Horizontal Debris Blockage Start	
	IU18		Horizontal Debris Blockage End	
	IU19		Vertical Debris Blockage Start	
	IU20		Vertical Debris Blockage End	
	IU21		Current Scour Countermeasure Type	
	IU22		Location of Current Scour Countermeasure	
	IU23		Condition of Current Scour Countermeasure	
	IU24		Subunit Number	
	IU25		Location of Potential Scour Countermeasure	
	IU26		Work Candidate	
	IU27		SCBI Code	
	IU28		SCBI Case	
	IW02		Anchorage Condition Rating	
	IW05		Panel Condition Rating	
	IW06		Post Condition Rating	
	IW09		Parapets Condition Rating	
	IW12		Next Inspection Type for Wall Structure	
	IW14		Next Inspection Date of Wall Structure	
	SC01		Span ID Suffix	
	SC06		Non-Restricted Clearance Review Indicator	
	SG01		Structure Group Type	
	SG02		Structure Group Name	
	SG03		Structure Group Identification Number	
	SG04		Structure Group Relationship Type	
	SG05		Structure Group Description	
	SP01	5D04	Span Type	
	SP02	5D02	Unit ID	

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
	SP04		Span Deck Width	
	SP05		Flare Indicator	
	SP06		Span Description	
	SS02		Actual Span	
	SS10		Notes	
	VA14		Notes	
	VB01		ECMS Number	
	VB02		Work Scope (TAMP)	
	VB03		Work Type (BAMS)	
	VB04		Let Date	
	VB05		Completion Date	
	VB06		Total Bid Cost	
	VB07		Total Structure Cost @ Let	
	VB08		Total Amount Terndered Cost	
	VB09		Total Structure Cost @ Final	
	VB10		MPMS Number	
	VB11		S-Drawing Number	
	VB12		Work Status	
	VB13		Project Narrative	
	VB14		Staged Construction	
	VB15		Prime Contactor?	
	VB16		Contractor	
	VB16a		Contractor Role	
	VB17		Not Used - Reserved for Future Use	
	VB18		Not Used - Reserved for Future Use	
	VB19		Not Used - Reserved for Future Use	
	VB20		Inspection Record Before Project	
	VB21		Inspection Record After Project	
	VB22		Deck Condition Rating (Before/After)	
	VB23		Wearing Surface Condition Rating (Before/After)	
	VB24a		Deck Surface Type (Main) (Before/After)	
	VB24b		Deck Surface Type (Approach) (Before/After)	
	VB25a		Deck Membrane Type (Main) (Before/After)	
	VB25b		Deck Membrane Type (Approach) (Before/After)	
	VB26a		Deck Protection Type (Main) (Before/After)	
	VB26b		Deck Protection Type (Approach) (Before/After)	
	VB27a		Wearing Surface Thickness (Main) (Before/After)	
	VB27b		Wearing Surface Thickness (Approach) (Before/After)	
	VB28		Protection Year (Before/After)	
	VB29		Protection System Note (Before/After)	
	VB30		Bridge Deck Type (Before/After)	
	VB31		Form Type (Before/After)	
	VB32		Rebar Type (Before/After)	
	VB33		Deck Rehab Area	
	VB34		Deck Overlay Area	
	VB35		Deck Overlay Cost (Mat and Install)	
	VB36		Overlay Cost per SF	
	VB37		Duration to Install Overlay	
	VB38		Deck Repair Area	
	VB39		Deck Repair Cost	
	VB40		Deck Repair Cost per SF	
	VB41		Hydrodemolition Used?	
	VB42		Not Used - Reserved for Future Use	
	VB43		Not Used - Reserved for Future Use	
	VB44		Not Used - Reserved for Future Use	
	VB45		Not Used - Reserved for Future Use	
	VB46		Not Used - Reserved for Future Use	
	VB47		Not Used - Reserved for Future Use	
	VB48		Not Used - Reserved for Future Use	
	VB49		Not Used - Reserved for Future Use	
	VB50		Overall Joint Condition Rating	
	VB51		Joint Work Record Key	
	VB52		Joint Scope of Work	
	VB53		Joint Type	
	VB54		Joint Movement Class	
	VB55		Length of Joint (ft)	
	VB56		Cost	
	VB57		Cost per LF ($/LF)	
	VB58		Not Used - Reserved for Future Use	
	VB59		Not Used - Reserved for Future Use	
	VB60		Overall Bearing Condition Rating (Before/After)	
	VB61		Bearing Work Record Key	
	VB62		Bearing Scope of Work	
	VB63		Bearing Type	
	VB64		Bearing Movement Type	

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
	VB65		Bearing Count on Bridge	
	VB66		Cost	
	VB67		Cost per Bearing ($/EA)	
	VB68		Not Used - Reserved for Future Use	
	VB69		Not Used - Reserved for Future Use	
	VB70		Superstructure Work Type	
	VB71		Superstructure Condition Rating (Before/After Conditions Superstructure)	
	VB72		Culvert Condition Rating (Before/After Conditions Superstructure)	
	VB73		Paint Condition Rating (Before/After Conditions Superstructure)	
	VB74		Material Type (Before/After Conditions Superstructure; Main/Approach)	
	VB75		Physical (Before/After Conditions Superstructure; Main/Approach)	
	VB76		Span Interaction (Before/After Conditions Superstructure; Main/Approach)	
	VB77		Structural Configuration (Before/After Conditions Superstructure; Main/Approach)	
	VB78		Square Footage of Painting	
	VB79		Paint Cost	
	VB80		Paint Cost per SF	
	VB81		Not Used - Reserved for Future Use	
	VB82		Not Used - Reserved for Future Use	
	VB83		Not Used - Reserved for Future Use	
	VB84		Not Used - Reserved for Future Use	
	VB85		Not Used - Reserved for Future Use	
	VB86		Not Used - Reserved for Future Use	
	VB87		Not Used - Reserved for Future Use	
	VB88		Not Used - Reserved for Future Use	
	VB89		Not Used - Reserved for Future Use	
	VB90		Substructure Work Type	
	VB91		Substructure Condition Rating	
	VD18		Culvert Opening Type	
	VD20		Minimum Fill Height Over Culvert	
	VD21		Maximum Fill Height Over Culvert	
	VD22		Effective Width of Hydraulic Opening	
	VD24		Culvert Floor Type	
	VD31		Number of Locations for Bearing Seat and Horizontal Surface Cleaning	
	VD32		Bridge Seat Cleaning Note	
	VD33		Number of Scuppers with Downspouts	
	VD34		Number of Scuppers without Downspouts	
	VI01		Minimum Crane Reach Required	
	VI03		Railroad Flagger Required	
	VI04		Traffic Flagger Required	
	VI11		Inspection Limitations	
	VI13		Equipment Quantity	
	VI14		Is the Type of Equipment Consumable?	
	VI15		Assigned To	
	VI16		Notes	
	VI17		Not Used - Reserved for Future Use	
	VI18		Permit Type	
	VI19		Not Used - Reserved for Future Use	
	VI20		Point of Contact	
	VI21		Phone # for Point of Contact	
	VI22		Fax # for Point of Contact	
	VI23		Email for Point of Contact	
	VI24		Notes	
	VM06		PUC Order Date	
	VM07		Notes	
	VN02		Soil Boring Notes	
	VN03		Test Description	
	VN04		Storage Location	
	VP10		Permanently Closed Structure (District Use Only)	
	VS01		Not Used - Reserved for Future Use	
	VS02		Not Used - Reserved for Future Use	
	VS03		Not Used - Reserved for Future Use	
	VS04		Not Used - Reserved for Future Use	
	VS05		Mounting Type	
	VS06		Foundation Type	
	VS07		Manufacturer	
	VS08		Inspection Location Information	
	VS09		Not Used - Reserved for Future Use	
	VS13		Not Used - Reserved for Future Use	
	VS14		Not Used - Reserved for Future Use	
	VS15		Not Used - Reserved for Future Use	
	VS16		Not Used - Reserved for Future Use	
	VS17		Distance From Roadway	
	VS18		Direction From Roadway	
	VS19		Maximum Diameter of High Mast Tower	
	VS20		Minimum Diameter of High Mast Tower	

APPENDIX C
BMS to BMS2 Conversion Chart

BMSCode	BMS2Code	BMS2 Link	Description	FHWA
	VS21		Is the Mounting Bolt Base Grounded?	
	VS22		Height of High Mast Tower	
	VS23		Movement	
	VS24		Alignment	
	VS31		Not Used - Reserved for Future Use	
	VS32		Not Used - Reserved for Future Use	
	VS33		Not Used - Reserved for Future Use	
	VS34		Dynamic Message Sign Indicator	
	VT (A.8)		Service in Tunnel	
	VT (C.3)		Direction of Traffic	
	VT (C.4)		Toll	
	VT (C.7)		Functional Classification	
	VT (C.8)		Urban Code	
	VT (D.1)			
	VT (D.4)			
	VT (I.15)		Border Tunnel State Code	
	VT (I.16)		Border Tunnel Financial Responsibility	
	VT (I.17)		Border Tunnel Number	
	VT (I.18)		Border Tunnel Inspection Responsibility	
	VT (N.1)		Under Navigable Waterway	
	VT (N.2)		Navigable Waterway Clearance	
	VT (N.3)		Tunnel or Portal Island Protection From Navigation	
	VT (S.1)		Number of Bores	
	VT (S.2)		Tunnel Shape	
	VT (S.3)		Portal Shape	
	VT (S.4)		Ground Conditions	
	VT (S.5)		Complex	
	VW05		Foundation Type	
	VW08		Historic Eligibility Information	
	VW09		Manufacturer	
	VW11		Mounting Type	
	VW12		Post Type	
	VW13		Not Used - Reserved for Future Use	
	VW15		Were Architectural Forms Used?	
	VW16		Type of Reinforcement Bar Protection	
	VW17		Compressive Strength Concrete at 28 Days	
	VW18		Support Information	
	VW19		Direction Information	
	VW20		Installed/Retrofitted	
	VW25		Distance to Road	
	VW27		Minimum Lateral Clearance	
	VW32		Not Used - Reserved for Future Use	
	VW33		Not Used - Reserved for Future Use	
	VW34		Not Used - Reserved for Future Use	

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Appendix D

SNTI to BMS2 Conversion

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APPENDIX D
SNTI to BMS2 Conversion Chart

SNTI	BMS2	Description
I.1	5A03	Tunnel Number
I.2	5A02	Tunnel Name
I.3	5A14	State Code
I.4	5A05	County Code
I.5	5A06	Place Code
I.6	5A04	Highway Agency District
I.7	5C06	Route Number
I.8	5C06	Route Direction
I.9	5C04	Route Type
I.10	5A08	Facility Carried
I.11	5C20	LRS Route ID
I.12	5C18	LRS Mile Point
I.13	5A10	Tunnel Portal's Latitude
I.14	5A11	Tunnel Portal's Longitude
I.15	5A12	Border Tunnel State or County Code
I.16	5A12	Border Tunnel Financial Responsibility
I.17		Border Tunnel Number
I.18	VM03, VM04	Border Tunnel Inspection Responsibility
A.1	5A15	Year Built
A.2	5A16	Year Rehabilitated
A.3	5C08, 5A19	Total Number of Lanes
A.4	5C10	Annual Average Daily Traffic
A.5	5C14	Annual Average Daily Truck Traffic
A.6	5C11	Year of Annual Average Daily Traffic
A.7	5C15	Detour Length
A.8		Service in Tunnel
C.1	5A21	Owner
C.2	VO07	Operator
C.3	5C23	Dirrection of Traffic
C.4	5C21	Toll
C.5	6C15	NHS Designation
C.6	5C28	STRAHNET Designation
C.7	5C22	Functional Classification
C.8		Urban Code
G.1	5B18	Tunnel Length
G.2	6C20, 6C21	Minimum Veritcal Clearance over Tunnel Roadway
G.3	5C27	Roadway Width, Curb-to-Curb
G.4	5B05	Left Sidewalk Width
G.5	5B06	Right Sidewalk Width
D.1		Routine Inspection Target Date
D.2	7A08	Actual Routine Inspection Date
D.3	7A09	Routine Inspection Interval
D.4		In-Depth Inspection
D.5	7A03	Damage Inspection
D.6	7A03	Special Inspection

APPENDIX D
SNTI to BMS2 Conversion Chart

SNTI	BMS2	Description
L.1	IR06	Load Rating Method
L.2		Inventory Load Rating Factor
L.3		Operating Load Rating Factor
L.4	VP02	Tunnel Load Posting Status
L.5	VP04	Posting Load - Gross
L.6		Posting Load - Axle
L.7		Posting Load - Type 3
L.8		Posting Load - Type 3S2
L.9		Posting Load - Type 3-3
L.10		Height Restriction
L.11		Hazardous Material Restriction
L.12		Other Restrictions
N.1		Under Navigable Waterway
N.2		Navigable Waterway Clearance
N.3		Tunnel or Portal Island Protection From Navigation
S.1		Number of Bores
S.2		Tunnel Shape
S.3		Portal Shape
S.4		Ground Conditions
S.5		Complex

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Appendix E

Crystal Reports Tables for BMS2 Items

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APPENDIX E
Crystal Reports Tables for BMS Items

BMS2 Code	Table Name	COLUMN NAME	BMS Code
2A01	BRIDGE	NOTES	L_NAR_TEXT (AL)
3B01	BRIDGE	PROPWORK	F02
3B02	BRIDGE	WORKBY	F02
3B03	BRIDGE	IMPLEN	F05
3B04	BRIDGE	NBIIMPCOST	F20
3B05	BRIDGE	NBIRWCOST	F21
3B06	BRIDGE	NBITOTCOST	F24
3B07	BRIDGE	NBIYRCOST	F01
4A15	BRIDGE	VCLROVER	B22
4A16	BRIDGE	REFVUC	
4A17	BRIDGE	VCLRUNDER	B22
4A18	BRIDGE	REFHUC	
4A19	BRIDGE	HCLRURT	B20
4A20	BRIDGE	HCLRULT	B20
4A21	BRIDGE	NAVCNTROL	D12
4A22	BRIDGE	NAVVC	D12
4A23	BRIDGE	NAVHC	D12
4A24	BRIDGE	LFTBRNAVCL	D12
4B01	BRIDGE	DESIGNLOAD	C03
4B02	BRIDGE	RATER_INI	
4B02	BRIDGE	RATINGDATE	
4B03	BRIDGE	POSTING	E29
4B04	BRIDGE	ORTYPE	E32
4B05	BRIDGE	ORLOAD	E31
4B06	BRIDGE	IRTYPE	E32
4B07	BRIDGE	IRLOAD	E30
4B08	BRIDGE	ALTORMETH	
4B09	BRIDGE	ALTORLOAD	
4B10	BRIDGE	ALTIRMETH	
4B11	BRIDGE	ALTIRLOAD	
4B12	BRIDGE	TRUCK1OR	
4B12	BRIDGE	TRUCK1IR	
4B13	BRIDGE	TRUCK2OR	
4B13	BRIDGE	TRUCK2IR	
5A01	BRIDGE	BRIDGE_ID	A01
5A02	BRIDGE	STRUCNAME	A06
5A03	BRIDGE	STRUCT_NUM	STRUCTURE_REF_NUM
5A03	BRIDGE	BRKEY	STRUCTURE_REF_NUM
5A04	BRIDGE	DISTRICT	
5A05	BRIDGE	COUNTY	A01
5A06	BRIDGE	PLACECODE	A09
5A07	BRIDGE	FEATINT	B32
5A08	BRIDGE	FACILITY	B33
5A09	BRIDGE	LOCATION	A06

APPENDIX E
Crystal Reports Tables for BMS Items

BMS2 Code	Table Name	COLUMN NAME	BMS Code
5A10	BRIDGE	LATITUDE	A07
5A11	BRIDGE	LONGITUDE	A08
5A12	BRIDGE	BB_PCT	A04-B
5A12	BRIDGE	N_FHWA_REG	
5A12	BRIDGE	NSTATECODE	A04-A
5A13	BRIDGE	BB_BRDGEID	A04-C
5A14	BRIDGE	FHWA_REGN	A37
5A14	BRIDGE	FIPS_STATE	A37
5A15	BRIDGE	YEARBUILT	A16
5A16	BRIDGE	YEARRECON	A17
5A17	BRIDGE	SERVTYPON	A26
5A18	BRIDGE	SERVTYPUND	A26
5A19	BRIDGE	SUMLANES	B11
5A20	BRIDGE	CUSTODIAN	A23
5A21	BRIDGE	OWNER	A20
5A23	BRIDGE	ADMINAREA	
5B01	BRIDGE	DKSTRUCTYP	C09
5B02	BRIDGE	DKSURFTYPE	C10
5B03	BRIDGE	DKMEMBTYPE	C10
5B04	BRIDGE	DKPROTECT	C10
5B05, VI07	BRIDGE	LFTCURBSW	A34
5B06, VI08	BRIDGE	RTCURBSW	A34
5B07	BRIDGE	DECKWIDTH	A33
5B08	BRIDGE	BRIDGEMED	B10
5B09	BRIDGE	SKEW	B09
5B10	BRIDGE	STRFLARED	A32
5B11	BRIDGE	MAINSPANS	C16
5B12	BRIDGE	MATERIALMAIN	C05
5B13	BRIDGE	DESIGNMAIN	C05
5B14	BRIDGE	APPSPANS	C16
5B15	BRIDGE	MATERIALAPPR	C05
5B16	BRIDGE	DESIGNAPPR	C05
5B17	BRIDGE	MAXSPAN	C08
5B18, VS27	BRIDGE	LENGTH	T06, C07
5B19	BRIDGE	DECK_AREA	
5B20	BRIDGE	TOT_LENGTH	
5E01	BRIDGE	NBISLEN	C07-A
5E02	BRIDGE	PARALSTRUC	B10
5E03	BRIDGE	TEMPSTRUC	A27
5E04	BRIDGE	HISTSIGN	C01
5E10	BRIDGE	USERKEY1	
5E11	BRIDGE	USERKEY2	
5E12	BRIDGE	USERKEY3	
5E13	BRIDGE	USERKEY4	

APPENDIX E
Crystal Reports Tables for BMS Items

BMS2 Code	Table Name	COLUMN NAME	BMS Code
5E14	BRIDGE	USERKEY5	
5E15	BRIDGE	USERKEY6	
5E16	BRIDGE	USERKEY7	
5E17	BRIDGE	USERKEY8	
5E24	BRIDGE	USERKEY15	
7A11	BRIDGE	NEXTINSPID	
7A12	BRIDGE	CREWHRS	E09
7A13	BRIDGE	SNOOPERHRS	E10
7A14	BRIDGE	BRIDGEGROUP	E02
7A15	BRIDGE	FLAGGERHRS	
7A16	BRIDGE	SPCREWHRS	
7A17	BRIDGE	HELPERHRS	
7A18	BRIDGE	SPEQUIPHRS	
IR01a	BRIDGE	REQ_OP_RAT	
	BRIDGE	DOCREFKEY	
	BRIDGE	OTHERLOAD	
1A10, 1B04	ELEMINSP	QUANTITY	
1A11	ELEMINSP	PCTSTATE1	
1A11	ELEMINSP	PCTSTATE2	
1A11	ELEMINSP	PCTSTATE3	
1A11	ELEMINSP	PCTSTATE4	
1A11	ELEMINSP	PCTSTATE5	
1A11	ELEMINSP	QTYSTATE1	
1A11	ELEMINSP	QTYSTATE2	
1A11	ELEMINSP	QTYSTATE3	
1A11	ELEMINSP	QTYSTATE4	
1A11	ELEMINSP	QTYSTATE5	
1A12	ELEMINSP	NOTES	
1B01	ELEMINSP	ELEMKEY	
1B02	ELEMINSP	STRUNITKEY	
1B03	ELEMINSP	ENVKEY	
1B05	ELEMINSP	ELEM_SCALE_FACTOR	
1B06	ELEMINSP	CITRIGGER	
1B07	ELEMINSP	DESCRIPTION	
5A03	ELEMINSP	BRKEY	STRUCTURE_REF_NUM
	ELEMINSP	INSPKEY	
	ELEMINSP	ELINSPDATE	
	ELEMINSP	ELCONDEST	
	ELEMINSP	DOCREFKEY	
	ELEMINSP	ELMROWIDKEY	
3A02	INSP_WCAND	WC_ID	
3A03	INSP_WCAND	STRUNITKEY	H03
5A03	INSP_WCAND	BRKEY	STRUCTURE_REF_NUM
IM01	INSP_WCAND	ACTKIND	

APPENDIX E
Crystal Reports Tables for BMS Items

BMS2 Code	Table Name	COLUMN NAME	BMS Code
IM02	INSP_WCAND	OBJCODE	
IM03	INSP_WCAND	ACTCODE	H01
IM04	INSP_WCAND	ESTIMQUANTITY	H05
IM05	INSP_WCAND	AGENCY_PRIORITY	H08
IM06	INSP_WCAND	WORKRECDATE	H10
IM07	INSP_WCAND	AGENCY_STATUS	
IM08	INSP_WCAND	TARGETYEAR	H12
IM10, IM19	INSP_WCAND	ESTIMCOST	H06
IM11	INSP_WCAND	WORKASSIGNMENT	H09
IM15a, IM21	INSP_WCAND	NOTES	N03
	INSP_WCAND	DOCREFKEY	
	INSP_WCAND	FLAG_WHOLE	
	INSP_WCAND	INSPKEY	
	INSP_WCAND	OBJKIND	
	INSP_WCAND	REF_WITEMKEY	
	INSP_WCAND	STATE1	
	INSP_WCAND	STATE2	
	INSP_WCAND	STATE3	
	INSP_WCAND	STATE4	
	INSP_WCAND	STATE5	
	INSP_WCAND	WCKEY	
1A01	INSPEVNT	DKRATING	E17
1A02	INSPEVNT	SUBRATING	E20
1A03	INSPEVNT	CULVRATING	E22
1A04	INSPEVNT	SUPRATING	E18
1A05	INSPEVNT	CHANRATING	E21
1A06	INSPEVNT	WATERADEQ	E27
1A07	INSPEVNT	DECKDISTR	
1A09	INSPEVNT	INSPSTAT	
2A02, IW11, IS11	INSPEVNT	NOTES	T18
4A01, VP02	INSPEVNT	OPPOSTCL	D13
4A02	INSPEVNT	APPRALIGN	E28
4A03, IA02	INSPEVNT	RAILRATING	E28-A
4A04, IA02	INSPEVNT	TRANSRATIN	E28-A
4A05, IA02	INSPEVNT	ARAILRATIN	E28-A
4A06, IA02	INSPEVNT	AENDRATING	E28-A
4A07	INSPEVNT	PIERPROT	D12-A
4A08	INSPEVNT	SCOURCRIT	E29-A, W06
4A08b	INSPEVNT	SCOUR_CRIT_CTGRY	
4A09	INSPEVNT	STRRATING	E24
4A10	INSPEVNT	DECKGEOM	E25
4A11	INSPEVNT	UNDERCLR	E26
4A12	INSPEVNT	NBI_RATING	M08
4A13	INSPEVNT	SUFF_RATE	M05

APPENDIX E
Crystal Reports Tables for BMS Items

BMS2 Code	Table Name	COLUMN NAME	BMS Code
4A14	INSPEVNT	CONDITION	
5A03	INSPEVNT	BRKEY	STRUCTURE_REF_NUM
7A01	INSPEVNT	INSPDATE	E06
7A02	INSPEVNT	INSPUSRKEY	
7A03, IW01	INSPEVNT	INSPTYPE	E07
7A04	INSPEVNT	REV_REQ	
7A05	INSPEVNT	INSPECTCONTROLID	E08
7A06	INSPEVNT	NBINSPDONE	W02
7A06	INSPEVNT	ELINSPDONE	W02
7A06	INSPEVNT	FCINSPDONE	W02
7A06	INSPEVNT	UWINSPDONE	W02
7A06	INSPEVNT	OSINSPDONE	W02
7A07	INSPEVNT	OSINSPREQ	
7A07	INSPEVNT	UWINSPREQ	
7A07	INSPEVNT	FCINSPREQ	
7A07	INSPEVNT	ELINSPREQ	
7A08	INSPEVNT	FCLASTINSP	
7A08	INSPEVNT	OSLASTINSP	
7A08	INSPEVNT	LASTINSP	
7A08	INSPEVNT	UWLASTINSP	
7A09	INSPEVNT	ELINSPFREQ	E01
7A09	INSPEVNT	OSINSPFREQ	E01
7A09	INSPEVNT	UWINSPFREQ	W03
7A09	INSPEVNT	FCINSPFREQ	J05
7A09, IS13, IW13	INSPEVNT	BRINSPFREQ	E01
7A10	INSPEVNT	ELNEXTDATE	E05
7A10	INSPEVNT	FCNEXTDATE	E05
7A10	INSPEVNT	OSNEXTDATE	E05
7A10	INSPEVNT	UWNEXTDATE	E05
7A10, IW14, IS14	INSPEVNT	NEXTINSP	E05
	INSPEVNT	DOCREFKEY	
	INSPEVNT	INSPKEY	
IM18	PRJ_WITEMS	QUANTITY	N05
5A03	ROADWAY	BRKEY	STRUCTURE_REF_NUM
5C01, FW01	ROADWAY	ROADWAY_NAME	D06, B03
5C03	ROADWAY	ON_UNDER	B01, B04
5C04	ROADWAY	KIND_HWY	B07, R03
5C05	ROADWAY	LEVL_SRVC	B08
5C06	ROADWAY	DIRSUFFIX	B06
5C06	ROADWAY	ROUTENUM	B05, R03
5C08, FR07	ROADWAY	LANES	B11
5C08	ROADWAY	NUM_MEDIAN	
5C08	ROADWAY	ROAD_SPEED	
5C09	ROADWAY	ADTCLASS	

APPENDIX E
Crystal Reports Tables for BMS Items

BMS2 Code	Table Name	COLUMN NAME	BMS Code
5C10	ROADWAY	ADTTOTAL	B27, R04
5C11	ROADWAY	ADTYEAR	B28, R05
5C12	ROADWAY	ADTFUTURE	F10
5C13	ROADWAY	ADTFUTYEAR	F11
5C14	ROADWAY	TRUCKPCT	B30A, R07-A
5C15	ROADWAY	BYPASSLEN	A35
5C16	ROADWAY	DET_SPEED	
5C17	ROADWAY	ACC_RATE	
5C17	ROADWAY	TEN_YR_CNT	
5C18	ROADWAY	KMPOST	
5C19	ROADWAY	ONBASENET	
5C20	ROADWAY	LRSINVRT	
5C20	ROADWAY	SUBRTNUM	
5C21	ROADWAY	TOLLFAC	A25
5C22, IL04	ROADWAY	FUNCCLASS	B18, R10
5C23	ROADWAY	TRAFFICDIR	
5C24	ROADWAY	VCLRINV	B23
5C25	ROADWAY	HCLRINV	
5C26	ROADWAY	AROADWIDTH	A30
5C27	ROADWAY	ROADWIDTH	A31
5C28	ROADWAY	DEFHWY	B24
5C29	ROADWAY	NHS_IND	B17-A
5C30	ROADWAY	SCHOOL_BUS	A18
5C31	ROADWAY	FEDLANDHWY	
5C32	ROADWAY	TRANSIT_RT	A19
5C33	ROADWAY	TRUCKNET	B19-A
5C34	ROADWAY	CRIT_TRAV	
5C36	ROADWAY	ON_UNDER_ADJ	
FR16, FW20	ROADWAY	NOTES	
	ROADWAY	DOCREFKEY	
5A03	STRUCTURE_UNIT	BRKEY	STRUCTURE_REF_NUM
5D01	STRUCTURE_UNIT	STRUNITKEY	
5D02, SP02	STRUCTURE_UNIT	STRUNITLABEL	J09, W09
5D03, SP06	STRUCTURE_UNIT	STRUNITDESCRIPTION	
5D04, SP01	STRUCTURE_UNIT	STRUNITTYPE	J09
5D05	STRUCTURE_UNIT	DEFAULTFLAG	
	STRUCTURE_UNIT	DOCREFKEY	
	STRUCTURE_UNIT	NOTES	
5A03	T_APRAS_CLEAR	BRKEY	STRUCTURE_REF_NUM
SC02	T_APRAS_CLEAR	ON_UNDER	PB08
SC03	T_APRAS_CLEAR	ON_WEIGHT_COND1	PB12
SC03	T_APRAS_CLEAR	ON_WEIGHT_COND2	PB17
SC03	T_APRAS_CLEAR	ON_WEIGHT_COND3	PB13
SC03	T_APRAS_CLEAR	UNDER_CLEAR_COND1	PB14

BMS2 Code	Table Name	COLUMN NAME	BMS Code
SC03	T_APRAS_CLEAR	UNDER_CLEAR_COND2	PB15
SC03	T_APRAS_CLEAR	ON_CLEAR_COND1	PB18
SC03	T_APRAS_CLEAR	ON_CLEAR_COND2	PB16
SC05	T_APRAS_CLEAR	NON_RES_VERT_CLEAR	PB10
SC06	T_APRAS_CLEAR	NON_RES_REVIEW	
SC07	T_APRAS_CLEAR	MIN_TRAVEL_WIDTH_LEFT	PB13
SC08	T_APRAS_CLEAR	MIN_TRAVEL_WIDTH_RIGHT	PB13
	T_APRAS_CLEAR	APRAS_SPAN_KEY	
5A03	T_APRAS_CLEAR_DETAIL	BRKEY	STRUCTURE_REF_NUM
SC09	T_APRAS_CLEAR_DETAIL	HOR_CLEAR	PB11
SC10	T_APRAS_CLEAR_DETAIL	VERT_CLEAR	PB11
	T_APRAS_CLEAR_DETAIL	APRAS_SPAN_KEY	
	T_APRAS_CLEAR_DETAIL	CLEARKEY	
	T_APRAS_CLEAR_DETAIL	ON_UNDER	
5A03	T_APRAS_NARRATIVE	BRKEY	STRUCTURE_REF_NUM
SC04	T_APRAS_NARRATIVE	CONDITION_NARRATIVE	PB14
	T_APRAS_NARRATIVE	APRAS_SPAN_KEY	
	T_APRAS_NARRATIVE	NARRATIVE_KEY	
5A03	T_APRAS_RATING	BRKEY	STRUCTURE_REF_NUM
SL01	T_APRAS_RATING	RATING_DATE	PC08
SL02	T_APRAS_RATING	MOMENT_NORMAL	PB03
SL03	T_APRAS_RATING	MOMENT_SINGLE	PB03
SL04	T_APRAS_RATING	SHEAR_NORMAL	PB04
SL05	T_APRAS_RATING	SHEAR_SINGLE	PB04
SL06	T_APRAS_RATING	POS_MOM_COMP_FACTOR_NORM	PB05
SL07	T_APRAS_RATING	POS_MOM_COMP_FACTOR_REST	PB05
SL08	T_APRAS_RATING	NEG_MOM_COMP_FACTOR_NORM	PB06
SL09	T_APRAS_RATING	NEG_MOM_COMP_FACTOR_REST	PB06
SL10	T_APRAS_RATING	LOAD_COND1	PB07
SL10	T_APRAS_RATING	LOAD_COND2	PB07
SL11	T_APRAS_RATING	SINGLE_LANE_SPAN_ID	PA11
SL12	T_APRAS_RATING	RESTRICT_SPAN_ID1	PC12
SL13	T_APRAS_RATING	RESTRICT1	PC13
SL13	T_APRAS_RATING	RESTRICT2	PC13
SL13	T_APRAS_RATING	RESTRICT3	PC13
SL14	T_APRAS_RATING	RESTRICT_SPAN_ID2	PC14
SL15	T_APRAS_RATING	RESTRICT4	PC15
SL15	T_APRAS_RATING	RESTRICT5	PC15
SL15	T_APRAS_RATING	RESTRICT6	PC15
SL15	T_APRAS_RATING	RESTRICT7	PC15
SL16	T_APRAS_RATING	RATING_NOTES	PC11
5A03	T_APRAS_SPAN	BRKEY	STRUCTURE_REF_NUM
SS01, SC01	T_APRAS_SPAN	SPAN_ID_SUFFIX	PA04
SS02	T_APRAS_SPAN	STRUNITKEY	

APPENDIX E
Crystal Reports Tables for BMS Items

BMS2 Code	Table Name	COLUMN NAME	BMS Code
SS03	T_APRAS_SPAN	BACKSPAN	PA04
SS04	T_APRAS_SPAN	IDENTICAL_SPAN_NO	PA05
SS05	T_APRAS_SPAN	BEGIN_CONTINUOUS	PA06
SS06	T_APRAS_SPAN	END_CONTINUOUS	PA06
SS07	T_APRAS_SPAN	C_C_SPAN_LENGTH	PA08
SS08	T_APRAS_SPAN	MOM_COMP_SPAN_LENGTH	PA10
SS09	T_APRAS_SPAN	DEPT_STRUC_CONFIG	PA09
SS09	T_APRAS_SPAN	DEPT_PHYSICAL_TYPE	PA09
SS09	T_APRAS_SPAN	DEPT_SPAN_INTERACTION	PA09
SS09	T_APRAS_SPAN	DEPT_MATERIAL_TYPE	PA09
SS10	T_APRAS_SPAN	NOTES	
	T_APRAS_SPAN	APRAS_SPAN_KEY	
IB01	T_BEARINGS	OVERALL_COND_RATING	
5A03	T_BEARING_TYPE	BRKEY	STRUCTURE_REF_NUM
VD30	T_BEARING_TYPE	BEARING_TYPEKEY	
VD30	T_BEARING_TYPE	BEARING_TYPE	C23
IB02	T_BEARINGS_DETAILS	BEARING_KEY	
IB03	T_BEARINGS_DETAILS	RECORD_KEY	
IB04	T_BEARINGS_DETAILS	BEARING_TYPE	
IB05	T_BEARINGS_DETAILS	BEARING_LOCATION	
IB06	T_BEARINGS_DETAILS	BEARING_COUNT	
IB07	T_BEARINGS_DETAILS	BEARING_MOVEMENT	
IB08	T_BEARINGS_DETAILS	CORROSION	
IB09	T_BEARINGS_DETAILS	ALLIGNMENT_ISSUES	
IB10	T_BEARINGS_DETAILS	ANCHOR_BOLT	
IB11	T_BEARINGS_DETAILS	BEARING_AREA	
IB12	T_BEARINGS_DETAILS	CONDITION_RATING	
IB13	T_BEARINGS_DETAILS	INSTALL_DATE	
IB14	T_BEARINGS_DETAILS	ECMS_ID	
IB15	T_BEARINGS_DETAILS	REPLACE_REASON	
IB16	T_BEARINGS_DETAILS	REPLACE_COMMENT	
IB17	T_BEARINGS_DETAILS	BEARING_COMMENT	
BP01	T_BMS2_BPR	REPORTED_BY	
BP02	T_BMS2_BPR	BPR_ID	
BP03	T_BMS2_BPR	REPORTED_ON	
BP04	T_BMS2_BPR	BPR_STATUS	
BP05	T_BMS2_BPR	CRITICAL_FINDING	
BP06	T_BMS2_BPR	FINALIZED_BY	
BP11	T_BMS2_BPR	CAUSE_ISSCOUR	
BP11	T_BMS2_BPR	CAUSE_ISCORROSION	
BP11	T_BMS2_BPR	CAUSE_ISLOADING	
BP11	T_BMS2_BPR	CAUSE_ISFATIGUE	
BP11	T_BMS2_BPR	CAUSE_ISOVERLOAD	
BP11	T_BMS2_BPR	CAUSE_ISFIRE	

APPENDIX E
Crystal Reports Tables for BMS Items

BMS2 Code	Table Name	COLUMN NAME	BMS Code
BP11	T_BMS2_BPR	CAUSE_ISFLOOD	
BP11	T_BMS2_BPR	CAUSE_ISHEIGHTEXCEED	
BP11	T_BMS2_BPR	CAUSE_ISWIDTHEXCEED	
BP11	T_BMS2_BPR	CAUSE_ISOTHERIMPACT	
5A01	T_BMS2_BPR	STRUCTURE_ID	
5A03	T_BMS2_BPR	BRKEY	
	T_BMS2_BPR	BPR_FORMAT	
5A04	T_BMS2_BPR	DISTRICT	
5A05	T_BMS2_BPR	COUNTY	
	T_BMS2_BPR	COUNTY_DESC	
5A07	T_BMS2_BPR	ROUTE	
5A08	T_BMS2_BPR	ROUTE_OVER	
5A02	T_BMS2_BPR	BRIDGE_NAME	
5A21	T_BMS2_BPR	BRIDGE_OWNER	
	T_BMS2_BPR	BRIDGE_TYPE	
5B18	T_BMS2_BPR	BRIDGE_LENGTH	
5B17	T_BMS2_BPR	BRIDGE_SPAN_LENGTH	
5B07	T_BMS2_BPR	BRIDGE_WIDTH	
	T_BMS2_BPR	IS_FCM	
5A15	T_BMS2_BPR	YEARBUILD	
5A16	T_BMS2_BPR	YEARRECON	
4A14	T_BMS2_BPR	CONDITION	
5E01	T_BMS2_BPR	NBISLEN	
5E04	T_BMS2_BPR	HISTSIGN	
VP02	T_BMS2_BPR	POST_STATUS	
	T_BMS2_BPR	REPAIR_RECOMMENDED	
	T_BMS2_BPR	TAKEN_BY	
5C10	T_BMS2_BPR	ADT_ON	
6C27	T_BMS2_BPR	ADTT_ON	
5C15	T_BMS2_BPR	BRIDGE_DETOUR_LEN	
5C29	T_BMS2_BPR	IS_NHS	
6C06	T_BMS2_BPR	FED_AID_SYSTEM	
5C22	T_BMS2_BPR	FUNC_CLASS	
	T_BMS2_BPR	DOC_CONTAINER_SEQ_NUM	
	T_BMS2_BPR	IMAGE_CAPTION	
	T_BMS2_BPR	IMAGE_SIZE	
	T_BMS2_BPR	DOC_ID_PIC1	
	T_BMS2_BPR	DOC_ID_PIC2	
BP07	T_BMS2_BPR_COMMENT	COMMENTS	
BP08	T_BMS2_BPR_COMMENT	COMMENTS	
BP09	T_BMS2_BPR_COMMENT	COMMENTS	
BP10	T_BMS2_BPR_COMMENT	COMMENTS	
VB61	T_BMS2_PR_BEARING_DETAILS	BEARING_WORK_TYPE	
VB62	T_BMS2_PR_BEARING_DETAILS	BEARING_SCOPE	

APPENDIX E
Crystal Reports Tables for BMS Items

BMS2 Code	Table Name	COLUMN NAME	BMS Code
VB63	T_BMS2_PR_BEARING_DETAILS	BEARING_TYPE	
VB64	T_BMS2_PR_BEARING_DETAILS	BEARING_MOVEMENT_TYPE	
VB65	T_BMS2_PR_BEARING_DETAILS	BEARING_COUNT	
VB66	T_BMS2_PR_BEARING_DETAILS	BEARING_COST	
VB67	T_BMS2_PR_BEARING_DETAILS	BEARING_COST_UNIT	
VB60	T_BMS2_PR_BEARINGS	OVERALL_COND_RATING_BEFORE	
VB60	T_BMS2_PR_BEARINGS	OVERALL_COND_RATING_AFTER	
VB15	T_BMS2_PR_CONTRACT_INFO	PRIM_CONTRACTOR	
VB16	T_BMS2_PR_CONTRACT_INFO	SUBCONTRACTOR_1	
VB16a	T_BMS2_PR_CONTRACT_INFO	SUBCONTRACTOR_ROLE_1	
VB51	T_BMS2_PR_JOINT_DETAILS	JOINT_WORK_TYPE	
VB52	T_BMS2_PR_JOINT_DETAILS	JOINT_SCOPE	
VB53	T_BMS2_PR_JOINT_DETAILS	JOINT_TYPE	
VB54	T_BMS2_PR_JOINT_DETAILS	JOINT_MOVEMENT_CLASS	
VB55	T_BMS2_PR_JOINT_DETAILS	JOINT_LENGTH	
VB56	T_BMS2_PR_JOINT_DETAILS	JOINT_COST	
VB57	T_BMS2_PR_JOINT_DETAILS	JOINT_COST_LF	
VB50	T_BMS2_PR_JOINTS	OVERALL_COND_RATING_BEFORE	
VB50	T_BMS2_PR_JOINTS	OVERALL_COND_RATING_AFTER	
VB02	T_BMS2_PR_WORKTYPE_DATA	WS_REPLACEMENT	
VB02	T_BMS2_PR_WORKTYPE_DATA	WS_REHAB	
VB02	T_BMS2_PR_WORKTYPE_DATA	WS_PRESERVATION	
VB02	T_BMS2_PR_WORKTYPE_DATA	WS_MAINTENANCE	
VB02	T_BMS2_PR_WORKTYPE_DATA	WS_CAPACITY_ADD	
VB03	T_BMS2_PR_WORKTYPE_DATA	WT_PRESV_OVERLAY	
VB04	T_BMS2_PR_WORKTYPE_DATA	WT_PRESV_EPOXY	
VB05	T_BMS2_PR_WORKTYPE_DATA	WT_PRESV_PPC	
VB06	T_BMS2_PR_WORKTYPE_DATA	WT_PRESV_JOINT	
VB07	T_BMS2_PR_WORKTYPE_DATA	WT_PRESV_PAINT	
VB08	T_BMS2_PR_WORKTYPE_DATA	WT_PRESV_BEARING	
VB09	T_BMS2_PR_WORKTYPE_DATA	WT_PRESV_CULV	
VB10	T_BMS2_PR_WORKTYPE_DATA	WT_REHAB_SUP	
VB11	T_BMS2_PR_WORKTYPE_DATA	WT_REHAB_SUB	
VB12	T_BMS2_PR_WORKTYPE_DATA	WT_REHAB_CULV	
VB13	T_BMS2_PR_WORKTYPE_DATA	WT_REPLACE_DECK	
VB14	T_BMS2_PR_WORKTYPE_DATA	WT_REPLACE_SUP_DECK	
VB15	T_BMS2_PR_WORKTYPE_DATA	WT_REPLACE_BRIDGE	
VB16	T_BMS2_PR_WORKTYPE_DATA	WT_REPLACE_CULV	
VB17	T_BMS2_PR_WORKTYPE_DATA	WT_PRESV_BITUMINOUS	
VB18	T_BMS2_PR_WORKTYPE_DATA	WT_MAINTENANCE	
VB19	T_BMS2_PR_WORKTYPE_DATA	WT_NEW_CONSTRUCTION	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_STEEL_REPAIR	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_STEEL_REPLACE	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_CONCRETE_REPAIR	

APPENDIX E
Crystal Reports Tables for BMS Items

BMS2 Code	Table Name	COLUMN NAME	BMS Code
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_CONCRETE_REPLACE	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_MANSONRY_REPAIR	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_MANSONRY_REPLACE	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_TIMBER_REPAIR	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_TIMBER_REPLACE	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_TRUSS_REPAIR	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_TRUSS_REPLACE	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_CULV_REPAIR	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_CULV_REPAIR	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_PAINT_PARTIAL	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_PAINT_FULL	
VB70	T_BMS2_PR_WORKTYPE_DATA	SUP_WT_OTHER	
VB90	T_BMS2_PR_WORKTYPE_DATA	SUB_WT_BRIDGE_SEAT	
VB90	T_BMS2_PR_WORKTYPE_DATA	SUB_WT_ABUTMENT_CONCRETE	
VB90	T_BMS2_PR_WORKTYPE_DATA	SUB_WT_ABUTMENT_STEEL	
VB90	T_BMS2_PR_WORKTYPE_DATA	SUB_WT_ABUTMENT_MANSONRY	
VB90	T_BMS2_PR_WORKTYPE_DATA	SUB_WT_ABUTMENT_OTHER	
VB90	T_BMS2_PR_WORKTYPE_DATA	SUB_WT_ABUTMENT_UNDERPIN	
VB90	T_BMS2_PR_WORKTYPE_DATA	SUB_WT_SCOUR_HOLE	
VB90	T_BMS2_PR_WORKTYPE_DATA	SUB_WT_SCOUR_IMPROVE	
VB90	T_BMS2_PR_WORKTYPE_DATA	SUB_WT_ROCK_PROTECT	
VB90	T_BMS2_PR_WORKTYPE_DATA	SUB_WT_OTHER	
VB01	T_BMS2_PRESERV_REHAB	ECMS_NO	
VB04	T_BMS2_PRESERV_REHAB	LET_DATE	
VB05	T_BMS2_PRESERV_REHAB	WORK_COMPLETE_DATE	
VB06	T_BMS2_PRESERV_REHAB	TOT_BID_COST	
VB07	T_BMS2_PRESERV_REHAB	TOT_STRUCT_COST_LET	
VB08	T_BMS2_PRESERV_REHAB	TOT_TENDER_COST	
VB09	T_BMS2_PRESERV_REHAB	TOT_STRUCT_COST_FINAL	
VB10	T_BMS2_PRESERV_REHAB	MPMS_NO	
VB11	T_BMS2_PRESERV_REHAB	DRAWING_NO	
VB12	T_BMS2_PRESERV_REHAB	WORK_STATUS	
VB13	T_BMS2_PRESERV_REHAB	PROJ_NARRATIVE	
VB14	T_BMS2_PRESERV_REHAB	STAGE_CONSTRUCTION	
VB20	T_BMS2_PRESERV_REHAB	INSPDATE_BEFORE	
VB21	T_BMS2_PRESERV_REHAB	INSPDATE_AFTER	
VB22	T_BMS2_PRESERV_REHAB	DK_COND_RATING_BEFORE	
VB22	T_BMS2_PRESERV_REHAB	DK_COND_RATING_AFTER	
VB23	T_BMS2_PRESERV_REHAB	WEAR_SURF_RATING_BEFORE	
VB23	T_BMS2_PRESERV_REHAB	WEAR_SURF_RATING_AFTER	
VB24a	T_BMS2_PRESERV_REHAB	DK_SURF_TYPE_BEFORE	
VB24a	T_BMS2_PRESERV_REHAB	DK_SURF_TYPE_AFTER	
VB24b	T_BMS2_PRESERV_REHAB	APR_DK_SURF_TYPE_BEFORE	
VB24b	T_BMS2_PRESERV_REHAB	APR_DK_SURF_TYPE_AFTER	

BMS2 Code	Table Name	COLUMN NAME	BMS Code
VB25a	T_BMS2_PRESERV_REHAB	DK_MEMBRANE_TYPE_BEFORE	
VB25a	T_BMS2_PRESERV_REHAB	DK_MEMBRANE_TYPE_AFTER	
VB25b	T_BMS2_PRESERV_REHAB	APR_DK_MEMBRANE_TYPE_BEFORE	
VB25b	T_BMS2_PRESERV_REHAB	APR_DK_MEMBRANE_TYPE_AFTER	
VB26a	T_BMS2_PRESERV_REHAB	DK_PROTECT_TYPE_BEFORE	
VB26a	T_BMS2_PRESERV_REHAB	DK_PROTECT_TYPE_AFTER	
VB26b	T_BMS2_PRESERV_REHAB	APPR_DK_PROTECT_TYPE_BEFORE	
VB26b	T_BMS2_PRESERV_REHAB	APPR_DK_PROTECT_TYPE_AFTER	
VB27a	T_BMS2_PRESERV_REHAB	MAIN_WEAR_SURF_THICK_BEFORE	
VB27a	T_BMS2_PRESERV_REHAB	MAIN_WEAR_SURF_THICK_AFTER	
VB27b	T_BMS2_PRESERV_REHAB	APPR_WEAR_SURF_THICK_BEFORE	
VB27b	T_BMS2_PRESERV_REHAB	APPR_WEAR_SURF_THICK_AFTER	
VB28	T_BMS2_PRESERV_REHAB	PROTECT_YEAR_BEFORE	
VB28	T_BMS2_PRESERV_REHAB	PROTECT_YEAR_AFTER	
VB29	T_BMS2_PRESERV_REHAB	PROTECT_SYS_TYPE_BEFORE	
VB29	T_BMS2_PRESERV_REHAB	PROTECT_SYS_TYPE_AFTER	
VB30	T_BMS2_PRESERV_REHAB	BRIDGE_DECK_TYPE_BEFORE	
VB30	T_BMS2_PRESERV_REHAB	BRIDGE_DECK_TYPE_AFTER	
VB31	T_BMS2_PRESERV_REHAB	FORM_TYPE_BEFORE	
VB31	T_BMS2_PRESERV_REHAB	FORM_TYPE_AFTER	
VB32	T_BMS2_PRESERV_REHAB	REBAR_TYPE_BEFORE	
VB32	T_BMS2_PRESERV_REHAB	REBAR_TYPE_AFTER	
VB33	T_BMS2_PRESERV_REHAB	DK_REHAB_AREA	
VB34	T_BMS2_PRESERV_REHAB	DK_OVERLAY_AREA	
VB35	T_BMS2_PRESERV_REHAB	DK_OVERLAY_COST	
VB36	T_BMS2_PRESERV_REHAB	OVERLAY_COST_SF	
VB37	T_BMS2_PRESERV_REHAB	OVERLAY_INSTALL_DURATION	
VB38	T_BMS2_PRESERV_REHAB	DK_REPAIR_AREA	
VB39	T_BMS2_PRESERV_REHAB	DK_REPAIR_COST	
VB40	T_BMS2_PRESERV_REHAB	DK_REPAIR_COST_SF	
VB41	T_BMS2_PRESERV_REHAB	HYDRODEMOLITION	
VB71	T_BMS2_PRESERV_REHAB	SUP_COND_RATING_BEFORE	
VB71	T_BMS2_PRESERV_REHAB	SUP_COND_RATING_AFTER	
VB72	T_BMS2_PRESERV_REHAB	CULV_COND_RATING_BEFORE	
VB72	T_BMS2_PRESERV_REHAB	CULV_COND_RATING_AFTER	
VB73	T_BMS2_PRESERV_REHAB	PAINT_COND_RATING_BEFORE	
VB73	T_BMS2_PRESERV_REHAB	PAINT_COND_RATING_AFTER	
VB74	T_BMS2_PRESERV_REHAB	MAIN_MATERIAL_TYPE_BEFORE	
VB74	T_BMS2_PRESERV_REHAB	MAIN_MATERIAL_TYPE_AFTER	
VB74	T_BMS2_PRESERV_REHAB	APPR_MATERIAL_TYPE_BEFORE	
VB74	T_BMS2_PRESERV_REHAB	APPR_MATERIAL_TYPE_AFTER	
VB75	T_BMS2_PRESERV_REHAB	MAIN_PHYSICAL_BEFORE	
VB75	T_BMS2_PRESERV_REHAB	MAIN_PHYSICAL_AFTER	
VB75	T_BMS2_PRESERV_REHAB	APPR_PHYSICAL_BEFORE	

BMS2 Code	Table Name	COLUMN NAME	BMS Code
VB75	T_BMS2_PRESERV_REHAB	APPR_PHYSICAL_AFTER	
VB76	T_BMS2_PRESERV_REHAB	MAIN_SPAN_INTERACTION_BEFORE	
VB76	T_BMS2_PRESERV_REHAB	MAIN_SPAN_INTERACTION_AFTER	
VB76	T_BMS2_PRESERV_REHAB	APPR_SPAN_INTERACTION_BEFORE	
VB76	T_BMS2_PRESERV_REHAB	APPR_SPAN_INTERACTION_AFTER	
VB77	T_BMS2_PRESERV_REHAB	MAIN_STRUC_CONFIG_BEFORE	
VB77	T_BMS2_PRESERV_REHAB	MAIN_STRUC_CONFIG_AFTER	
VB77	T_BMS2_PRESERV_REHAB	APPR_STRUC_CONFIG_BEFORE	
VB77	T_BMS2_PRESERV_REHAB	APPR_STRUC_CONFIG_AFTER	
VB78	T_BMS2_PRESERV_REHAB	PAINT_SQ_FT	
VB79	T_BMS2_PRESERV_REHAB	PAINT_COST	
VB80	T_BMS2_PRESERV_REHAB	PAINT_COST_SF	
VB91	T_BMS2_PRESERV_REHAB	SUB_COND_RATING_BEFORE	
VB91	T_BMS2_PRESERV_REHAB	SUB_COND_RATING_AFTER	
5A03	T_BRIDGE_ASSIGNMENT	BRKEY	
	T_BRIDGE_ASSIGNMENT	ASSIGN_TYPE_KEY	
	T_BRIDGE_ASSIGNMENT	BP_ID	
	T_COUNTY	COUNTY	
	T_COUNTY	PENNDOT_COUNTY	
	T_COUNTY	PLAN_PARTNER	
	T_COUNTY	SAP_ORG_CODE	
	T_COUNTY_DISTRICT	DISTRICT	
	T_COUNTY_DISTRICT	PENNDOT_COUNTY	
5A03	T_CULVERT_OPENING	BRKEY	STRUCTURE_REF_NUM
VD18	T_CULVERT_OPENING	OPENING_TYPE	
VD19	T_CULVERT_OPENING	CULVERT_LENGTH	C06
VD20	T_CULVERT_OPENING	MIN_FILL_HEIGHT	
VD21	T_CULVERT_OPENING	MAX_FILL_HEIGHT	
VD22	T_CULVERT_OPENING	EFF_WIDTH	
VD23	T_CULVERT_OPENING	TIE_TYPE	C42
VD24	T_CULVERT_OPENING	FLOOR_TYPE	
	T_CULVERT_OPENING	OPENING_KEY	
	T_DECK_TYPE	DEPT_DKSTRUCTYP	
	T_DECK_TYPE	FHWA_DKSTRUCTYP	
5A03	T_DESIGN_EXCEPTION	BRKEY	STRUCTURE_REF_NUM
VN01	T_DESIGN_EXCEPTION	DESIGN_EXCEPTION	A12-A
5A03	T_DRAWING	BRKEY	STRUCTURE_REF_NUM
VN05	T_DRAWING	DRAWING_TYPE	A14
VN06	T_DRAWING	DRAWING_NUM	A15
VN07	T_DRAWING	DRAWING_DESC	G07
	T_DRAWING	DRAWING_KEY	
5A03	T_EXP_JOINT	BRKEY	STRUCTURE_REF_NUM
VD25	T_EXP_JOINT	EXP_JOINT_TYPE	C22
VD26	T_EXP_JOINT	MOVEMENT_CLASS	C22

APPENDIX E
Crystal Reports Tables for BMS Items

BMS2 Code	Table Name	COLUMN NAME	BMS Code
VD27	T_EXP_JOINT	MANUFACTURE_CODE	C22
	T_EXP_JOINT	EXP_JOINT_KEY	
5A03	T_FC_INSP	BRKEY	STRUCTURE_REF_NUM
IF01	T_FC_INSP	STRUNITKEY	J09
IF02	T_FC_INSP	FC_MEM_TYPE	
IF03	T_FC_INSP	FC_MEM	J10
IF04	T_FC_INSP	FC_DETAIL	J11
IF05	T_FC_INSP	FATIG_STRESS_CAT	J11-A
IF06	T_FC_INSP	FC_DESC	J12
	T_FC_INSP	FC_KEY	
	T_FC_INSP	INSPKEY	
SG01	T_GROUP	TYPECODE	
SG02	T_GROUP	NAME	
SG03	T_GROUP	GROUPID	
SG05	T_GROUP	DESCRIPTION	
	T_GROUP_STRUCTURE	BRKEY	
SG03	T_GROUP_STRUCTURE	GROUPID	
SG04	T_GROUP_STRUCTURE	RELATIONCD	
5A03	T_INSP_COMMENT	BRKEY	STRUCTURE_REF_NUM
IC01	T_INSP_COMMENT	COMMENT_TYPE	
IC02, IL08	T_INSP_COMMENT	NOTES	
	T_INSP_COMMENT	INSPKEY	
5A03	T_INSP_DEFECT	BRKEY	STRUCTURE_REF_NUM
	T_INSP_DEFECT	DEFECT	
	T_INSP_DEFECT	DEFECT_DESC	
	T_INSP_DEFECT	DEFECT_KEY	
	T_INSP_DEFECT	DEFECT_LOC	
	T_INSP_DEFECT	INSPKEY	
5A03	T_INSP_EQUIP	BRKEY	STRUCTURE_REF_NUM
VI12	T_INSP_EQUIP	EQUIP_TYPE	E03, S04
VI13	T_INSP_EQUIP	EQUIP_QTY	
VI14	T_INSP_EQUIP	CONSUMABLE	
VI15	T_INSP_EQUIP	ASSIGNED_TO	
VI16	T_INSP_EQUIP	NOTES	
	T_INSP_EQUIP	EQUIP_KEY	
5A03	T_INSP_PERMIT	BRKEY	STRUCTURE_REF_NUM
VI18	T_INSP_PERMIT	PERMIT_TYPE	
VI20	T_INSP_PERMIT	POC	
VI21	T_INSP_PERMIT	PHONE_NUM	
VI22	T_INSP_PERMIT	FAX_NUM	
VI23	T_INSP_PERMIT	EMAIL_ADDR	
VI24	T_INSP_PERMIT	NOTES	
	T_INSP_PERMIT	PERMIT_KEY	
5A03	T_INSP_STATUS_AUDIT	BRKEY	STRUCTURE_REF_NUM

BMS2 Code	Table Name	COLUMN NAME	BMS Code
	T_INSP_STATUS_AUDIT	CHANGED_INSP_STATUS	
	T_INSP_STATUS_AUDIT	INSPKEY	
IJ01	T_JOINTS	OVERALL_COND_RATING	
IJ02	T_JOINTS_DETAILS	JOINT_KEY	
IJ03	T_JOINTS_DETAILS	RECORD_KEY	
IJ04	T_JOINTS_DETAILS	JOINT_TYPE	
IJ05	T_JOINTS_DETAILS	JOINT_LOCATION	
IJ06	T_JOINTS_DETAILS	JOINT_MOVEMENT	
IJ07	T_JOINTS_DETAILS	JOINT_MANUFACTURER	
IJ08	T_JOINTS_DETAILS	JOINT_LENGTH	
IJ09	T_JOINTS_DETAILS	DEBRIS_IMPACT	
IJ10	T_JOINTS_DETAILS	LEAKING	
IJ11	T_JOINTS_DETAILS	DAMAGE	
IJ12	T_JOINTS_DETAILS	COVERED	
IJ13	T_JOINTS_DETAILS	CONDITION_RATING	
IJ14	T_JOINTS_DETAILS	EXTRUSION_INSTALL_DATE	
IJ15	T_JOINTS_DETAILS	SEAL_INSTALL_DATE	
IJ16	T_JOINTS_DETAILS	ECMS_ID	
IJ17	T_JOINTS_DETAILS	REPLACE_REASON	
IJ18	T_JOINTS_DETAILS	REPLACE_COMMENT	
IJ19	T_JOINTS_DETAILS	JOINT_COMMENT	
5A03	T_MAINT_RESP	BRKEY	STRUCTURE_REF_NUM
VM03	T_MAINT_RESP	AGENCY_RESP	A23
VM04	T_MAINT_RESP	PORTION_RESP	A23
VM05	T_MAINT_RESP	PSC_PUC_NUM	A13
VM06	T_MAINT_RESP	ORDER_ENTERED_DATE	
VM07	T_MAINT_RESP	NOTES	
	T_MAINT_RESP	MAINT_RESP_KEY	
5A03	T_PAINT	BRKEY	STRUCTURE_REF_NUM
VA01	T_PAINT	PAINT_DATE	G09
VA02	T_PAINT	EXTENT	E19, G16
VA03	T_PAINT	STEEL_PAINTED	G10
VA04	T_PAINT	EST_SURFACE_AREA	G11
VA05	T_PAINT	PRIMER_TYPE	G16
VA06	T_PAINT	INTERM_TYPE	G16
VA07	T_PAINT	FINISH_TYPE	G16
VA08	T_PAINT	COLOR	G14
VA09	T_PAINT	COATS_APPLIED_QTY	G12
VA10	T_PAINT	THICKNESS	G16
VA11	T_PAINT	AMOUNT_APPLIED	G13
VA12	T_PAINT	CLEANING_TYPE	G15
VA13	T_PAINT	PAINTING_COST	G17
VA14	T_PAINT	NOTES	
	T_PAINT	PAINT_KEY	

BMS2 Code	Table Name	COLUMN NAME	BMS Code
5A03	T_PIER_FOUND_TYPE	BRKEY	STRUCTURE_REF_NUM
VD17	T_PIER_FOUND_TYPE	PIER_FOUND_TYPE	C40
	T_PIER_FOUND_TYPE	PIER_FOUND_TYPE_KEY	
5A03	T_PIER_TYPE	BRKEY	STRUCTURE_REF_NUM
VD16	T_PIER_TYPE	PIER_CONFIG_TYPE	C39
VD16	T_PIER_TYPE	PIER_MATERIAL_TYPE	C39
	T_PIER_TYPE	PIER_TYPE_KEY	
5A03	T_POSTING	BRKEY	STRUCTURE_REF_NUM
L.5	T_POSTING	POST_STATUS	
VP01	T_POSTING	POST_STATUS_DATE	D16, D17
VP02	T_POSTING	POST_STATUS	D13
VP03	T_POSTING	SPEC_RESTRICT_POST	D14
VP04	T_POSTING	POST_LIMIT_WEIGHT	D15
VP05	T_POSTING	POST_LIMIT_COMB	D15
VP06	T_POSTING	POST_REASON	D18
VP07	T_POSTING	FIELD_COND	D19
VP08	T_POSTING	SPEC_COND	D20
VP09	T_POSTING	IMPACT	D21
VP10	T_POSTING	PERMANENTLY_CLOSED_STRUC	
	T_POSTING	ACTIVE	
	T_POSTING	POSTING_KEY	
FR17	T_RAILROAD_GC	RRDIV	
FR18	T_RAILROAD_GC	RRSUBDIV	
FR19	T_RAILROAD_GC	BRANCH	
FR20	T_RAILROAD_GC	RAILROAD_OPERATOR	
5A03	T_RATING_LOAD	BRKEY	STRUCTURE_REF_NUM
IR03	T_RATING_LOAD	RATING_DATE	
IR04	T_RATING_LOAD	LOAD_TYPE	E30, E31
IR05	T_RATING_LOAD	NBI_RATING_IND	
IR06	T_RATING_LOAD	RATING_ANALYSIS_METHOD	E32
IR07	T_RATING_LOAD	CONTROL_MEM_TYPE	E33, PC03
IR08	T_RATING_LOAD	FATIG_STRESS_CAT	E34, PC06
IR09	T_RATING_LOAD	FATIG_LOAD_TYPE	E35
IR10	T_RATING_LOAD	IRLOAD	E30, PC09
IR11	T_RATING_LOAD	ORLOAD	E31, PC10
IR11a	T_RATING_LOAD	SLC_RATING	
IR12	T_RATING_LOAD	INV_RATING_STRESS_METHOD	E32
IR13	T_RATING_LOAD	OPR_RATING_STRESS_METHOD	E32
IR14	T_RATING_LOAD	AASHTO_MANUAL_YEAR	E38
IR15	T_RATING_LOAD	AASHTO_SPEC_YEAR	E37, PC04
IR16	T_RATING_LOAD	ANALYSIS_ENGINEER	
IR17	T_RATING_LOAD	SUPPORT_DATASET	
IR18	T_RATING_LOAD	STRESS_RANGE	E36
IR19	T_RATING_LOAD	NOTES	

BMS2 Code	Table Name	COLUMN NAME	BMS Code
IR20	T_RATING_LOAD	IR_LOAD_FACTOR	
IR21	T_RATING_LOAD	OR_LOAD_FACTOR	
	T_RATING_LOAD	RATING_KEY	
5A03	T_SAFETY_FEATURE	BRKEY	STRUCTURE_REF_NUM
IA01	T_SAFETY_FEATURE	LOCATION	
IA03	T_SAFETY_FEATURE	SF_DESC	
	T_SAFETY_FEATURE	INSPKEY	
	T_SAFETY_FEATURE	SAFETY_FEATURE_TYPE	
IM16	T_SAP_WITEMS	SCHED_CLOSE_DATE	
IM17	T_SAP_WITEMS	SAP_WORK_ORDER_NUM	
5A03	T_SCOUR_CMEASURE	BRKEY	STRUCTURE_REF_NUM
IU21	T_SCOUR_CMEASURE	CMEASURE_TYPE	
IU22	T_SCOUR_CMEASURE	CMEASURE_LOCATION	
IU23	T_SCOUR_CMEASURE	CMEASURE_COND	
IU24	T_SCOUR_CMEASURE	PIER_NUM	
	T_SCOUR_CMEASURE	CMEASURE_KEY	
	T_SCOUR_CMEASURE	INSPKEY	
5A03	T_SCOUR_COMP	BRKEY	STRUCTURE_REF_NUM
IL02	T_SCOUR_COMP	OVERTOP_RISK	E27
IL03	T_SCOUR_COMP	TRAFFIC_DELAY	E27
IL05	T_SCOUR_COMP	HIGH_WATER_ELEV	
IL06	T_SCOUR_COMP	HIGH_WATER_DATE	
IL07	T_SCOUR_COMP	NEW_HIGH_WATER	
IL13	T_SCOUR_COMP	OVERTOPPING	
IL14	T_SCOUR_COMP	OVERTOP_DATE	
IU00a	T_SCOUR_COMP	REVIEWER_ACTION	
IU00b	T_SCOUR_COMP	REVIEWER_COMMENT	
IU01	T_SCOUR_COMP	SCOUR_RECALC	
IU02	T_SCOUR_COMP	UNITS_INSPECTED_QTY	W14
IU03	T_SCOUR_COMP	SCBI_SOURCE	
IU04	T_SCOUR_COMP	OVERALL_OSA	
IU04b	T_SCOUR_COMP	SCOUR_CALCULATED	
IU05	T_SCOUR_COMP	OVERALL_SAR	
IU06	T_SCOUR_COMP	STREAM_BED_MATERIAL_1	W07
IU06	T_SCOUR_COMP	STREAM_BED_MATERIAL_2	W07
IU07	T_SCOUR_COMP	STREAM_BED_MATERIAL_DESC	W07
IU08	T_SCOUR_COMP	DEBRIS_POTENTIAL	
IU09	T_SCOUR_COMP	TRAPPING_POTENTIAL	
IU10	T_SCOUR_COMP	PRESSURE_FLOW	
IU11	T_SCOUR_COMP	NAB_LOCATION	
IU12	T_SCOUR_COMP	FAB_LOCATION	
IU13	T_SCOUR_COMP	US_LEFT_WW_PRESENCE	
IU14	T_SCOUR_COMP	US_LEFT_WW_COND	
IU15	T_SCOUR_COMP	US_RIGHT_WW_PRESENCE	

BMS2 Code	Table Name	COLUMN NAME	BMS Code
IU16	T_SCOUR_COMP	US_RIGHT_WW_COND	
IU17	T_SCOUR_COMP	HOR_DEBRIS_START_PCT	
IU18	T_SCOUR_COMP	HOR_DEBRIS_END_PCT	
IU19	T_SCOUR_COMP	VERT_DEBRIS_START_PCT	
IU20	T_SCOUR_COMP	VERT_DEBRIS_END_PCT	
	T_SCOUR_COMP	INSPKEY	
5A03	T_SCOUR_POSS_CMEASURE	BRKEY	STRUCTURE_REF_NUM
IU25	T_SCOUR_POSS_CMEASURE	LOCATION	
IU26	T_SCOUR_POSS_CMEASURE	WCKEY	
	T_SCOUR_POSS_CMEASURE	INSPKEY	
	T_SCOUR_POSS_CMEASURE	PCM_KEY	
5A03	T_SIGN_LIGHT	BRKEY	STRUCTURE_REF_NUM
6C01	T_SIGN_LIGHT	PA_COUNTY	
6C02	T_SIGN_LIGHT	SR_NUM	
6C03	T_SIGN_LIGHT	SEG_NUM	
6C04	T_SIGN_LIGHT	OFFSET	
VS05	T_SIGN_LIGHT	MOUNT_TYPE	
VS06	T_SIGN_LIGHT	FOUND_MATERIAL_TYPE	
VS07	T_SIGN_LIGHT	MANUFACTURER	
VS08	T_SIGN_LIGHT	INSP_LOC	
VS11	T_SIGN_LIGHT	SIGN_QTY	S13
VS12	T_SIGN_LIGHT	LIGHT_QTY	S06
VS17	T_SIGN_LIGHT	ROAD_DISTANCE	
VS18	T_SIGN_LIGHT	ROAD_SIDE	
VS19	T_SIGN_LIGHT	MAX_TOWER_DIAMETER	
VS20	T_SIGN_LIGHT	MIN_TOWER_DIAMETER	
VS21	T_SIGN_LIGHT	MOUNT_BOLT_BASE	
VS22	T_SIGN_LIGHT	HEIGHT	
VS23	T_SIGN_LIGHT	LEAN_MOVEMENT	
VS24	T_SIGN_LIGHT	LEAN_ALIGNMENT	
VS25	T_SIGN_LIGHT	TOT_SIGN_AREA	S05
VS26	T_SIGN_LIGHT	MAX_COLUMN_HEIGHT	S19
VS28	T_SIGN_LIGHT	SPAN_QTY	S20
VS30	T_SIGN_LIGHT	MEDIAN_WIDTH	S21-A
VS34	T_SIGN_LIGHT	MSG_SIGN	
5A03	T_SIGN_LIGHT_INSP	BRKEY	STRUCTURE_REF_NUM
IS01	T_SIGN_LIGHT_INSP	SIGN_INSPTYPE	E07, S01A
IS02	T_SIGN_LIGHT_INSP	BASE_COND_RATE	S22
IS03	T_SIGN_LIGHT_INSP	GRAIL_COND_RATE	S23
IS04	T_SIGN_LIGHT_INSP	COLUMN_COND_RATE	S24
IS05	T_SIGN_LIGHT_INSP	ACCESS_COND_RATE	S25
IS06	T_SIGN_LIGHT_INSP	SIGN_COND_RATE	S26
IS07	T_SIGN_LIGHT_INSP	LIGHT_COND_RATE	S27
IS08	T_SIGN_LIGHT_INSP	SURFACE_COND_RATE	S28

BMS2 Code	Table Name	COLUMN NAME	BMS Code
IS09	T_SIGN_LIGHT_INSP	HOR_COND_RATE	S29
IS10	T_SIGN_LIGHT_INSP	STRRATING	S30
IS12	T_SIGN_LIGHT_INSP	NEXT_SIGN_INSPTYPE	S02-A
IS15	T_SIGN_LIGHT_INSP	SIGN_ASSET_TAG	
	T_SIGN_LIGHT_INSP	INSPKEY	
5A03	T_SIGNING	BRKEY	STRUCTURE_REF_NUM
ID01	T_SIGNING	SIGN_TYPE	
ID02	T_SIGNING	SIGN_NEEDED	
ID03	T_SIGNING	SIGN_MESSAGE	
ID04	T_SIGNING	NEAR_ADVANCE_COND	
ID05	T_SIGNING	FAR_ADVANCE_COND	
ID06	T_SIGNING	NEAR_SITE_COND	
ID07	T_SIGNING	FAR_SITE_COND	
ID08	T_SIGNING	NOTES	
	T_SIGNING	INSPKEY	
5A03	T_STEEL_TYPE	BRKEY	STRUCTURE_REF_NUM
VD05	T_STEEL_TYPE	STEEL_TYPE	C12
	T_STEEL_TYPE	STEEL_TYPE_KEY	
5A03	T_STRAND_SIZE	BRKEY	STRUCTURE_REF_NUM
VD13	T_STRAND_SIZE	STRAND_SIZE	C28
	T_STRAND_SIZE	STRAND_SIZE_KEY	
	T_STRUC_DESIGN_TYPE	DEPT_SPAN_INTERACTION	
	T_STRUC_DESIGN_TYPE	DEPT_STRUC_CONFIG	
	T_STRUC_DESIGN_TYPE	FHWA_DESIGN_TYPE	
	T_STRUC_MATERIAL_TYPE	DEPT_SPAN_INTERACTION	
	T_STRUC_MATERIAL_TYPE	DEPT_MATERIAL_TYPE	
	T_STRUC_MATERIAL_TYPE	FHWA_MATERIAL_TYPE	
5A03	T_STRUC_UNIT_INSP_COMMENT	BRKEY	STRUCTURE_REF_NUM
IC03	T_STRUC_UNIT_INSP_COMMENT	STRUNITKEY	
IC04	T_STRUC_UNIT_INSP_COMMENT	COMMENT_TYPE	
IC05	T_STRUC_UNIT_INSP_COMMENT	NOTES	
	T_STRUC_UNIT_INSP_COMMENT	INSPKEY	
I.15	T_TUNNEL_IDENTIFY	BORDER_ST_CODE	
I.16	T_TUNNEL_IDENTIFY	BORDER_FIN_RESP	
I.17	T_TUNNEL_IDENTIFY	BORDER_NUMBER	
I.18	T_TUNNEL_IDENTIFY	BORDER_INSP_RESP	
L.2	T_TUNNEL_LOAD_RATING	RATING_METHOD	
L.3	T_TUNNEL_LOAD_RATING	INV_LR_FACTOR	
L.4	T_TUNNEL_LOAD_RATING	OP_LR_FACTOR	
L.6	T_TUNNEL_LOAD_RATING	GROSS_POST_LOAD	
L.7	T_TUNNEL_LOAD_RATING	AXLE_POST_LOAD	
L.8	T_TUNNEL_LOAD_RATING	TYPE3_POST_LOAD	
L.9	T_TUNNEL_LOAD_RATING	TYPE3_3_POST_LOAD	
L.10	T_TUNNEL_LOAD_RATING	HEIGHT_RESTR	

BMS2 Code	Table Name	COLUMN NAME	BMS Code
L.11	T_TUNNEL_LOAD_RATING	HAZMAT_RESTR	
L.12	T_TUNNEL_LOAD_RATING	OTHER_RESTR	
N.1	T_TUNNEL_NAV	UNDER_NAV_WATERWAY	
N.2	T_TUNNEL_NAV	NAV_WATERWAY_CLRNC	
N.3	T_TUNNEL_NAV	PROTECT_FM_NAV	
A.8	T_TUNNEL_SERVICE	SVC_IN_TUNNEL	
C.3	T_TUNNEL_SERVICE	DIR_OF_TRAFFIC	
C.4	T_TUNNEL_SERVICE	TOLL	
C.7	T_TUNNEL_SERVICE	FUNCTIONAL_CLASS	
C.8	T_TUNNEL_SERVICE	URBAN_CODE	
S.1	T_TUNNEL_STRUCTMAT	NUM_BORES	
S.2	T_TUNNEL_STRUCTMAT	TUNNEL_SHAPE	
S.3	T_TUNNEL_STRUCTMAT	PORTAL_SHAPE	
S.4	T_TUNNEL_STRUCTMAT	GROUND_CONDTN	
S.5	T_TUNNEL_STRUCTMAT	COMPLEX	
5A03	T_UNDERWATER_INSP	BRKEY	STRUCTURE_REF_NUM
IN01	T_UNDERWATER_INSP	STRUNITKEY	W09
IN02	T_UNDERWATER_INSP	PREVIOUS_CURRENT	W13
IN03	T_UNDERWATER_INSP	OBS_SCOUR_RATING	W11-A
IN04	T_UNDERWATER_INSP	CHG_SINCE_LAST_INSP	
IN05	T_UNDERWATER_INSP	SCOUR_HOLE	
IN06	T_UNDERWATER_INSP	DEBRIS_POTENTIAL	
IN07	T_UNDERWATER_INSP	SUB_SCOUR	
IN08	T_UNDERWATER_INSP	OPEN_ADEQ_CHANNEL	
IN09	T_UNDERWATER_INSP	SED_DEPOSIT	
IN10	T_UNDERWATER_INSP	ALIGNMENT	
IN11	T_UNDERWATER_INSP	VELO_STREAM_SLOPE	
IN12	T_UNDERWATER_INSP	SUBUNIT_TYPE	
IN13	T_UNDERWATER_INSP	INV_FOUND_TYPE	W10
IN14	T_UNDERWATER_INSP	FOUND_TYPE	W10
IN15	T_UNDERWATER_INSP	STREAM_BED_MATERIAL	W07
IN16	T_UNDERWATER_INSP	UNDERWATER_INSP_TYPE	W11-B
IN17	T_UNDERWATER_INSP	OBS_SCOUR_DEPTH	W11-C
IN18	T_UNDERWATER_INSP	MAX_WATER_DEPTH	W11
IN19	T_UNDERWATER_INSP	MOVEMENT	
IN20	T_UNDERWATER_INSP	SCOUR_UNDERMINE	
IN21	T_UNDERWATER_INSP	COUNTERMEASURES	W11-F
IN22	T_UNDERWATER_INSP	CALC_SCOUR_DEPTH_100	W11-D
IN23	T_UNDERWATER_INSP	CALC_SCOUR_DEPTH_500	W11-E
IN24	T_UNDERWATER_INSP	UNDERWATER_INSP_DESC	W12
IU27	T_UNDERWATER_INSP	SCBI_CODE	
IU28	T_UNDERWATER_INSP	SCBI_CASE	
	T_UNDERWATER_INSP	INSPKEY	
IM05b	T_USERINSP_WCAND	PRIORITY_CHANGE_DATE	

BMS2 Code	Table Name	COLUMN NAME	BMS Code
IM09	T_USERINSP_WCAND	LOCATION	H03
IM12	T_USERINSP_WCAND	DRAWING_IND	
IM13	T_USERINSP_WCAND	PERMIT_IND	
IM14a	T_USERINSP_WCAND	COMPLETED_DATE	N01
IM14b	T_USERINSP_WCAND	POA_DATE	
IM14c	T_USERINSP_WCAND	MITIGATION_DATE	
IM15b	T_USERINSP_WCAND	DEFERRED_ACTION_DESC	
IM15c	T_USERINSP_WCAND	BRIDGE_APPROVAL	
IM15d	T_USERINSP_WCAND	MAINT_APPROVAL	
IM15e	T_USERINSP_WCAND	CO_APPROVAL	
	T_USERINSP_WCAND	WCKEY	
5A03	T_UTILITY	BRKEY	STRUCTURE_REF_NUM
FT01	T_UTILITY	UTILITY_NAME	D02
FT02	T_UTILITY	UTILITY_TYPE	
FT03	T_UTILITY	LICENSE_NUM	D03
FT04	T_UTILITY	LICENSE_ISSUE_DATE	D04
FT05	T_UTILITY	UTILITY_WEIGHT	D05
FT06	T_UTILITY	UTILITY_ADDR	D02
FT07	T_UTILITY	HAZMAT	
FT08	T_UTILITY	LOCATION_DESC	
FT09	T_UTILITY	CONTACT_DESC	
FT10	T_UTILITY	NOTES	
	T_UTILITY	UTILITY_KEY	D01
5A03	T_UW_UNDERCLEAR	BRKEY	STRUCTURE_REF_NUM
IL09	T_UW_UNDERCLEAR	ORIGIN	
IL10	T_UW_UNDERCLEAR	HOR_DISTANCE	
IL11	T_UW_UNDERCLEAR	VERT_UNDERCLEAR	
IL12	T_UW_UNDERCLEAR	NOTES	
	T_UW_UNDERCLEAR	INSPKEY	
	T_UW_UNDERCLEAR	UNDERCLEAR_KEY	
5A03	T_VOID_TYPE	BRKEY	STRUCTURE_REF_NUM
VD12	T_VOID_TYPE	VOID_TYPE	C33
	T_VOID_TYPE	VOID_TYPE_KEY	
5A03	T_WALL	BRKEY	STRUCTURE_REF_NUM
VW05	T_WALL	FOUND_TYPE	
VW06	T_WALL	BACKFILL_MATERIAL1	T11
VW07	T_WALL	BACKFILL_MATERIAL2	T11
VW08	T_WALL	HIST_ELIG	
VW09	T_WALL	MANUFACTURER	
VW10	T_WALL	WALL_USE	T10
VW11	T_WALL	MOUNT_TYPE	
VW12	T_WALL	POST_TYPE	
VW15	T_WALL	ARCH_FORMS	
VW16	T_WALL	REBAR_TYPE	

BMS2 Code	Table Name	COLUMN NAME	BMS Code
VW17	T_WALL	FCI	
VW18	T_WALL	SUPPORT_DESC	
VW19	T_WALL	ROAD_SIDE	
VW20	T_WALL	INSTALL_ROADWAY_TYPE	
VW21	T_WALL	BEGIN_COUNTY	A01
VW21	T_WALL	END_COUNTY	
VW22	T_WALL	BEGIN_ROUTENUM	A01
VW22	T_WALL	END_ROUTENUM	
VW23	T_WALL	BEGIN_SEG_NUM	A01
VW23	T_WALL	END_SEG_NUM	
VW24	T_WALL	BEGIN_OFFSET	A01
VW24	T_WALL	END_OFFSET	
VW25	T_WALL	ROAD_DISTANCE	
VW26	T_WALL	BACKFILL_SLOPE	T12
VW27	T_WALL	MIN_CLEARANCE	
VW28	T_WALL	MIN_HEIGHT	T04
VW29	T_WALL	MAX_HEIGHT	T05
VW31	T_WALL	WALL_SURFACE_AREA	T07
5A03	T_WALL_INSP	BRKEY	STRUCTURE_REF_NUM
IW02	T_WALL_INSP	CORROSION_COND_RATE	
IW03	T_WALL_INSP	BACKFILL_COND_RATE	T13
IW04	T_WALL_INSP	WALL_COND_RATE	T14
IW05	T_WALL_INSP	PANEL_COND_RATE	
IW06	T_WALL_INSP	POST_COND_RATE	
IW07	T_WALL_INSP	DRAINAGE_COND_RATE	T15
IW08	T_WALL_INSP	FOUND_COND_RATE	T16
IW09	T_WALL_INSP	PARAPETS_COND_RATE	
IW10	T_WALL_INSP	STRRATING	T17
IW12	T_WALL_INSP	NEXT_WALL_INSPTYPE	
	T_WALL_INSP	INSPKEY	
1A09a	T_WORKFLOW	CREATEUSERKEY	
5A03	USERBRDG	BRKEY	STRUCTURE_REF_NUM
5E05	USERBRDG	CRGIS_SHPOKEY_NUM	
6A01	USERBRDG	SEN_DISTRICT	A02, R13
6A01	USERBRDG	SEN_DISTRICT2	A02, R13
6A02	USERBRDG	CONG_DISTRICT	A03, R14
6A02	USERBRDG	CONG_DISTRICT2	A03, R14
6A03	USERBRDG	LEG_DISTRICT	A04, R15
6A03	USERBRDG	LEG_DISTRICT2	A04, R15
6A04	USERBRDG	BOUNDARY_CODE	A10
6A05	USERBRDG	UTIL_PRESENT	C34
6A06	USERBRDG	SUB_AGENCY	A05
6A07	USERBRDG	FED_FUND	A12
6A09	USERBRDG	CRIT_FACILITY	A28

BMS2 Code	Table Name	COLUMN NAME	BMS Code
6A10	USERBRDG	FLOOD_INSP	E02-A
6A11	USERBRDG	COVERED_BRIDGE	C01-A
6A12	USERBRDG	DEM_REPLACED	
6A13	USERBRDG	DEM_REPLACED_DATE	
6A14	USERBRDG	HIST_DISTRICT_CONT	
6A15	USERBRDG	HIST_DISTRICT_NAME	
6A16	USERBRDG	PRESERV_CAND	
6A17	USERBRDG	FUTURE_BRIDGE_BILL	
6A18	USERBRDG	NETWORK	
6A19	USERBRDG	BUS_PLAN_NETWORK	B35
6A20	USERBRDG	WATERSHED	
6A21	USERBRDG	DEICING_EQUIP	
6A22	USERBRDG	CORRIDOR	
6A23	USERBRDG	OWNER_DESC	A20
6A24	USERBRDG	TURNBACK	
6A26	USERBRDG	DEPT_APPR_MATERIAL_TYPE	C05
6A26	USERBRDG	DEPT_MAIN_MATERIAL_TYPE	C05, S12, T08
6A27	USERBRDG	DEPT_APPR_PHYSICAL_TYPE	C05
6A27	USERBRDG	DEPT_MAIN_PHYSICAL_TYPE	C05, S12, T08
6A28	USERBRDG	DEPT_APPR_SPAN_INTERACTION	C05
6A28	USERBRDG	DEPT_MAIN_SPAN_INTERACTION	C05, S12, T08
6A29	USERBRDG	DEPT_APPR_STRUC_CONFIG	C05
6A29	USERBRDG	DEPT_MAIN_STRUC_CONFIG	C05, S12, T08
6A30	USERBRDG	APPR_DKSURFTYPE	C10
6A31	USERBRDG	APPR_DKMEMBTYPE	C10
6A32	USERBRDG	APPR_DKPROTECT	C10
6A33	USERBRDG	APPR_WS_THICKNESS	C10-A
6A33	USERBRDG	MAIN_WS_THICKNESS	C10-A
6A34	USERBRDG	APPR_WS_THICK_DATE	
6A34	USERBRDG	MAIN_WS_THICK_DATE	
6A35	USERBRDG	WS_THICKNESS_OVER	
6A35	USERBRDG	WS_THICKNESS_UNDER	
6A36	USERBRDG	PROTECT_YEAR	
6A37	USERBRDG	PROTECT_NOTE	
6A38	USERBRDG	DEPT_DKSTRUCTYP	C09
6A39	USERBRDG	RELIEF_JOINT	C19
6A40	USERBRDG	DECK_FORM_TYPE	C20
6A41	USERBRDG	DECK_JOINTS	C19-A
6A42	USERBRDG	DECK_REBAR_TYPE	C21
6A43	USERBRDG	APPR_PAVEMENT_WIDTH	A29
6A44	USERBRDG	APPR_FC_GROUP_NUM	C18, J06
6A44	USERBRDG	MAIN_FC_GROUP_NUM	C18, J02
6A45	USERBRDG	APPR_CRF_MEM_TYPE	C18-A, J07
6A45	USERBRDG	MAIN_CRF_MEM_TYPE	C18-A, J03

BMS2 Code	Table Name	COLUMN NAME	BMS Code
6A46	USERBRDG	APPR_CRF_FATIG_SUS	C18-A, J07
6A46	USERBRDG	MAIN_CRF_FATIG_SUS	C18-A, J03
6A47	USERBRDG	APPR_CRF_MATERIAL	C18-A, J07
6A47	USERBRDG	MAIN_CRF_MATERIAL	C18-A, J03
6A48	USERBRDG	APPR_CRF_CUM_ADTT	C18-A, J07
6A48	USERBRDG	MAIN_CRF_CUM_ADTT	C18-A, J03
6A49	USERBRDG	MAIN_CRF_CUM_ADTT	
6A49	USERBRDG	MAIN_CRF_FATIG_SUS	
6A49	USERBRDG	MAIN_CRF_MATERIAL	
6A49	USERBRDG	MAIN_CRF_MEM_TYPE	
6A50	USERBRDG	SUP_PROBLEM_TYPE	C25
6A51	USERBRDG	SUB_PROBLEM_TYPE	C43
6A52	USERBRDG	EST_TRUCK_TRAFFIC	C14
6A53	USERBRDG	EST_CUM_FATIG_LIFE	C02
6A54	USERBRDG	EST_TRUCK_TRAFFIC_MONTH	C15
6A54	USERBRDG	EST_TRUCK_TRAFFIC_YEAR	C15
6A55	USERBRDG	DECK_RECON_WORK_TYPE	F02
6A56	USERBRDG	SUP_RECON_WORK_TYPE	F02
6A57	USERBRDG	SUB_RECON_WORK_TYPE	F02
SS11	USERBRDG	APRAS_REF	PA01
SS12	USERBRDG	APRAS_MAX_AXLE_WEIGHT	PA03
SS13	USERBRDG	TOTAL_APRAS_SPAN_QTY	PA02
VD01	USERBRDG	DESIGN_METHOD	C04
VD02	USERBRDG	LIVE_LOAD_CONT	C35
VD03	USERBRDG	BEAM_GEOM	C11
VD04	USERBRDG	STEEL_BEAM_SPLICE_TYPE	C24
VD06	USERBRDG	VAC_PROC	C31
VD07	USERBRDG	STRAND_TYPE	C30
VD08	USERBRDG	BEAM_CONC_STRENGTH	C27
VD09	USERBRDG	BEAM_CONC_STRENGTH_INIT	C26
VD10	USERBRDG	SPLICE_FILLER	C36
VD10	USERBRDG	SPLICE_THRU	C36
VD10	USERBRDG	SPLICE_TYPE	C36
VD11	USERBRDG	TENSION_METHOD1	C29
VD11	USERBRDG	TENSION_METHOD2	C29
VD11	USERBRDG	TENSION_METHOD3	C29
VD14	USERBRDG	FAR_ABUT_TYPE	C37
VD14	USERBRDG	NEAR_ABUT_TYPE	C37
VD15	USERBRDG	FAR_ABUT_FOUND_TYPE	C38
VD15	USERBRDG	NEAR_ABUT_FOUND_TYPE	C38
VD28	USERBRDG	HAUNCH_TYPE	C32
VD29	USERBRDG	SPEC_PIER_CAP_TYPE	C41
VD31	USERBRDG	SEAT_CLEANING	
VD32	USERBRDG	SEAT_CLEANING_NOTE	

BMS2 Code	Table Name	COLUMN NAME	BMS Code
VD33	USERBRDG	SCUPPERS_WITH_DOWNSPOUTS	
VD34	USERBRDG	SCUPPERS_WITHOUT_DOWNSPOUTS	
VI01	USERBRDG	MIN_CRANE_REACH	
VI02	USERBRDG	HVPL	E05-A
VI03	USERBRDG	RR_FLAGGING	
VI04	USERBRDG	TRAF_FLAGGING	
VI05	USERBRDG	SIDEWALK_TYPE_LEFT	A34
VI06	USERBRDG	SIDEWALK_TYPE_RIGHT	A34
VI09	USERBRDG	HOR_CURVE	A36
VI10	USERBRDG	VERT_CURVE	A36
VI11	USERBRDG	INSP_LIMIT_NOTES	
VM01	USERBRDG	LEG_ACT_NUM	A21
VM02	USERBRDG	MAINT_RESP_DESC	A22
VN02	USERBRDG	SOIL_BORING_NOTES	
VN03	USERBRDG	MEM_PROP_TEST	
VN04	USERBRDG	STORAGE_LOC	
	USERBRDG	AGENCY_ID	
	USERBRDG	PARENT_BRKEY	
5A03	USERINSP	BRKEY	STRUCTURE_REF_NUM
6B01	USERINSP	SPEC_INSP_TYPE	E04
6B02	USERINSP	NEW_WS	
6B03	USERINSP	INV_CORRECT	
6B04	USERINSP	APPR_BUMP	
6B05	USERINSP	DECK_OVERLAY_MEAS_DATE	
6B06	USERINSP	UTILITY_REPAIR	
6B07	USERINSP	EST_SPALL_DELAM_PCT	
6B08	USERINSP	EST_SPALL_DELAM_DATE	
6B09	USERINSP	WEATHER_COND	
6B10	USERINSP	EST_CHLORIDE_CONTENT_PCT	
6B11	USERINSP	EST_CHLORIDE_CONTENT_DATE	
6B12	USERINSP	TEMP	
6B13	USERINSP	CONT_VERT	
6B14	USERINSP	DECKGEOM_TABLE	
6B15	USERINSP	DECKGEOM_DESIGN_EXCEPTION	
6B16	USERINSP	STRRATING_TABLE	
6B17	USERINSP	STRRATING_ADT	B27
6B18	USERINSP	STRRATING_IRLOAD	E30
6B19	USERINSP	CAP_APPR_CONTROL	
6B20	USERINSP	NEXT_INSP_TYPE	S02-A
6B21	USERINSP	NEXT_CRANE_INSP_DATE	
6B23	USERINSP	INSP_TEAM_HELPER	
6B24	USERINSP	CONSULTANT_HIRED_BY	E13
6B25	USERINSP	LOCAL_INSP_CONTRACT_NUM	
6B26	USERINSP	CREWHRS	E09

BMS2 Code	Table Name	COLUMN NAME	BMS Code
6B27	USERINSP	SNOOPERHRS	E10
6B28	USERINSP	FLAGGERHRS	
6B29	USERINSP	SPCREWHRS	
6B30	USERINSP	HELPERHRS	
6B31	USERINSP	SPEQUIPHRS	
6B32	USERINSP	FIELD_ENG_INSP_COST	E11
6B33	USERINSP	RIGGING_INSP_COST	E11
6B34	USERINSP	OFFICE_INSP_COST	E11
6B35	USERINSP	NEW_PAINT	
6B36	USERINSP	PAINT_COND_RATE	E19
6B37	USERINSP	PAINT_EXTENT_RATE	E19
6B38	USERINSP	APPR_SLAB_COND_RATE	E14
6B39	USERINSP	APPR_ROAD_COND_RATE	E15
6B40	USERINSP	DECK_WS_COND_RATE	E16
6B41	USERINSP	HBRR_ELIG	M06
6B42	USERINSP	SUFF_RATE_S1	M01
6B43	USERINSP	SUFF_RATE_S2	M02
6B44	USERINSP	SUFF_RATE_S3	M03
6B45	USERINSP	SUFF_RATE_S4	M04
6B46	USERINSP	MAINT_DEF_RATE	M34
6B47	USERINSP	DECK_CRACKING_METRIC	
6B48	USERINSP	MAT_STORE_UND	
6B49	USERINSP	INACCESS_PORTION_STRUCT	
7A05a	USERINSP	INSP_ORG_NAME	
7A09	USERINSP	INTERIM_INSP_FREQ	E01, W04
7A19	USERINSP	EXTINSPFREQ_ELIG	
7A20	USERINSP	EXTINSPFREQ_CONC	
IR01b	USERINSP	LR_REVIEW_ACTION	
IR02	USERINSP	RATING_APPR_DATE	
IR02a	USERINSP	APPROVER_NAME	
IR03	USERINSP	RATING_DATE	
	USERINSP	INSPKEY	
	USERINSP	WATER_DEPTH	
	USERINSP	WATER_UNIT_QTY	
	USERINSP	WATER_VELOCITY	
IM20	USERPROJ	MPMS_PROJECT_NUM	
5A03	USERRWAY	BRKEY	STRUCTURE_REF_NUM
5C03, FR02	USERRWAY	ON_UNDER	B01
5C35	USERRWAY	RMS_ROADWAY_BPN	
6C01	USERRWAY	PA_COUNTY	PB08, R01
6C02	USERRWAY	SR_NUM	B02, PB08, R01
6C03	USERRWAY	SEG_NUM	B02, PB08, R01
6C04	USERRWAY	OFFSET	PB08, R01
6C05	USERRWAY	ADMIN_JURIS	B16

BMS2 Code	Table Name	COLUMN NAME	BMS Code
6C06	USERRWAY	FED_AID	R09
6C07	USERRWAY	GOVT_CONT	R08
6C08	USERRWAY	URBAN_RURAL	R11
6C09	USERRWAY	HIGHWAY_IND	R12
6C10	USERRWAY	HWY_SYS_TYPE	B17
6C11	USERRWAY	STATE_HWY_NETWORK	B19
6C12	USERRWAY	INTERSTATE_NETWORK	R12
6C14	USERRWAY	ATTT_NETWORK	R12
6C15	USERRWAY	NHS_NETWORK	R12
6C16	USERRWAY	TTTN_NETWORK	R12
6C18, FR12	USERRWAY	TOT_HOR_CLEAR_LEFT	B21
6C19, FR13	USERRWAY	TOT_HOR_CLEAR_RIGHT	B21
6C20, FR10	USERRWAY	MIN_OVER_VERT_CLEAR_LEFT	B22, D08
6C21, FW11, FR11	USERRWAY	MIN_OVER_VERT_CLEAR_RIGHT	B22, D08
6C22, FR14	USERRWAY	DEF_VERT_CLEAR_LEFT	B23
6C23, FR15	USERRWAY	DEF_VERT_CLEAR_RIGHT	B23
6C25	USERRWAY	BRIDGEMED	B10
6C26	USERRWAY	MED_WIDTH	B10
6C27	USERRWAY	ADTT	B29, R06
6C28	USERRWAY	ADTT_YEAR	B30, R07
6C30	USERRWAY	ROADWAY_LABEL1	PR Screen
6C31	USERRWAY	ROADWAY_LABEL2	PR Screen
6C32	USERRWAY	ROADWAY_LABEL3	PR Screen
6C33	USERRWAY	ROADWAY_LABEL4	PR Screen
6C34	USERRWAY	FEATURE_TYPE	
6C35	USERRWAY	VERT_CLEAR_SIGN	B31
6C36	USERRWAY	VERT_CLEAR_SIGN_R	B31
6C37	USERRWAY	VRT_CLR_POST_LEFT_FT	
6C37	USERRWAY	VRT_CLR_POST_LEFT_INCH	
6C38	USERRWAY	VRT_CLR_POST_RIGHT_FT	
6C38	USERRWAY	VRT_CLR_POST_RIGHT_INCH	
FR01	USERRWAY	RR_NAME	B13
FR03	USERRWAY	RR_SERV_STATUS	B13
FR04	USERRWAY	RR_MILEPOST	B15
FR05	USERRWAY	AAR_DOT_NUM	B14
FR06	USERRWAY	ELEC_TRACK_QTY	B12
FR08	USERRWAY	SPAN_DESC	
FR09	USERRWAY	ADD_OPER_DESC	
FW02	USERRWAY	DEP_CLASS_1	
FW03	USERRWAY	DEP_CLASS_2	
FW04	USERRWAY	DEP_TIMEFRAME	
FW05	USERRWAY	DEP_CLASS_3	
FW06	USERRWAY	DEP_PERMIT_TYPE	
FW07	USERRWAY	STREAM_DRAIN_AREA	D07

BMS2 Code	Table Name	COLUMN NAME	BMS Code
FW08	USERRWAY	FISHABLE	D11
FW09	USERRWAY	WATERFLOW_DIR	
FW10	USERRWAY	PRIMARY_WATERWAY	
FW12	USERRWAY	MAX_WATER_SURF_ELEV	D10
FW13	USERRWAY	MAX_WATER_SURF_YEAR	D10
FW14	USERRWAY	DESIGN_FLOOD_MAGNITUDE	D09
FW15	USERRWAY	DESIGN_FLOOD_ELEV	D09
FW16	USERRWAY	DESIGN_FLOOD_FREQ	D09
FW17	USERRWAY	DESIGN_FLOOD_VEL	D09
FW18	USERRWAY	POLLUTANT_DESC	
FW19	USERRWAY	STREAM_RESTRICT_DESC	
5A03	USERSTRUNIT	BRKEY	STRUCTURE_REF_NUM
SP03	USERSTRUNIT	SPAN_LENGTH	C17
SP04	USERSTRUNIT	SPAN_DECK_WIDTH	
SP05	USERSTRUNIT	SPAN_FLARED	
SP07	USERSTRUNIT	DEPT_MATERIAL_TYPE	PA09
SP08	USERSTRUNIT	DEPT_PHYSICAL_TYPE	PA09
SP09	USERSTRUNIT	DEPT_SPAN_INTERACTION	PA09
SP10	USERSTRUNIT	DEPT_STRUC_CONFIG	PA09
	USERSTRUNIT	IDENTICAL_STRUNITKEY	
	USERSTRUNIT	STRUNITKEY	
5A24	V.BRIDGE	REPORTGROUP	

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Appendix F

D-450's and D-491's

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Structure Identification

5A01 Structure ID:
5A02 Structure Name:
5A03 NBI Structure No:

Location

5A04 District:
5A05 County:
5A06 City/Town/Place:
5A07 Feature Intersected:
5A08 Facility Carried:
5A09 Location:
5A10 Latitude:
5A11 Longitude:

Age and Service

5A15 Year Built:
5A16 Year Reconstruction:
5A17 Service Type On:
5A18 Service Type Under:
5A19 # of Lanes Under:
5A20 Maint Resp:
5A21 Owner Code:
6A06 Submitting Agency:
6A23 Owner Description:
6A19 BPN:
VP02 Posting Status:

Deck Information

5B01 Deck Structure Type:
5B02 Deck Surface Type:
5B03 Deck Membrane Type:
5B04 Deck Protection:
5B05 Left Curb/S'walk Width:
5B06 Right Curb/S'walk Width:
5B07 Deck Width (O/O):
5B08 Median Type:
5B09 Skew:
5B10 Structure Flare:
6A38 PennDOT Deck Type:
6A39 Relief Joints?:
6A40 Form Type:
6A41 No. of Joints:

Span Information

5B11 No. of Main Spans:
5B12 Main Span Mat'l Type:
5B13 Main Span Design Type:
5B14 No. of Approach Spans:
5B15 Appr Span Mat'l Type:
5B16 Appr Span Design Type:
5B18 Structure Length:
VD19 Culvert Length:
5B19 Deck Area:

Classification Items

5E01 NBIS Bridge Length:
5E03 Temporary Structure:
5E04 Historical Significance:
5A24 Report Group:

2A01 Structure Notes

Structure Type

	Main	Approach
6A26 Material		
6A27 Physical Span Make-Up		
6A28 Span Interaction		
6A29 Structure Type		
6A33 Wearing Surface Thickness		
6A34 WS Thickness Date		
6A44 FC Group No.		
6A45 FC Member Type		
6A46 FC Fatigue Susceptibility		
6A47 FC Material Type		
6A48 FC ADTT		
6A49 FC Total CRF		

Span-Specific Information

5D01 Unit Key	5D04/SP01 Type	5D02/ SP02 Unit ID	SP03 Span Length	SP04 Deck Width	SP05 Flared?	SP07 to SP10 Structural Config	Structure Type Description
1					☐	____	
2					☐	____	
3					☐	____	

SNBI Inspection Types Performed

B.IE.01 Inspection Type	B.IE.02 Inspection Start Date	B.IE.03 Inspection End Date	B.IE.04 NCBI (Team Leader)	B.IE.05 Inspection Interval	B.IE.06 Inspection Due Date	B.IE.07 RBI Method

B.IE.01 Inspection Type:
B.IE.02 Inspection Start Date:
B.IE.03 Inspection End Date:
B.IE.04 NCBI (Team Leader):
B.IE.05 Inspection Interval:
B.IE.06 Inspection Due Date:
B.IE.07 RBI Method:
B.IE.08 Quality Control Date:
B.IE.10 Modified Date:
B.IE.11 Limited Scope Descr:
B.IE.12 Inspection Equipment:

Access Equipment (Check all that apply, at least one is required)

☐ No Acc. Equip. Used ☐ Ladder ☐ Bucket lift vehicle ☐ Snooper ☐ Rigging ☐ Waders
☐ Boat ☐ Snorkel ☐ SCUBA ☐ Surface supplied air ☐ ROV ☐ Video pole
☐ Borescope ☐ UAS/UAV ☐ Service Traveler ☐ Other Access Equip.

Inspection Equipment (Check all that apply, at least one is required)

☐ No Insp. Equip. Used ☐ Ultrasonic ☐ GP Radar ☐ Infrared Thermo. ☐ Radiographic Test. ☐ Impact Echo
☐ Electromagnetic ☐ Rebound/Penetration ☐ Acoustic Emissions ☐ Dye Penetrant ☐ Magnetic Particle ☐ Eddy Current
☐ Boring or Drilling ☐ Underwater Imaging ☐ Depth Finder ☐ Stress Wave Timer ☐ Other Insp. Equip.

B.IE.01 Inspection Type	B.IE.02 Inspection Start Date	B.IE.03 Inspection End Date	B.IE.04 NCBI (Team Leader)	B.IE.05 Inspection Interval	B.IE.06 Inspection Due Date	B.IE.07 RBI Method

B.IE.01 Inspection Type:
B.IE.02 Inspection Start Date:
B.IE.03 Inspection End Date:
B.IE.04 NCBI (Team Leader):
B.IE.05 Inspection Interval:
B.IE.06 Inspection Due Date:
B.IE.07 RBI Method:
B.IE.08 Quality Control Date:
B.IE.10 Modified Date:
B.IE.11 Limited Scope Descr:
B.IE.12 Inspection Equipment:

Access Equipment (Check all that apply, at least one is required)

☐ No Acc. Equip. Used ☐ Ladder ☐ Bucket lift vehicle ☐ Snooper ☐ Rigging ☐ Waders
☐ Boat ☐ Snorkel ☐ SCUBA ☐ Surface supplied air ☐ ROV ☐ Video pole
☐ Borescope ☐ UAS/UAV ☐ Service Traveler ☐ Other Access Equip.

Inspection Equipment (Check all that apply, at least one is required)

☐ No Insp. Equip. Used ☐ Ultrasonic ☐ GP Radar ☐ Infrared Thermo. ☐ Radiographic Test. ☐ Impact Echo
☐ Electromagnetic ☐ Rebound/Penetration ☐ Acoustic Emissions ☐ Dye Penetrant ☐ Magnetic Particle ☐ Eddy Current
☐ Boring or Drilling ☐ Underwater Imaging ☐ Depth Finder ☐ Stress Wave Timer ☐ Other Insp. Equip.

SNBI Future Scheduling Information

Inspection Type	7A57 Required	7A58 Last Date	7A59 Interval	7A60 Next Inspection Date
1 - Initial	N/A		0 mos	N/A
2 - Routine	☑		0 mos	
3 - Underwater	☐		0 mos	
4 - NSTM	☐		0 mos	
5 - Damage	N/A		0 mos	N/A
6 - In-Depth	☐		0 mos	
7 - Special	☐		0 mos	
8 - Service	☐		0 mos	
9 - Scour Monitoring	N/A		0 mos	N/A
P - Problem Area	N/A		0 mos	N/A
E - Elements	☑		0 mos	
Q - QA	N/A		0 mos	N/A

Inspection Information

7A05 Inspection Performed By:

7A05a Inspection Organization:

6B23 Inspection Team Member:
SHAWN SHANNON

6B24 Consultant Hired By:

6B25 Inspection Agreement Number:

7A19 Ext. Insp. Interval Elig.:

7A20 Ext. Insp. Interval Conc.:

7A21 NBIS Ext. Insp. Interval Elig.:

6B49 Inaccessible Area:

6B09 Weather:

6B12 Temperature:

6B26 NBI Crew Hours:

6B27 Crane Hours:

6B28 NSTM Hours:

6B30 UW Hours:

6B32 Engineering Costs:

6B33 Rigging Costs:

6B34 Office Costs:

Legacy Schedule Information

7A01 Inspection Start Date:

7A01e Inspection End Date:

7A02 Team Leader:

7A03 Primary Inspection Type:

7A06 Inspection Performed:

NBI: ☑
NSTM: ☐
Underwater: ☐
Other Special: ☐
Element: ☑

	7A07 Required	7A08 Last Inspection Date	7A09 Inspection Interval	7A10 Next Inspection Date
NBI:		01/01/1901	0 mos	01/01/1901
NSTM:	☐	01/01/1901	0 mos	01/01/1901
Underwater:	☐	01/01/1901	0 mos	01/01/1901
Other Special:	☐	01/01/1901	0 mos	01/01/1901
Element:	☑	01/01/2001	0 mos	01/01/1901

Inspection Status

1A09 Inspection Status:

Key Field Comparison since Last Accepted Inspection

	Current	Previous
7A01 Inspection Date:		
7A03 Inspection Type:		
1A01 Deck:		
1A04 Superstructure:		
1A02 Substructure:		
1A03 Culvert:		
IA02/B.C.05 Railings:		
IA02/B.C.06 Transition:		
IB01 Bearings:		
IJ01 Joints:		
1A05 Channel:		
1A05b Channel Protection:		
1A13 Scour:		
1A14 Underwater:		
1A15 NSTM:		
4A08 SCBI:		
4A08b SCBI Category:		
IN15 Streambed Material:		
4A14 Bridge Condition:		

	7A07 Required		7A09 Interval	
	Current	Previous	Current	Previous
NBI	N/A	N/A	0 mos	-1 mos
NSTM	☐	☐	0 mos	-1 mos
UW	☐	☐	0 mos	-1 mos
OS	☐	☐	0 mos	-1 mos
Element	☑	☐	0 mos	-1 mos

Condition Ratings

1A01 Deck:
1A02 Substructure:
1A03 Culvert:
1A15 NSTM Inspection Condition:
2A02 Inspection Notes:
1A04 Superstructure:
1A05 Channel:
1A06 Waterway:
1A16 Lowest Condition Rating:

Appraisal Ratings

IA02 Railing:
IA02 Transition:
IA02 Approach Guide Rail:
IA02 Approach Rail End:
6B35 New Protective Coating? ☐
6B36 Protective Coating:
4A02 Approach Alignment:
6B38 Approach Slab:
6B39 Approach Roadway:
4A10 Deck Geometry:
4A11 Underclearance:
6B40 Deck Wearing Surface:

6B37 Protective Coating (Extent):

4B03 Posting:

4A26 Seismic Vulnerability:

4A08 SCBI:

4A08b SCBI Category:

4A14 Bridge Condition:

Approach Conditions

4A02 Approach Alignment:

Alignment Notes:

6B39 Approach Roadway:

6B38 Approach Slab:

IA02 Railing:

IA02 Transition:

IA02 Guide Rail:

IA02 Rail End:

Approach Details and Inspection Notes

6A43 Approach Pavement Width: ft

Pavement:

Drainage:

Shoulders:

Approach Slab:

6B04 Bump at Bridge? ☑

6A39 Pavement Relief Joints Present? No

Bridge Railing:

Description:

Notes:

Transition:

Description:

Notes:

Guiderail:

Description:

Notes:

Rail End:

Description:

Notes:

Signs

ID01 Type of Sign	ID03 Sign Message	ID04 Near Advance	ID06 Bridge Site Near	ID07 Bridge Site Far	ID05 Far Advance	ID08 Signing Notes

Deck Conditions

1A01 Deck Condition Rating:
Overall Deck Notes:

6B40 Wearing Surface Condition Rating:
Overall Wearing Surface Notes:

6B10/6B11 Estimated Chloride Content/Date:
5B02/6A30 Surface Type Main/Approach:
5B03/6A31 Membrane Type Main/Approach:
5B04/6A32 Protection Main/Approach:
6A33 Wearing Surface Thickness Main/Approach:
6A34 Wearing Surface Date Recorded Main/Approach:
6B47 Deck Cracking Metric:
5B01 Deck Structure Type:
5B07 Deck Width (O/O):
5C27 Roadway Width (C/C):
5B05 Left Curb or Sidewalk Width:
5B06 Right Curb or Sidewalk Width:
6C25 Bridge Median:

Deck Inspection Notes

Deck Top and Wearing Surface:

Deck Underside:

Deck Drainage:

Joint Conditions

IJ01 Overall Joint Condition Rating:
Overall Joint Notes:

Legend:

IJ02 Joint Key	IJ05 Joint Location	IJ09 Debris Impaction?	IJ12 Covered?
IJ03 Record Key	IJ06 Joint Movement	IJ10 Leaking?	IJ13 Condition Rating
IJ04 Joint Type	IJ08 Joint Length (ft)	IJ11 Damage?	

IJ02-IJ03	IJ04	IJ05	IJ06	IJ08	IJ09	IJ10	IJ11	IJ12	IJ13
					☑	☐	☐	☐	
IJ19 Joint Notes:									
					☑	☐	☐	☐	
IJ19 Joint Notes:									

Superstructure Conditions

1A04 Superstructure Condition Rating:

Overall Superstructure Notes:
P/S CONCRETE PA BULB TEE BEAMS.

6B48 Combustible Material Under Bridge:

Combustible Material Under Bridge Notes:
NONE.

6B35 New Coating Since Last Inspection: ☐

6B36 Protective Coating Rating:

6B37 Protective Coating (Extent) Rating:

Overall Protective Coating Notes:

Superstructure Details

5B11 Main Spans: **5B14 Approach Spans:**

VD31 Bridge Seat Cleaning:

VD32 Bridge Seat Cleaning Notes:

VD33 Scuppers w/Downspouts: **VD34 Scuppers w/out Downspouts:**

Superstructure Inspection Notes

Girders/Beams:

Floorbeams:

Stringers:

Diaphrams:

Truss Members:

Portals/Bracings:

Drainage System:

Protective Coating Inspection Notes

Interior Girder/Beam:

Fascia:

Splash Zone - Truss/ Girder:

Truss:

Bearing:

Other:

Bearing Conditions

IB01 Overall Bearing Condition Rating:
Overall Bearing Notes:

Legend:

IB02 Bearing Key	IB05 Bearing Location	IB08 Corrosion?	IB11 Loss of Bearing Area?
IB03 Record Key	IB06 Bearing Count	IB09 Alignment Issues?	IB12 Condition Rating
IB04 Bearing Type	IB07 Bearing Movement?	IB10 Anchor Bolt Issues?	

IB02-IB03	IB04	IB05	IB06	IB07	IB08	IB09	IB10	IB11	IB12
IB17 Bearing Notes:									
IB17 Bearing Notes:									

Substructure Conditions

1A02 Substructure Condition Rating:
Substructure Notes:

Near Abutment

Near Abutment Inspection Notes

Backwall:

Bridge Seats:

Cheekwalls:

Stem:

Wings:

Footing:

Piles:

Settlement:

Embank Slope-Wall:

Wall Drainage:

Near Abutment - Waterway

IN01 Sub Unit:
IN02 Current Inspection? ☑
IU27 SCBI Code:
IU28 SCBI Case:
IN03 Scour Rating:
IN04 Change Since Last Insp:
IN05 Scour Hole:
IN06 Debris Potential:
IN07 Scourability:
IN08 Opening Adeq Channel:
IN09 Sediment:
IN10 Alignment:
IN11 Velocity Stream Slope:
IN24 Notes:

IN12 Pier/Abutment Type:
IN13 Inv Foundation Type:
IN14 OSA Foundation Type:
IN15 Streambed Material:
IN16 UW Inspection Type:
IN17 Observed Scour Depth:
IN18 Water Depth:
IN19 Movement Indicator: ☐
IN20 Scour/Undermine Indicator: ☐
IN21 Countermeasures: ☐
IN22 100yr Flood Scour Depth:
IN23 500yr Flood Scour Depth:
IN25 In 500yr Flood Plain? ☐

Far Abutment

Far Abutment Inspection Notes

Backwall:

Bridge Seats:

Cheekwalls:

Stem:

Wings:

Footing:

Piles:

Settlement:

Embank Slope-Wall:

Wall Drainage:

Far Abutment - Waterway

IN01 Sub Unit:
IN02 Current Inspection? ☑
IU27 SCBI Code:
IU28 SCBI Case:
IN03 Scour Rating:
IN04 Change Since Last Insp:
IN05 Scour Hole:
IN06 Debris Potential:
IN07 Scourability:
IN08 Opening Adeq Channel:
IN09 Sediment:
IN10 Alignment:
IN11 Velocity Stream Slope:
IN24 Notes:

IN12 Pier/Abutment Type:
IN13 Inv Foundation Type:
IN14 OSA Foundation Type:
IN15 Streambed Material:
IN16 UW Inspection Type:
IN17 Observed Scour Depth:
IN18 Water Depth:
IN19 Movement Indicator: ☐
IN20 Scour/Undermine Indicator: ☐
IN21 Countermeasures: ☐
IN22 100yr Flood Scour Depth:
IN23 500yr Flood Scour Depth:
IN25 In 500yr Flood Plain? ☐

Culvert Conditions

1A03 Culvert Condition Rating:
Overall Culvert Notes:
6B48 Combustible Material Under Bridge:
6B48 Combustible Material Notes:
NONE.
6B35 New Coating Since Last Inspection: ☐
6B36 Protective Coating Rating:
6B37 Protective Coating (Extent) Rating:
Overall Protective Coating Notes:

Culvert Details

5B11 Main Spans: 1 5B14 Approach Spans: 4

VD18 Opening Type	VD19 Length of Culvert Barrel	VD20 Min Fill Height	VD21 Max Fill Height	VD22 Eff Width	VD23 Tie Type	VD24 Floor Type

Culvert Inspection Notes

Top Slab:
Barrel:
Floor/Paving:
Headwall:
Wings:
Settlement:
Debris:
Footing:

Waterway Conditions

4A08 SCBI:
4A08b Scour Critical Category:
IU03 SCBI Source:
IU04 Overall SCBI:
IU04b: ☑
1A05 Channel:
1A05b Channel Protection:
1A06 Waterway:
1A13 Overall Scour:
1A14 Underwater:
IU29 Scour Vulnerability:
IU30 Scour POA Required:

Waterway Details

IU06 Stream Bed Material:

IU07 Streambed Material Description:
IU02 Number of Subunits:
IU11 NAB Location:
IU12 FAB Location:
IU13 U/S Left WW Presence:
IU14 U/S Left Condition:
IU15 U/S Right WW Presence:
IU16 U/S Right Condition:
IU17 Horizontal Debris Start:
IU18 Horizontal Debris End: (0%=LAB to 100%=RAB)
IU19 Vertical Debris Start:
IU20 Vertical Debris End: (0%=Str'bed to 100%=Bm)

Current Scour Measures and Countermeasures

Record Key	IU21 Type	IU22 Location	IU23 Condition	IU24 Subunit

Potential Countermeasures

Record Key	IU25 Location	IU26 Countermeasures

Channel and Waterway Adequacy Information

1A05 Channel: 1A05b Channel Protection: 1A06 Waterway:

Channel:

Channel Protection:

Banks:

Streambed Movements:

Debris, Vegetation:

River (Stream) Control Devices:

Embankment/Streambed Controls:

Drift, Other:

Waterway Adequacy:

IL02 Overtopping Likelihood: IL03 Traffic Delay:

IL13 Worst Flood Event: IL14 Worst Flood Event Date:

5C22 Functional Class:

IL05 High Water Elevation: ft IL06 High Water Date: IL07 New High Water Mark: ☐

IL08 High Water Notes:

Subunits within 500yr Flood Plain

Legend:

IN01 Subunit	IN06 Debris Potential	IN10 Alignment	IN19 Movement Ind
IN03 Obs Scour Rtg	IN07 Scourability	IN11 Velocity Str Slope	IU27 SCBI Code
IN04 Chg Since Last Insp	IN08 Opening Adeq/Channel	IN12 Pier/Abut Type	
IN05 Scour Hole	IN09 Sediment	IN15 Strmbd Matl	

IN01	IN12	IN15	IN19	IN04	IN05	IN06	IN07	IN08	IN09	IN10	IN11	IN03	IU27
			☐										
			☐										

Other Subunit Details:

Legend:

IN01 Subunit	IN16 UW Insp Type	IN20 Scour/Undermine	IN22 100yr Flood Calc Scour Depth (ft)
IN02 Info From Current Insp	IN17 Obs Scr Depth (ft)	IN21 Countermeasures	IN23 500yr Flood Calc Scour Depth (ft)
IN14 OSA Found Type	IN18 Water Depth (ft)		IN25 In 500yr Flood Plain?

IN01	IN14	IN16	IN18	IN17	IN20	IN21	IN02	IN22	IN23	IN25
			ft		☐	☑	☑			☑
IN24 Notes:										
NAB			ft		☐	☑	☑			☑
IN24 Notes:										

BMSID: BRKEY:

Load Ratings Page

pennsylvania DEPARTMENT OF TRANSPORTATION

Status:

Inspection Record:

Date Printed: 05/21/2024

IR01a Load Rating Rev. Recom'd: ☑ IR01b Reviewer Action: 0 - Not Reviewed VP11 Posting Rev. Recom'd: ☐

Inspection Team Notes:

Previous Inspection Team Notes:

IR03 Calculation Date: 01/01/1901

IR02a Assigned Rating Approval Engineer:

Previous Load Rating Engineer Notes:

IR02 Assigned Rating Approval Date:

Load Ratings Details

IR04 Load Type	IR05 NBI	IR06 Load Rating Method	IR10 IR Tons	IR11 OR Tons	IR11a SLC Tons	IR20 IR RF	IR21 OR RF	IR17 Rating Dataset

NBI & Alternate Ratings

NBI:

4B01 Design Load:

4B02 Rating Date:

4B03 Posting:

4B07 Inv. Rating: Tons

4B06 Inv. Type:

4B05 Oper. Rating: Tons

4B04 Oper. Type:

Alternate:

4B11 H20 Inv. Rating: Tons

4B10 H20 Inv. Type:

4B09 H20 Oper. Rating: Tons

4B08 H20 Oper. Type:

4B12 ML80 Inv. Rating: Tons

4B12b ML80 Inv. Type:

4B12a ML80 Oper. Rating: Tons

4B12c ML80 Oper. Type:

4B13 TK527 Inv. Rating: Tons

4B13b TK527 Inv. Type:

4B13a TK527 Oper. Rating: Tons

4B13c TK527 Oper. Type:

Posting History

VP01 Status Date	VP02 Posting Status	VP03 Special Restr. Posting	VP04 Posted Wt. Limit (Tons)	VP05 Posted Limit Comb. (Tons)	VP06 Posting Reason

VP01 Status Date:

VP06 Posting Reason:

VP02 Posting Status:

VP07 Field Conditions:

VP02a Posting Type:

VP08 Special Conditions:

VP02b Posting Condition:

VP09 AASHTO Impact Code:

VP03 Special Restr. Posting:

Active: ☑

VP03a Vehicle Posting Type:

VP04 Posted Wt. Limit:

VP05 Posted Limit Comb.:

VP01 Status Date:

VP06 Posting Reason:

VP02 Posting Status:

VP07 Field Conditions:

VP02a Posting Type:

VP08 Special Conditions:

Load Ratings Page

VP01 Status Date	VP02 Posting Status	VP03 Special Restr. Posting	VP04 Posted Wt. Limit (Tons)	VP05 Posted Limit Comb. (Tons)	VP06 Posting Reason

VP02b Posting Condition:

VP09 AASHTO Impact Code:

VP03 Special Restr. Posting: _

Active: ☐

VP03a Vehicle Posting Type:

VP04 Posted Wt. Limit: -Tons

VP05 Posted Limit Comb.: -Tons

Plug Weld Indicator	
6A50 Superstructure	6A51 Substructure

Span Set	6A44 Group	6A45-48 CRF	6A49 Total CRF	6A26 Material Makeup	6A27 Physical Makeup	6A28 Span Interaction	6A29 Structural Config
Main							
Approach							

Details:

IF07 Fatigue Details: N - No E/E' Details

IF00 Key	IF01 Location	IF02 Member Type	IF03 Member	IF04 Member Detail	IF05 Member Stress Category	IF06 Member Detail Condition

SP02 Structure Unit ID: SP01 Span Type: 5D01 Unit Key: 1

	1B01 Element Description	1B05 SF	1A10 Total Qty	UOM	1A11 CS1 Qty	1A11 CS2 Qty	1A11 CS3 Qty	1A11 CS4 Qty
Description:			Condition:					
Description:			Condition:					
Description:			Condition:					
Description:			Condition:					
Description:			Condition:					
Description:			Condition:					
Description:			Condition:					
Description:			Condition:					
Description:			Condition:					

Clearance Information

Minimum Vert Clr

4A15 Over Structure:
4A16 Under (Reference):
4A17 Under Clr:

Minimum Lateral Clr

4A18 Reference Feature:
4A19 Under Right:
4A20 Under Left:

Navigation Control

4A21 Nav Control Exists:
4A22 Nav Vert Clr:
4A23 Nav Horiz Clr:
4A24 Min Vert Lift Clr:

Feature Intersection Details

5C03 On/Under:	6B02 New Wear Surface Ind: ☐
5C01 Feature Name:	6C18 Horiz (L):
6C01 County:	6C19 Horiz (R):
6C02 State Route #:	6C20 Min Vert (L):
6C03 Segment:	6C21 Min Vert (R):
6C04 Offset:	6C22 Defense Vert (L):
5C06 Route #:	6C23 Defense Vert (R):
5C06 Direction:	6C34 Feature Type:
5C22 Functional Class:	6C35 Vert Clr Sign (L):
5C29 Nat Hwy Sys:	6C37 Vert Clr Posting (L):
5C08 Lanes:	6C36 Vert Clr Sign (R):
5C08 Medians:	6C38 Vert Clr Posting (R):
5C08 Speed:	
5C10 Recent ADT:	
5C11 Year:	
5C14 Truck % ADT:	
6C27 ADTT:	
6C28 ADTT Year:	

5C03 On/Under:	6B02 New Wear Surface Ind: ☐
5C01 Feature Name:	6C18 Horiz (L):
6C01 County:	6C19 Horiz (R):
6C02 State Route #:	6C20 Min Vert (L):
6C03 Segment:	6C21 Min Vert (R):
6C04 Offset:	6C22 Defense Vert (L):
5C06 Route #:	6C23 Defense Vert (R):
5C06 Direction:	6C34 Feature Type:
5C22 Functional Class:	6C35 Vert Clr Sign (L):
5C29 Nat Hwy Sys:	6C37 Vert Clr Posting (L):
5C08 Lanes:	6C36 Vert Clr Sign (R):
5C08 Medians:	6C38 Vert Clr Posting (R):
5C08 Speed:	
5C10 Recent ADT:	
5C11 Year:	
5C14 Truck % ADT:	
6C27 ADTT:	
6C28 ADTT Year:	

Proposed Candidates

3A02 Candidate ID	IM03 Action	IM04 Est Qty	UOM	IM05 Priority	IM06 Initial Recom'd Date

IM07 Status:

IM08 Target Year:

IM11 Work Assign:

IM09 Location:

IM15a Work Candidate Notes:
#1
#2
#3

Completed Candidates

3A02 Candidate ID	IM03 Action	IM04 Est Qty	UOM	IM05 Priority	IM06 Initial Recom'd Date	IM14a Completed Date

Inspection Notes

IC01 Note Type	IC02 Note
1 - Approach Alignment	
2 - Approach Roadway - Pavement	
3 - Approach Roadway - Drainage	
4 - Approach Roadway - Shoulders	
5 - Approach Slab	
7 - Bridge Railing	
8 - Transition	
9 - Approach Guiderail	
10 - Approach Rail End	
12 - Deck	
13 - Deck Drainage	
14 - Deck Wearing Surface	
15 - Superstructure	
16 - Superstructure - Diaphragms	
17 - Superstructure - Portals/ Bracing	
18 - Superstructure - Drainage System	
19 - Substructure	
30 - Superstructure - Girders/Beams	
31 - Superstructure - Floorbeams	N/A
32 - Superstructure - Stringers	
33 - Superstructure - Truss Members	
34 - Superstructure - Bearings	
35 - Deck Top	
36 - Deck Underside	
45 - Channel	
46 - Banks	
47 - Streambed Movements	
48 - Debris, Vegetation	
49 - River/Stream Control Devices	
50 - Embankment/Streambed Controls	
53 - Paint - Interior Beam/Girder	
54 - Paint - Fascias	

IC01 Note Type	IC02 Note
55 - Paint - Splash Zone	
56 - Paint - Truss	
57 - Paint - Bearings	
58 - Paint - Other	
66 - Waterway Adequacy	
67 - Due To	
69 - Bump at Bridge	
70 - Deck - Expansion Joints	
74 - Combustible Material Stored Under Bridge	
80 - Channel Protection Condition Rating	

Substructure Notes

IC03 Substucture Unit	IC04 Note Type	IC05 Note
3 - NAB	20 - Abut/Backwall	
3 - NAB	21 - Abut/Bridge Seats	
3 - NAB	22 - Abut/Cheekwalls	
3 - NAB	23 - Abut/Stem	
3 - NAB	24 - Abut/Wings	
3 - NAB	25 - Abut/Footing	
3 - NAB	26 - Abut/Piles	
3 - NAB	27 - Abut/Settlement	
3 - NAB	28 - Abut/Emb. Slopewall	
3 - NAB	29 - Abut/Wall Drainage	
2 - FAB	20 - Abut/Backwall	
2 - FAB	21 - Abut/Bridge Seats	
2 - FAB	22 - Abut/Cheekwalls	
2 - FAB	23 - Abut/Stem	
2 - FAB	24 - Abut/Wings	
2 - FAB	25 - Abut/Footing	
2 - FAB	26 - Abut/Piles	
2 - FAB	27 - Abut/Settlement	
2 - FAB	28 - Abut/Emb. Slopewall	
2 - FAB	29 - Abut/Wall Drainage	

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 STRUCTURE HOME

Structure Identification

***5A01** Structure ID:
5A02 Name:
5A03 NBI Structure No.:
Agency ID:
*7A01 Inspection Date:

Location

5A04 District:
5A05 County:
***5A06** City/Town/Place:
***5A07** Feature Intersected:
***5A08** Facility Carried:
***5A09** Location:
***5A10** Lat / ***5A11** Long:
***5A12** Border State/FHWA Reg:
Share: %
***5A13** Border Struc No:
***5A14** FIPS State: 42 - Pennsylvania
***5A14** FIPS Region: 3 - Region 3-Baltimore

Age and Service

***5A15** Year Built:
***5A16** Year Reconstruct:
***5A17** Type Service On:
***5A18** Under:
***5A19** # Lanes Under:

Management

5A20 Maint Resp:
***5A21** Owner:
5A23 Agency Admin Area:

Deck Information

***5B02** Deck Surface Type:
***5B03** Deck Membrane Type:
***5B04** Deck Protection:
***5B05** Left:
Curb Sidewalk Width:
***5B06** Right:
***5B07** Deck Width:
***5B09** Skew:
***5B10** Structure Flared:

Span Information

***5B11** Number of Main Spans:
***5B12** Main Span Material:
***5B13** Main Span Design:
***5B14** Number of Approach Spans:
***5B15** Approach Span Material:
***5B16** Approach Span Design:
***5B17** Maximum Span Length:
***5B18** Structure Length:
5B19 Deck Area:
5B20 Total Length:

Classification Information

5E01 NBIS Bridge Len:
5E02 Parallel Structure:
5E03 Temporary Structure:
***5E04** Hist Significance:
5E05 Frac Crit Details:

Agency Items

5E10 ACM Status:
5E11 IR:
5E12 IC:
5E13 ACM Insp Date:
5E14 ACM Qty:
5E15 ACM num Loc:
5E16 ACM Loc Desc 1:
5E17 ACM Loc Desc 2:
5E18 9:
5E19 10:
5E20 11:
5E21 12:
5E22 13:
5E23 14:
5E24 15:

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 STRUCTURE NOTES

Structure Identification

***5A01** Structure ID:

5A02 Name:

5A03 NBI Structure No.:

Agency ID:

*7A01 Inspection Date:

2A01 Structure Notes

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 SCHEDULE AND RATING

Structure Identification

***5A01**	Structure ID:	**5A03**	NBI Structure No.:
5A02	Name:		Agency ID:
			*7A01 Inspection Date:

Condition

***1A01**	Deck:	***1A02**	Substructure:	***1A03**	Culvert:
***1A04**	Superstructure:	***1A05**	Channel:	***1A06**	Waterway:
1A07	Unrep Spalls:			**1A09**	Inspection Status:

Structure Appraisal

***4A02**	Approach Alignment:
***IA02**	Railing:
***IA02**	Transition:
***IA02**	Approach Guiderail:
***IA02**	Approach Rail End:
***4A07**	Pier Protection:
***4A08**	Scour Critical:
***4B03**	Posting:

NBI Appraisal Rating

***4A09**	Structural Eval:
***4A10**	Deck Geometry:
***4A11**	Underclearances:
4A12	SD/FO Status:
4A13	Sufficiency Rating:
4A14	Bridge Condition:

Schedule Summary

7A01	Inspection Date :
***7A02**	Team Leader:
7A03	Primary Type:
7A04	Review Required:
7A05	Inspected By:
7A05a	Insp Org. Name:

7A06 Inspection Performed

	National Bridge Inventory:
	Element:
	Fracture Critical:
	Underwater:
	Other Special:

Extended Inspection Interval

7A19	Extended Inspection Interval Eligibility:
7A20	Extended Inspection Interval Concurrence:

Schedule

	7A07 Required (Y/N)	**7A08** Last Date	***7A09** Frequency	***7A10** Next Date
NBI:				
Fracture Critical:				
Underwater				
Other Special:				
Element:				

Bridge Inspection Resources

7A11	Next Team Lead:	**7A12**	NBI Crew Hours	**7A13**	Crane Hours:
7A14	Next insp By:	**7A15**	Frac Crit Hours:	**7A16**	Other 1 Hours:
		7A17	Underwater Hours:	**7A18**	Other 2 Hours:

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 AGENCY BRIDGE

Structure Identification

***5A01**	Structure ID:	**5A03**	NBI Structure No.:
5A02	Name:		Agency ID:
			*7A01 Inspection Date:

General

6A01	Senat Dist:
6A02	Cong Dist:
6A03	Leg Dist:
6A04	Bndy:
6A05	Util Present:
***6A06**	Sub Agency:
6A07	Fed Fund:
6A09	Critical Facility:
6A10	Flood Insp:
6A11	Covered Bridge:
6A12	Dem/Repl Ind:
6A13	Dem/Repl Date:
6A14	Hist Dist Cont:
6A15	Hist Dist:
6A16	Preserv Candidate:
6A17	Future Bridge Bill:
6A18	Network:
6A19	Bus Plan Ntk:
6A20	Watershed:
6A21	De-Ice Equip:
6A22	Corridor:
6A23	Owner Desc:
6A24	Turnback Desc:

Structure Type

		Approach
***6A26**	Material:	
***6A27**	Physical:	
***6A28**	Span Interaction:	
***6A29**	Struct Config:	

Deck Wearing Surface Info

		Main	Approach
***5B02 / 6A30**	Surf:		
***5B03 / 6A31**	Memb:		
***5B04 / 6A32**	Protect:		
6A33	Thickness:		
6A34	Dt Recorded:		
6A35	Surf Thick (Over/Under):		
6A36	Protect Year:		
6A37	Protect Note:		

Latent Problem

6A50	Sup Struc:
6A51	Sub Struc:

Deck Info

6A38	Dept Structyp:
6A39	Relief Joints:
6A40	Form Type:
6A41	No. of Joints:
6A42	Rebar Type:
6A43	Appr Pav Width:

Est Truck Traffic

6A52	Traffic:
6A53	Fatig Life:
6A54	Year:

Fracture Critical

		Main	Approach
6A44	Group No.:		
6A45	Mem Type:		
6A46	Fatig Sus:		
6A47	Material:		
6A48	ADTT		
6A49	Total Crf:		

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 AGENCY INSPECTION

Structure Identification

***5A01**	Structure ID:	**5A03**	NBI Structure No.:
5A02	Name:		Agency ID:
			*7A01 Inspection Date:

General

***6B01**	Spc Insp Type:	**6B02**	New Wear Srf Ind:
6B03	Inventory Correction Ind:	**6B04**	Bump at Bridge Ind:
6B05	Deck Overlay Meas Dt:	**6B06**	Utility Repair ind:
6B07	Est Spall Delam %:	**6B08**	Est Spall Delam Dt:
		6B09	Weather:
6B10	Est Spall Chloride %:	**6B11**	Est Spall Chloride Dt:
6B12	Tempurature:	**6B13**	Under Cont Vert:
6B14	Deck Geom Appr Tbl:	**1A09**	Inspection Status:
6B15	Design Except:		

Structure Condition / Load Appraisal

6B16	Appr Based On:	**6B17**	ADT:	**6B18**	Inventory Rating:
6B19	Cap Appr Cntrl:				

Next Inspection

6B20	Insp Type:	**7A02**	Team Leader:
		7A05a	Insp Org. Name:
6B21	Crane Insp Dt:	**6B23**	Member:
		6B24	Hired By:

Inspection Team

7A05	Inspected By:		
6B25	Insp Contract Num:		

Inspection Hrs (Actual)

6B26	NBI Crew:	**6B27**	Crane:	**6B32**	Engineer:
6B28	Frac Crit:	**6B29**	Other 1:	**6B33**	Rigging:
6B30	Uwater:	**6B31**	Other 2:	**6B34**	Office:

Inspection Cost

Paint Info

6B35	New Protective Coating Since Last Insp:	**6B38**	Appr Slab:
6B36	Protective Coating:	**6B39**	Appr Roadway:
6B37	Protective Coating (Extent):	**6B40**	Deck Wear Surf:

Condition Rating

Commonwealth of Pennsylvania **BRIDGE MANAGEMENT SYSTEM 2**

Department of Transportation **D-491 FEATURES INTERSECTED**

Structure Identification

***5A01** Structure ID: **5A03** NBI Structure No.:

5A02 Name: Agency ID:

*7A01 Inspection Date:

Roadway Detail

Roadway Identification

***5C01 Route Name:**

***5C03 On/Under:**

***5C04 Kind HWY(Rt Pref):**

***5C05 Desig. Lvl Service:**

***5C06 Rte # / Suffix:**

Traffic

***5C08 Lanes:** **Medians:** **Speed:**

*** 5C09 ADT Class:**

***5C10 Recent ADT:** ***5C11 Year:**

5C12 Future ADT: **5C13 Year:**

***5C14 Truck % ADT:**

***5C15 Detour Length:** mi. **5C16 Speed:**

6C27 ADTT: **6C28 ADTT Year:**

Highway Networks and Service Classifications

5C18 Mile Pt.:

5C19 Nat Base Net:

5C20 LRS Inventory Rte: **Sub#:**

***5C21 Toll Facility:**

***5C22 Functional Class:**

5C23 Traffic Direction:

Width

***5C26 Appr. Road:** ***5C27 Roadway:**

Alternate Classifications

***5C28 Defense Hwy:**

***5C29 Nat. Hwy Sys.:** **5C30 SB:**

***5C31 Fed Lands Hwy:** **5C32 Trans:**

***5C33 Nat. Truck Net:** **5C34 Emer:**

State Roadway Location

6C01 County:

6C02 SR Num:

6C03 Seg:

6C04 Offset:

Roadway Admin

***6C05 Admin Juris:**

6C07 Gov Cont:

6C06 Fed Aid:

6C08 Urban / Rural:

6C09 Hwy ind:

6C10 Hwy System Typ:

Clearances

***4A20 Min Lat Under (L):**	ft.	***4A19 Min Lat Under (R):**	ft.
6C18 Horiz (L):	ft.	***6C19 Horiz (R):**	ft.
***6C20 Min Vert (L):**	ft.	***6C21 Min Vert (R):**	ft.
***6C22 Def Vert (L):**	ft.	***6C23 Def Vert (R):**	ft.
***6C35 Vert Clearance Sign (L):**		***6C36 Vert Clearance Sign (R):**	
***6C37 Vert Clearance Post (L):**	ft. in.	***6C38 Vert Clearance Post (R):**	ft. in.

Median

***6C25 Type:** ***6C26 Width:** ft.

Network

6C11 State Code: **6C12 INT:**

6C14 ATTT:

6C15 RMS NHS: **6C16 TTTN:**

Roadway Labels

6C30 Gen Seg Ahead Lbl:

6C31 User Seg Ahead Lbl:

6C32 Gen Seg Back Lbl:

6C33 User Seg Back Lbl:

Notes:

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 FEATURES INTERSECTED

Structure Identification

***5A01** Structure ID:
5A02 Name:
5A03 NBI Structure No.:
Agency ID:
*7A01 Inspection Date:

Waterway Detail

***5C03 On/Under**
***4A21 Nav Control Exists:**
***4A22 Nav Vertical Clr:** **ft.**
***4A23 Nav Horizontal Clr:** **ft.**
***4A24 Min Vert Lft Clr:** **ft.**

Waterway

***FW01 Stream Name:**
FW03 Stream Classification 1:
FW03 Stream Classification 2
FW04 Timeframe:
FW03 Stream Classification 3
FW06 Permit Type:
FW07 Drainage Area: **sq. mi.**
FW08 Fishable:
FW09 Waterflow Direction:
FW10 Primary Waterway:
FW11 Vertical Clearance: **ft.**
FW12 Max W.S. Elevation: **ft.**
FW13 Max W.S. Elevation Year:

Design Flood Data

FW14 Magnitude: **cf/s**
FW15 Elevation: **ft.**
FW16 Frequency: **yrs**
FW17 Velocity: **fps.**
FW18 Pollutant Description:

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 STRUCTURE UNITS / SPANS

Structure Identification

***5A01** Structure ID:

5A02 Name:

5A03 NBI Structure No.:

Agency ID:

*7A01 Inspection Date:

Number of Spans

5B11 Number of Main Spans:

5B14 Number of Approach Spans:

5D01 Unit Key	5D04 Type	5D02 Unit ID	SP03 Span Length

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 INVENTORY DESIGN

Structure Identification

***5A01** Structure ID:

5A02 Name:

5A03 NBI Structure No.:

Agency ID:

*7A01 Inspection Date:

VD01 Design Method:

VD02 Live Load Continuity:

VD03 Geometry:

Superstructure Steel

VD04 Steel Beam Splice:

VD05 Steel Types:

Superstructure Concrete

VD06 Vacuum Process:

VD07 Strand Type:

VD08 Comp Strength @ 28 Days: psi.

VD09 Comp Strength @ Release psi.

VD10 Prestressed Splice Type:
Design:
Filler:
Through:

VD11 Design Tension Methods :

VD12 Void Types:

VD13 Strand Sizes:

Substructure

VD14 Abutment Type:
Near:
Far:

VD15 Abutment Foundation Type:
Near:
Far:

VD17 Pier Foundation Types:

Pier Types

VD16 Material Type:

VD16 Configuration Type:

Culvert

Expansion Joint

Other

VD28 Haunch Type:

VD29 Special Pier Cap:

VD31 Bridge Seat Cleaning:

VD32 Seat Cleaning Note:

VD30 Bearing Types:

VD33 Scuppers w/ Downspouts:

VD34 Scuppers w/o Downspouts:

Structure Identification

***5A01** Structure ID:

5A02 Name:

5A03 NBI Structure No.:

Agency ID:

*7A01 Inspection Date:

VN01
Design Exception Codes:

VN02
Soil Boring Notes:

VN03
Test Description:

VN04
Storage Location:

VN05-VN07 Drawings

Drawing Type	Drawing Number	Description

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 INVENTORY INSPECTION PLANNING

Structure Identification

***5A01** Structure ID:

5A02 Name:

5A03 NBI Structure No.:

Agency ID:

*7A01 Inspection Date:

Miscellaneous

VI01 Min Crane Reach:

VI02 High Voltage Power Line Ind:

VI03 RR Flagger Required:

VI04 Traffic Flagger Required:

Sidewalk

VI05 Type (Left):

VI06 Type (Right):

VI07 Width (Left): ft.

VI08 Width (Right): ft.

VI09 Horizontal Curve:

VI10 Vertical Curve:

Contact

District Bridge Engineer Name:	District Bridge Engineer Phone:	District Bridge Engineer Email:
Local Bridge Coordinator	Local Bridge Coordinator Phone:	Local Bridge Coordinator Email:
Local Owner Name:	Local Owner Phone:	Local Owner Email:

VI11 Inspection Limitations

Equipment

Permits

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 INVENTORY POSTING

Structure Identification

***5A01**	Structure ID:	**5A03**	NBI Structure No.:
5A02	Name:		Agency ID:
			*7A01 Inspection Date:

Posting Detail

VP01	**Status Date:**	**VP06**	**Posting Reason:**
***VP02**	**Posting Status:**	**VP07**	**Field Conditions:**
VP03	**Special Restrictive Posting**	**VP08**	**Special Conditions:**
VP04	**Posted Weight Limit:**	**VP09**	**AASHTO Impact Code:**
VP05	**Posted Limit Combination:**		

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 INSPECTION ELEMENT LIST

>> NBE <<

Structure Identification

***5A01**	Structure ID:	**5A03**	NBI Structure No.:
5A02	Name:		Agency ID:
		***7A01**	Inspection Date:

Structure Unit | Structure Unit ID: | Type:

Elem / Env	1B01 Element Description	1A10 Qty	UOM	A11 Qty1	A11 Qty2	A11 Qty3	A11 Qty4

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 INSPECTION COMMENTS

Structure Identification

***5A01** Structure ID:

5A02 Name:

5A03 NBI Structure No.:

Agency ID:

*7A01 Inspection Date:

Inspection Comments

IC01 Comment Type **IC02 Comment**

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 INSPECTION COMMENTS

Structure Identification

***5A01** Structure ID:

5A02 Name: M

5A03 NBI Structure No.:

Agency ID:

*7A01 Inspection Date:

Substructure Comments

IC03 Substruc Unit **IC04 Comment Type** **IC05 Notes**

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 INSPECTION LOAD RATING

Structure Identification

5A01 Structure ID:
5A02 Name:
5A03 NBI Structure No.:
Agency ID:
***7A01** Inspection Date:

Inspection - Load Ratings Detail

***IR01a** Load Rating Review Recomended:
***IR01b** Reviewer Action:
***IR03** Calc Date:
***IR02** Rating Approved:

*IR04 Load Type	*IR05 NBI	*IR06 Load Rating Method	*IR10 IR	*IR11 OR	IR11a SLC	IR20 IR RF	IR21 OR RF	*IR12 Govern Crit IR	*IR13 Govern Crit OR
1 - H Loading									
2 - HS Loading									
8 - ML80/Ped/Special									
0 - TK527									
D - PHL93									

Structure Identification

5A01 Structure ID: **5A03** NBI Structure No.:

5A02 Name: **Agency ID:**

***7A01 Inspection Date:**

Inspection Information

7A03 Primary Insp Type: 7A09 Frequency: **Inspection Status:**

Main

6A44 Group: 6A45-6A48 CRF: 6A49 Total CRF: 6A26-6A29 Dept. Struc Type:

Approach

6A44 Group: 6A45-6A48 CRF: 6A49 Total CRF: 6A26-6A29 Dept. Struc Type:

Fracture Critical Members

IF01 FC Location	IF02 Member Type	IF03 FC Member	IF04 Member Detail	IF05 Fatigue Stress Cat

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 INSPECTION UNDERWATER (SCBI)

Structure Identification

***5A01** Structure ID:

5A02 Name:

5A03 NBI Structure No.:

Agency ID:

*7A01 Inspection Date:

Inspection - Underwater

IU01 Recalculate SCBI:
IU02 Num Units:
1A09 Inspection Status:
7A03 Primary Insp Type:
IU03 SCBI Source:
***4A08 SCBI:**
7A09 Inspection Freq: **IU00a UW**
Reviewer Action:
***4A08b Scour Critical Category:**
IU00b Review Comments:

SCBI

IU04 Overall SCBI:
IU04b Scour Calculated:
IU05 Total SAR:
IU06 Stream Bed Material:
IU07 Stream Bed Material Desc:

SAR Calculation Data

IU11 NAB Loc:
IU16 Condition:
IU12 FAB Location:
IU17 Horiz Debris Start:
IU13 US Left WW Presence:
IU18 Horiz Debris End: (0% = LAB to 100% = RAB)
IU14 Condition:
IU19 Vert Debris Start:
IU15 US Right WW Presence:
IU20 Vert Debris End: (0% = Streambed to 100% = Beam)

Current Countermeasures

Potential Countermeasures

Commonwealth of Pennsylvania **BRIDGE MANAGEMENT SYSTEM 2**

Department of Transportation **D-491 INSPECTION UNDERWATER (Sub Units)**

Structure Identification

***5A01**	Structure ID:	**5A03**	NBI Structure No.:
5A02	Name:		Agency ID:
			*7A01 Inspection Date:

IN01 - IN11 Sub Unit Detail

IN01 Sub Unit	IN02 Curr Ind	IN03 Scour Rating	IN04 Change Since Last Insp	IN05 Scour Hole	IN06 Debris Potn	IN07 Scourability	IN08 Opening Adeq Channel	IN09 Sediment	IN10 Alignment	IN11 Velocity Stream Slope

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 INSPECTION UNDERWATER (Sub Units)

Structure Identification

***5A01**	Structure ID:	**5A03**	NBI Structure No.:
5A02	Name:		Agency ID:
			*7A01 Inspection Date:

IN12 - IN18 Sub Unit Detail

IN01 Sub Unit	IN12 Pier/ Abut Type	IN13 Inv Found Type	IN14 Found Type	IN15 Streambed Matl	IN16 UW Inspection Type	IN17 Observed Scour Depth	IN18 Water Depth

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 INSPECTION UNDERWATER (Sub Units)

Structure Identification

***5A01**	Structure ID:	**5A03**	NBI Structure No.:
5A02	Name:		Agency ID:
			*7A01 Inspection Date:

IN19 - IN24 Sub Unit Detail

IN01 Sub Unit	IN19 Movement Indicator	IN20 Scour/ Undermine Indicator	IN21 Countermeasures	IN22 Calculated Scour Depth w/ 100 Year Flood	IN23 Calculated Scour Depth w/ 500 Year Flood	IN24 Inspection Notes

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 INSPECTION UNDERWATER (Other)

Structure Identification

***5A01** Structure ID:
5A02 Name:
5A03 NBI Structure No.:
Agency ID:
***7A01** Inspection Date:

Structure Level Data

1A06 Waterway:
IL03 Traffic Delay:
IL02 Risk of Overtopping:
IL04 Func Class:
IL13 Worst Flood Event:
IL14 Worst Flood Event Date:

High Water Mark

IL05 Elevation: -1.00
IL06 Date:
IL07 New High Water:

IL08 High Water Notes:

Underclearance

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 INSPECTION JOINTS AND BEARINGS

Structure Identification

5A01 Structure ID:
5A02 Name:
5A03 NBI Structure No.:
Agency ID:
*7A01 Inspection Date:

Inspection Information

7A03 Primary Insp. Type:
7A09 Frequency: *months*
Inspection Status:

Joint Inspection Information

IJ01 - Overall Joint Condition Rating:
Overall Joint Notes:

IJ02/IJ03 Joint / Record Key	IJ04 Joint Type	IJ05 Joint Location	IJ06 Joint Movement	IJ07 Joint Manufacturer	IJ08 Joint Length *(ft)*	IJ09 Debris Impact ?	IJ10 Leaking ?	IJ11 Damaged ?	IJ12 Covered ?	IJ13 Condition Rating

IJ02/IJ03 Joint / Record Key	IJ14 Extrusion Install Date	IJ15 Seal Install Date	IJ16 ECMS NO.	IJ17 Replacement Reason	IJ18 Replacement Comment	IJ19 Joint Comment

Bearing Inspection Information

IB01 - Overall Bearing Condition Rating:
Overall Bearing Notes:

IB02/IB03 Bearing / Record Key	IB04 Bearing Type	IB05 Bearing Location	IB06 Bearing Count	IB07 Bearing Movement	IB08 Corrosion ?	IB09 Alignment Issues?	IB10 Anchor Bolt Issues?	IB11 Loss of Bearing Area?	IB12 Condition Rating

IB02/IB03 Bearing / Record Key	IB13 Install Date	IB14 ECMS NO.	IB15 Replacement Reason	IB16 Replacement Comment	IB17 Bearing Comment

Commonwealth of Pennsylvania
Department of Transportation

BRIDGE MANAGEMENT SYSTEM 2
D-491 PROPOSED MAINTENANCE

Structure Identification

5A01 Structure ID:
5A02 Name:
5A03 NBI Structure No.:
Agency ID:
***7A01 Inspection Date:**

Inspection Information

7A03 Primary Insp Type:
7A09 Frequency: months
Inspection Status:

Proposed Maintenance Detail

IM01 Scope:
IM02 Element:
IM03 Action:
IM04 Est. Quantity:
IM05 Priority:
IM06 Date Recom:
IM07 Status:
IM15a Notes:
IM08 Target Year:
IM09 Location:
IM10 Estimated Cost:
IM11 Work Assignment:
IM12 Drawing Indicator:
IM13 Permit Indicator:

Commonwealth of Pennsylvania **BRIDGE MANAGEMENT SYSTEM 2**

Department of Transportation **D-491 COMPLETED MAINTENANCE**

Structure Identification

5A01 Structure ID: **5A03** NBI Structure No.:

5A02 Name: **Agency ID:**

***7A01 Inspection Date:**

Inspection Information

7A03 Primary Insp Type: 7A09 Frequency: months **Inspection Status:**

Completed Maintenance Detail

IM01 Scope: **IM14 Comp Date:**

IM02 Element: **IM16 SAP Closed Date:**

IM03 Action: **IM17 SAP WO Number:**

IM05 Priority: **IM18 Actual Quantity:**

IM07 Status: **IM19 Actual Cost:**

IM20 MPMS Number:

IM21 Notes:

Structure Identification

***5A01** Structure ID:

5A02 Name:

5A03 NBI Structure No.:

Agency ID:

*7A01 Inspection Date:

Identification Items

I.15 Border Tunnel State Code :

I.16 Border Tunnel Financial Responsibility : %

I.17 Border Tunnel Number :

I.18 Border Tunnel Inspection Responsibility :

Structure Type And Material Items

S.1 Number of Bores :

S.2 Tunnel Shape :

S.3 Portal Shape :

S.4 Ground Conditions :

S.5 Complex :

Navigation

N.1 Under Navigable Waterway :

N.2 Navigable Waterway Clearance :

N.3 Tunnel or Portal Island Protection from Navigation :

Age and Service Items

A.5 Annual Average Daily Truck Traffic :

A.8 Service in Tunnel :

Substructure

N.1 Direction of Traffic :

N.1 Toll :

N.1 Functional Classification :

N.1 Urban Code :

Commonwealth of Pennsylvania

BRIDGE MANAGEMENT SYSTEM 2
D-491 INSPECTION - SIGNS AND LIGHTS

Structure Identification

Structure ID:		**5A03** NBI Structure No.:	
Name:		Agency ID:	
		***7A01** Inspection Date:	

Inspection Information

7A03 Primary Inspection Type:	S	IS01 Sign/Light Inspection Type:	

Condition Ratings

IS02 Foundation:		IS07 Lights:	
IS03 Guide Rail:		IS08 Surface Paint:	
IS04 Column:		IS09 Horizontal Member/Frame:	
IS05 Method of Access:		IS10 Overall:	
IS06 Sign:		IS15 Sign Asset Tags - Exist/Cond :	

IS11 Notes

Next Inspection Information

IS12 Next Sign Inspection Type:	IS13 Next Inspection Freq:	IS14 Next Inspection Date:

Commonwealth of Pennsylvania

BRIDGE MANAGEMENT SYSTEM 2
D-491 INVENTORY - WALLS

Structure Identification

Structure ID:		**5A03** NBI Structure No.:	
Name:		Agency ID:	
		***7A01** Inspection Date:	

General Information

VW05 Foundation Type:		VW15 Architectural Forms:	
VW06 Backfill/Damping 1:		VW16 Rebar Protection:	
VW07 Backfill/Damping 2:		VW17 FCI:	
VW08 Historic Elig Info:		VW18 Support Info:	
VW09 Manufacturer:		VW19 Direction Info:	
VW10 Wall Use:		VW20 Installed/Retrofitted:	
VW11 Mount Type:			
VW12 Post Type:			
5A15 Year Built:			
5A16 Reconstruct Yr:			

Structure TypeGeneral Information

6A26 Material Type:	1 - Steel
6A27 Physical Type:	9 - Other or none
6A28 Interaction Type:	A - Suspended span
6A29 Configuration:	70 - Flex non-Anchored

Measurements

VW21 County - Begin:		VW21 County - End:	
VW22 SR - Begin:		VW22 SR - End:	
VW23 Segment - Begin:		VW23 Segment - End	
VW24 Offset - Begin:		VW24 Offset - End:	
VW25 Distance to Road:		VW28 Min Wall Height:	
VW26 Slope:		VW29 Max Wall Height:	
VW27 Min Clearance:		5B18 Structure Length:	
		VW31 Total Area:	

Structure Notes

2A01 Notes:

Management

5A20 Maint Resp:		5A21 Owner:	

BRIDGE MANAGEMENT SYSTEM 2
D-491 INSPECTION - WALLS

Structure Identification

Structure ID:		**5A03** NBI Structure No.:	
Name:		Agency ID:	
		***7A01** Inspection Date:	

Inspection Information

Structure Type:	
IW01 Primary Inspection Type:	
VW06 Backfill/Damping 1:	
VW06 Backfill/Damping 2:	

Condition Ratings

IW02 Anchorage:		IW07 Drainage:	
IW03 Backfill/Damping:		IW08 Foundation:	
IW04 Wall:		IW09 Parapets:	
IW05 Panel:		IW10 Overall:	
IW06 Post:			

Notes

IW11 Notes:

Next Inspection Information

IW12 Next Inspection Type:			
IW13 Next Inspection Freq:		IW14 Next Inspection Date:	

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Appendix G

Stone Masonry Arch
Condition Rating Guidelines

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Stone Masonry Arch Condition Rating Guidelines

The following condition codes are to be used in conjunction with Table 1.0 when performing a field inspection of a stone masonry arch bridge. The inspector will frequently need to use sound judgment when deciding which condition rating is to be used for various items. When deciding which code to use, the description of condition codes in Section 1A Inspection Condition of Publication 100A should also be considered.

Tables 2.0 & 3.0 are field aids for the bridge inspectors. They summarize, in tabular form, the information given in the CONDITION RATING GUIDELINES.

A. INTRADOS

1. Changes Since Last Inspection

Changes to the intrados since the previous inspection could indicate a serious problem and need to be closely examined. Widening or lengthening of cracks, appearance of bulge or increased bulging over a substantial area which identifies a change in the geometry of the original arch curvature, additional missing stones, all must be well documented to show extent and location of changes.

Rating:

6, 7, 8, 9 No changes noted.

5 Minor extension of cracks, additional small missing stones.

4 Visible moderate widening of crack. A few additional isolated missing stones.

3 New distortion of original arch curvature or significant transverse or longitudinal crack.

2 Substantial widening of cracks, increased distortion of arch shape or significant losses of stones in intrados. Bridge closure may be required.

1 Bridge is Closed. Movement or loss of stones has advanced to a point where failure appears imminent.

0 Arch barrel has failed.

2. Bulge

Visible bulging which changes the geometry of the arch shape over a substantial area of the intrados could indicate a serious condition and possibly the formation of a hinge that could ultimately be part of a hinged collapse mechanism. This condition must be well documented with a sketch of the reflected view and with descriptions on extent, location, and magnitude of bulge.

Rating:

5, 6, 7, 8, 9	No bulge or geometric distortion.
4	Slight bulging or geometric distortion visible.
3	Visible bulge or geometric distortion with associated crack.
2	Bulge or geometric distortion and crack has extended to a point where collapse of arch is possible.
1	Bridge is Closed. Bulge or geometric distortion has advanced to a point where failure appears imminent.
0	Arch barrel has failed.

3. Transverse Cracks

Visible, continuous transverse cracking in the intrados could be due to deformation of the arch intrados that occurs during the formation of a "hinge" in the stone masonry. Hinge formation is a precursor to the formation of a hinged collapse mechanism. Any visible bulging of the intrados that is associated with a transverse crack would indicate a more advanced condition in hinge formation. These cracks must be documented with a sketch showing location and measurements of length and width. Reference markers should be installed at crack location to assure accurate monitoring of any crack growth.

Rating:

7, 8, 9	No transverse cracks.
6	Any transverse crack with length less than the width of one stone.
5	Short, isolated transverse crack.
4	Transverse crack for substantial length of intrados.
3	Transverse crack is accompanied by visible slight bulging of intrados.
2	Transverse crack associated with significant bulging of intrados.
1	Bridge is Closed. Movement has advanced to a point where failure appears imminent.
0	Arch barrel has failed.

4. Longitudinal and Skewed Cracks

Cracks are differentiated by location and orientation. Longitudinal cracks adjacent to the ringstone are rated in the outboard row of Table 1.0; the remainder of cracks are considered interior cracks. Outboard cracks are defined as cracks that are located within a distance of 0.1 x (Bridge Width) from the interior side of the ringstone with a maximum distance of 5′. Identifying these longitudinal cracks separately is desirable because the outboard cracks may provide information on movement of the spandrel walls. Skewed cracks extend diagonally across the intrados and could indicate a condition different from those causing longitudinal cracks, such as foundation settlement. When cracks are rated as 4 or less, the inspection report should include a sketch of the reflected view of the intrados indicating the location, extent, and width of cracks. Closely spaced parallel longitudinal cracks could indicate the barrel is breaking up and segments are working independently. For wide cracks, install marker reference points on both sides of the crack and record the distance between the markers. Provide a sketch showing the marker locations and give a description of the marker type.

Rating:

8, 9	Original intrados rehabilitated and in good condition.
6, 7	No cracks or fine cracks.
5	Only medium width cracks visible.
4	Wide cracks up to a maximum of ½″ at interior locations and up to 1″ along outboard edge. There is no indication that a significant number of stones are being dislodged or in any way moving as a result of the cracks.
3	Wide cracks or gaps appearing which have resulted in loosening or movement of adjacent stones.
2	Gap along ringstone is coincident with visible movement of spandrel wall. Closely spaced parallel cracks or interior cracks have resulted in loosening or loss of a significant number of stones.
1	Bridge is closed. Imminent failure of spandrel wall or arch barrel or serious loss of stones associated with cracking.
0	Arch barrel has failed.

5. Missing Stones

Isolated missing stones in the intrados are usually not a significant concern, however a substantial opening created by loss of stones reduces the confinement of adjacent stones and could result in an accelerated loss of intrados stone masonry. When this item is rated 4 or less, a sketch of a reflected view should be made which shows location and dimensions of areas with missing stones.

Rating:

8, 9	Intrados not visible due to shotcrete or other material in good condition.
6, 7	None missing or a few small missing stones. Cracks with efflorescence in shotcrete or concrete veneer.
5	A few random missing stones.
4	Moderate opening in intrados due to missing stones. There are no associated bulges. Small area of fill may be visible.
3	Structural capacity of arch barrel could be affected by loss of stones. As a result of openings in intrados loss of additional stones appears imminent. A significant area of fill material may be visible.
2	The loss of stones may have significantly reduced capacity or reduced stone confinement to such an extent that there may be a sudden large loss of intrados stones. Opening has increased and is steadily increasing. There may be a loss of fill material.
1	Bridge is Closed. Imminent failure of arch barrel.
0	Arch barrel has failed.

6. Missing Mortar

Minor superficial mortar loss is relatively shallow, does not indicate the onset of stones loosening, and is easily repaired by repointing. A significant loss of mortar will result in the loosening of stones and eventually stones being dislodged from the intrados.

Rating:

8, 9	Mortar joints have been repointed.
6, 7	None or minor mortar loss.
5	Substantial area of mortar loss of moderate depth.
4	Deep loss over significant area which may have resulted in or contributed to the loss of intrados stones.
3	Mortar material is missing to such an extent that a significant number of stones may be loosening or have already been dislodged from intrados.
2	Opening has increased and is steadily increasing. There may be a loss of fill material.
1	Bridge is closed. Imminent failure of intrados.
0	Arch barrel has failed.

7. Seepage

Poor drainage may result in water seepage through intrados stonework. Especially when combined with freeze - thaw conditions this can result in stone and mortar deterioration along with associated loosening of stones.

Rating:

7, 8, 9	N/A
6	Minor seepage.
5	Substantial seepage accompanied by stone and mortar deterioration.
4	Deterioration from seepage appears to be resulting in loosening or loss of stones.
3	Seepage so severe it appears to be related to the loss of a significant number of stones. Fill material may be visible. Possible small void at interface of fill and intrados.
2	Opening due to stone loss has increased and is steadily increasing. There may be a loss of fill material with a significant void.
1	Bridge is closed. Imminent failure of arch barrel.
0	Arch barrel has failed.

8. Delaminations

Stones may delaminate by splitting along a seam. These tend to frequently exist along the unconfined face of the ringstone. They may also occur in the intrados if the orientation of layers is parallel to the underside. Delaminating is primarily a concern because it may result in reduced confinement and cause the loss of adjacent intrados stones.

Rating:

8, 9	Original stonework rehabilitated and in good condition.
6, 7	None or minor delaminations.
5	Substantial delaminating resulting in reduced volume of several stones.
4	Stone loss from delaminations may result in loosening and loss of adjacent stones.
3	Delaminations are so severe that it has resulted in the loss of a substantial number of stones which could affect arch barrel capacity.
2	Opening has increased and is steadily increasing. There may be a loss of fill material.
1	Bridge is closed. Imminent failure of intrados.
0	Arch barrel has failed.

9. INTRADOS RATING

INTRADOS items 1 to 8 in Table 1.0 are considered when determining overall Intrados Rating. The lower item numbers should be weighted more heavily for the rating. If any of Condition Items 1 thru 5 is coded ≤ 4, the overall Intrados Condition Rating cannot be higher than the lowest rating among these five items. The final rating should be consistent with the definitions given in the CONDITION RATING CODES in Section 1A – Inspection Condition of Publication 100A.

B. SPANDREL WALLS / RINGSTONE

1. Changes Since Last Inspection

Additional spandrel wall movement since previous inspection could indicate imminent loss of stability and spandrel wall failure that could result in loss of fill and subsequent roadway failure.

Rating:

6, 7, 8, 9 No changes noted.

5 Minor extension of cracks, additional small missing stones.

4 New isolated missing stones, minor leaning, or bulging of wall noted.

3 New significant wall movement noted.

2 Substantial advancement of wall movement or stone losses since last inspection. Wall stability affected.

1 Bridge is Closed. Significant wall movement, and imminent failure.

0 Spandrel wall has failed.

2. Loss of Fill

Openings in the spandrel wall, partial or complete collapse of the wall could result in a loss of the fill material supporting the roadway. This may require closure of the bridge.

Rating:

5, 6, 7, 8, 9	No loss of fill material.
4	Small area of fill visible at opening in wall. No loss noted.
3	Substantial area of fill visible, appears stable.
2	Exposed fill has minor losses or appears unstable with losses imminent.
1	Bridge is Closed. Failure of section of spandrel wall accompanied by loss of roadway fill.
0	Spandrel wall has failed.

3. Out of Plumb

Transverse forces from fill material may be forcing the spandrel wall outward. The wall may be visibly out of plumb. This condition should be noted and measurements taken so any further movement tracked. The method of measurement shall be noted, and the location where the measurement was taken shall be shown on a sketch.

Rating:

8, 9	Original wall rehabilitated and in good condition.
6, 7	Wall vertical or only slightly leaning.
5	Visible movement of wall but does not appear to be threatening stability.
4	Measurable movement. There may be associated cracking.
3	Significant movement. Stability of wall is beginning to be affected.
2	As a result of movement there appears to be the potential for the collapse of the spandrel wall.
1	Bridge is closed. Imminent failure of wall.
0	Spandrel wall has failed.

4. Misalignment

Any indication of misalignment in the normal curvature of ringstone could indicate a serious problem related to spandrel wall movement.

Rating:

8, 9	Original stones or replaced stones are in good condition.
6, 7	No visible or minor misalignment of ringstone curvature.
5	Smooth curvature of ring seems to have been altered but there is no indication of spandrel wall or intrados problems.
4	Altered curvature is accompanied by some visible movement of spandrel wall or intrados.
3	Ring misalignment appears to be related to significant movement of spandrel wall or intrados.
2	Serious movement of spandrel wall or arch barrel related to ringstone deterioration.
1	Bridge is closed. Imminent collapse of spandrel wall, arch ring or adjacent intrados.
0	Arch ring collapse accompanied by arch barrel or spandrel wall failure.

5. Bulge

A bulge in spandrel wall is likely due to the same transverse forces described for Item B.3 (Out of Plumb) and raises the same concerns. Bulge can be measured using a plumb bob, level, or similar method. The method of measurement and locations where measurements were taken shall be clearly shown on a sketch.

Rating:

8, 9	Original wall rehabilitated and in good condition.
6, 7	No bulging or only minor bulging visible.
5	Visible bulging of wall but does not appear to be threatening stability.
4	Measurable movement. There may be associated cracking.
3	Significant movement. Stability of wall is beginning to be affected.
2	As a result of movement there appears to be the potential for the collapse of the spandrel wall.
1	Bridge is closed. Imminent failure of wall.
0	Spandrel wall has failed.

6. Missing Stones

Isolated missing stones in the spandrel walls are usually not a significant concern, however a substantial opening created by loss of stones reduces the support and confinement of adjacent stones and could result in accelerated movement of the wall. When this item is rated 4 or less, a sketch of a reflected view should be made which shows location and dimensions of areas with missing stones.

Rating:

6, 7, 8, 9	None.
5	A few random small missing stones.
4	Moderate opening in wall due to missing stones. There are no associated bulges. Small area of fill may be visible.
3	Stability of wall could be affected by loss of stones. As a result of the openings, loss of additional stones appears imminent.
2	The wall stability is seriously threatened. There may be a loss of fill material.
1	Bridge is Closed. Imminent failure of spandrel wall.
0	Spandrel wall has failed.

7. Cracks

Cracks in spandrel walls may be associated with transverse forces generated by the fill material. Less frequently, they may be related to a general vertical movement. Either case should be noted and it should be indicated if they appear to be due to movement of spandrel wall or intrados. When rated 4 or less, there should be a sketch showing the extent and width of cracks. For wide cracks, install marker reference points on both sides of the crack and record the distance between the markers. Provide a sketch showing the marker locations and give a description of the marker type.

Rating:

8, 9	Original wall rehabilitated and in good condition.
6, 7	No cracks or fine cracks.
5	Only medium width cracks visible.
4	Wide cracks up to a maximum of ½". There may be some associated minor movement of the spandrel wall.
3	Wide cracks or gaps appearing which has resulted in loosening or movement of adjacent stones.
2	Wide cracks are coincident with significant movement of spandrel wall.
1	Bridge is closed. Imminent collapse of spandrel wall.
0	Spandrel wall has failed.

8. Missing Mortar

A significant mortar loss will result in a loosening of stones and potentially stones being dislodged from the spandrel wall.

Rating:

8, 9	Original wall rehabilitated and in good condition.
6, 7	None or minor mortar loss.
5	Substantial loss of moderate depth.
4	Deep loss over significant area which may have resulted in or contributed to loosening of stones.
3	Mortar material is missing to such an extent that a number of stones may be loosening or have already been dislodged from wall.
2	Missing stones are affecting stability of spandrel wall. Loss of stones has increased and is steadily worsening. There may be a loss of fill material.
1	Bridge is closed. Imminent failure of intrados or spandrel wall.
0	Arch barrel or spandrel wall has failed.

9. SPANDREL WALLS / RINGSTONE RATING

SPANDREL WALLS / RINGSTONE items 1 to 8 in Table 1.0 are considered when determining overall condition rating. The lower item numbers should be weighted more heavily for the rating. The final rating should be consistent with the definitions given in the CONDITION RATING CODES in Section 1A – Inspection Condition of Publication 100A.

C. OVERALL SPAN RATING

Span rating is based on the lower value of the Intrados and Spandrel Walls/Ringstone condition ratings.

D. OVERALL SUPERSTRUCTURE / CULVERT RATING (1A04/1A03)

Superstructure / Culvert rating for bridge is lowest overall span rating.

Overall and Component Condition Rating Tables

Table 1.0 is used for recording the condition rating codes for the various intrados, spandrel wall, and ringstone elements. The table includes separate boxes for assigning the overall coding of intrados and spandrel walls/ringstone.

Tables 2.0 & 3.0 are field aids for the bridge inspectors. They summarize, in tabular form, the information given in the CONDITION RATING GUIDELINES.

TABLE 1.0 – Overall Superstructure(1A04)/Culvert(1A03) Rating						
			CONDITION RATING			
	SPAN		1	2	3	4
INTRADOS	1*	***Changes Since Last Inspection				
	2*	Bulge				
	3*	Transverse Cracks				
	4*	Cracks - Longitudinal and Skewed – Interior				
		Cracks - Longitudinal and Skewed – Outboard				
	5*	Missing Stones				
	6	Missing Mortar				
	7	Seepage				
	8	Delaminations				
	Intrados Rating					
SPANDREL WALLS / RINGSTONE	1*	***Changes Since Last Inspection				
	2*	Loss of Fill				
	3*	Out of Plumb				
	4*	Misalignment				
	5*	Bulge				
	6*	Missing Stones				
	7	Cracks				
	8	Missing Mortar				
	Spandrel Walls / Ringstone Rating					
	**OVERALL SPAN RATING					

Overall Superstructure/Culvert Rating	

* If any item with an asterisk has a condition rating ≤ 4, the associated overall rating for Intrados and Spandrel Walls/Ringstone cannot be higher than the lowest rating among these items.

** Overall Span Rating is the lower rating of the Intrados and Spandrel Walls/Ringstone.

*** When Changes Since Last Inspection is coded ≤ 4, the item that has changed shall be coded no higher than the Changes Since Last Inspection code.

NOTE: Table 1.0 does not account for scour in the culvert rating. Inspectors need to consider scour if it has affected the overall condition of the culvert.

TABLE 2.0 – Intrados Condition Rating Summary

	RATING	INTRADOS							
		1	2	3	4	5	6	7	8
		CHANGES	**BULGE**	**TRANSV. CRACKS (4)**	**LONG. & SKEWED CRACKS (3)** OUTBOARD or INTERIOR	**MISSING STONES**	**MISSING MORTAR**	**SEEPAGE**	**DELAMINATION**
LIGHT	9	None	None	None	None (1)	None (1)	Joints repointed	None	None (1)
	8	None	None	None	None (1)	None (1)	Joints repointed	None	None (1)
	7	None	None	None	None	None	None	None	None
MODERATE	6	None	None	Short ≤ length of 1 stone	Few fine cracks	Random small stones	Minor losses	Minor	Minor
	5	Minor crack extension or additional small missing stones	None	Short/Isolated	Few medium width	A few small stones	Substantial losses of moderate depth	Substantial seepage with some mortar deterioration	Substantial volume loss to several stones
SEVERE	4	*Mod. crack widening, additional isolated missing stones	Slight bulging or geometric distortion	Mod. to long crack	Few wide, minor loosening of stones	Moderate opening in intrados	Deep losses over significant area/stones loosened	Seepage has resulted in some loosening of stones	Loosening stones due to delamination
	3	*New significant bulging, transverse or long. crack	Advanced bulging or distortion with cracking	Mod to long with minor bulge	Wide w/adjacent loose or missing stones	Significant opening, further losses imminent	Mortar loss related to significant number of loose stones	Significant stone loss associated with seepage	Severe delam. affecting load capacity
CRITICAL	2***	*Significant changes; possible need to close bridge	Distortion. approaching possible collapse	Wide with significant bulge	Significant with losses of stones	Significant losses possibly affecting structural capacity	Missing mortar results in serious stone loss	Serious losses associated with seepage	Structural capacity seriously affected by delamination
	1**	*Imminent intrados failure	Imminent intrados failure associated with distortion	Imminent intrados failure	Imminent intrados failure	Imminent intrados failure	Imminent failure due to loss of stones	Imminent failure due to loss of stones	Imminent failure due to loss of stones
	0	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)

* When Changes Since Last Inspection is coded ≤ 4, the item that has changed can be coded no higher than the Changes Since Last Inspection code.
** Condition code 1 indicates the bridge is closed.
*** Condition code 2 indicates advanced deterioration and may require closure of bridge until repairs are made.

(1) Repaired or rehabilitated
(2) Structure failed
(3) Longitudinal cracks are parallel to centerline of roadway
(4) Transverse cracks are parallel to centerline of roadway

TABLE 3.0 – Spandrel Walls / Ringstone Condition Rating Summary									
	RATING	SPANDREL WALLS / RINGSTONE							
		1	2	3	4	5	6	7	8
		CHANGES	LOSS OF FILL	OUT OF PLUMB	MISALIGNMENT	BULGE	MISSING STONES	CRACKS	MISSING MORTAR
LIGHT	9	None	None	None (1)	None (1)	None (1)	None	None (1)	None (1)
	8	None	None	None (1)	None (1)	None (1)	None	None (1)	None (1)
	7	None	None	None	None	None	None	None	None
MODERATE	6	None	None	Slight	Slight	Random small	None	Few fine	Minor
	5	Minor crack or small missing stones	None	Minor, wall still stable	Minor, no spandrel wall problems	A few stones, visibly bulged	A few small missing stones	Few medium width	Substantial losses of moderate depth
SEVERE	4	*New minor movement, isolated missing stones, moderate cracks	Small area of fill visible, no losses	Measurable movement, possible associated cracks	Some misalignment with some associated spandrel wall movement	Measurable movement, possible associated cracks	Moderate opening, no associated bulge	Wide cracks, some associated movement	Deep losses over significant area, stones loosened
	3	*Significant new movement or stone losses	Substantial visible fill, appears stable	Significant movement, wall stability affected	Significant ringstone misalignment	Significant movement affecting stability	Wall stability being affected by missing stones	Wide cracks with movement or missing stones	Mortar loss related to significant number of loose stones
CRITICAL	2	*New movement or loss of stones threatens wall stability	Exposed fill appears unstable	Potential collapse due to movement	Ringstone movement associated with serious movement of spandrel wall	Substantial movement, possible wall collapse	Wall stability seriously threatened. May be loss of fill	Wide cracks with significant movement or significant number of missing stones	Missing mortar results in serious stone loss
	1**	*Imminent spandrel wall failure and loss of fill	Serious loss of fill material	Imminent spandrel wall failure and loss of fill	Imminent spandrel wall failure associated with ringstone losses	Imminent spandrel wall failure and loss of fill	Imminent spandrel wall failure and loss of fill	Imminent spandrel wall failure and loss of fill	Imminent failure due to loss of stones
	0	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)

* When Changes Since Last Inspection is coded ≤ 4, the item that has changed can be coded no higher than the Changes Since Last Inspection code.
** Condition code 1 indicates the bridge is closed.

(1) Repaired or rehabilitated
(2) Structure failed

FIELD NOTE SHEETS

Field note sheets provide specific locations for recording comments on condition of intrados, spandrel walls/ringstone.

Span ___

Intrados

Code

☐ **Changes**

☐ **Bulge**

☐ **Crack-Trans.**

☐ **Crack Interior**

☐ **Crack Outboard**

☐ **Missing Stones**

☐ **Missing Mortar**

☐ **Seepage**

☐ **Delam.**

Additional Notes:

Span ___

Spandrel Walls/
Ringstone

Code

☐ **Changes**

☐ **Loss of Fill**

☐ **Out of Plumb**

☐ **Misalignment**

☐ **Bulge**

☐ **Missing Stones**

☐ **Cracks**

☐ **Missing Mortar**

Additional Notes:

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Appendix H

National Bridge Inventory
Bridge Elements

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Preface

PennDOT conducts element level bridge inspection using FHWA's Specification for the National Bridge Inventory Bridge Elements (SNBIBE) and AASHTO's Manual for Bridge Elements Inspection (MBEI).

Appendix H is separated into two parts; the first part, used with permission from AASHTO, consists of Sections 1.1 through 1.5 from the MBEI. Part 1 provides background information on general bridge element philosophy, element types and instructions on how to use the MBEI. The second part provides additional guidance and clarification with regards to element measurements, scale factors, and definitions used specifically in Pennsylvania.

Part 1 – AASHTO Manual for Bridge Element Inspection

Section 1: BACKGROUND

1.1 - Condition Assessment Philosophy: Multipath and Defect Concepts

The Manual for Bridge Element Inspection builds on the element-level condition assessment methods developed in the AASHTO Guide for Commonly Recognized Structural Elements. Improvements have been made to fully capture the condition of the elements by reconfiguring the element language to utilize multiple distress paths within the defined condition states. The multipath distress language provides the means to fully incorporate all possible defects within the overall condition assessment of the element. The overall condition of an element can be utilized in this aggregate form or broken down into specific defects present as desired by the agency for Bridge Management System (BMS) use.

The MBEI provides a comprehensive set of bridge elements that is designed to be flexible in nature to satisfy the needs of all agencies. The complete set of elements captures the components necessary for an agency to manage all aspects of the bridge inventory utilizing the full capability of a BMS.

The element set presented within includes two element types identified as National Bridge Elements (NBEs) or Bridge Management Elements (BMEs). The combination of these two element types comprise the full AASHTO element set. All of the elements, whether they are NBEs or BMEs, have the same general condition assessment characteristics:

1. Standard number of condition states is four.
2. The standard condition states are good, fair, poor, and severe general descriptions.
3. Units of measure are length in feet, area in square feet, and each for enumerated elements.

1.2 - National Bridge Elements (NBEs)

The National Bridge Elements represent the primary structural components of bridges necessary to determine the overall condition and safety of the primary load carrying members. The NBEs are a refinement of the deck, superstructure, substructure, and culvert condition ratings defined in the Federal Highway Administration's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges. Additional elements included in this section are bridge rail and bearings. The NBEs are designed to remain consistent from agency to agency across the country in order to facilitate and standardize the capture of bridge element conditions at the national level. In order to capture the diversity of new element design types and materials, many elements in this category have an "other" element type defined.

1.3 - Bridge Management Elements (BMEs)

Bridge Management Elements include components of bridges such as joints, wearing surfaces, and protective coating systems and deck/slab protection systems that are typically managed by agencies utilizing Bridge Management Systems. The BMEs are defined with a recommended set of condition assessment language that can be modified to suit the agencies' needs as these elements are not intended to be utilized for the purposes of national policy-making. The BMEs defined within the MBEI were purposefully left fairly general in nature to provide the flexibility to develop agency specific elements that best suit the local bridge management practices. Agencies may choose to develop additional BMEs as necessary following the agency-developed element conventions discussed in Appendix A. When considering additional elements, the agency should consider such factors as element performance, deterioration rates, feasible actions, and preservation costs, as well as the practical considerations of training and inspection costs.

1.4 - Agency Developed Elements (ADEs)

The elements presented within provide the flexibility for an agency to define custom elements in accordance with the defined element framework that may be sub-elements of NBEs or BMEs, or may be agency-defined elements without ties to the elements defined in the MBEI.

By defining a comprehensive set of bridge elements necessary for robust bridge management and the minimum set of elements necessary to assess the condition of primary components of bridges, the MBEI provides a flexible element set that can be tailored to the needs of all agencies. The identification numbers 800 and above are not used in the MBEI for any elements and are reserved for agency purposes.

1.5 - How to Use the MBEI

Bridge inspection based on the MBEI consists of defining the elements (pieces of the bridge) and total quantities that exist at each bridge. The condition of each element is determined by performing a field inspection and recording quantities of the element that have identified defects that correlate to the severity of the defects defined in the particular condition state definition of the MBEI. The condition assessment is complete when the appropriate portion of the total quantity is stratified over the defined condition states. For agencies utilizing bridge management systems (BMSs), the appropriate element defects and environment shall be recorded for use in deterioration modeling.

In the MBEI, the element represents the aggregate condition of the defined element inclusive of all defects. The specific listing of all defects is optional; however, the element condition must be inclusive of all defined defects. Element defects are typically to be used when the element reaches Condition State 2 or lower and they essentially act to break down the overall element condition into one or more specific observed problems. The defects defined within the MBEI shall always assume the units of the element with which they are associated. For example, the scour defect may be applied to a column or a pier wall. The defect language is the same for both elements; however, the units for the column defect would be each and the units for the pier wall would be linear feet. In some cases, multiple defects may operate in the same defined space. In this case, the inspector shall report the defect in the most severe condition state. If two defects in the same condition state operate in the same defined space, the inspector shall determine the predominant defect for reporting. For example, if a reinforced concrete bridge deck is cracked throughout and also has a spall in a portion of the deck, the spalling would likely be determined to be the predominant defect.

The MBEI attempts to cover the vast majority of all bridge elements found on highway bridges in the United States. During the course of an inspection, the inspector may find materials or elements that are not defined. In these cases, the inspector should use judgment to select the closest element match or use the "other" element type. In a similar vein, the inspector should use judgment when utilizing the condition state defect definitions. There may be cases when the specific condition observed in the field is not defined in the MBEI. In these cases, the inspector should use the general description of the condition states to determine the appropriate condition.

The granularity of the defect details is typically not specified with defect descriptive language for Condition State 4, as this state is reserved for severe conditions that are beyond the specific defects defined for Condition States 1 through 3. Elements with a portion or all of the quantity in Condition State 4 may often have load capacity implications warranting a structural review. Within the MBEI, the term "structural review" is defined as a review by a person qualified to evaluate the field observed conditions and make a determination of the impacts of the conditions on the performance of the element. Structural reviews may include a review of the field inspection notes and photographs, review of as-built plans, or analysis as deemed appropriate to evaluate the performance of the element. Agencies may establish additional guidance to aid the inspector in determining the field circumstances where structural review is warranted, taking into consideration the education, training, and experience of their inspection staff.

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Part 2 – Defect Code Recording in Pennsylvania

Part 1 of this appendix reproduces Sections 1.1 through 1.5 of the MBEI; Section 1.5 explains how inspectors are to use the MBEI and it states "the specific listing of all defects is optional." However, PennDOT has decided to require the collection of specific element defect codes in order to increase the accuracy and consistency of both defect code condition state and element condition state quantity distributions. This information will be utilized to support bridge management deterioration modeling, forecasting and evaluation.

All ADEs, most NBEs, and certain BMEs have Condition State Definitions that require a structural review if defect quantities exist in the Severe Condition State (CS-4). If there is no impact on strength or serviceability after a structural review has been completed, then the quantity should be moved to Poor CS-3 Poor (does not require a structural review) to be consistent with the condition state definitions. This statement does not apply to protective systems and coatings, wearing surfaces, or joints. In the event a CS-4 quantity impacts the load rating of a structure, the quantity of shall remain in CS-4 if the bridge is posted because of the CS-4 quantity.

The **Damage*** defect condition state descriptions below are to be utilized in Pennsylvania. It is modified from the original description in AASHTO's Manual for Bridge Element Inspections is applicable to elements which do NOT require a structural review for CS-4:

Defect	Condition States			
	1	2	3	4
	GOOD	FAIR	POOR	SEVERE
Damage (Impact Related) (7000)	Not applicable.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 4 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.

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The **Corrosion*** defect condition state descriptions below are to be utilized in Pennsylvania. They are modified from the original description in AASHTO's Manual for Bridge Element Inspections:

Defect	Condition States			
	1	2	3	4
	GOOD	FAIR	POOR	SEVERE
Corrosion (1000)	None.	Freckled Rust. Corrosion of the steel has initiated.	Measurable (≥ 1/16″) section loss is evident or pack rust is present but does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.

Element Measurements and Scale Factors

When calculating element quantities, use the following hierarchy to obtain measurements:

1) As Built Drawings
2) Design Drawings
3) Field measurements
4) Field Estimation

All elements and corresponding dimensions used for quantity calculation shall be clearly identified on the existing bridge plans and placed in the bridge file for future reference. When bridge plans do not exist, the elements and quantity calculation methodology shall be clearly documented with sketches and notes placed in the bridge file.

When assigning condition state measurements, record the length to the nearest foot and area to the nearest square foot. When taking scale factor measurements, record to the nearest tenth of a foot. A primary unit of measurement quantifies each element. For cost tracking purposes, elements may be further quantified with an additional component known as the scale factor. The scale factor is a multiplier to account for the relative sizes of the element in order to develop a more accurate estimate.

The elements to be further quantified with a scale factor are beam/girder, abutment, wing and retaining walls, pier wall, pier cap, and column elements. The procedure for calculating scale factor measurements is provided within the Element Type description below, if applicable based upon the element.

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Element Types

Decks

The terms "deck" and "slab" are sometimes used incorrectly to describe the same bridge component. A deck is supported by a superstructure unit (beams, girders, etc.), whereas a slab is a superstructure unit supported by a substructure unit (abutments, piers, bents, etc.). A deck can be loosely defined as the top surface of the bridge, which carries the traffic. A slab serves as the superstructure and the top surface that carries the traffic.

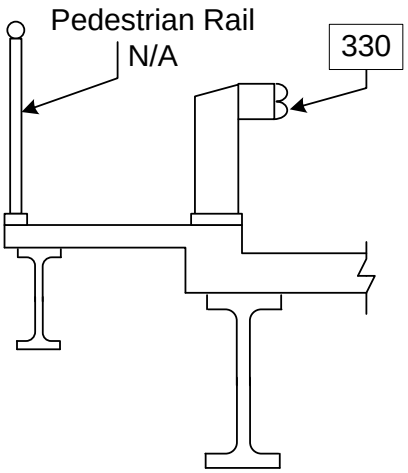
For Northeast Extreme Tee (NEXT) Beams, PennDOT does not allow the top flange of the NEXT Beam to function as the deck. The approved products drawings associated with the NEXT Beam indicate the top flange is intended to act as a deck form only. Therefore, a NEXT Beam or a similar type of beam/girder will be shown as Element 109 and a separate deck element is required. For adjacent, non-composite box beams where the top of the box acts as the deck, both Elements 104 (Prestressed Concrete Closed Web/Box Girder) and Element 16 (Reinforced Concrete Top Flange) should be inventoried and assessed. Element 16 is used over Element 15 (Prestressed Concrete Top Flange) because there are not prestressing strands typically in the top flange. If there are prestressing strands in the top flange, it would be appropriate to use Element 15.

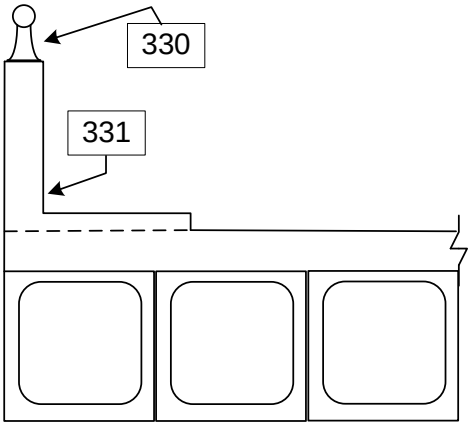
For single span structures, deck length is measured from paving notch to paving notch or back to back of backwalls. For multiple span structures, the deck length measurement is dependent upon the structure unit location. The deck length for end units is measured from paving notch or back of backwall to centerline of pier, while the deck length for interior units is measured from centerline of pier to centerline of pier.

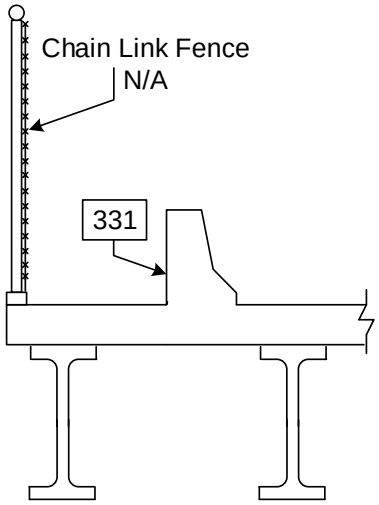
For this element, deck width is equal to the out-to-out width.

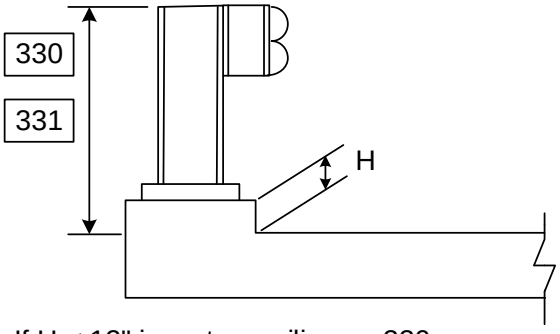
Bridge Railing

The quantity for railings is the length of each rail system measured from paving notch to paving notch or back to back of backwalls. If both railings are of the same type, the entire quantity for both rails should be placed in the appropriate railing element. When two railings types are used in conjunction with one another, i.e., metal railing mounted on a concrete railing, both elements should be recorded. The quantity of railing is the number of rows of bridge rail on the bridge times the length of a bridge. For example, on a two lane, undivided highway, the bridge railing would be placed on either side of the bridge. Regardless of the number of rails per row, each side would be considered one row. Furthermore, when there is a joint between median barriers along a divided highway, the barrier will be quantified as two separate rows. When offsets are used between support posts and guide rail, the condition of the offsets, regardless of material type, should be documented using the Connection Defect Code (1020). Additional guidance can be found in the MBEI Appendix B. Coding examples of railing are provided on the next page.



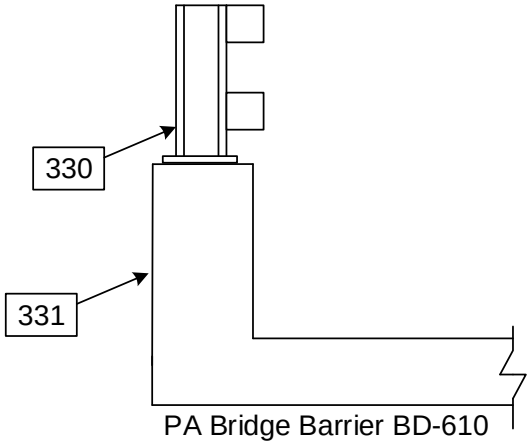




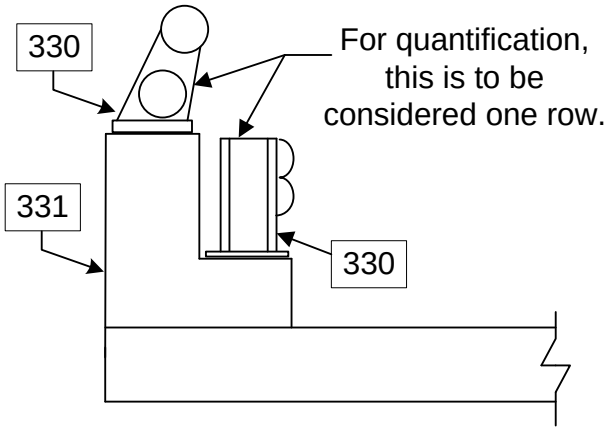


If H < 12" inventory railing as 330

If H > 12" inventory railing as 330 and 331



PA Bridge Barrier BD-610
(PA Type 10 M similar)



Notes:

1. 331 Element Number.
2. Vertical measurements shall be taken to top of deck or wearing surface, if present.

Joints

The quantity for joints shall be the total length of joint from out-to-out of deck along the structure skew to the nearest foot. If various types of joints are present, code the linear feet of each type of joint that is visible. If a joint was originally constructed with a compression seal, but the seal has fallen out, do not code the joint as an open joint. It should be coded as a compression joint with a low condition state.

Beams, Girders, and Stringers

The length of beams, girders and stringers shall be measured from centerline of bearing to centerline of bearing. If the span length varies (e.g. when substructure units are not parallel to each other), the average span length may be used.

Beams, girders and stringers have a primary unit of measurement of feet, which is measured along their length. They also have a scale factor measurement for average depth, in feet, to identify very large beams versus smaller ones.

Beams, girders or stringers that do not support the deck directly, should not be counted in the total element quantity. Examples of this would include stringers on a truss that support only the sidewalk or instances when a longitudinal joint is present between the sidewalk and the deck.

Girder Line Determination

Two methods of counting girders are in use: the "conventional" method and the AASHTO method. The conventional method will be used for Pennsylvania. The examples shown in Figure 1 (below) demonstrate the conventional method for several common girder types.

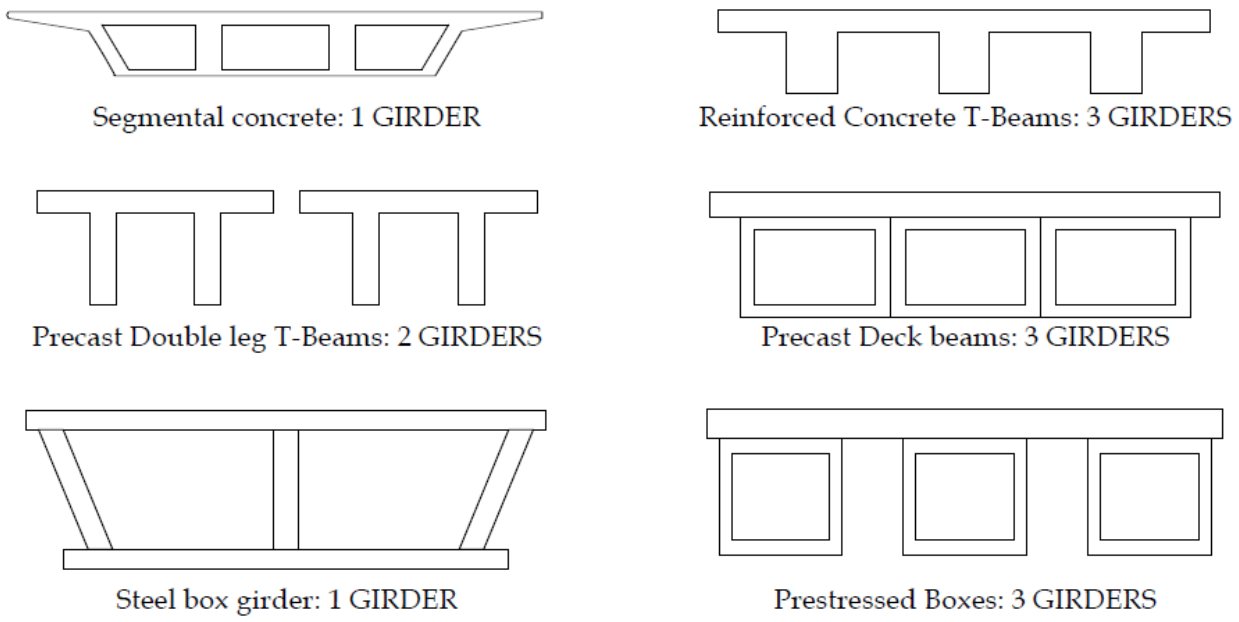


Figure 1: Girder Quantity Examples

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Truss and Open Spandrel Arch Quantities

All measurements of a truss and an open spandrel arch are along the horizontal projection. This convention includes the quantities for deterioration measurements.

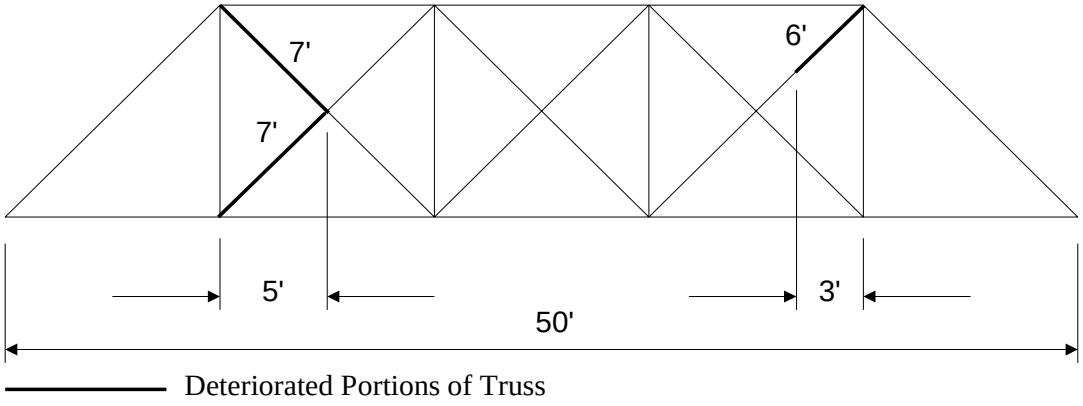

Figure 2: Truss Quantity Example

For the example shown in Figure 2, the total length of the truss is 50′. The total quantity of the condition state for the deterioration is 5′ + 3′ = 8′.

Columns

Columns are to be counted as EACH (EA) items, as long as the width of the column is less than ten feet in width. For widths 10 feet and greater, refer to Pier Walls below. The scale factor measurement for columns is the average height of column from the top of footing to the bearing seat or bottom of pier cap, if present. If the footing is below the ground line and the depth cannot be determined from plans, use the length of the exposed portion plus 3 feet for the scale factor measurement.

Since columns are assessed as an EACH (EA) item, it is better to assess the condition and assign a condition state similar to component condition ratings and not downgrade the condition based on localized defects. In other words, apply a general condition rating approach of good, fair, poor or severe and then apply the defect code concepts if the column is considered fair, poor or severe. If there are localized areas of deterioration, use the defect code notes to specify the location and condition of that specific defect.

Pier Walls

The pier wall element should be used for any rectangular RC support pier shaft that is not part of a Pier Bent configuration. When the pier supporting member is ten feet or greater in width, the component is defined as a Pier Wall. A Pier Wall may or may not have a Pier Cap. A typical example of a pier wall is the pier shaft of a large hammerhead pier.

The scale factor measurement for pier walls is the average height of the pier wall from the top of the footing to the bearing seat if there is no pier cap. If there is a pier cap, the average height is from the top of the footing to the bottom of the pier cap. If the footing is below the ground line and the depth cannot be determined from plans, use the height of the exposed portion plus 3 feet for the scale factor measurement.

Pier Caps

The pier cap supports the girders and transfers the load into piles or columns. Generally speaking, pier caps are on top of pier columns and are wider than the pier columns. Usually caps are a separate concrete pour. Pier caps lengths are measured along the centerline of bearing.

The scale factor measurement for pier caps is the average height of the pier cap from the top of the column to the bottom of the bearing seats.

Abutments

Abutments are measured along the entire face of the abutment and back along the wingwalls to the first vertical joint. If the wingwalls are integral (no joints), the quantity will include the length of the abutment plus the entire length of each wingwall. If the wingwalls are not integral, the abutment quantity will include only the length of abutment and a separate element must be coded for the wingwalls.

The scale factor measurement for abutments is the average height of the abutment stem from the top of the footing to the bearing seat. If the footing is below the ground line and the depth cannot be determined from plans, use the height of the exposed portion plus 3 feet for the scale factor measurement.

Wingwalls

Non-integral wingwalls are measured along the face from the vertical joint at the abutment to the end of the wingwall face.

The scale factor measurement for wingwalls is the average height of the wall stem from the top of the footing to the top of the wall. If the footing is below the ground line and the depth cannot be determined from plans, use the height of the exposed portion plus 3 feet.

Structure Units

Structures (bridges, culverts, etc.) can be divided into one or more smaller units, called structure units. A structure unit is any logical grouping of structure components usually having the same structural design and material. In Pennsylvania, each span of a structure is considered to be an individual structure unit.

When coding elements, the quantity for each element on each structure unit is required. Elements that are common to two spans are assigned to the lowest numbered span that they share. For example, the pier for a two-span bridge would be placed with span 1.

Environments

At this time, all Pennsylvania bridge elements will be placed in environment 3 (moderate). For additional information refer to Section 3.10 of the MBEI**.**

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AASHTO/PennDOT Bridge Elements, Defects, and Condition States (2015 Interims)

Decks/Slabs (NBE's)			
Element #	Element Name	Units	Note
12	Reinforced Concrete Deck	AREA (sq. ft.)	
13	Prestressed Concrete Deck	AREA (sq. ft.)	
15	Prestressed Concrete Top Flange	AREA (sq. ft.)	2
16	Reinforced Concrete Top Flange	AREA (sq. ft.)	2
28	Steel Deck with Open Grid	AREA (sq. ft.)	
29	Steel Deck with Concrete Filled Grid	AREA (sq. ft.)	
30	Steel Deck Corrugated/Orthotropic/Etc.	AREA (sq. ft.)	
31	Timber Deck	AREA (sq. ft.)	
38	Reinforced Concrete Slab	AREA (sq. ft.)	1
54	Timber Slab	AREA (sq. ft.)	1
60	Other Deck	AREA (sq. ft.)	
65	Other Slab	AREA (sq. ft.)	1

Wearing Surface and Protective System (BME's)			
Element #	Element Name	Units	Note
510	Wearing Surface	AREA (sq. ft.)	3,5
515	Steel Protective Coating	AREA (sq. ft.)	
520	Concrete Reinforcing Steel Protective System	AREA (sq. ft.)	
521	Concrete Protective Coating	AREA (sq. ft.)	

Joints (BME's)			
Element #	Element Name	Units	Note
300	Strip Seal Expansion Joint	LENGTH (ft.)	
301	Pourable Joint Seal	LENGTH (ft.)	
302	Compression Joint Seal	LENGTH (ft.)	
303	Assembly Joint with Seal	LENGTH (ft.)	
304	Open Expansion Joint	LENGTH (ft.)	
305	Assembly Joint without Seal	LENGTH (ft.)	
306	Other Joint	LENGTH (ft.)	

Bearings (NBE's)			
Element #	Element Name	Units	Note
310	Elastomeric Bearing	EACH	
311	Movable Bearing	EACH	
312	Enclosed/Concealed Bearing	EACH	
313	Fixed Bearing	EACH	
314	Pot Bearing	EACH	
315	Disk Bearing	EACH	
316	Other Bearing	EACH	

Approach Slab (BME's)			
Element #	Element Name	Units	Note
320	Prestressed Concrete Approach Slab	AREA (sq. ft.)	
321	Reinforced Concrete Approach Slab	AREA (sq. ft.)	

Superstructures (NBE's)			
Element #	Element Name	Units	Note
102	Steel Closed Web/Box Girder	LENGTH (ft.)	
104	Prestressed Concrete Closed Web/Box Girder	LENGTH (ft.)	
105	Reinforced Concrete Closed Web/Box Girder	LENGTH (ft.)	
106	Other Closed Web/Box Girder	LENGTH (ft.)	
107	Steel Open Girder/Beam	LENGTH (ft.)	
109	Prestressed Concrete Open Girder/Beam	LENGTH (ft.)	
110	Reinforced Concrete Open Girder/Beam	LENGTH (ft.)	
111	Timber Open Girder/Beam	LENGTH (ft.)	
112	Other Open Girder/Beam	LENGTH (ft.)	
113	Steel Stringer	LENGTH (ft.)	
115	Prestressed Concrete Stringer	LENGTH (ft.)	
116	Reinforced Concrete Stringer	LENGTH (ft.)	
117	Timber Stringer	LENGTH (ft.)	
118	Other Stringer	LENGTH (ft.)	
120	Steel Truss	LENGTH (ft.)	
135	Timber Truss	LENGTH (ft.)	
136	Other Truss	LENGTH (ft.)	
141	Steel Arch	LENGTH (ft.)	4
142	Other Arch	LENGTH (ft.)	4
143	Prestressed Concrete Arch	LENGTH (ft.)	4
144	Reinforced Concrete Arch	LENGTH (ft.)	4
145	Masonry Arch	LENGTH (ft.)	4
146	Timber Arch	LENGTH (ft.)	4
147	Steel Main Cables	LENGTH (ft.)	
148	Secondary Steel Cables	EACH	
149	Other Secondary Cable	EACH	
152	Steel Floor Beam	LENGTH (ft.)	
154	Prestressed Concrete Floor Beam	LENGTH (ft.)	
155	Reinforced Concrete Floor Beam	LENGTH (ft.)	
156	Timber Floor Beam	LENGTH (ft.)	
157	Other Floor Beam	LENGTH (ft.)	
161	Steel Pin and Pin & Hanger Assembly or both	EACH	
162	Steel Gusset Plate	EACH	

Railings (NBE's)			
Element #	Element Name	Units	Note
330	Metal Bridge Railing	LENGTH (ft.)	
331	Reinforced Concrete Bridge Railing	LENGTH (ft.)	
332	Timber Bridge Railing	LENGTH (ft.)	
333	Other Bridge Railing	LENGTH (ft.)	
334	Masonry Bridge Railing	LENGTH (ft.)	

Substructures (NBE's)			
Element #	Element Name	Units	Note
202	Steel Column	EACH	
203	Other Column	EACH	
204	Prestressed Concrete Column	EACH	
205	Reinforced Concrete Column	EACH	
206	Timber Column	EACH	
207	Steel Tower	LENGTH (ft.)	
208	Timber Trestle	LENGTH (ft.)	
210	Reinforced Concrete Pier Wall	LENGTH (ft.)	
211	Other Pier Wall	LENGTH (ft.)	
212	Timber Pier Wall	LENGTH (ft.)	
213	Masonry Pier Wall	LENGTH (ft.)	
215	Reinforced Concrete Abutment	LENGTH (ft.)	
216	Timber Abutment	LENGTH (ft.)	
217	Masonry Abutment	LENGTH (ft.)	
218	Other Abutments	LENGTH (ft.)	
219	Steel Abutment	LENGTH (ft.)	
220	Reinforced Concrete Pile Cap/Footing	LENGTH (ft.)	
225	Steel Pile	EACH	
226	Prestressed Concrete Pile	EACH	
227	Reinforced Concrete Pile	EACH	
228	Timber Pile	EACH	
229	Other Pile	EACH	
231	Steel Pier Cap	LENGTH (ft.)	
233	Prestressed Concrete Pier Cap	LENGTH (ft.)	
234	Reinforced Concrete Pier Cap	LENGTH (ft.)	
235	Timber Pier Cap	LENGTH (ft.)	
236	Other Pier Cap	LENGTH (ft.)	

Culverts (NBE's)			
Element #	Element Name	Units	Note
240	Steel Culvert	LENGTH (ft.)	5
241	Reinforced Concrete Culvert	LENGTH (ft.)	5
242	Timber Culvert	LENGTH (ft.)	5
243	Other Culvert	LENGTH (ft.)	5
244	Masonry Culvert	LENGTH (ft.)	5
245	Prestressed Concrete Culvert	LENGTH (ft.)	5

Walls (ADE's)			
Element #	Element Name	Units	Note
853	MSE Retaining Wall/Wingwall	LENGTH (ft.)	
857	Reinforced Concrete Wingwall/Retaining Wall	LENGTH (ft.)	
860	Other Wingwall/Retaining Wall	LENGTH (ft.)	
861	Prefabricated Concrete Modular Wall	LENGTH (ft.)	

Notes for AASHTO/PennDOT Bridge Elements

1. Slab elements (38, 54, and 65) are independent elements (don't require beams) to transfer load to substructures while deck elements are supported on superstructure elements.
2. Prestressed Concrete Top Flange (15) shall be coded when superstructure element also functions as the deck and there is prestressing in the top flange. Reinforced Concrete Top Flange (16) shall be used when there is only mild reinforcement in the top flange.
3. Wearing Surface shall have a parent element of a deck, slab, or culvert at grade. Note, a culvert at grade will also have 6B40 coded.
4. Arch structures, which have a superstructure and substructure component (6A29=20), must have both a superstructure and substructure element. Arch structures which only have a culvert component (6A29=32 or 33) shall only have a culvert element.
5. Culverts at grade, which have a concrete distribution slab, shall have the distribution slab code as a wearing surface (510) under the culvert parent element and not a deck element (12).

Supplemental Notes for AASHTO/PennDOT Bridge Elements

- Bridges with Deck/Slab, or Superstructure Element should also have a Substructure Element.
- Bridges with Deck Elements (12, 13, 15, 16, 28-31, and 60) should also have a Superstructure Element.
- Bridges with Slab Elements (38, 54, and 65) should not have Superstructure Elements (Hybrid structures are an exception).
- Bridges with a Culvert element (Element #240-245) and (6A29=30, 31, 32, 33, and 35) should not have Deck or Superstructure Elements (Hybrid structures are an exception).
- Bridges with a Culvert element (240-245) and (6A29=30, 31, 32, 33, and 35) should not have Substructure Elements except for foundation elements (220, 225, 226, 227, 228 or 229). Hybrid structures are an exception.
- Rigid Frame structures at grade (6A29=22) must have Slab Elements (38, 54, or 65) and Substructure Elements. Rigid Frame structures under fill (6A29=30) must have Culvert Elements coded.
- The quantity for Culvert Elements (240-245) is determined based on the length along the flow line times the number of barrels.

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Reinforced Concrete – Condition State Definitions

Defect	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
Delamination / Spall / Patched Area (1080)	None	Delaminated. Spall 1 in. or less deep or 6 in. or less in diameter. Patched area that is sound.	Spall greater than 1 in. deep or greater than 6 in. diameter. Patched area that is unsound or showing distress. Does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Exposed Rebar (1090)	None	Present without measurable section loss.	Present with measurable section loss, but does not warrant structural review.	
Efflorescence / Rust Staining (1120)	None	Surface white without build-up or leaching without rust staining.	Heavy build-up with rust staining.	
Cracking (RC and Other) * (1130)	Insignificant cracks or moderate width cracks that have been sealed.	Unsealed moderate width cracks or unsealed moderate pattern (map) cracking.	Wide cracks or heavy pattern (map) cracking.	
Abrasion / Wear (PSC/RC) (1190)	No abrasion or wearing	Abrasion or wearing has exposed coarse aggregate but the aggregate remains secure in the concrete.	Coarse aggregate is loose or has popped out of the concrete matrix due to abrasion or wear.	
Distortion (1900)	None	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant structural review.	
Settlement (4000)	None	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant structural review.	
Scour (6000)	None	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits, but is less than the critical limits determined by scour evaluation and does not warrant structural review.	
Damage (Impact Related) (7000)	Not applicable	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	

Concrete Reinforcing Steel Protective Systems – Condition State Definitions

Defect	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
Effectiveness (3600)	Fully effective.	Substantially effective.	Limited effectiveness.	The protective system has failed or is no longer effective.
Damage (Impact Related) (7000)	Not applicable.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 4 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.

Prestressed Concrete – Condition State Definitions

Defect	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
Delamination / Spall / Patched Area (1080)	None	Delaminated. Spall 1 in. or less deep or 6 in. or less in diameter. Patched area that is sound.	Spall greater than 1 in. deep or greater than 6 in. diameter. Patched area that is unsound or showing distress. Does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Exposed Rebar (1090)	None	Present without measurable section loss.	Present with measurable section loss, but does not warrant structural review.	
Exposed Prestressing (1100)	None	Present without section loss	Present with section loss, but does not warrant structural review.	
Cracking (PSC) * (1110)	Insignificant cracks or moderate width cracks that have been sealed.	Unsealed moderate width cracks or unsealed moderate pattern (map) cracking.	Wide cracks or heavy pattern (map) cracking.	
Efflorescence / Rust Staining (1120)	None	Surface white without build- up or leaching without rust staining.	Heavy build-up with rust staining.	
Abrasion / Wear (1190)	No abrasion or wearing	Abrasion or wearing has exposed coarse aggregate but the aggregate remains secure in the concrete.	Coarse aggregate is loose or has popped out of the concrete matrix due to abrasion or wear.	
Distortion (1900)	None	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant structural review.	
Settlement (4000)	None	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant structural review.	
Scour (6000)	None	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits, but is less than the critical limits determined by scour evaluation and does not warrant structural review.	
Damage (Impact Related) (7000)	Not applicable	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	

*The inspector should use judgement when utilizing the condition state defect definitions, especially for prestressed concrete cracking. The crack defect description definitions describe generalized distress, but the inspector should consider width, spacing, location, orientation, and structural or nonstructural nature of the cracking. The inspector should consider exposure and environment when evaluating cracking width.

Reinforced Concrete: In general, cracks less than 0.012 inches can be considered insignificant, cracks ranging from 0.012 to 0.05 inches can be considered moderate, and cracks greater than 0.05 inches can be considered wide.

Prestressed Concrete: In general, prestressed concrete cracks less than 0.004 inches can be considered insignificant and a defect is not warranted, Cracks ranging from 0.004 to 0.009 inches can be considered moderate, and cracks greater than 0.009 inches can be considered

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Wearing Surfaces – Condition State Definitions

Defect	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
Delamination / Spall/ Patched Area / Pothole (3210)	None.	Delaminated. Spall less than 1 in. deep or less than 6 in. diameter. Patched area that is sound. Partial depth pothole.	Spall 1 in. deep or greater or 6 in. diameter or greater. Patched area that is unsound or showing distress. Full depth pothole.	The wearing surface is no longer effective.
Crack (Wearing Surface) (3220)	Width less than 0.012 in. or pacing greater than 3.0 ft.	Width 0.012–0.05 in. or spacing of 1.0–3.0 ft.	Width of more than 0.05 in. or spacing of less than 1.0 ft.	
Effectiveness (3230)	Fully effective. No evidence of leakage or further deterioration of the protected element.	Substantially effective. Deterioration of the protected element has slowed.	Limited effectiveness. Deterioration of the p rotected element has progressed.	
Damage (Impact Related) (7000)	Not applicable.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 4 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.

Bearings – Condition State Definitions

Defect	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
Corrosion (1000)	None.	Freckled Rust. Corrosion of the steel has initiated.	Measurable (≥ 1/16") section loss is evident or pack rust is present but does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Connection (1020)	Connection is in place and functioning as intended.	Loose fasteners or pack rust without distortion is present but the connection is in place and functioning as intended.	Missing bolts, rivets, broken welds, fasteners or pack rust with distortion but does not warrant a structural review.	
Movement (2210)	Free to move.	Minor restriction.	Restricted but not warranting structural review.	
Alignment (2220)	Lateral and vertical alignment is as expected for the temperature conditions.	Tolerable lateral or vertical alignment that is inconsistent with the temperature conditions.	Approaching the limits of lateral or vertical alignment for the bearing but does not warrant a structural review.	
Bulging, Splitting or Tearing (2230)	None.	Bulging less than 15% of the thickness.	Bulging 15% or more of the thickness. Splitting or tearing. Bearing's surfaces are not parallel. Does not warrant structural review.	
Loss of Bearing Area (2240)	None.	Less than 10%.	10% or more but does not warrant structural review.	
Damage (Impact Related) (7000)	Not applicable.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	

Joints – Condition State Definitions

Defect	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
Leakage (2310)	None.	Minimal. Minor dripping through the joint.	Moderate. More than a drip and less than free flow of water.	Free flow of water through the joint.
Seal Adhesion (2320)	Fully Adhered.	Adhered for more than 50% of the joint height.	Adhered 50% or less of joint height but still some adhesion.	Complete loss of adhesion.
Seal Damage (2330)	None.	Seal abrasion without punctures.	Punctured or ripped or partially pulled out.	Punctured completely through, pulled out, or missing.
Seal Cracking (2340)	None.	Surface crack.	Crack that partially penetrates the seal.	Crack that fully penetrates the seal.
Debris Impaction (2350)	No debris to a shallow cover of loose debris may be evident but does not affect the performance of the joint.	Partially filled with hard-packed material, but still allowing free movement.	Completely filled and impacts joint movement.	Completely filled and prevents joint movement.
Adjacent Deck or Header (2360)	Sound. No spall, delamination or unsound patch.	Edge delamination or spall 1 in. or less deep or 6 in. or less in diameter. No exposed rebar. Patched area that is sound.	Spall greater than 1 in. deep or greater than 6 in. diameter. Exposed rebar. Delamination or unsound patched area that makes the joint loose.	Spall, delamination, unsound patched area or loose joint anchor that prevents the joint from functioning as intended.
Metal Deterioration or Damage (2370)	None.	Freckled rust, metal has no cracks, or impact damage. Connection may be loose but functioning as intended.	Section loss, missing or broken fasteners, cracking of the metal or impact damage but joint still functioning.	Metal cracking, section loss, damage or connection failure that prevents the joint from functioning as intended.
Damage (Impact Related) (7000)	Not applicable.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 4 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.

Concrete Protective Coating – Condition State Definitions

Defect	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
Wear (3510)	None.	Underlying concrete not exposed, coating showing wear from UV exposure, friction course missing.	Underlying concrete is not exposed, thickness of the coating is reduced.	Underlying concrete exposed, treated cracks are exposed.
Effectiveness (3540)	Fully effective.	Substantially effective.	Limited effectiveness.	The protective system has failed or is no longer effective.
Damage (Impact Related) (7000)	Not applicable.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 4 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.

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Steel – Condition State Definitions

Defect	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
Corrosion (1000)	None.	Freckled Rust. Corrosion of the steel has initiated.	Measurable (≥ 1/16″) section loss is evident or pack rust is present but does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Cracking (1010)	None.	Crack that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar.	Identified crack exists that is not arrested but does not warrant structural review	
Connection (1020)	Connection is in place and functioning as intended.	Loose fasteners or pack rust without distortion is present but the connection is in place and functioning as intended.	Missing bolts, rivets, or fasteners; broken welds; or pack rust with distortion but does not warrant a structural review.	
Distortion (1900)	None.	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant structural review.	
Settlement (4000)	None.	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant structural review.	
Scour (6000)	None.	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits, but is less than the critical limits determined by scour evaluation and does not warrant structural review.	
Damage (Impact Related) (7000)	Not applicable.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	

Steel Protective Coatings – Condition State Definitions

Defect	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
Chalking (3410)	None.	Surface Dulling.	Loss of Pigment.	Not Applicable.
Peeling / Bubbling/ Cracking (3420)	None.	Finish coats only.	Finish and primer coats.	Exposure of bare metal.
Oxide Film Degradation Color/ Texture Adherence (weathering steel patina) (3430)	Yellow-orange or light brown for early development. Chocolate- brown to purple-brown for fully developed. Tightly adhered, capable of withstanding hammering or vigorous wire brushing.	Granular texture.	Small flakes, less than 1/2 in. diameter.	Dark black color. Large flakes, 1/2 in. diameter or greater or laminar sheets or nodules.
Effectiveness (3440)	Fully effective.	Substantially effective.	Limited effectiveness.	Failed, no protection of the underlying metal.
Damage (Impact Related) (7000)	Not applicable.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 4 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.

Timber – Condition State Definitions

Defect	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
Connection (1020)	Connection is in place and functioning as intended.	Loose fasteners or pack rust without distortion is present but the connection is in place and functioning as intended.	Missing bolts, rivets, broken welds, fasteners or pack rust with distortion but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Decay / Section Loss (1140)	None.	Affects less than 10% of the member section.	Affects 10% or more of the member but does not warrant structural review.	
Check / Shake (1150)	Surface penetration less than 5% of the member thickness regardless of location.	Penetrates 5% - 50% of the thickness of the member and not in a tension zone.	Penetrates more than 50% of the thickness of the member or more than 5% of the member thickness in a tension zone. Does not warrant structural review.	
Crack (1160)	None.	Crack that has been arrested through effective measures.	Identified crack exists that is not arrested, but does not require structural review.	
Split / Delamination (1170)	None.	Length less than the member depth or arrested with effective actions taken to mitigate.	Length equal to or greater than the member depth, but does not require structural review.	
Abrasion / Wear (1180)	None or no measurable section loss.	Section loss less than 10% of the member thickness	Section loss 10% or more of the member thickness but does not warrant structural review.	
Distortion (1900)	None.	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant structural review.	
Settlement (4000)	None.	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant structural review.	
Scour (6000)	None.	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits, but is less than the critical limits determined by scour evaluation and does not warrant structural review.	
Damage (Impact Related) (7000)	Not applicable.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	

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Masonry – Condition State Definitions

Defect	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
Delamination / Spall / Patched Area (1080)	None.	Delaminated. Spall 1 in. or less deep or 6 in. or less in diameter. Patched area that is sound.	Spall greater than 1 in. deep or greater than 6 in. diameter. Patched area that is unsound or showing distress. Does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Efflorescence / Rust Staining (1120)	None.	Surface white without build- up or leaching without rust staining.	Heavy build-up with rust staining.	
Mortar Breakdown (1610)	None.	Cracking or voids in less than 10% of joints.	Cracking or voids in 10% or more of the of joints	
Split / Spall (1620)	None.	Block or stone has split or spalled with no shifting.	Block or stone has split or spalled with shifting but does not warrant a structural review.	
Patched Area (1630)	None.	Sound patch.	Unsound patch.	
Masonry Displacement (1640)	None.	Block or stone has shifted slightly out of alignment.	Block or stone has shifted significantly out of alignment or is missing but does not warrant structural review.	
Distortion (1900)	None.	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant structural review.	
Settlement (4000)	None.	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant structural review.	
Scour (6000)	None	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits, but is less than the critical limits determined by scour evaluation and does not warrant structural review.	
Damage (Impact Related) (7000)	Not applicable	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the predominate defect recorded for this location on the element.	

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Other Materials – Condition State Definitions

Defect	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
Corrosion (1000)	None.	Freckled Rust. Corrosion of the steel has initiated.	Measurable (≥ 1/16") section loss is evident or pack rust is present but does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Cracking (1010)	None.	Crack that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar.	Identified crack exists that is not arrested but does not warrant structural review.	
Connection (1020)	Connection is in place and functioning as intended.	Loose fasteners or pack rust without distortion is present but the connection is in place and functioning as intended.	Missing bolts, rivets, broken welds, fasteners or pack rust with distortion but does not warrant a structural review.	
Delamination / Spall / Patched Area (1080)	None.	Delaminated. Spall 1 in. or less deep or 6 in. or less in diameter. Patched area that is sound.	Spall greater than 1 in. deep or greater than 6 in. diameter. Patched area that is unsound or showing distress. Does not warrant structural review.	
Efflorescence / Rust Staining (1120)	None	Surface white without build-up or leaching without rust staining.	Heavy build-up with rust staining.	
Cracking* (1130)	Insignificant cracks or moderate width cracks that have been sealed.	Unsealed moderate width cracks or unsealed moderate pattern (map) cracking.	Wide cracks or heavy pattern (map) cracking.	
Deterioration (1220)	None.	Initiated breakdown or deterioration.	Significant deterioration or breakdown, but does not warrant structural review.	
Distortion (1900)	None.	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant structural review.	
Movement (2210)	Free to move.	Minor restriction.	Restricted but not warranting structural review.	
Alignment (2220)	Lateral and vertical alignment is as expected for the temperature conditions.	Tolerable lateral or vertical alignment that is inconsistent with the temperature conditions.	Approaching the limits of lateral or vertical alignment for the bearing but does not warrant a structural review.	
Bulging, Splitting, or Tearing (2230)	None.	Bulging less than 15% of the thickness.	Bulging 15% or more of the thickness. Splitting or tearing. Bearing's surfaces are not parallel. Does not warrant structural review.	
Loss of Bearing Area (2240)	None.	Less than 10%.	10% or more but does not warrant structural review.	
Leakage (2310)	None.	Minimal. Minor dripping through the joint.	Moderate. More than a drip and less than free flow of water.	Free flow of water through the joint.

Other Materials – Condition State Definitions (continued)

Defect	CS 1 - Good	CS 2 - Fair	CS 3 - Poor	CS 4 - Severe
Seal Adhesion (2320)	Fully adhered	Adhered for more than 50% of the joint heighted.	Adhered 50% or less of joint height but still some adhesion.	Complete loss of adhesion.
Seal Damage (2330)	None.	Seal abrasion without punctures	Punctured or ripped or partially pulled out.	Punctured completely through, pulled out, or missing.
Seal Cracking (2340)	None.	Surface crack.	Crack that partially penetrates the seal.	Crack that fully penetrates the seal.
Debris Impaction (2350)	No debris to a shallow cover of loose debris may be evident but does not affect the performance of the joint.	Partially filled with hard-packed material but still allowing free movement.	Completely filled and impacts joint movement.	Completely filled and prevents joint movement.
Adjacent Deck or Header (2360)	Sound. No spall, delamination, or unsound patch.	Edge delamination or spall 1 in. or less deep or 6 in. or less in diameter. No exposed rebar. Patched area that is sound.	Spall greater than 1 in. deep or greater than 6 in. diameter. Exposed rebar. Delamination or unsound patched area that makes the joint loose.	Spall, delamination, unsound patched area, or loose joint anchor that prevents the joint from functioning as intended.
Metal Deterioration or Damage (2370)	None.	Freckled rust; metal has no cracks or impact damage. Connection may be loose but functioning as intended.	Section loss, missing or broken fasteners, cracking of the metal, or impact damage but joint still functioning.	Metal cracking, section loss, damage, or connection failure that prevents the joint from functioning as intended.
Settlement (4000)	None.	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Scour (6000)	None	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits, but is less than the critical limits determined by scour evaluation and does not warrant structural review.	
Damage (Impact Related) (7000)	Not applicable	The element has impact damage. The specific damage caused by the impact has been captured in condition state 2 under the appropriate material defect entry.	The element has impact damage. The specific damage caused by the impact has been captured in condition state 3 under the appropriate material defect entry.	

**The inspector should use judgement when utilizing the condition state defect definitions, especially for concrete cracking. The crack defect description definitions describe generalized distress, but the inspector should consider width, spacing, location, orientation, and structural or nonstructural nature of the cracking. The inspector should consider exposure and environment when evaluating cracking width.

Other Concrete: In general, cracks less than 0.012 inches can be considered insignificant, cracks ranging from 0.012 to 0.05 inches can be considered moderate, and cracks greater than 0.05 inches can be considered wide.

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Appendix I

PennDOT Agency Developed Elements

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Element # 853 — MSE Retaining Wall / Wingwall

Description: Mechanically stabilized earth retaining walls and non-monolithic wingwalls where the structure interacts with the soil for support, including materials retaining the embankment, precast concrete panel and their anchorage system.

Classification: ADE – Agency-Developed Element **Units of Measurement:** ft

Quantity Calculation: Sum of the length of the walls as measured along the face of wall.

Condition State Definitions

Defects	Condition States			
	1	2	3	4
	GOOD	FAIR	POOR	SEVERE
Delamination/Spall/ Patched Area* (1080)	None	Delaminated. Spall 1 in. or less deep or 6 in. or less in diameter. Patched area that is sound.	Spall greater than 1 in. deep or greater than 6 in. diameter. Patched area that is unsound or showing distress. Does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Exposed Rebar* (1090)	None	Present without measurable section loss.	Present with measurable section loss but does not warrant structural review.	
Efflorescence/Rust Staining* (1120)	None	Surface white without build-up or leaching without rust staining.	Heavy build-up with rust staining.	
Cracking (RC and Other)* (1130)	Insignificant cracks or moderate-width cracks that have been sealed.	Unsealed moderate width cracks or unsealed moderate pattern (map) cracking.	Wide cracks or heavy pattern (map) cracking.	
Abrasion/Wear* (PSC/RC) (1190)	No abrasion or wearing	Abrasion or wearing has exposed coarse aggregate but the aggregate remains secure in the concrete.	Coarse aggregated is loose or has popped out of the concrete matrix due to abrasion or wear.	
Deterioration (Other)* (1220)	None	Initiated breakdown or deterioration.	Significant deterioration or breakdown but does not warrant structural review.	

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Distortion* (1900)	None	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Settlement* (4000)	None	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant structural review.	
Scour* (6000)	None	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits, but is less than the critical limits determined by scour evaluation and does not warrant structural review.	
Damage (Impact Related)* (7000)	Not applicable	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the only defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the only defect recorded for this location on the element.	

Element Commentary

See Appendix H for a complete description of the "height" scale factor.

1220 Deterioration (Other) is reserved for grout pocket and steel anchor or strap related deficiencies observed during the inspection. Use of this defect code is to be supported in the condition notes in BMS3, Form E. The user should enter a narrative as applicable.

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Element # 857 — Reinforced Concrete Wingwall / Retaining Wall

Description: Wingwalls that are non-integral with the abutments and retaining walls constructed of reinforced cast-in-place concrete or precast reinforced concrete.

Classification: ADE –Agency-Developed Element **Units of Measurement:** ft

Quantity Calculation: Sum of the length of the walls as measured along the face of wall.

Condition State Definitions

Defects	Condition States			
	1	2	3	4
	GOOD	FAIR	POOR	SEVERE
Delamination/Spall/ Patched Area* (1080)	None	Delaminated. Spall 1 in. or less deep or 6 in. or less in diameter. Patched area that is sound.	Spall greater than 1 in. deep or greater than 6 in. diameter. Patched area that is unsound or showing distress. Does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Exposed Rebar* (1090)	None	Present without measurable section loss.	Present with measurable section loss but does not warrant structural review.	
Efflorescence/Rust Staining* (1120)	None	Surface white without build-up or leaching without rust staining.	Heavy build-up with rust staining.	
Cracking (RC and Other)* (1130)	Insignificant cracks or moderate-width cracks that have been sealed.	Unsealed moderate width cracks or unsealed moderate pattern (map) cracking.	Wide cracks or heavy pattern (map) cracking.	
Abrasion/Wear (PSC/RC)* (1190)	No abrasion or wearing	Abrasion or wearing has exposed coarse aggregate but the aggregate remains secure in the concrete.	Coarse aggregated is loose or has popped out of the concrete matrix due to abrasion or wear.	
Deterioration (Other)* (1220)	None	Initiated breakdown or deterioration.	Significant deterioration or breakdown but does not warrant structural review.	

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Distortion* (1900)	None	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Settlement* (4000)	None	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant structural review.	
Scour* (6000)	None	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits, but is less than the critical limits determined by scour evaluation and does not warrant structural review.	
Damage (Impact Related)* (7000)	Not applicable	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the only defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the only defect recorded for this location on the element.	

Element Commentary

See Appendix H for a complete description of the "height" scale factor.

1220 Deterioration (Other) can be used for to the assembly components of precast walls. Use of this defect code is to be supported in the condition notes in BMS3, Form E. The user should enter a narrative as applicable.

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Element # 860 — Other Wingwall / Retaining Wall

Description: Wingwalls that are non-integral with the abutments, and retaining walls, constructed of any material other than reinforced cast-in-place concrete or proprietary prefabricated concrete components, or MSE Walls and concrete modular retaining walls.

Classification: ADE –Agency-Developed Element **Units of Measurement:** ft

Quantity Calculation: Sum of the length of the walls as measured along the face of wall.

Condition State Definitions

Defects	Condition States			
	1	2	3	4
	GOOD	FAIR	POOR	SEVERE
Connection* (1020)	Connection is in place and functioning as intended.	Loose fasteners or pack rust without distortion is present but the connection is in place and functioning as intended.	Missing bolts, rivets, fasteners, broken welds or pack rust with distortion but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Delamination/Spall/ Patched Area* (1080)	None	Delaminated. Spall 1 in. or less deep or 6 in. or less in diameter. Patched area that is sound.	Spall greater than 1 in. deep or greater than 6 in. diameter. Patched area that is unsound or showing distress. Does not warrant structural review.	
Exposed Rebar* (1090)	None	Present without measurable section loss.	Present with measurable section loss but does not warrant structural review.	
Efflorescence/Rust Staining* (1120)	None	Surface white without build-up or leaching without rust staining.	Heavy build-up with rust staining.	
Cracking (RC and Other)* (1130)	Insignificant cracks or moderate-width cracks that have been sealed.	Unsealed moderate width cracks or unsealed moderate pattern (map) cracking.	Wide cracks or heavy pattern (map) cracking.	
Decay/Section Loss* (1140)	None.	Affects less than 10% of the member section.	Affects 10% or more of the member but does not warrant structural review.	

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Check/Shake* (1150)	Surface penetration less than 5% of the member thickness regardless of location.	Penetrates 5% - 50% of the thickness of the member and not in a tension zone.	Penetrates more than 50% of the thickness of the member or more than 5% of the member thickness in a tension zone. Does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Crack (Timber)* (1160)	None.	Crack has been arrested through effective measures.	Identified crack that is not arrested but does not warrant a structural review.	
Split/Delamination* (1170)	None.	Length less than the member depth or arrested with effective actions taken to mitigate.	Length equal to or greater than the member depth but does not warrant a structural review.	
Abrasion/Wear (Timber)* (1180)	None or no measurable section loss.	Section loss less than 10% of the member thickness.	Section loss 10% or more of the member thickness but does not warrant a structural review.	
Abrasion/Wear (PSC/RC)* (1190)	No abrasion or wearing	Abrasion or wearing has exposed coarse aggregate but the aggregate remains secure in the concrete.	Coarse aggregated is loose or has popped out of the concrete matrix due to abrasion or wear.	
Deterioration (Other)* (1220)	None	Initiated breakdown or deterioration.	Significant deterioration or breakdown but does not warrant structural review.	
Mortar Breakdown (Masonry)* (1610)	None	Cracking or voids in less than 10% of the joints.	Cracking or voids in 10% or more of the joints but does not warrant a structural review.	
Split/Spall (Masonry)* (1620)	None	Block or stone has split or spalled with no shifting.	Block or stone has split or spalled with shifting but does not warrant a structural review.	
Patched Area (Masonry)* (1630)	None	Sound patch.	Unsound patch but does not warrant a structural review.	

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Masonry Displacement* (1640)	None	Block or stone has shifted slightly out of alignment.	Block or stone has shifted significantly out of alignment or is missing but does not warrant a structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Distortion* (1900)	None	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant structural review.	
Settlement* (4000)	None	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant structural review.	
Scour* (6000)	None	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits, but is less than the critical limits determined by scour evaluation and does not warrant structural review.	
Damage (Impact Related)* (7000)	Not applicable	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the only defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the only defect recorded for this location on the element.	

Element Commentary

See Appendix H for a complete description of the "height" scale factor.

1220 Deterioration (Other) can be used for to the assembly components of precast walls. Use of this defect code is to be supported in the condition notes in BMS3, Form E. The user should enter a narrative as applicable.

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Element # 861 — Prefabricated Concrete Modular Wall

Description: Wingwalls that are non-integral with the abutments and retaining walls constructed of proprietary prefabricated concrete components, such as concrete modular retaining walls (Reinforced Earth, Doublewal, etc.).

Classification: ADE –Agency-Developed Element **Units of Measurement:** ft

Quantity Calculation: Sum of the length of the walls as measured along the face of wall.

Condition State Definitions

Defects	Condition States			
	1	2	3	4
	GOOD	FAIR	POOR	SEVERE
Delamination/Spall/ Patched Area* (1080)	None	Delaminated. Spall 1 in. or less deep or 6 in. or less in diameter. Patched area that is sound.	Spall greater than 1 in. deep or greater than 6 in. diameter. Patched area that is unsound or showing distress. Does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Exposed Rebar* (1090)	None	Present without measurable section loss.	Present with measurable section loss but does not warrant structural review.	
Efflorescence/Rust Staining* (1120)	None	Surface white without build-up or leaching without rust staining.	Heavy build-up with rust staining.	
Cracking (RC)* (1130)	Insignificant cracks or moderate-width cracks that have been sealed.	Unsealed moderate width cracks or unsealed moderate pattern (map) cracking.	Wide cracks or heavy pattern (map) cracking.	
Abrasion/Wear (PSC/RC)* (1190)	No abrasion or wearing	Abrasion or wearing has exposed coarse aggregate but the aggregate remains secure in the concrete.	Coarse aggregated is loose or has popped out of the concrete matrix due to abrasion or wear.	
Deterioration (Other)* (1220)	None	Initiated breakdown or deterioration.	Significant deterioration or breakdown but does not warrant structural review.	

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Distortion* (1900)	None	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the elements or bridge. Or a structural review has been completed and the defects impact strength or serviceability of the elements or bridge. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.
Settlement* (4000)	None	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits but does not warrant structural review.	
Scour* (6000)	None	Exists within tolerable limits or has been arrested with effective countermeasures.	Exceeds tolerable limits, but is less than the critical limits determined by scour evaluation and does not warrant structural review.	
Damage (Impact Related)* (7000)	Not applicable	The element has impact damage. The damage caused by the impact has been assessed as Condition State 2 based on the material–specific defects description(s); however, Damage is the only defect recorded for this location on the element.	The element has impact damage. The damage caused by the impact has been assessed as Condition State 3 based on the material–specific defects description(s); however, Damage is the only defect recorded for this location on the element.	

Element Commentary

See Appendix H for a complete description of the "height" scale factor.

1220 Deterioration (Other) can be used for to the assembly components of precast walls. Use of this defect code is to be supported in the condition notes in BMS3, Form E. The user should enter a narrative as applicable.

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Appendix J

Bridge Element Coding Examples

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APPENDIX J
Bridge Element Coding Examples

Preface

Each bridge requiring element-level inspection, as indicated in Publication 238, Bridge Safety Inspection Manual, will be defined by a collection of National Bridge Elements (NBEs) and Bridge Management Elements (BMEs), in accordance with the current AASHTO Manual for Bridge Element Inspection (MBEI). Agency Developed Elements, as indicated in Appendix I of this manual, will also be collected; these elements are specific to Pennsylvania. Each element will be quantified by four Element Condition States in accordance with the MBEI such that 100 percent of the total element quantity is coded in one or more Element Condition States. The Element Condition States provide a general overview of the condition of the element while Defect Code Condition States provide greater detail and identifies specific deterioration of the element. The quantity in each Element Condition State is based on the defect quantities identified and documented by the inspector during an inspection. Defects are recorded using predefined Defect Codes from the MBEI (also shown in Appendix H) and quantified in four Defect Code Condition States. If no defects are recorded for a specific element, the entire quantity is placed in Element CS-1. The Element Condition State quantity must equal the total Defect Code Condition States for a specific condition state, and the total element quantity must equal the sum of the Element Condition State quantities. The coding examples that follow in this appendix provide guidance in the application of Defect Codes for the following three structure types:

J1 – Single Span, Reinforced Concrete Tee Beam on Cast-in-Place, Reinforced Concrete Abutments.

J2 – Single Span, Pony Truss on Cast-in-Place, Reinforced Concrete Abutments.

J3 – Two-Span, Simple, Steel Multi-Beam on Cast-in-Place, Reinforced Concrete Abutments (Note: this example includes both Quantity Mode and Percent Mode found in BMS3 for defect code and condition state quantity summation).

J4 – Single Span, Non-Composite Adjacent Box Beam (Superstructure and above only).

J5 – Single Span, Composite Spread Box Beam (Superstructure and above only).

J6 – Single Span, Composite P/S I-Beam (Superstructure and above only).

J7 – Single Cell, Precast Concrete Box Culvert.

J8 – Single Span, Slab Beam (Superstructure and above only)

Defect Code Basics

The recording of an observed defect is done by selecting the applicable Defect Code(s) for each NBE, BME, or ADE and associating the observed field condition with one of the three Defect Code Condition States descriptions for that Defect Code. The applicable defect codes that apply to a specific element, are listed in both BMS3and BMS2 when a specific element is being modified. It is common for advanced defects to have a distribution across multiple condition states that represent the progression of material deterioration. As an element progresses in its service life, it will eventually exhibit multiple defects each with their own Defect Code Condition States. When this occurs, the inspector must apply judgement to avoid double counting defects and ensure the Defect Code quantity is assigned to the predominant defect. The following section provides general guidelines for selecting defects and assigning condition state quantitates based on defect code definition language.

NBE/BME/ADE Defect Code Guidelines:

- The inspector should use guidance from the AASHTO MBEI found in Appendix H. In particular, familiarity with Section 1.5 "How to use the MBEI" is required to complete an element level inspection.
- The purpose of collecting and recording Defect Code Condition States is to ensure an accurate assessment and assignment of Element Condition States.
- Defect Code CS-1 is reserved for element units in good condition and will not require the inspector

to place a quantity in Defect Code CS-1 as the value for Defect Code CS-1 will always be displayed as "0" in BMS3.

- For each defect observed on an element, select the predominate Defect Code and record the applicable Defect Code Condition State quantity in BMS3.
- The total element quantity will default to Element CS-1 if no defect codes are applied.
- When multiple defects overlap within the same element unit and are quantified with different Defect Code Condition States, the more severe defect (e.g. CS-4) is quantified first and recorded in the applicable condition state. This quantity is subtracted from the total element quantity until all applicable defects have been quantified and the sum of the condition state quantities equals the total element quantity.
- To modify the Defect Code Condition State quantities, the applied check box must be checked in BMS3.
- Editable fields are highlighted in BMS3 when the specific defect code is selected.

BME Protective System Guidelines:

- Protective systems are child elements to other NBE's, BME's, and ADE's. They cannot occur without a parent element (i.e., NBE, BME, ADE) and will be the same environment as the parent element.
- Within a protective system, the defect codes are child elements to the protective system.
- The total quantity for a protective system must be entered by the user.
- Quantities for the protective systems are not automatically totaled into the Defect Code Condition State quantities by BMS3 and BMS2.
- Editable fields are highlighted when the specific defect code is selected.

Defect Code Quantification by Percent Guidelines:

- The default defect code quantification mode is quantity. To switch to percent mode, simply click the radio button to the left of the word percent on the defect code screen. Similarly, to switch from percent to quantity, select the desired radio button.
- When working in Quantity Mode, the individual Defect Code Condition State quantities must be entered first and the total quantity is calculated by BMS2/BMS3. However, when working in Percent Mode, the total Defect Code is editable and the quantity must be entered prior to entering the individual Defect Code Condition State percentages.
- To begin, the user must enter a defect code quantity. To make the quantity field editable for a specific defect code, the "Applied" box must be checked. The sum of all the defect code quantities cannot exceed the total element quantity.
- When entering a percent for Defect Code CS-2, CS-3, or CS-4, the percentage is based upon the total defect code quantity and not the total element quantity. For example, the user enters the total defect code quantity of 10 SF for Defect Code 1080 (Exposed Rebar), and subsequently enters 40% of the 10 SF is in CS-2, and the remaining 60% is in CS-3.
- When the user entered quantity multiplied by the user entered Condition State percentage equals a non-whole number, the system automatically rounds down the percentage so that the corrected percentage times the user entered quantity equals a whole number. Any remaining percentage will default to the CS-1 percentage value. The user must update the percentages in CS-2, CS-3, and/or CS-4 to equal a combined 100%.
- Editable fields are highlighted when the specific defect code is selected.

1 Single Span Reinforced Concrete Tee Beam

1.1 Structure Description

This structure, shown in Figure 1.1-1, is a single span cast-in-place reinforced concrete tee beam bridge with a 30-foot span length. There is a total of six beams. The superstructure supports a 24-foot roadway consisting of two 10-foot lanes with 2-foot shoulders on each side. The out-to-out width of the superstructure is 26 feet. The concrete abutments have 8-foot long integral wingwalls at each end. The deck has an asphalt overlay and the joints above the abutments consist of pourable seals. No bearings are visible. The bridge carries a state route with an ADT of 1,000 vehicles per day over a two-lane roadway.

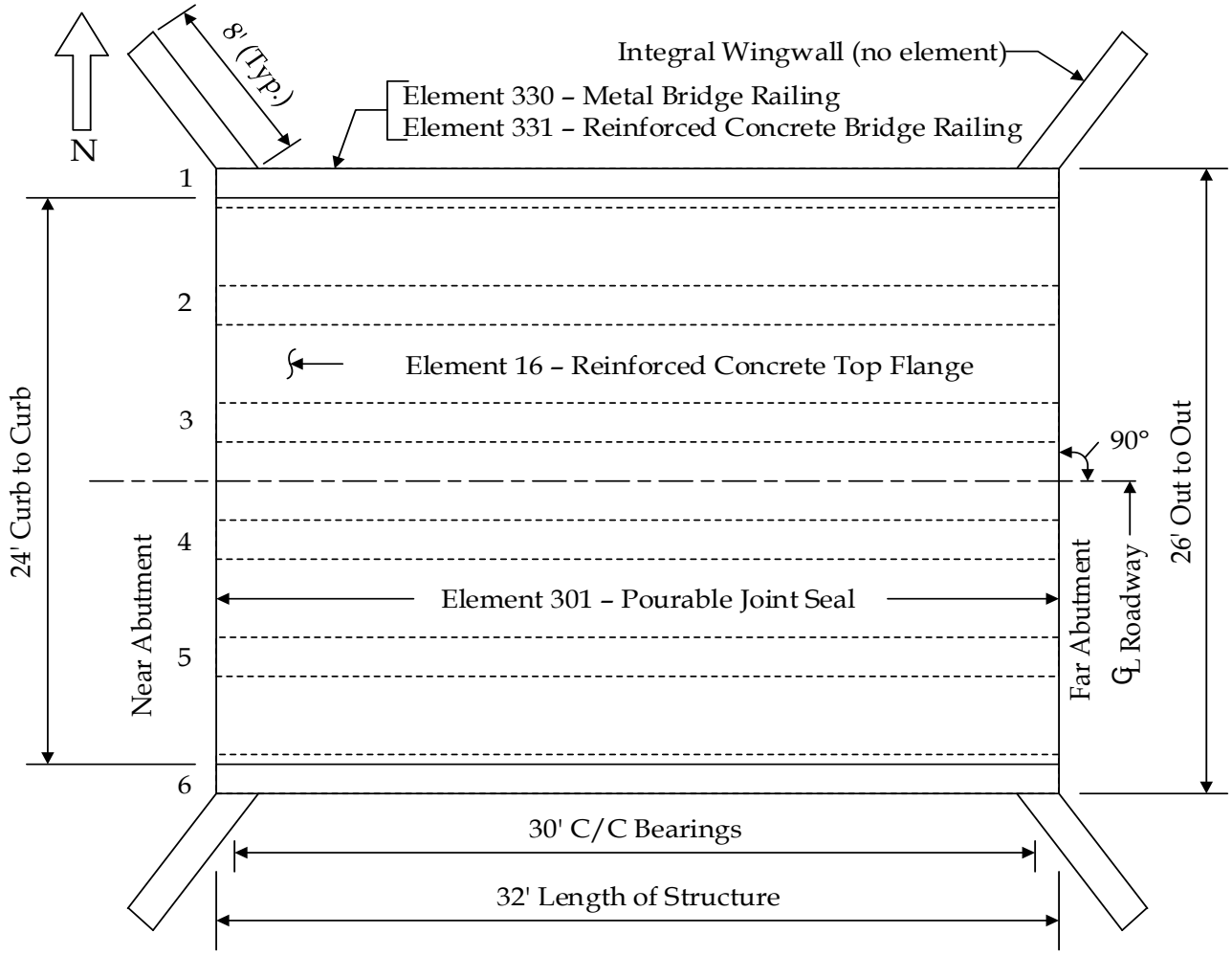

Figure 1.1-1 Plan View of Reinforced Concrete Tee Beam Bridge

1.2 Deck Elements and Quantities

The typical section is shown in Figure 1.2-1. The deck contains epoxy coated reinforcement. The appropriate deck elements and quantity calculations are shown in Table 1.2-1.

Table 1.2-1 Deck Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION
16	Reinforced Concrete Top Flange	32′ Long x 26′ Wide = 832 SF
510	Wearing Surfaces	32′ Long x 24′ Wide = 768 SF
520	Reinforcing Steel Protective System	32′ Long x 26′ Wide = 832 SF
301	Pourable Joint Seal	$\frac{26' \text{ Long x 2 Joints}}{\sin(90°)} = 52$ LF
330	Metal Bridge Railing	32′ Long x 2 Rows = 64 LF
331	Reinforced Concrete Bridge Railing	32′ Long x 2 Rows = 64 LF
520	Reinforcing Steel Protective System	64′ LF x 3 SF/LF = 192 SF

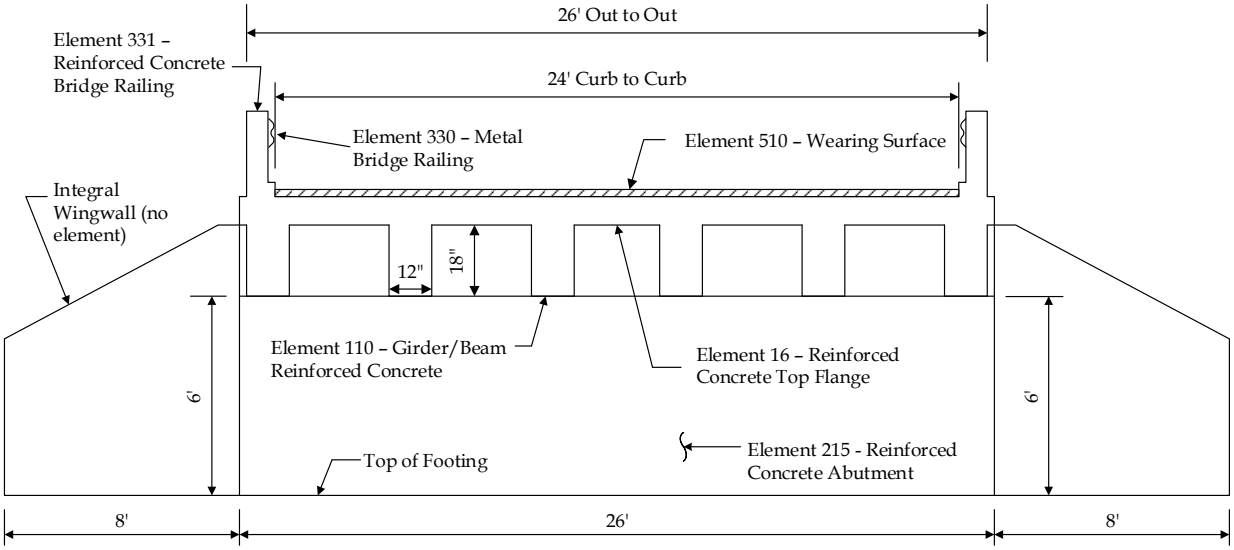

Figure 1.2-1 Typical Tee Beam Section at Abutment

1.3 Superstructure Elements and Quantities

For this example, the superstructure consists of only the beam elements since no bearings are visible. The girders contain epoxy coated reinforcement for the entire length. The appropriate element and quantity calculations are shown in Table 1.3-1.

Table 1.3-1 Superstructure Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION	SCALE FACTOR
110	Girder/Beam, Reinforced Concrete	30′ Long x 6 Beams = 180 FT	$\frac{18" \text{ Depth}}{12" \text{ per Foot}} = 1.5$ FT
520	Reinforcing Steel Protective System	180 LF x 1.5 LF = 270 SF	N/A

1.4 Substructure Elements and Quantities

The reinforced concrete substructure element in this example includes the abutments and wingwalls. The reinforced concrete wingwall are integral with the abutment. Since the wingwalls are integral with the abutments (no joints) they are included in the abutment element. The substructure contains epoxy coated reinforcement. The appropriate element and quantity calculation are shown in Table 1.4-1.

Table 1.4-1 Substructure Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION	SCALE FACTOR
215	Reinforced Concrete Abutment	26′ Wide Abutments x 2 Abutments = 52 LF, plus 8′ Long Wings x 4 Wings = 32 LF, 52 LF + 32 LF = 84 LF Total	Ht. = 6 LF
520	Reinforcing Steel Protective System	84 LF x 6 LF = 504 SF	N/A

1.5 Environmental States

All elements will be placed in environment 3 (Moderate), as per current policy.

1.6 Inspection Notes

Table 1.6-1 Tee Beam Field Conditions

BEAM NO.	CONDITION
1	2″ deep spalling over 6 LF at end with 2 LF exposed rebar (1/16″ section loss)
2	2 LF x 2′ wide spalled at end with exposed rebar (1/16″ section loss)
3	6″ diameter spall near midspan with exposed stirrup (no section loss)
4	Full-length longitudinal cracks <1/16″ (no efflorescence or rust staining)
5	2″ deep spalling over 12 LF at end with 4 LF exposed rebar (1/16″ section loss)
6	Spalling with exposed reinforcing over 6′ at mid-span caused by impact

A detailed inspection of the bridge revealed that the asphalt wearing surface exhibited slight wheel rutting over a 24 SF area that included 18 SF of 1/16″ map cracking and 6 SF of potholes. The underside of the deck has 200 SF of efflorescence with rust staining. Within that area, there are 75 SF of delaminations with 30 SF of spalls with exposed rebar. The delaminated areas also contain 10 SF of random cracking up to 1/16″ wide. A separate area of approximately 300 SF exhibits efflorescence without rust stains. The bridge railing is a combination of concrete and metal. 10 LF of the south concrete railing is severely spalled with 6 LF of exposed reinforcement with rust staining. 15 LF of the right railing, both the metal and concrete portions, has impact damage from a striking vehicle and has caused distortion and spalling in the railings. The remainder of the left rail has random light spalling throughout. Both joints are poured sealant in good condition. The Near Abutment has full-length (not including wingwalls), variable height horizontal cracks and spalling with efflorescence, water leakage and rust staining. The spalls have an average depth of 2 in. There is also an area (7 SF), where the exposed rebar within the spall has 1/16″ measurable losses. No scour was noted. The wingwalls are in good condition. The reinforcement used in the top flange (deck), girders, barriers, and abutments were epoxy coated.

The conditions of the beams are summarized in Table 1.6-1. Note that Element 16 Reinforced Concrete Top Flange requires an assessment of the top, bottom and fascia portions of the deck element. The recommended method of defect documentation is graphic notation on field sketches.

1.7 Defect Code Condition State Assessment

16 – Reinforced Concrete Top Flange: The 200 SF of efflorescence with rust staining on the top flange underside is in Condition State (CS)-3. The 300 SF of efflorescence with no rust staining is in CS-2.

Noted Overlapping Defects: 75 SF of delaminations, spalls, and cracking in CS-3 are accounted for in 200 SF of efflorescence/rust staining in CS-3 and will not be counted separately under the condition state quantities. This defect should be noted in the BMS3 condition field.

510 – Wearing Surface (Applied to Element 16): The 18 SF of asphalt cracking is wide enough (1/16") to warrant CS-3 for both the Cracking Defect Code and Effectiveness. The potholes at 6 SF can be considered CS-3 based on their size being larger than 6 inches in diameter and warrant CS-3 for both Pothole Defect Code and Effectiveness.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 16): The underside of the exposed top flanges are exhibit efflorescence and rust staining. The assumption is made the rust staining occurs because the epoxy coating on the reinforcing system has limited effectiveness. Both the 200 SF and 300 SF areas of rust staining are in CS-3.

Noted Overlapping Defects: 30 SF of exposed reinforcing are accounted for in 200 SF of efflorescence/rust staining in CS-3 and will not be counted separately under the condition state quantities. This defect should be noted in the BMS3 condition field.

330 – Metal Bridge Railing: The 15 LF of impact damage is considered CS-3 as the railing shape has caused distortion that requires mitigation, however, it does not warrant a structural review. This will be recorded under the Damage defect code.

Noted Overlapping Defects: The 15 LF of distorted metal bridge railing occurs within the impact damage and therefore is not cumulative and will not be counted separately towards the CS quantity. This defect should be noted in the BMS3 condition field.

331 – Reinforced Concrete Bridge Railing: The 10 LF of severely spalled bridge railing will be in CS-3. The remaining length of left railing will be in CS-2 because of the light spalling. The 15 LF of impact damage is considered CS-3 as the concrete railing exhibits heavy map cracking.

Noted Overlapping Defects: The 6 SF of exposed reinforcing with rust staining occurs within the 10 LF of severely spalled bridge railing are therefore not cumulative. Similarly, the 15 LF of heavy map cracking that occurs within the impact damage is not cumulative. Neither overlapping defect will be counted separately towards the CS quantity. These defects should be noted in the BMS3 condition field.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 331): The concrete barrier spall exposes 6 LF of reinforcing. With no width provided, assume the spall exposes a single bar or 1' width. The 6 SF (6 LF x 1 LF) of exposed reinforcing exhibits rust staining and is in CS-3.

110 - Girder / Beam, Reinforced Concrete: Beams 1, 2 and 5 exhibit 20 LF of spalling with 8 LF that have exposed reinforcement in CS-3 (measurable section loss). The entire length of Beam 4 will be in CS-2 because of the full-length cracks < 1/16" wide. The 6 LF of spalling with exposed reinforcing caused by impact damage will be in CS-4 as a structural review was completed and indicated a reduction in capacity of the beam. The remaining lengths of the beams have no recordable defects and will be in CS-1. The 6" diameter spall in Beam #3 is a CS-2.

Noted Overlapping Defects: The 1 LF of exposed rebar in Beam #3, CS-2, is accounted for in the 1 LF of delamination/spall/patched area, CS–2, the 8 LF of exposed rebar, CS-3, is accounted for in the 20 SF of delamination/spall/patched area, CS–3 and the 6 LF of exposed rebar and spalling in CS-4, is accounted for in the 6 LF of damage (impact releated); therefore, all areas of exposed rebar and the spalling on Beam 6 are accounted for and will not be counted separately towards the CS quantity. These defects should be noted in the BMS3 condition field.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 110): The exposed reinforcing along Beams 1, 2, and 6 totals 8 SF and is in CS-4 because of the measurable section losses. The exposed reinforcing along Beam 3 is visible, however, there is no rust staining or measurable losses and is in CS-2.

215 – Reinforced Concrete Abutment: The 26 LF of the Near Abutment with a variable height spall (average 2 LF) with an average depth of 2 in and is coded CS-3. The remaining portions of this abutment and the wingwalls have no noted defects and will be in condition state CS-1.

> Noted Overlapping Defects: The 7 LF of exposed rebar with a 1/16" section loss will also be in CS-3, however, it is accounted for in the spalling and will not be counted separately towards the CS quantity. This defect should be noted in the BMS3 condition field.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 215): The variable height spall along the Near Abutment (52 SF) exhibits exposed reinforcing with rust staining, which is in CS-2. The second spall exposes 7 LF of reinforcing with 1/16" section loss and is in CS-4. The second spall occurs over a width of 1'.

Other Elements: The remaining elements that define the bridge have no defects and are in CS-1. A summary of the elements, condition states, and applicable Defect Codes is provided in Table 1.7-1.

Table 1.7-1 Summary of Element Identification and Assessment

ELEM. NUMBER	DEFECT CODE	ELEMENT / CODE DESCRIPTION	UNIT	TOTAL QTY.	CONDITION STATE QTY.			
					CS-1	CS-2	CS-3	CS-4
16	-	Reinforced Concrete Top Flange	SF	832	332	300	200	0
	1120	*Efflorescence / Rust Staining*	*SF*	*500*	*0*	*300*	*200*	*0*
510	-	Wearing Surfaces	SF	768	744	0	24	0
	3210	*Pothole (Wearing Surface)*	*SF*	*6*	*0*	*0*	*6*	*0*
	3220	*Crack (Wearing Surface)*	*SF*	*18*	*0*	*0*	*18*	*0*
520	-	Reinforcing Steel Protective Systems	SF	832	332	0	500	0
	3600	*Effectiveness*	*SF*	*500*	*0*	*0*	*500*	*0*
301	-	Pourable Joint Seal	LF	52	52	0	0	0
330	-	Metal Bridge Railing	LF	64	49	0	15	0
	7000	*Damage (Impact Related)*	*LF*	*15*	*0*	*0*	*15*	*0*
331	-	Reinforced Concrete Bridge Railing	LF	64	17	22	25	0
	1080	*Delamination/Spall/Patched Area*	*LF*	*32*	*0*	*22*	*10*	*0*
	7000	*Damage (Impact Related)*	*LF*	*15*	*0*	*0*	*15*	*0*
520	-	Reinforcing Steel Protective Systems	SF	192	186	0	6	0
	3600	*Effectiveness*	*SF*	*6*	*0*	*0*	*6*	*0*
110	-	Girder / Beam, Reinforced Concrete	LF	180	123	31	20	6
	1080	*Delamination/Spall/Patched Area*	*LF*	*21*	*0*	*1*	*20*	*0*
	1130	*Cracking (RC & Other)*	*LF*	*30*	*0*	*30*	*0*	*0*
	7000	*Damage (Impact Related)*	*LF*	*6*	*0*	*0*	*0*	*6*
520	-	Reinforcing Steel Protective Systems	SF	720	711	1	8	0
	3600	*Effectiveness*	*SF*	*9*	*0*	*1*	*8*	*0*
215	-	Reinforced Concrete Abutment	LF	84	58	0	26	0
	1080	*Delamination/Spall/Patched Area*	*LF*	*26*	*0*	*0*	*26*	*0*
520	-	Reinforcing Steel Protective Systems	SF	504	451	0	52	1
	3600	*Effectiveness*	*SF*	*53*	*0*	*0*	*52*	*1*

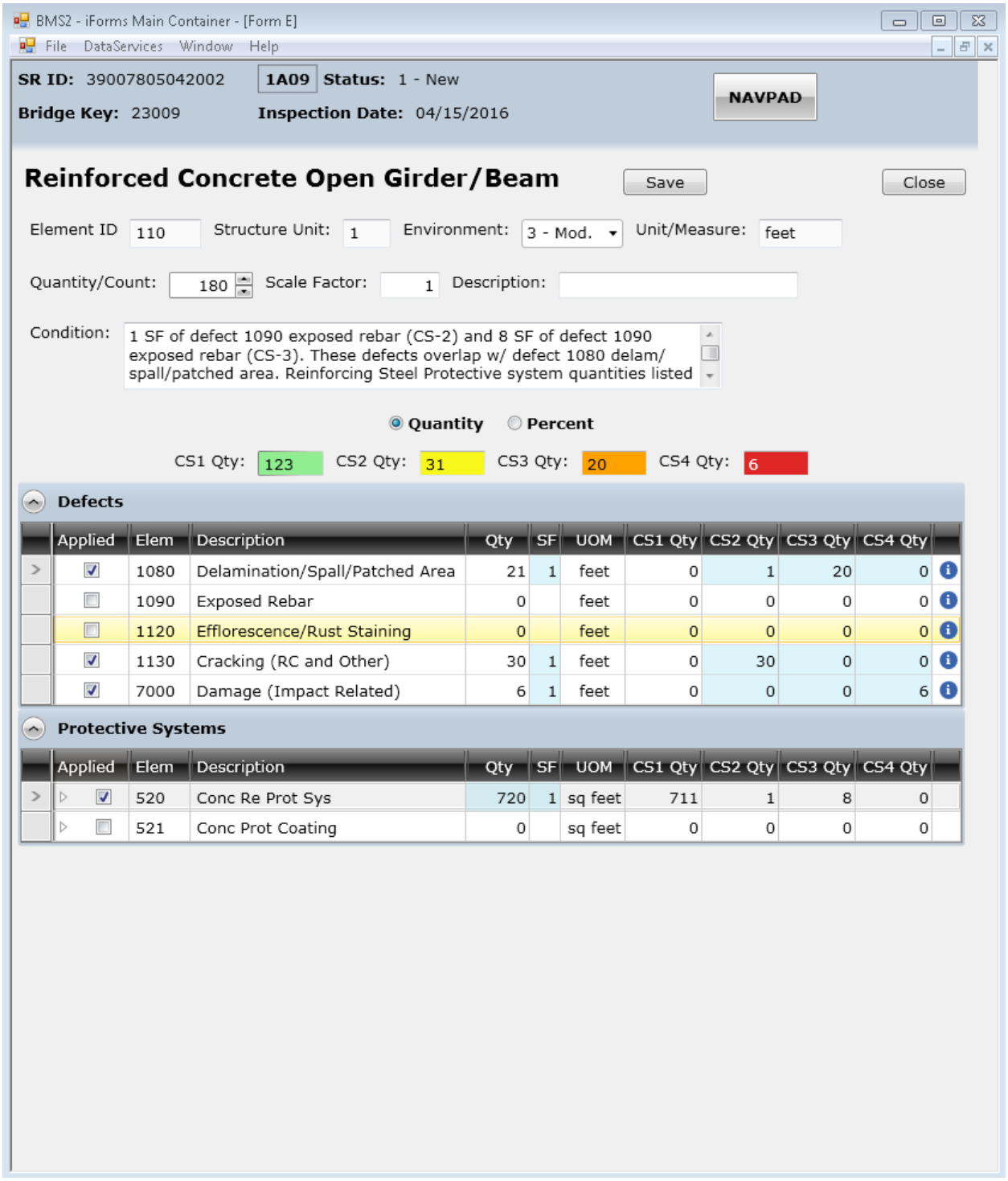

Figure 1.7-1 BMS3 Screen Shot for Elements 110 Reinforced Concrete Open Girder/Beam

2 Single Span Painted Steel Truss

2.1 Structure Description

This structure, shown in Figure 2.1-1, is a single span painted steel pony truss with a length of 113'-4". The floor system for the truss consists of nine floor beams spaced at 14′-2″ and five rows of stringers spaced at 5′-3″. The superstructure supports a 24-foot roadway consisting of two 10-foot lanes with 2-foot shoulders on each side. The centerline distance between trusses is 27 feet. The concrete abutments have 10-foot long non-integral wingwalls at each end. The deck has an asphalt overlay and the joints above the abutments consist of armored compression seals. The bearings at the Near Abutment are fixed, while the bearings at the Far Abutment are movable. The bridge carries a state route with an ADT of 2,500 vehicles per day over a small stream.

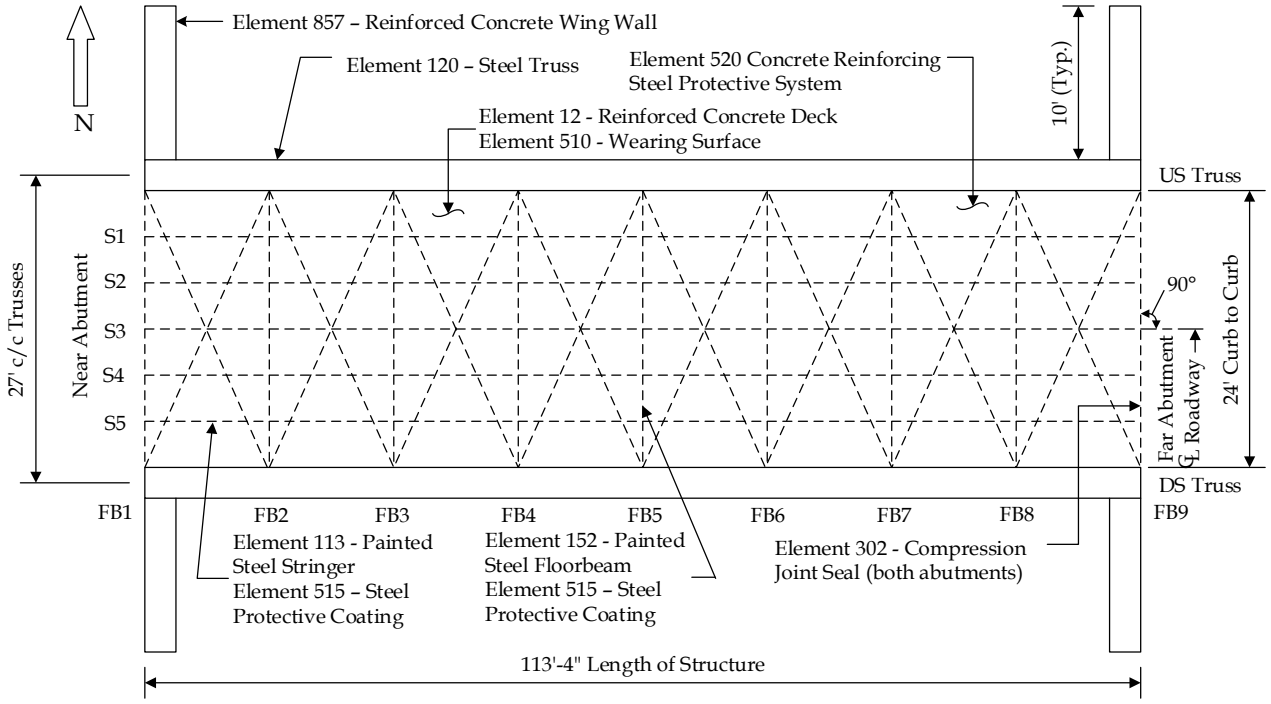

Figure 2.1-1 Plan View of Steel Truss

2.2 Deck Elements and Quantities

The typical section is shown in Figure 2.2-1. The deck contains epoxy coated reinforcement. The appropriate deck elements and quantity calculations are shown in Table 2.2-1.

Table 2.2-1 Deck Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION
12	Reinforced Concrete Deck	113′ Long x 25′ Wide = 2,825 SF
510	Wearing Surfaces	113′ Long x 24′ Wide = 2,712 SF
520	Concrete Reinforcing Steel Protective System	113′ Long x 25′ Wide = 2,825 SF
302	Compression Joint Seal	$\frac{25' \text{Long x 2 Joints}}{\sin(90°)}$ = 50 LF
330	Metal Bridge Railing	113′ Long x 2 Rows = 226 LF
515	Steel Protective System	226 LF x 4 SF/LF = 904 SF

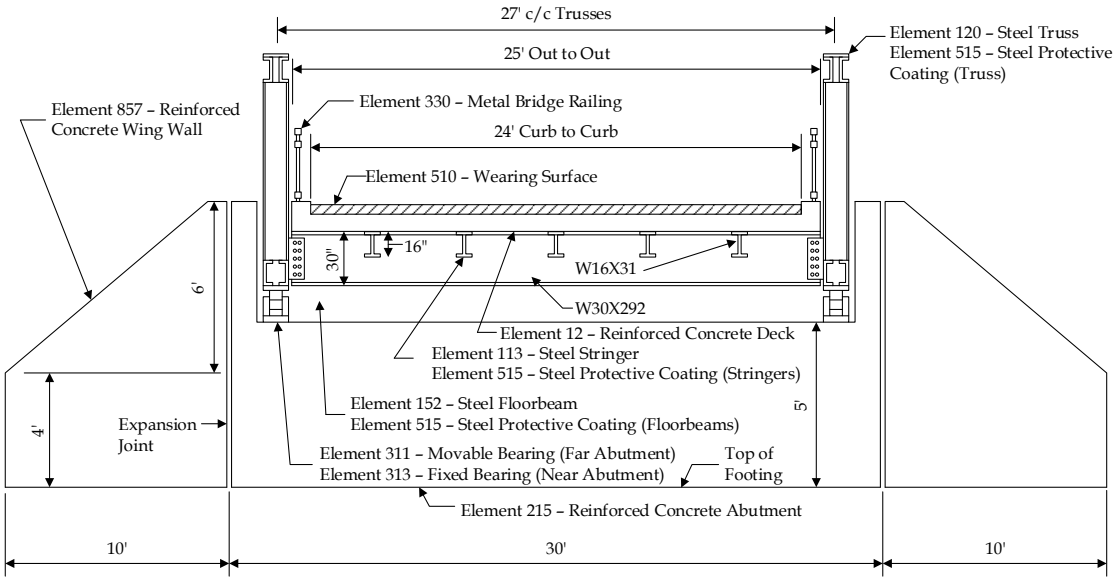

Figure 2.2-1 Typical Truss Section at Abutment

2.3 Superstructure Elements and Quantities

For this example, the superstructure consists of the trusses, floor system, and bearings. The appropriate elements and quantity calculations are shown in Table 2.3-1.

Table 2.3-1 Superstructure Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION	SCALE FACTOR
120	Steel Through Truss	113′ Long x 2 Trusses = 226 LF	N/A
515	Steel Protective Coating – Truss	22 SF/LF x 226 LF = 4,972 SF	N/A
113	Steel Stringer	113′ Long x 5 Rows = 565 LF	$\frac{16\text{" Depth}}{12\text{" per Foot}} = 1.33$ FT
515	Steel Protective Coating – Stringers	9 SF/LF x 565 LF = 5,085 SF	N/A
152	Steel Floorbeam	25′ Long x 9 Floorbeams = 225 LF	$\frac{30\text{" Depth}}{12\text{" per Foot}} = 2.5$ FT
515	Steel Protective Coating – Floorbeams	5 SF/LF x 225 LF = 1,125 SF	N/A
311	Movable Bearing	1 per Truss x 2 Trusses = 2 EA	N/A
515	Steel Protective Coating – Bearings	2 EA x 2 SF/EA = 4 SF	N/A
313	Fixed Bearing	1 per Truss x 2 Trusses = 2 EA	N/A
515	Steel Protective Coating – Bearings	2 EA x 2 SF/EA = 4 SF	N/A

Note: For protective coating on this truss, use 22 SF/LF of paint, protective coating on stringers, use 9 SF/LF of paint and for protective coating on the floor beams, use 5 SF/LF of paint. For the protective coating on the bearings, use 2 SF/EA of paint. The values listed above are specific to this example; calculations will be required for each bridge.

2.4 Substructure Elements and Quantities

The substructure includes the abutments and wingwalls. Since there are expansion joints between the abutment and wingwalls, they are not included in the abutment element and are tabulated separately. The substructure contains epoxy coated reinforcement. The appropriate elements and quantity calculations are shown in Table 2.4-1.

Table 2.4-1 Substructure Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION	SCALE FACTOR
215	Reinforced Concrete Abutment	30′ Long x 2 Abutments = 60 LF	Ht. = 5 LF
520	Concrete Reinforcing Protective System	60 LF x 5 LF = 300 SF	N/A
857	Reinforced Concrete Wingwall	10′ Long x 4 Wingwalls = 40 LF	Ht. = 7 LF (average height)
520	Concrete Reinforcing Protective System	40 LF x 7 LF = 280 LF	N/A

2.5 Environmental States

All elements will be placed in environment 3 (Moderate), as per current policy.

2.6 Inspection Notes

A detailed inspection of the bridge revealed that the asphalt wearing surface was generally in good condition with only minor cracking present over 907 SF. The underside of the deck has 114 SF of heavy map cracking with efflorescence but no rust staining. In a separate area, there is 133 SF of delaminations with 30 SF of 2″ deep spalls and exposed reinforcing with minor surface corrosion. The total combined area of underside defects is 247 SF. At the Near Abutment, the joint material is torn for a total of 10 LF and an additional 10 LF contains packed debris. 5 LF of the torn material shows free flow of water through the joint. Similarly, at the Far Abutment, 15 LF contains packed debris and 10 LF of material was torn. All floor beams have 1/16″ to 1/4″ section loss along the entire length of the top and bottom flanges. All stringers have 1/16″ to 3/16″ section loss on the top and bottom flanges for a length of 2 feet from the floorbeam connections. The bearings and concrete substructure are in good condition.

The reinforcing bars used in the deck, abutment, and wingwalls were epoxy coated.

2.7 Defect Code Condition State Assessment

12 – Reinforced Concrete Deck: The 114 SF of heavy map cracking with efflorescence located on the underside of the deck is in CS-3 and is in CS-2 respectively. The 133 SF of delaminations and spalling along with exposed reinforcement is in CS-3 and CS-2, respectively. Similarly, the exposed rebar is a CS-2 but is already quantified in the 133 SF for spalling under CS-3 and therefore is not recorded.

> Noted Overlapping Defects: The 30 SF of exposed rebar in CS-2 is captured in the 200 SF of delamination/spall/patched area in CS–3 and will not be counted in the table. The 114 SF of efflorescence/rust staining in CS–2 will be captured in the 114 SF of cracking in CS–3 and will not counted separately under the condition state quantities. These defects should be noted in the BMS3 condition field.

510 – Wearing Surface (Applied to Element 12): 907 SF of hairline asphalt cracking throughout the wearing surface warrants CS-2 for the Cracking Defect Code.

> Noted Overlapping Defects: The 907 SF of effectiveness in CS–2 will be accounted for in the 907 SF of crack defect in CS-2 and will not counted separately under the condition state quantities. These defects should, however, be noted in the BMS3 condition field.

520 - Concrete Reinforcing Steel Protective System (Applied to Element 12): The 30 SF area where the rebar is exposed, corroded and the epoxy coating is no longer effective is in CS-4. Areas that are cracked with efflorescence but without rust stains indicate the epoxy is still limitedly effective and in CS-3 (284 SF). The remaining area is hidden within the concrete and is in CS-1.

113 – Steel Stringers: All stringers have 1/16" to 3/16" section loss on the top and bottom flanges for a length of 2 feet from the floorbeam connections section loss, this places 160 LF of steel stringers in CS-3. The remaining lengths of the stringers are devoid of recordable defects and are in CS-1.

152 – Steel Floor Beam: All floor beams have 1/16" to 1/4" section loss along the entire length of the top and bottom flanges, this places all 225 LF of steel floor beams in CS-3.

515 - Steel Protective System (Applied to Elements 113, 120 and 152): For areas where the steel is exposed, corroded and exhibits section loss, all floor beams for their entire length and the end 2 LF of the stringers at the connection, the protective system has completely failed and is no longer effective. Therefore, a CS-4 exists for both effectiveness and peeling/bubbling/cracking defects with a total area of 2,565 SF (1,125 SF + 1,440 SF). 1,135 SF of the protective system along the stringers has peeled and cracked exposing the primer coat and limiting its effectiveness is in CS-3. There is an additional 566 SF along the truss protective coating that exhibits cracking in the finish coat only while still being substantially effective and is in CS-2. The remaining area is good and coded CS-1.

> Noted Overlapping Defects: The effectiveness for the steel protective system will not be tabulated in the table because it overlaps with the same area that accounts for the peeling/bubbling/cracking defect. These defects should be noted in the BMS3 condition field.

302 – Compression Joint seal: 10 LF at the Near Abutment and 15 LF at the Far Abutment contained packed debris and dirt that appeared not to hinder the movement of the joint, putting 25 LF in CS-2. Each joint contained 10 LF of torn joint material with 5 LF at the Near Abutment with severe leakage a total of 15 LF in CS-3 and 5 LF in CS-4 respectively.

> Noted Overlapping Defects: Within the 10 LF at the Near Abutment, 5 LF of the joint showed signs of severe leakage that warrants a CS-4 condition. The leakage defect quantity overlaps the seal damage and is not cumulative and will not be recorded separately in the table and the quantity for seal damage will be listed as 5 LF for the Near Abutment. These defects should be noted in the BMS3 condition field

Other Elements: The remaining elements that define the bridge have no defects and are in CS-1. A summary of the elements, condition states, and applicable Defect Codes is provided in Table 2.7-1.

Table 2.7-1 Summary of Element Identification and Assessment

ELEM. NUMBER	DEFECT CODE	ELEMENT / CODE DESCRIPTION	UNIT	TOTAL QTY.	CONDITION STATE QTY.			
					CS-1	CS-2	CS-3	CS-4
12	-	Reinforced Concrete Deck	SF	2,825	2,578	0	247	0
	1080	*Delamination/Spall/Patched Area*	*SF*	*133*	*0*	*0*	*133*	*0*
510	-	Wearing Surface	SF	2,712	1,805	907	0	0
	3220	*Crack*	*SF*	*907*	*0*	*907*	*0*	*0*
	1130	*Cracking*	*SF*	*114*	*0*	*0*	*114*	*0*
520	-	Concrete Reinforcing Steel Protective System	SF	2,825	2,578	217	0	30
	3600	*Effectiveness*	*SF*	*277*	*0*	*217*	*0*	*30*
302	-	Compression Joint Seal	LF	50	5	25	15	5
	2310	*Leakage*	*LF*	*5*	*0*	*0*	*0*	*5*
	2330	*Seal Damage*	*LF*	*15*	*0*	*0*	*15*	*0*
	2350	*Debris Impact*	*LF*	*25*	*0*	*25*	*0*	*0*
330	-	Metal Bridge Railing	LF	226	226	0	0	0
515	-	Steel Protective Systems	SF	904	904	0	0	0
113	-	Steel Stringer	LF	565	405	0	160	0
	1000	*Corrosion*	*LF*	*160*	*0*	*0*	*160*	*0*
515	-	Steel Protective System	SF	4,972	2,397	0	1,135	1,440
	3420	*Peeling/Bubbling/Cracking*	*SF*	*2,575*	*0*	*0*	*1,135*	*1,440*
120	-	Steel Truss	LF	226	226	0	0	0
515	-	Steel Protective System	SF	5,085	4,519	566	0	0
	3420	*Peeling/Bubbling/Cracking*	*SF*	*566*	*0*	*566*	*0*	*0*
152	-	Steel Floor Beam	LF	225	0	0	225	0
	1000	*Corrosion*	*LF*	*225*	*0*	*0*	*225*	*0*
515	-	Steel Protective System	SF	1,125	0	0	0	1,125
	3420	*Peeling/Bubbling/Cracking*	*SF*	*1,125*	*0*	*0*	*0*	*1,125*
311	-	Movable Bearing	EA	2	2	0	0	0
515	-	Steel Protective System	SF	4	4	0	0	0
313	-	Fixed Bearing	EA	2	2	0	0	0
515	-	Steel Protective System	SF	4	4	0	0	0
215	-	Reinforced Concrete Abutment	LF	60	60	0	0	0
520	-	Concrete Reinforcing Steel Protective System	SF	300	300	0	0	0
857	-	Reinforced Concrete Wingwalls	LF	40	40	0	0	0
520	-	Concrete Reinforcing Steel Protective System	SF	280	280	0	0	0

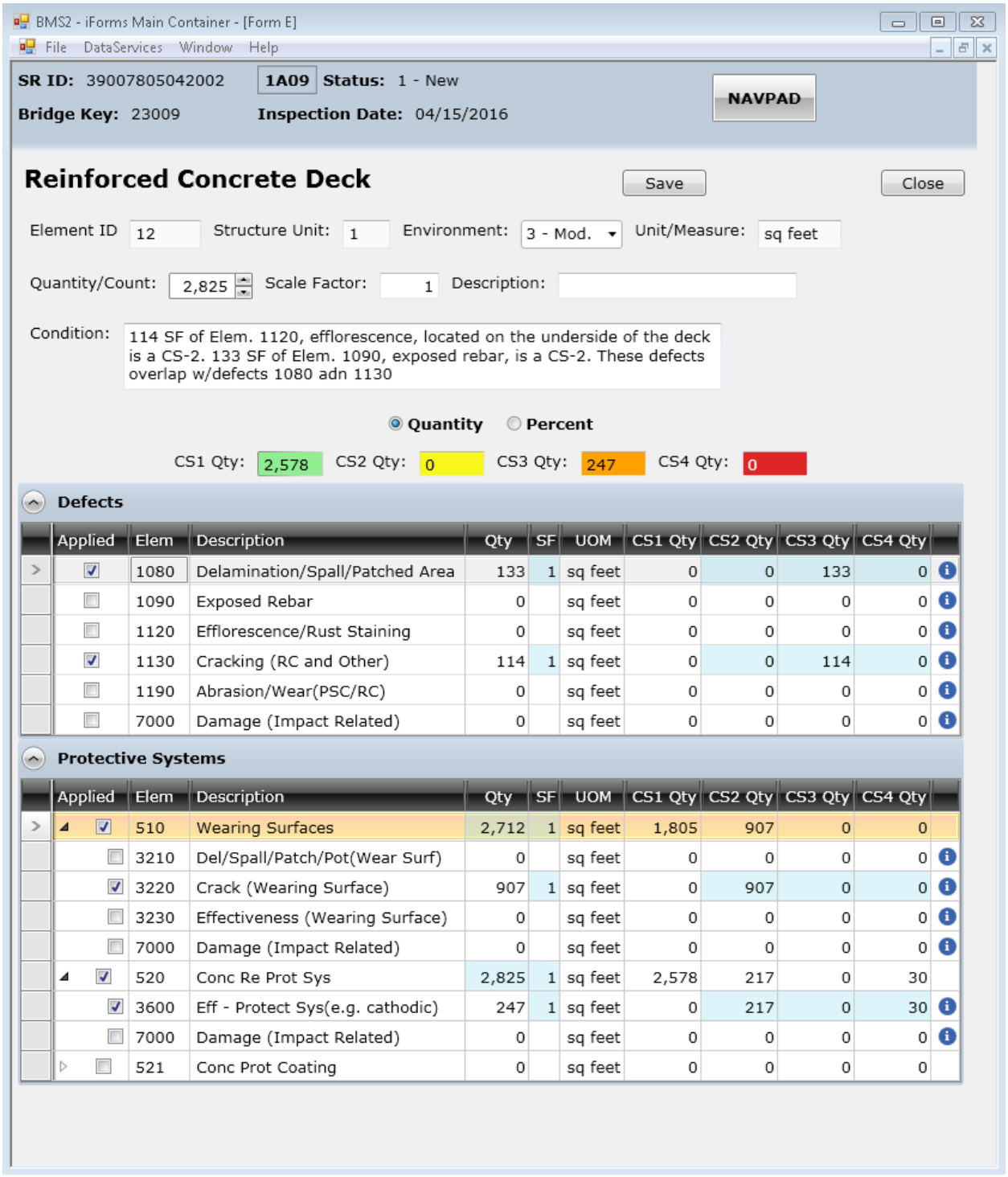

Figure 2.7-1 BMS3 Screen Shot for Element 12 Reinforced Concrete Deck

3 Two Span Painted Steel Multi-Beam Bridge

3.1 Structure Description

This structure, shown in Figure 3.1-1, is a painted steel multi-beam bridge with two equal span lengths of 61 feet. There is a total of nine W32X292 beams. The exterior face and bottom flange of the fascia beams are encased in concrete. The superstructure supports a 30-foot roadway consisting of two 10-foot lanes with 5-foot shoulders on each side. The out-to-out width of the bridge is 44 feet, including 6-foot sidewalks and 1-foot railings on each side. The deck was constructed with epoxy coated reinforcement. The concrete abutments have 10-foot long non-integral wingwalls at each end. The deck has an asphalt overlay and all joints are pourable seals. The bearings at the abutments are moveable, while the bearings at the pier are fixed. The bridge carries a state route with an ADT of 6,500 vehicles per day over a small stream.

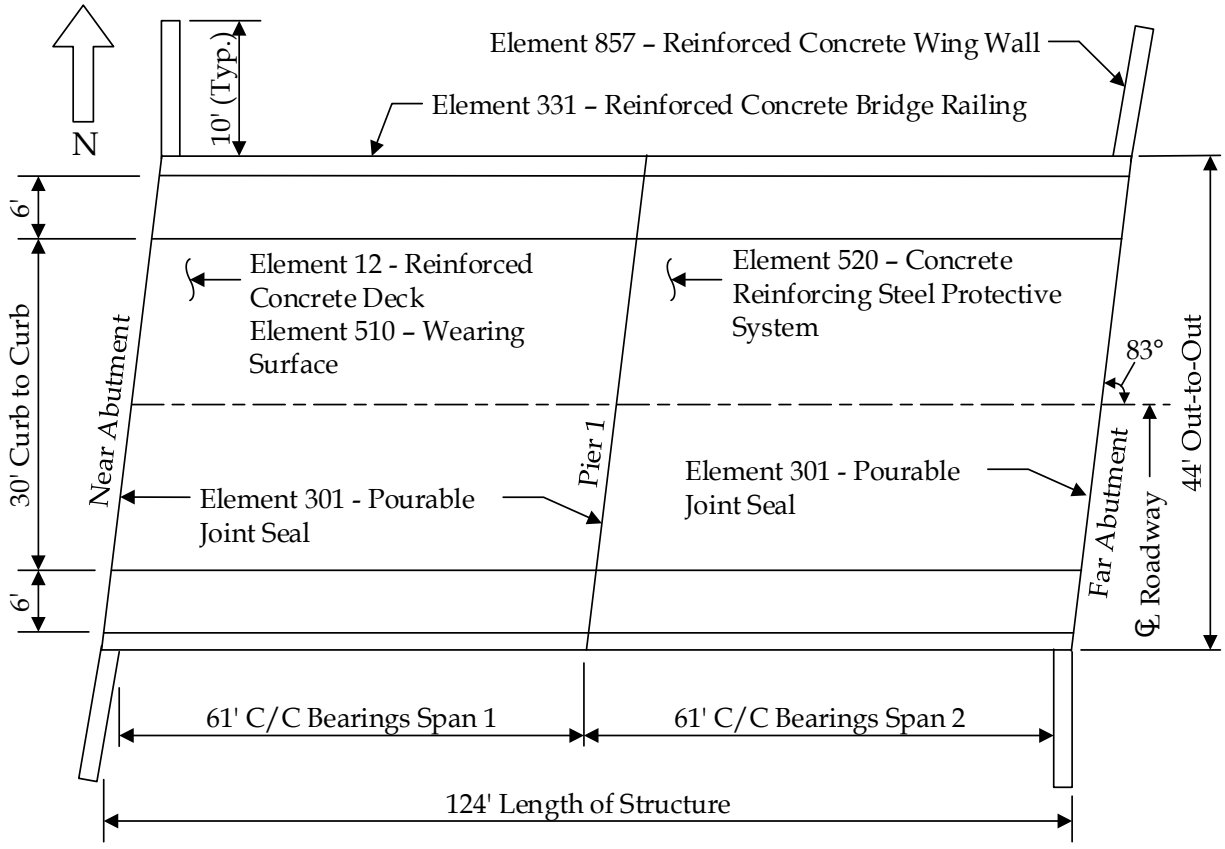

Figure 3.1-1 Plan View of Steel Multi-Beam Bridge

3.2 Deck Elements and Quantities

The typical section is shown in Figure 3.2-1. Joint elements at piers should be assigned to the lowest numbered span that they share. The deck contains epoxy coated reinforcement. The appropriate deck elements and quantity calculations are shown by span in Tables 3.2-1 and 3.2-2.

Table 3.2-1 Deck Elements and Quantity Calculations – Span 1

ELEMENT	DESCRIPTION	QUANTITY CALCULATION
12	Reinforce Concrete Deck	62′ Long x 44′ Wide = 2,728 SF
510	Wearing Surface	62′ Long x 30′ Wide = 1,860 SF
520	Concrete Reinforcing Steel Protective System	62′ Long x 44′ Wide = 2,728 SF
301	Pourable Joint Seal	$\frac{44' \text{ Long x 2 Joints}}{\sin(83°)} = 89$ LF
331	Reinforced Concrete Bridge Railing	62′ Long x 2 Rows = 124 LF
520	Concrete Reinforcing Steel Protective System	124 LF x 4.17 SF/LF = 517 SF

Table 3.2-2 Deck Elements and Quantity Calculations – Span 2

ELEMENT	DESCRIPTION	QUANTITY CALCULATION
12	Reinforce Concrete Deck	62′ Long x 44′ Wide = 2,728 SF
510	Wearing Surface	62′ Long x 30′ Wide = 1,860 SF
520	Concrete Reinforcing Steel Protective System	62′ Long x 44′ Wide = 2,728 SF
301	Pourable Joint Seal	$\frac{44' \text{ Long x 1 Joints}}{\sin(83°)} = 89$ LF
331	Reinforced Concrete Bridge Railing	62′ Long x 2 Rows = 124 LF
520	Concrete Reinforcing Steel Protective System	124 LF x 4.17 SF/LF = 517 SF

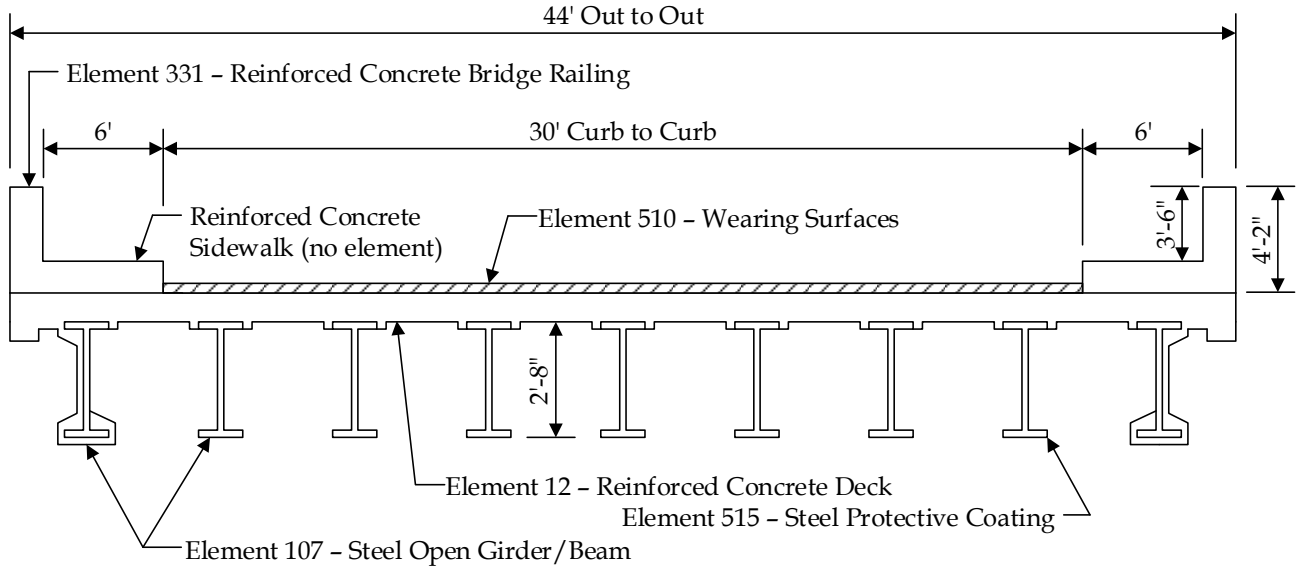

Figure 3.2-1 Typical Section of Steel Multi-Beam Bridge

3.3 Superstructure Elements and Quantities

For this example, the superstructure consists of the steel beams and steel bearings. The appropriate elements and quantity calculations are shown in Tables 3.3-1 and 3.3-2

Table 3.3-1 Superstructure Elements and Quantity Calculations – Span 1

ELEMENT	DESCRIPTION	QUANTITY CALCULATION	SCALE FACTOR
107	Steel Open Girder/Beam	61′ Span x 9 Beams = 549 LF	$\frac{32" \text{ Depth}}{12" \text{ per Foot}}$=2.7 FT
515	Steel Protective Coating	61′ Span x 7 Beams x 9 SF/LF = 3,843 SF	N/A
311	Movable Bearing	1 per Beam x 9 Beams = 9 EA	N/A
515	Steel Protective Coating	9 EA x 2 SF/EA = 18 SF	N/A
313	Fixed Bearing	1 per Beam x 9 Beams = 9 EA	N/A
515	Steel Protective Coating	9 EA x 2 SF/EA = 18 SF	N/A

Table 3.3-2 Superstructure Elements and Quantity Calculations – Span 2

ELEMENT	DESCRIPTION	QUANTITY CALCULATION	SCALE FACTOR
107	Steel Open Girder/Beam	61′ Span x 9 Beams = 549 LF	$\frac{32" \text{ Depth}}{12" \text{ per Foot}}$=2.7 FT
515	Steel Protective Coating	61′ Span x 7 Beams x 9 SF/LF = 3,843 SF	N/A
311	Movable Bearing	1 per Beam x 9 Beams = 9 EA	N/A
515	Steel Protective Coating	9 EA x 2 SF/EA = 18 SF	N/A

Note: For protective coating on the open steel girders use 9 SF/LF of paint, and use 2 SF/EA of paint for both the movable and fixed bearings. The values listed above are specific to this example. The values listed above are specific to this example; calculations will be required for each bridge.

3.4 Substructure Elements and Quantities

The substructure elements are shown in Figure 3.4-1. The substructure includes the pier, abutments, and wingwalls. Since there are expansion joints between the abutment and wingwalls, they are not included in the abutment element and are tabulated separately. Substructure elements should be assigned to the lowest numbered span that they share. The reinforcement in the substructures do not contain a protective coating. The appropriate elements and quantity calculations are shown in Tables 3.4-1 and 3.4-2.

Table 3.4-1 Substructure Elements and Quantity Calculations – Span 1

ELEMENT	DESCRIPTION	QUANTITY CALCULATION	SCALE FACTOR
210	Reinforced Concrete Pier Wall	44′ Long x 1 Pier = 44 LF	Ht. = 8.0 LF
215	Reinforced Concrete Abutment	44′ Long x 1 Abutment = 44 LF	Ht. = 10.0 LF
234	Reinforced Concrete Pier Cap	45′ Long x 1 Pier = 45 LF	Ht. = 2.0 LF
857	Reinforced Concrete Wingwall	10′ Long x 2 Wingwalls = 20 LF	Ht. = 10.0 LF (average height)

Table 3.4-2 Substructure Elements and Quantity Calculations – Span 2

ELEMENT	DESCRIPTION	QUANTITY CALCULATION	SCALE FACTOR
215	Reinforced Concrete Abutment	44′ Long x 1 Abutment = 44 LF	Ht. = 10.0 LF
857	Reinforced Concrete Wingwall	10′ Long x 2 Wingwalls = 20 LF	Ht. = 10.0 LF (average height)

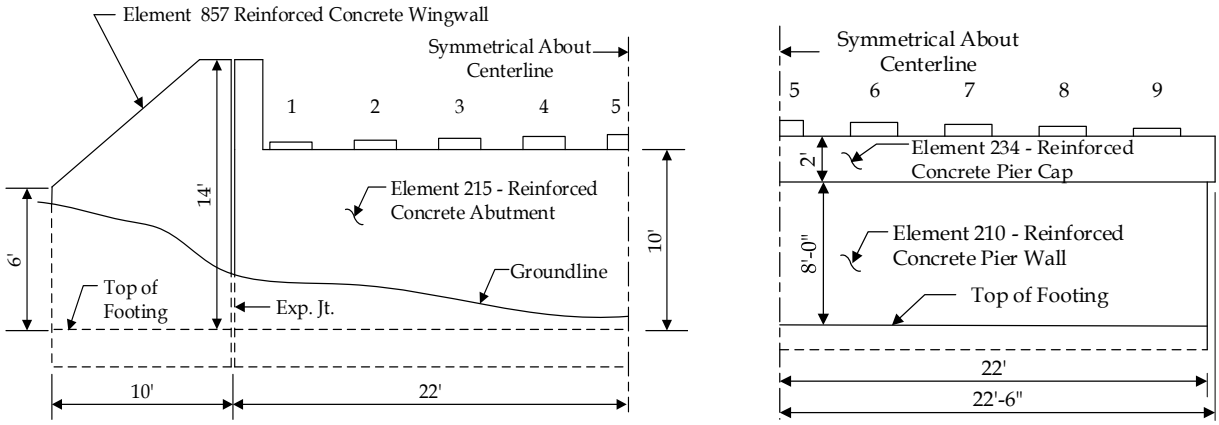

Figure 3.4-1 Half Elevation of Abutment and Pier

3.5 Environmental States

All elements will be placed in environment 3 (Moderate), as per current policy.

3.6 Inspection Notes

A detailed inspection of the bridge revealed that the asphalt wearing surface is generally in fair condition. Spans 1 and 2 have two new 5′-6″ wide patches in each span for the full length of the span (62′) with each surrounded by areas of light map cracking. The area of cracking is approximately 450 SF in Span 1 and 516 SF in Span 2.

The underside of the deck is covered by stay-in-place forms along the outer two bays with no signs of corrosion. In the exposed portions, Span 1 exhibits 20 SF of spalling with exposed reinforcing while Span 2 exhibits 10 SF. The spalls in both spans are large and are in CS-3. However, the exposed rebar has only surface corrosion and is in CS-2. There is also 10 SF of delaminations in Span 1 and 24 SF of delamination in Span 2, both of which are in CS-2 and independent of the other defect areas.

The beams present some surface rust and section loss. Their condition is summarized in Tables 3.6-1 and 3.6-2 on the following page. All areas along the interior beams without corrosion exhibited chalking paint over the entire length of the beams.

Table 3.6-1 Steel Beam Conditions – Span 1

BEAM NO.	CONDITION
1	No defects noted. Concrete encasement is sound
2	Minor section loss on bottom flange and lower 5″ of web for full length
3	Minor section loss from 12′ to 16′ from Near Abutment, heavy rust from 20′ to 40′ from Near Abutment
4	No defects noted
5	Minor surface rust on both flanges for full length
6	Minor surface rust on web and bottom flange for full length
7	3/32″ section loss for a 30′ length starting at Near Abutment
8	1/8″ section loss for a 50′ length starting at Near Abutment
9	No defects noted. Concrete encasement is sound

Table 3.6-2 Steel Beam Conditions – Span 2

BEAM NO.	CONDITION
1	No defects noted. Concrete encasement is sound
2	Minor section loss on bottom flange and lower 5″ of web for full length
3	No defects noted
4	No defects noted
5	Minor surface rust on both flanges for full length
6	Minor surface rust on web and bottom flange for full length
7	No defects noted
8	No defects noted
9	No defects noted. Concrete encasement is sound

The Near Abutment has 10 feet of spalling below the bearing seat, 1 ½″ deep by 8″ high, with exposed reinforcing. The Near Abutment backwall has minor spalling along the joint area over a width of 3 feet. The Far Abutment has spalling below the bearing seat for its full width, 2 ½″ deep by 12″ high, with exposed reinforcing (no measurable section loss or rust staining). The wall pier has one, 5-foot long, spall below the bearing seat, 2″ deep by 1′-2″ high, with exposed reinforcing exhibiting rust staining, while the remaining width has 2 spalls, each 1″ deep by 5″ high by 2′-6″ long, with no exposed reinforcing. No defects were noted on the concrete wingwalls. The pier wall has 5 feet of spalling directly below the pier cap, 4″ deep by 9″ high with exposed reinforcing. The pier wall has 5 feet of deliminations, 3″ high, along the ground line. The pier cap has a previously repaired area, 8″ x 5′ that is unsound directly below the bearing seat. There is also 6′ on either side of previously repaired area (12′ total), of a shallow ½″ deep by 5″ high spall. The concrete reinforcing used in the deck, and barrier is epoxy coated. The reinforcing used in the abutment, pier and wingwalls are black bars.

3.7 Defect Code Condition State Assessment

12 – Reinforced Concrete Deck: Span 1 contains 20 SF of spalling with exposed reinforcing while Span 2 contains 10 SF. The spalls in both spans are large and are in CS-3. However, the exposed rebar has only surface corrosion and is in CS-2. There is also 10 SF of delaminations in Span 1 and 24 SF of delamination in Span 2, both of which are in CS-2 and independent of the other defect areas.

> Noted Overlapping Defects: The 20 SF and 10 SF of exposed rebar is not counted in the Element Condition State total because it is accounted for in the more severe spalling defect. These defects should be noted in the BMS3 condition field.

520 - Concrete Reinforcing Steel Protective System (Applied to Element 12): For areas in both spans where the rebar is exposed and corroded, the epoxy coating is no longer effective and is in CS-4 (20 SF in Span 1, 10 SF in Span 2). Areas that are delaminated indicate the onset of corrosion and limited effectiveness are in CS-3 (10 SF in Span 1, 24 SF in Span 2). The remaining area has no visible defects and is coded CS-1.

510 – Wearing Surface (Applied to Element 12): 682 SF of asphalt patching in each span is in CS-2. The light asphalt map cracking around the patching in each span is in CS-2 for the Cracking Defect Code.

> Noted Overlapping Defects: The 1,132 SF in Span 1 and 1,198 SF in Span 2 is in CS-2 for the Effectiveness Defect Code will not be calculated in the Element Condition State total because it is accounted for in the more severe patched area and cracking defects. The effectiveness for the wearing surface should be noted in the BMS3 condition field.

107 - Steel Open Girder/Beam: Span 1 Beams collectively have 85 LF of corrosion with minor section loss putting this area is in CS-3. Span 1 Beams also exhibit 80 LF of corrosion with advanced section loss that warrants a structural evaluation and is in CS-4 coding. An additional area in Span 1 exhibits minor surface rust for 122 LF in CS-2. Span 2 Beams collectively have 61 LF of corrosion with minor section loss in CS-3, and 122 LF of surface or freckled rust in CS-2.

515 – Steel Protective Coating - Paint (Applied to Element 107): Using 9 SF/LF, the total quantity for 7 (interior) beams x 61 LF x 2 spans x 9 SF/LF = 7,686 SF. For coating defect quantification, areas with corrosion and any measure of section loss are in CS-4, and areas with the onset of corrosion are in CS-3. The remaining paint system is chalking and is in CS-2.

> Noted Overlapping Defects: The 3,843 SF in Span 1 and 3,843 SF in Span 2 is in CS-2 or CS-3 for the Effectiveness Defect Code and will not be calculated in the Element Condition State total because it is accounted for in the more severe chalking or peeling/bubbling/cracking defects. The effectiveness for the steel protective coating should be noted in the BMS3 condition field.

215 – Reinforced Concrete Abutment: At the Near Abutment, 10 LF of large spalling below the bearing seat is in CS-3. Rebar exposure without section loss or rust staining is in CS-2.The Near Abutment also has spalling along the backwall at the expansion joint (3 SF). This is in CS-2 and it does not overlap the spalling in the stem. At the Far Abutment the stem is spalled along the bearing seat for the entire 44 LF width with exposed rebar and is in CS-3.

> Noted Overlapping Defects: The 10 LF at the Near Abutment and the 44 LF at the Far Abutment of exposed rebar quantity is not counted in the Element Condition State total because it is accounted for in the more severe spalling defect. These defects should be noted in the BMS3 condition field.

210 - Reinforced Concrete Pier Wall: The pier has 5 LF of deep spalling with exposed reinforcing in CS-3 and 5 LF of minor spalling with no exposed reinforcing in CS-2.

> Noted Overlapping Defects: The 5 LF of exposed rebar at the wall pier is not counted in the Element Condition State total because it is accounted for in the more severe spalling defect. These defects should be noted in the BMS3 condition field.

234 - Reinforced Concrete Pier Cap: The pier cap has 6 LF of unsound patched area with no exposed reinforcing in CS-3 and 12 LF of minor spalling with no exposed reinforcing in CS-2.

Other Elements: The remaining elements that define the bridge have no defects and are in CS-1. Unless the sidewalk is part of the deck structure – not cast separately – defects in the sidewalk should not affect the condition station determination of the deck element.

A Summary of the elements, condition states, and applicable Defect Codes for each span is provided in Table 3.7-1 and Table 3.7-2 in the quantity mode, and Table 3.7-3 and Table 3.7-4 in the percent mode.

Table 3.7-1 Summary of Element Identification and Assessment – Span 1 (Quantity Mode)

ELEM. NUMBER	DEFECT CODE	ELEMENT / CODE DESCRIPTION	UNIT	TOTAL QTY.	CONDITION STATE QTY.			
					CS-1	CS-2	CS-3	CS-4
12	-	Reinforced Concrete Deck	SF	2,728	2,698	10	20	0
	1080	*Delamination/Spall/Patched Area*	*SF*	*30*	*0*	*10*	*20*	*0*
510	-	Wearing Surface	SF	1,860	728	1,132	0	0
	3210	*Delamination/Spall/Patched Area*	*SF*	*682*	*0*	*682*	*0*	*0*
	3220	*Crack (Wearing Surface)*	*SF*	*450*	*0*	*450*	*0*	*0*
520	-	Concrete Reinforcing Steel Protective System	SF	2,728	2,698	0	10	20
	3600	*Effectiveness*	*SF*	*30*	*0*	*0*	*10*	*20*
301	-	Pourable Joint Seal	LF	89	89	0	0	0
331	-	Reinforced Concrete Bridge Railing	LF	124	124	0	0	0
520	-	Concrete Reinforcing Steel Protective System	SF	517	517	0	0	0
107	-	Steel Open Girder/Beam	LF	549	262	122	85	80*
	1000	*Corrosion*	*LF*	*287*	*0*	*122*	*85*	*80**
515	-	Steel Protective Coating - Paint	SF	3,843	0	1,260	1,098	1,485
	3410	*Chalking*	*SF*	*1,260*	*0*	*1,260*	*0*	*0*
	3420	*Peeling/Bubbling/Cracking*	*SF*	*2,583*	*0*	*0*	*1,098*	*1,485*
311	-	Movable Bearing	EA	9	9	0	0	0
515	-	Steel Protective Coating - Paint	SF	18	18	0	0	0
313	-	Fixed Bearing	EA	9	9	0	0	0
515	-	Steel Protective Coating - Paint	SF	18	18	0	0	0
210	-	Reinforced Concrete Pier Wall	LF	44	34	5	5	0
	1080	*Delamination/Spall/Patched Area*	*LF*	*10*	*0*	*5*	*5*	*0*
215	-	Reinforced Concrete Abutment	LF	44	31	3	10	0
	1080	*Delamination/Spall/Patched Area*	*LF*	*13*	*0*	*3*	*10*	*0*
234	-	Reinforced Concrete Pier Cap	LF	45	27	12	6	0
	1080	*Delamination/Spall/Patched Area*	*LF*	*18*	*0*	*12*	*6*	*0*
857	-	Reinforced Concrete Wingwalls	LF	20	20	0	0	0

*For specific defect codes, a structural review is required when a quantity is placed in CS-4. If after the review it is determined the defect code quantity does not have an impact on the structural capacity of the parent element, the quantity shall be moved to CS-3.

Table 3.7-2 Summary of Element Identification and Assessment – Span 2 (Quantity Mode)

ELEM. NUMBER	DEFECT CODE	ELEMENT / CODE DESCRIPTION	UNIT	TOTAL QTY.	CONDITION STATE QTY.			
					CS-1	CS-2	CS-3	CS-4
12	-	Reinforced Concrete Deck	SF	2,728	2,694	24	10	0
	1080	*Delamination/Spall/Patched Area*	*SF*	*34*	*0*	*24*	*10*	*0*
510	-	Wearing Surface	SF	1,860	662	1,198	0	0
	3210	*Delamination/Spall/Patched Area*	*SF*	*682*	*0*	*682*	*0*	*0*
	3220	*Crack (Wearing Surface)*	*SF*	*516*	*0*	*516*	*0*	*0*
520	-	Concrete Reinforcing Steel Protective System	SF	2,728	2,694	0	24	10
	3600	*Effectiveness*	*SF*	*34*	*0*	*0*	*24*	*10*
301	-	Pourable Joint Seal	LF	89	89	0	0	0
331	-	Reinforced Concrete Bridge Railing	LF	124	124	0	0	0
520	-	Concrete Reinforcing Steel Protective System	SF	517	517	0	0	0
107	-	Steel Open Girder/Beam	LF	549	366	122	61	0
	1000	*Corrosion*	*LF*	*183*	*0*	*122*	*61*	*0*
515	-	Steel Protective Coating - Paint	SF	3,843	0	2,196	1,098	549
	3410	*Chalking*	*SF*	*2,196*	*0*	*2,196*	*0*	*0*
	3420	*Peeling/Bubbling/Cracking*	*SF*	*1,647*	*0*	*0*	*1,098*	*549*
311	-	Movable Bearing	EA	9	9	0	0	0
515	-	Steel Protective Coating - Paint	SF	18	18	0	0	0
215	-	Reinforced Concrete Abutment	LF	44	0	0	44	0
	1080	*Delamination/Spall/Patched Area*	*LF*	*44*	*0*	*0*	*44*	*0*
857	-	Reinforced Concrete Wingwalls	LF	20	20	0	0	0

Table 3.7-3 Summary of Element Identification and Assessment – Span 1 (Percent Mode)

ELEM. NUMBER	DEFECT CODE	ELEMENT / CODE DESCRIPTION	UNIT	TOTAL QTY.	CONDITION STATE %			
					CS-1	CS-2	CS-3	CS-4
12	-	Reinforced Concrete Deck	SF	2,728	98.90	0.37	0.73	0.00
	1080	*Delamination/Spall/Patched Area*	*SF*	*30*	*0.00*	*33.33*	*66.67*	*0.00*
510	-	Wearing Surface	SF	1,860	39.14	60.86	0.00	0.00
	3210	*Delamination/Spall/Patched Area*	*SF*	*682*	*0.00*	*100.00*	*0.00*	*0.00*
	3220	*Crack (Wearing Surface)*	*SF*	*450*	*0.00*	*100.00*	*0.00*	*0.00*
520	-	Concrete Reinforcing Steel Protective System	SF	2,728	98.90	0.00	0.37	0.73
	3600	*Effectiveness*	*SF*	*30*	*0.00*	*0.00*	*33.33*	*66.67*
301	-	Pourable Joint Seal	LF	89	100.00	0.00	0.00	0.00
331	-	Reinforced Concrete Bridge Railing	LF	124	100.00	0.00	0.00	0.00
520	-	Concrete Reinforcing Steel Protective System	SF	517	100.00	0.00	0.00	0.00
107	-	Steel Open Girder/Beam	LF	549	47.72	22.22	15.48	14.57
	1000	*Corrosion*	*LF*	*287*	*0.00*	*42.51*	*29.62*	*27.87*
515	-	Steel Protective Coating - Paint	SF	3,843	0.00	32.79	28.57	38.64
	3410	*Chalking*	*SF*	*1,260*	*0.00*	*100.00*	*0.00*	*0.00*
	3420	*Peeling/Bubbling/Cracking*	*SF*	*2,583*	*0.00*	*0.00*	*42.51*	*57.49*
311	-	Movable Bearing	EA	9	100.00	0.00	0.00	0.00
515	-	Steel Protective Coating - Paint	SF	18	100.00	0.00	0.00	0.00
313	-	Fixed Bearing	EA	9	100.00	0.00	0.00	0.00
515	-	Steel Protective Coating - Paint	SF	18	100.00	0.00	0.00	0.00
210	-	Reinforced Concrete Pier Wall	LF	44	77.27	11.36	11.36	0.00
	1080	*Delamination/Spall/Patched Area*	*LF*	*10*	*0.00*	*50.00*	*50.00*	*0.00*
215	-	Reinforced Concrete Abutment	LF	44	70.45	6.82	22.73	0.00
	1080	*Delamination/Spall/Patched Area*	*LF*	*13*	*0.00*	*23.08*	*76.92*	*0.00*
234	-	Reinforced Concrete Pier Cap	LF	45	60.00	26.67	13.33	0.00
	1080	*Delamination/Spall/Patched Area*	*LF*	*18*	*0.00*	*66.67*	*33.33*	*0.00*
857	-	Reinforced Concrete Wingwalls	LF	20	100.00	0.00	0.00	0.00

Refer to the Defect Code Quantification by Percent Guidelines on page J-2 of this Appendix for guidance on working in Percent Mode.

Table 3.7-4 Summary of Element Identification and Assessment – Span 2 (Percent Mode)

ELEM. NUMBER	DEFECT CODE	ELEMENT / CODE DESCRIPTION	UNIT	TOTAL QTY.	CONDITION STATE %			
					CS-1	CS-2	CS-3	CS-4
12	-	Reinforced Concrete Deck	SF	2,728	98.75	0.88	0.37	0.00
	1080	*Delamination/Spall/Patched Area*	*SF*	*34*	*0.00*	*70.59*	*29.41*	*0.00*
510	-	Wearing Surface	SF	1,860	35.59	64.41	0.00	0.00
	3210	*Delamination/Spall/Patched Area*	*SF*	*682*	*0.00*	*100.00*	*0.00*	*0.00*
	3220	*Crack (Wearing Surface)*	*SF*	*516*	*0.00*	*100.00*	*0.00*	*0.00*
520	-	Concrete Reinforcing Steel Protective System	SF	2,728	98.75	0.00	0.88	0.37
	3600	*Effectiveness*	*SF*	*34*	*0.00*	*0.00*	*70.59*	*29.41*
301	-	Pourable Joint Seal	LF	89	100.00	0.00	0.00	0.00
331	-	Reinforced Concrete Bridge Railing	LF	124	100.00	0.00	0.00	0.00
520	-	Concrete Reinforcing Steel Protective System	SF	517	100.00	0.00	0.00	0.00
107	-	Steel Open Girder/Beam	LF	549	66.67	22.22	11.11	0.00
	1000	*Corrosion*	*LF*	*183*	*0.00*	*66.67*	*33.33*	*0.00*
515	-	Steel Protective Coating - Paint	SF	3,843	0.00	57.14	28.57	14.29
	3410	*Chalking*	*SF*	*2,196*	*0.00*	*100.00*	*0.00*	*0.00*
	3420	*Peeling/Bubbling/Cracking*	*SF*	*1,647*	*0.00*	*0.00*	*66.67*	*33.33*
311	-	Movable Bearing	EA	9	100.00	0.00	0.00	0.00
515	-	Steel Protective Coating - Paint	SF	18	100.00	0.00	0.00	0.00
215	-	Reinforced Concrete Abutment	LF	44	0.00	0.00	100.00	0.00
	1080	*Delamination/Spall/Patched Area*	*LF*	*44*	*0.00*	*0.00*	*100.00*	*0.00*
857	-	Reinforced Concrete Wingwalls	LF	20	100.00	0.00	0.00	0.00

Refer to the Defect Code Quantification by Percent Guidelines on page J-2 of this Appendix for guidance on working in Percent Mode.

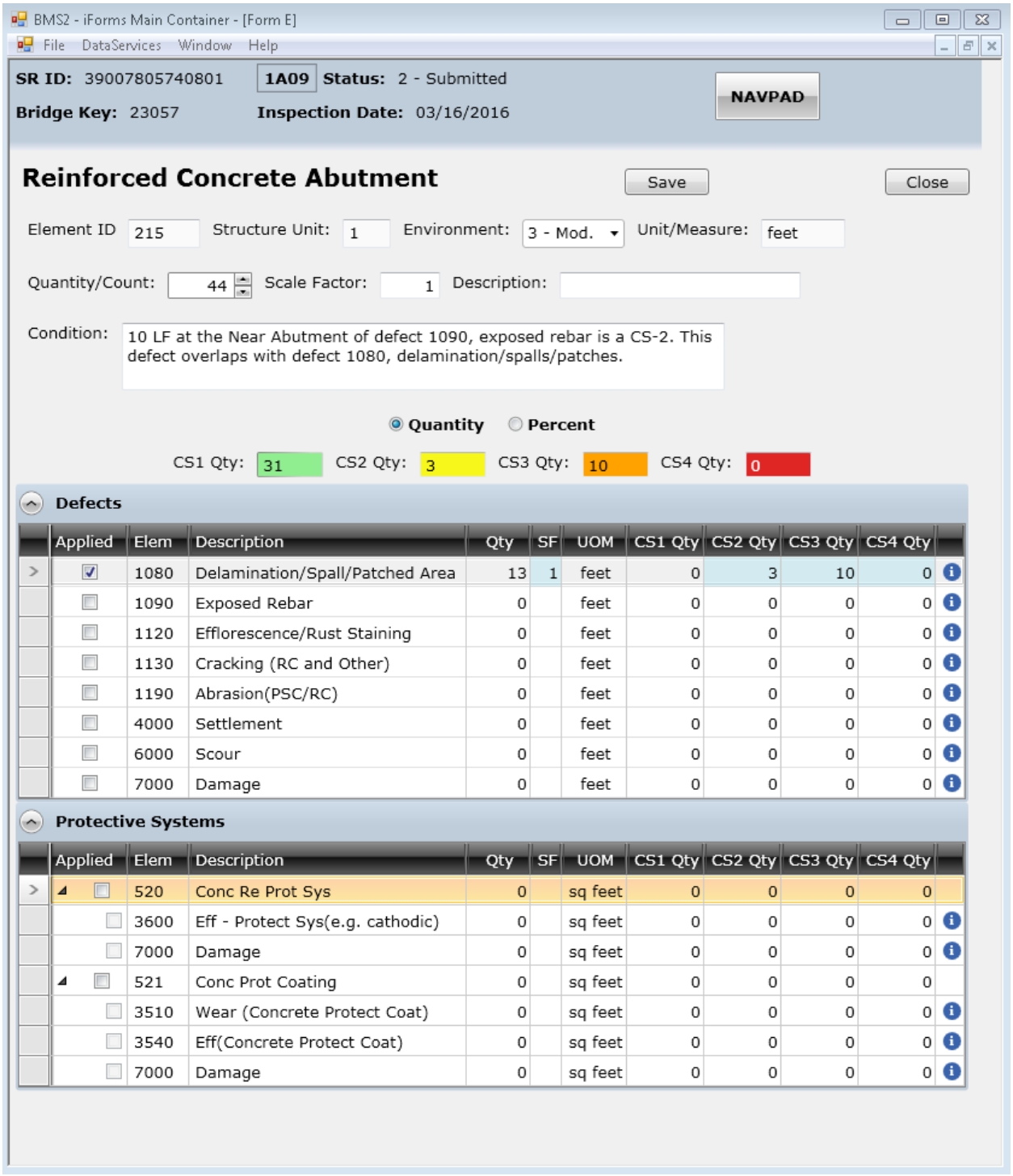

Figure 3.7-1 BMS3 Screen Shot for Element 215 Reinforced Concrete Abutment – Span 1 (Quantity Mode)

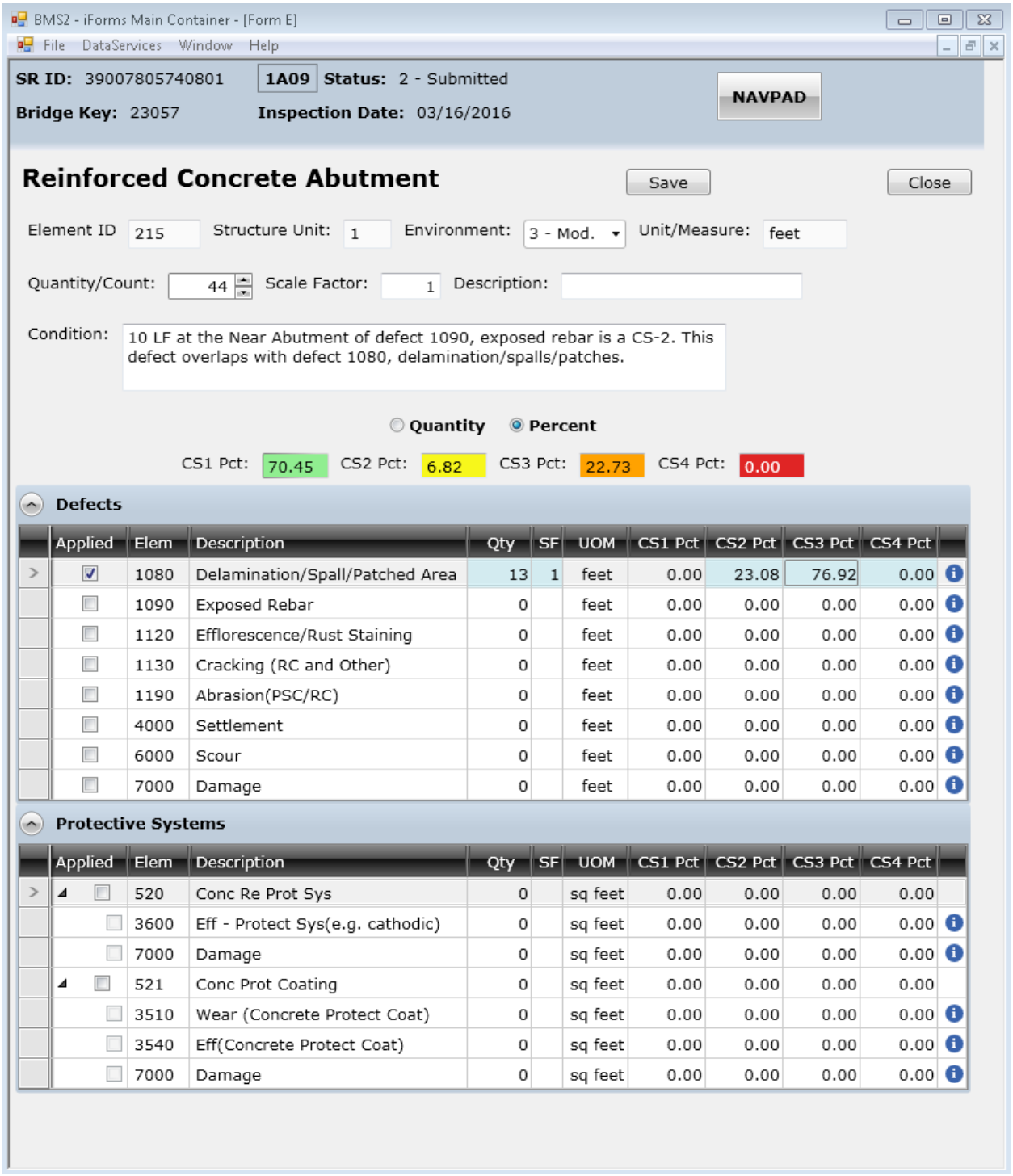

Figure 3.7-2 BMS3 Screen Shot for Element 215 Reinforced Concrete Abutment – Span 1 (Percent Mode)

4 Single Span Non-Composite Adjacent Box Beam (Superstructure and above ONLY)

4.1 Structure Description

This structure, shown in Figure 4.1-1, is a single span prestressed non-composite concrete adjacent box beam bridge with a 55-foot span length (57' structure length) and a 90 degree skew. There is a total of 8 box beams. The superstructure supports a 28-foot roadway consisting of two 14-foot lanes. The out-to-out width of the superstructure is 33.5′feet. The deck has an asphalt overlay and the joints above the abutments consist of pourable seals. Small neoprene bearings are visible at the abutments. The bridge carries a state route with an ADT of 1,000 vehicles per day over a two-lane roadway.

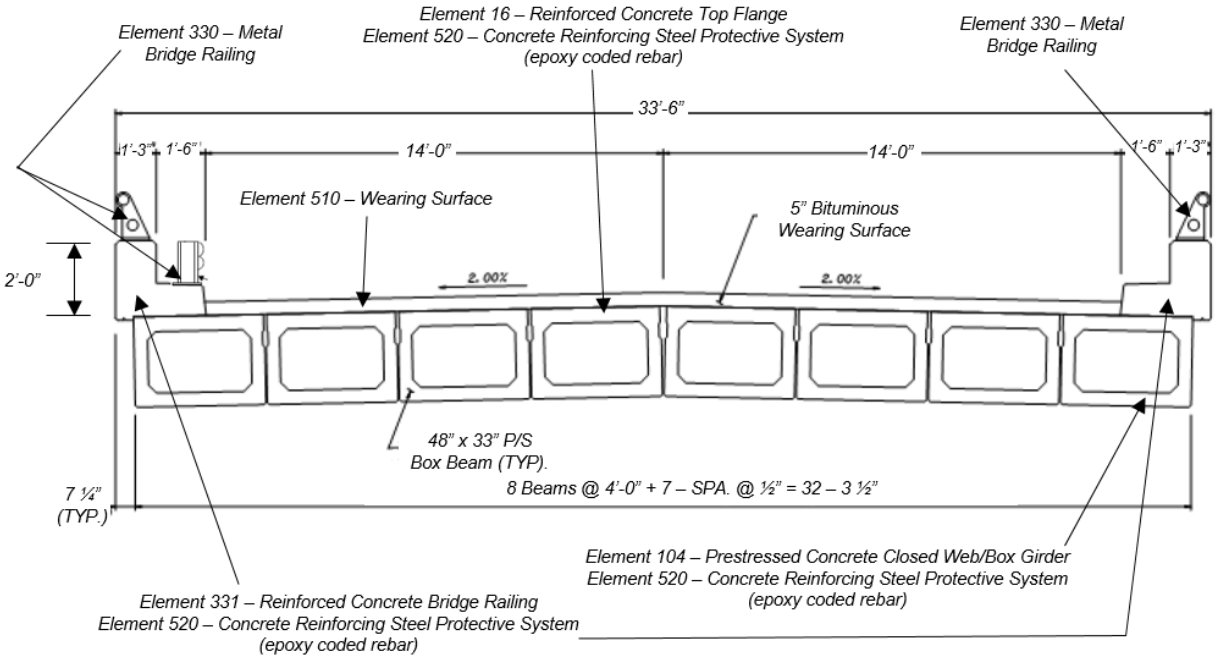

Figure 4.1-1 Typical Section of P/S Non-Composite Adjacent Box Beam Bridge (looking ahead)

4.2 Deck Elements and Quantities

The typical section is shown in Figure 4.1-1. The appropriate deck elements and quantity calculations are shown in Table 4.2-1.

Table 4.2-1 Deck Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION
16	Reinforced Concrete Top Flange*	57′ Long x 32.3′ Wide = 1841 SF
510	Wearing Surfaces	57′ Long x 28′ Wide = 1596 SF
520	Reinforcing Steel Protective System	57′ Long x 32.3′ Wide = 1841 SF
301	Pourable Joint Seal	33.5′ Long x 2 Joints = 67 LF
330	Metal Bridge Railing	57′ Long x 3 Rows = 171 LF
331	Reinforced Concrete Bridge Railing	57′ Long x 2 Rows = 114 LF
520	Reinforcing Steel Protective System	114 LF x 2.67 SF/LF Wide = 305 SF

* Reinforced Concrete Top Flange selected because no prestressing stands are present in the top flange of the adjacent box beams.

4.3 Superstructure Elements and Quantities

For this example, the superstructure consists of the beam elements and neoprene bearings. The appropriate element and quantity calculations are shown in Table 4.3-1.

Table 4.3-1 Superstructure Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION	SCALE FACTOR
104	P/S Concrete Closed Web/Box Girder	55′ Long x 8 Beams = 440 FT	$\frac{33\text{" Depth}}{12\text{" per Foot}} = 2.75$ FT
520	Reinforcing Steel Protective System	440 LF x 2.75 LF = 1,210 SF	N/A
310	Elastomeric Bearing	8 Beams x 2 Abutments = 16 Bearings	N/A

4.4 Substructure Elements and Quantities

Not included for this example.

4.5 Environmental States

All elements will be placed in environment 3 (Moderate), as per current policy.

4.6 Inspection Notes

The routine inspection provided detailed field notes and an element level assessment. The asphalt wearing surface exhibits hairline (up to 1/32″) reflective longitudinal cracking above joints between Beams 1 & 2, 4 & 5, and 7 & 8. Within the wheel paths there is minor rutting to include a 4′ x 6′ pothole near mid-span in the right travel lane. The joint at the near approach is abraded across the full width of deck. The far deck joint exhibits minor leakage over a length of 8′ along the left travel lane. The spall has exposed the top flange of Beam 6. Along the underside of the beams, water staining is present along the opening between Beams 1 & 2 as well as Beams 7 & 8. Specific defects are provided in Table 4.6-1. In general, the beams have isolated, hairline cracks along their exposed bottom flanges with no efflorescence or rust staining noted. The reinforcing steel used within the adjacent box beams is epoxy coated as well as the reinforcing within the concrete barriers.

The left concrete barrier exhibits spalling around the base of the structure mounted guide rail. The spalling was caused by the corrosion along the bolts used to fasten the guide rail to the concrete curb. A total of 27 LF of spalling was recorded with no exposed reinforcing. There is also impact damage along the right barrier for a length of 8′. The impact damaged only caused scrapes to the concrete but the steel railing mounted to the barrier is missing. The remaining sections of the concrete railing exhibit minor hairline cracking with efflorescence present for a total area of 57 LF. None of the metal railing on either side of the bridge has a protective coating.

Table 4.6-1 Tee Beam Field Conditions

BEAM NO.	CONDITION
1	Water staining along full length of interior edge. There is a small 3 SF spall that has exposed two P/S strands 3 LF from Near Abutment.
2	Water staining along the full length of the left edge. There are hairline cracks, up to 8′ in length scattered throughout the entire underside of the beam but none are continuous over the full length. Based on the amount of cracking, the crack is considered moderate.
3	Minor hairline cracking for the first and last 6′ of the beam.
4	Edge spalling along the bottom right corner of the beam for the first 16′ of the beam. Spalling has exposed four strands with moderate surface corrosion. All strands are intact but exhibit rust staining and minor section loss. A full length 1/16″ wide crack extends from the spalled area the length of the beam to the Far Abutment.
5	A 3′ wide by 4′ long spall exists at mid-span exposing 5 prestressing strands, two of which are severed. This spall was previously not reported.
6	Minor discoloration throughout from past water staining but no other defects noted.
7	Water staining along the full length of the right edge. There are eight hairline to 1/16″ cracks that are present for the last 13′ feet of the beam near the Far Abutment. There is minor rust staining through the wider cracks.
8	Water staining is present along the full length of the interior edge. There is a 3 SF spall along the right face of Beam 8 that appears to have been caused by flood debris. No strands are exposed but a single stir-up is visible.

4.7 Defect Code Condition State Assessment

16 – Reinforced Concrete Top Flange: The top flange of the beams is generally covered by the asphalt wearing surface. The small area of the exposed top flange due to the asphalt spalling exhibits no signs of stress or deterioration.

510 – Wearing Surface (Applied to Element 16): The hairline full-length hairline reflective cracks (57 SF) within the asphalt is wide enough (1/32″) to warrant CS-2 for the Cracking Defect Code. The Effectiveness is considered CS-3 for the cracks (114 SF) along Beams 1 & 2 and 7 & 8 due to the water staining and deterioration along the underside of the beams (caused by water penetrating from above). The pothole at 24 SF can be considered CS-3 based on their size being larger than 6 inches in diameter and warrant CS-3 for both Pothole Defect Code and Effectiveness.

> Noted Overlapping Defects: 114 SF of hairline cracking along Beams 1 & 2 and 7 & 8 are accounted for in 114 SF of Effectiveness in CS-3 and will not be counted separately under the condition state quantities. This defect should be noted in the BMS3 condition field.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 16): With the exception of the small area exposed, the top flange is hidden and shows no signs of distress and therefore it's assumed the protective system is effective.

301 – Pourable Joint Seal: There is minor leakage for 8' along the far joint and is considered to be CS-2.

330 – Metal Bridge Railing: The 8 LF of missing metal barrier is considered to be CS-3 because it's missing as a result of impact damage but does not reduce the structural capacity. The structure mounted guide rail connections are CS-2 (27 LF) because they exhibit pack rust and cause spalling to the adjacent concrete but there is no distortion.

331 – Reinforced Concrete Bridge Railing: The 8 LF impact damage to the right concrete railing is CS-3 because damage is the predominate defect. The areas (27 LF) around the connections for the structure mounted guide rail are deemed to be in CS-3 because the individual spalled areas are greater than 6" in diameter but do not warrant a structural review. The remaining sections that exhibit minor hairline cracking with efflorescence (57 LF) are considered to be in CS-2 because there is surface white without build-up.

> Noted Overlapping Defects: The 57 LF of hairline cracking in the barrier are accounted for within the 57 LF of Efflorescence in CS-2 and will not be counted separately under the CS-1 for insignificant cracks.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 331): With no exposed reinforcing or visible rust staining, the entire protective system is in CS-1.

104 – P/S Concrete Closed Web/Box Girder: Beam 1 has a 3 SF (3'L x 1'W) spall in CS-3 (greater than 6" diameter). The hairline cracks in Beam 2 are considered moderate based on the amount of cracking that exhibits over the full length of the beam and are in CS-2 with a total quantity of 55 LF. Along Beam 4, the 16 LF of exposed strands with minor surface corrosion is considered to be CS-3 because the section loss does not warrant a structural review. The 1/16" wide crack that extends from the spall to the Far Abutment along Beam 4 is considered to be moderate given the length and is in CS-2. The severed strands along the underside of Beam 5 are in CS-4 (4 LF) because they were not noted before and the load rating should be reevaluated. The 13 LF of cracking with rust staining along Beam 7 is in CS-3. The damaged caused by flooding along Beam 6 is CS-3 because it meets the criteria for CS-3 under spalling but damage is the predominate defect. The remaining lengths of the beams have no recordable defects and will be in CS-1.

> Noted Overlapping Defects: The two P/S strands in Beam 1 are in CS-2 (no section loss) are accounted for in the 3 SF spall. The 16 LF of spalling along Beam 4 is considered to be CS-3; however, the predominate defect was determined to be the exposed strands. The spalling in Beam 5 is considered to be in CS-3 because it is greater than 6" diameter but because it doesn't require a structural review, it is not considered the predominate defect. The moderate crack over the last 13 LF of Beam 7 (CS-2) is accounted for under the rust staining defect. The spalling (CS-3) and exposed stirrup (CS-2) along Beam 8 is accounted for under the damage defect in CS-3.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 104): The majority of the reinforcing is not visible and therefore in CS-1. The only exposed reinforcing is along Beam 8 but there is no measurable section loss to the epoxy coded stir-up. Therefore, the coating is considered to be effective and in CS-1.

Other Elements: The remaining elements that define the bridge have no defects and are in CS-1. A summary of the elements, condition states, and applicable Defect Codes is provided in Table 4.7-1.

Table 4.7-1 Summary of Element Identification and Assessment

ELEM. NUMBER	DEFECT CODE	ELEMENT / CODE DESCRIPTION	UNIT	TOTAL QTY.	CONDITION STATE QTY.			
					CS-1	CS-2	CS-3	CS-4
16	-	Reinforced Concrete Top Flange	SF	1841	1841	0	0	0
510	-	Wearing Surfaces	SF	1596	1401	57	138	0
	3210	*Delamination/Spall/Patched Area/Pothole*	*SF*	*24*	*0*	*0*	*24*	*0*
	3220	*Crack (Wearing Surface)*	*SF*	*57*	*0*	*57*	*0*	*0*
	3230	*Effectiveness*	*SF*	*114*	*0*	*0*	*114*	*0*
520	-	Reinforcing Steel Protective Systems	SF	1841	0	0	0	0
301	-	Pourable Joint Seal	LF	67	59	8	0	0
	2310	Leakage	LF	8	0	8	0	0
330	-	Metal Bridge Railing	LF	171	61	27	8	0
	1020	*Connection*	*LF*	*27*	*0*	*27*	*0*	*0*
	7000	*Damage (Impact Related)*	*LF*	*8*	*0*	*0*	*8*	*0*
331	-	Reinforced Concrete Bridge Railing	LF	114	22	65	27	0
	1080	*Delamination/Spall/Patched Area*	*LF*	*27*	*0*	*0*	*27*	*0*
	1120	*Efflorescence/Rust Staining*	*LF*	*57*	*0*	*57*	*0*	*0*
	7000	*Damage (Impact Related)*	*LF*	*8*	*0*	*8*	*0*	*0*
520	-	Reinforcing Steel Protective Systems	SF	384	384	0	0	0
104	-	P/S Concrete Closed Web/Box Girder	LF	440	307	94	35	4
	1080	*Delamination/Spall/Patched Area*	*LF*	*3*	*0*	*0*	*3*	*0*
	1100	*Exposed Prestressing*	*LF*	*20*	*0*	*0*	*16*	*4*
	1110	*Cracking (PSC)*	*LF*	*94*	*0*	*94*	*0*	*0*
	1120	*Efflorescence / Rust Staining*	*LF*	*13*	*0*	*0*	*13*	*0*
	7000	*Damage (Impact Related)*	*LF*	*3*	*0*	*0*	*3*	*0*
520	-	Reinforcing Steel Protective Systems	SF	1,210	1,210	0	0	0
310	-	Elastomeric Bearings	EA	16	16	0	0	0

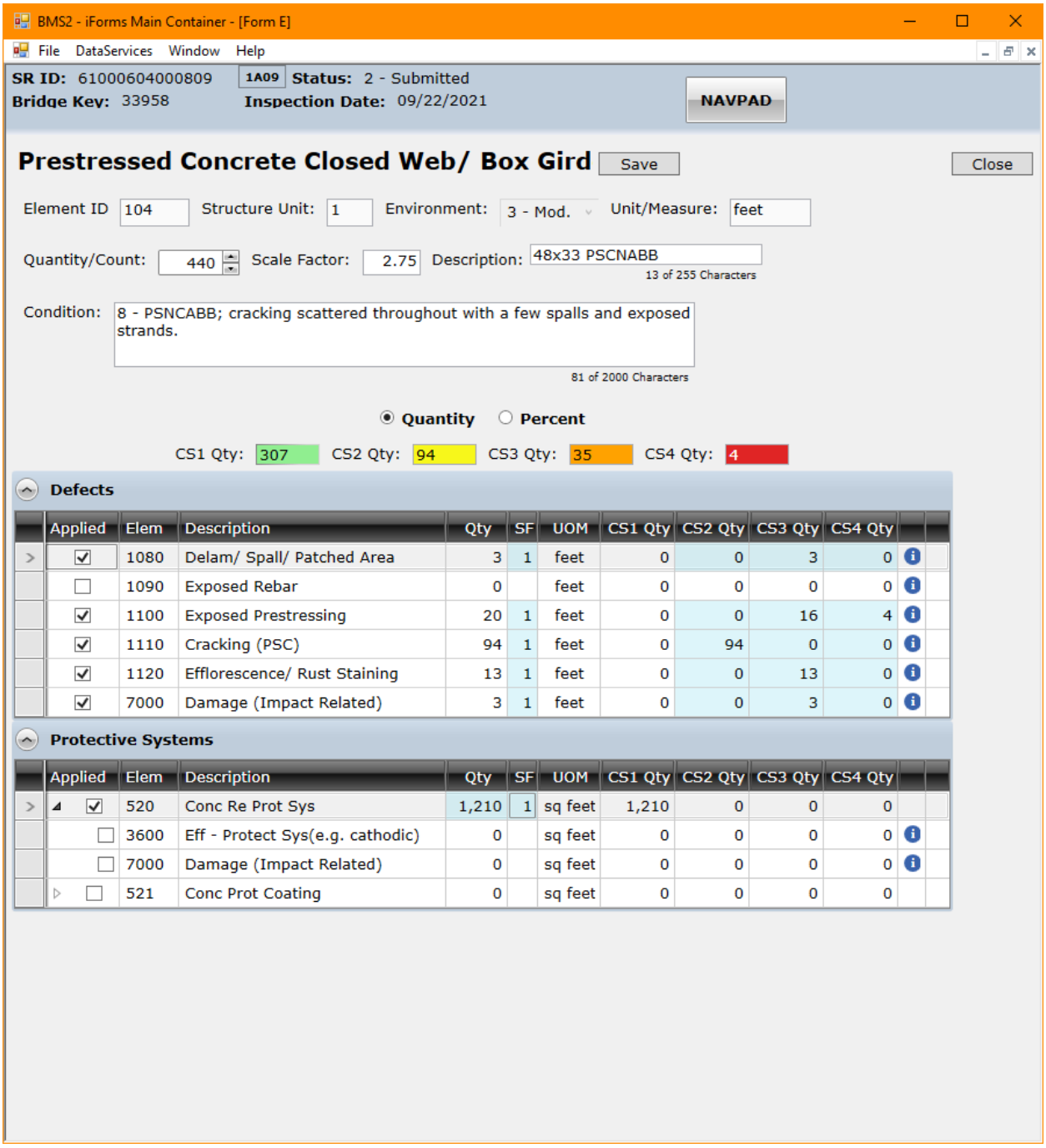

Figure 4.7-1 BMS3 Screen Shot for Element 104 Prestressed Concrete Closed Web/Box Girder (Quantity Mode)

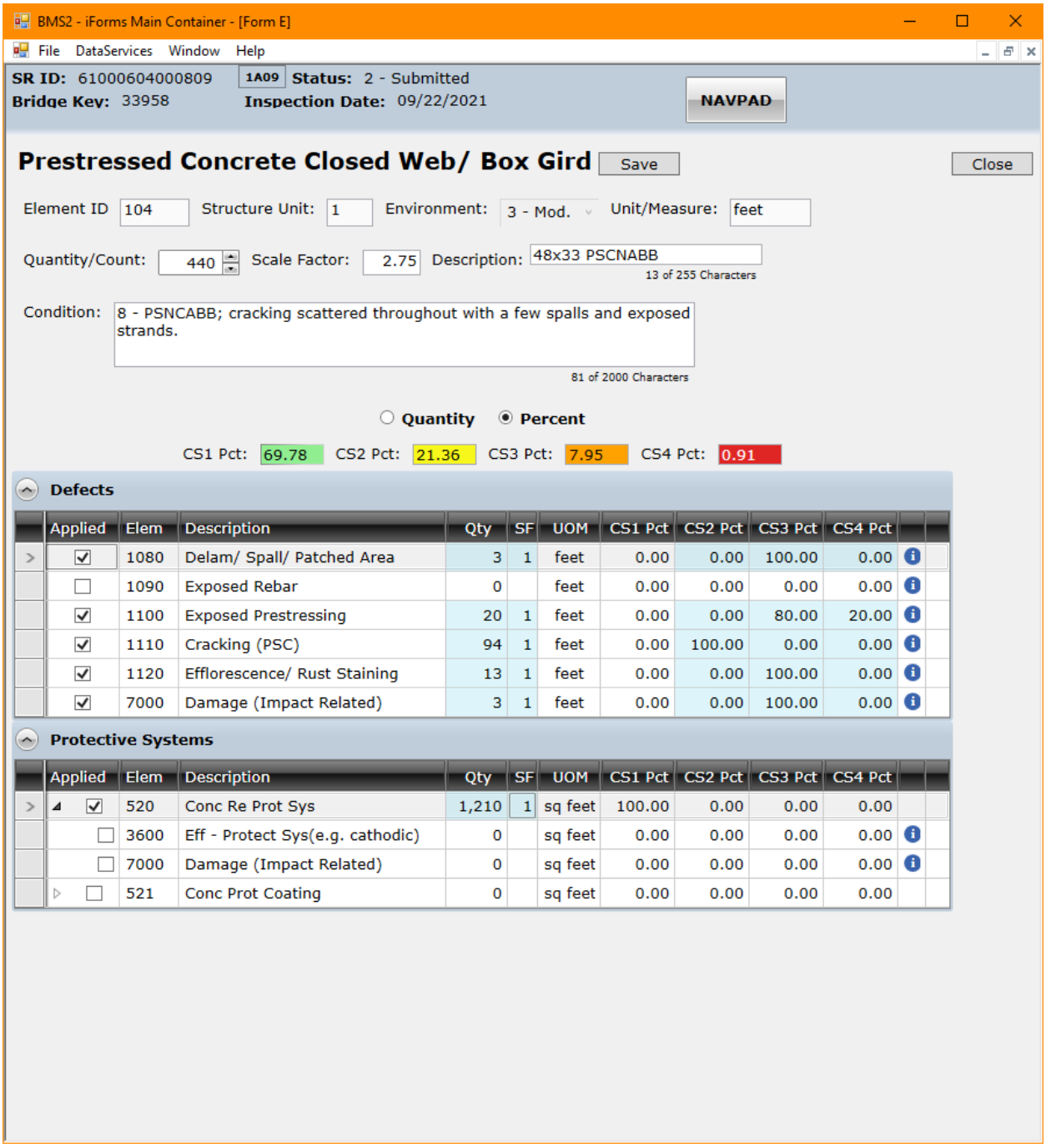

Figure 4.7-2 BMS3 Screen Shot for Element 104 Prestressed Concrete Closed Web/Box Girder (Percent Mode)

5 Single Span Composite Spread Box Beam (Superstructure and above ONLY)

5.1 Structure Description

This structure, shown in Figure 5.1-1, is a single-span prestressed composite concrete spread box beam bridge with a 53-foot span length (55-foot structure length) and a 90 degree skew. There is a total of 4 box beams. The superstructure supports a 28-foot roadway consisting of two 11-foot lanes with two 3-foot shoulders. The out-to-out width of the superstructure is 31'- 4 ½". The spread box beams are composite with the 8" concrete slab with an integral ½" wearing surface. At the near transition, there is a pourable joint. At the far transition, there is a 4" neoprene strip seal. Elastomeric bearings are visible at the abutments. The bridge carries a state route with an ADT of 13,986 vehicles per day over a two-lane roadway.

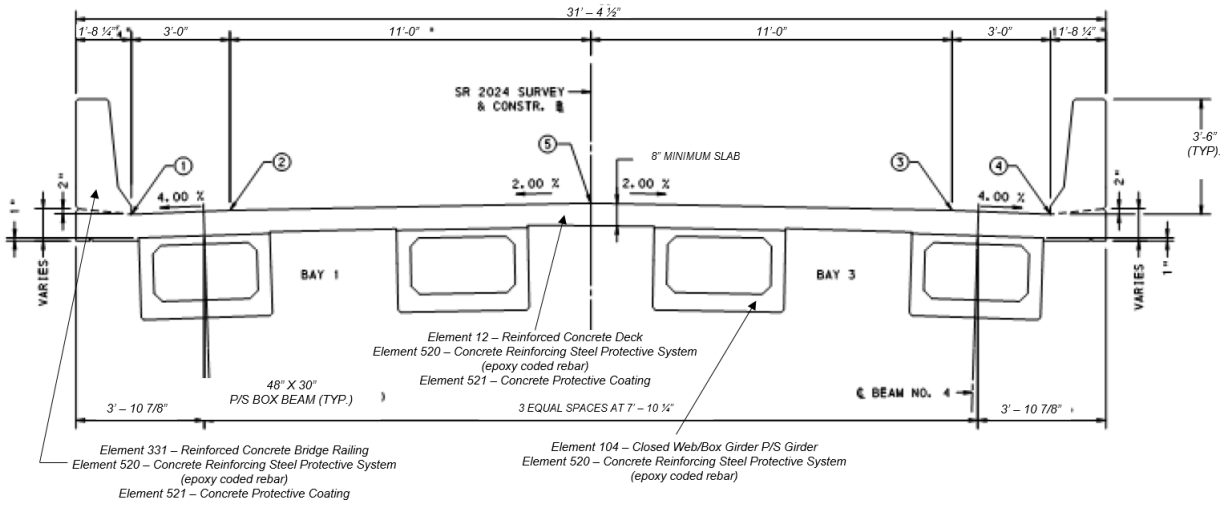

Figure 5.1-1 Typical Section of P/S Non-Composite Adjacent Box Beam Bridge (looking ahead)

5.2 Deck Elements and Quantities

The typical section is shown in Figure 5.1-1. The deck contains epoxy coated reinforcement and a sealant was placed over the entire deck surface. The appropriate deck elements and quantity calculations are shown in Table 5.2-1.

Table 5.2-1 Deck Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION
12	Reinforced Concrete Deck	55' Long x 31.4' Wide = 1727 SF
520	Reinforcing Steel Protective System	55' Long x 31.4' Wide = 1727 SF
521	Concrete Protective System	55' Long x 28.0' Wide = 1540 SF
300	Strip Seal Expansion Joint	31.4' Long x 1 Joint = 31.4 LF
301	Pourable Joint Seal	31.4' Long x 1 Joint = 31.4 LF
331	Reinforced Concrete Bridge Railing	55' Long x 2 Rows = 110 LF
520	Reinforcing Steel Protective System	110 LF x 3.5' High = 385 SF
521	Concrete Protective System	110 LF x 8.7 SF/LF Wide = 957 SF

Note: The ½" wearing surface on the deck was placed integrally with the deck; therefore, do not code 510 Wearing Surface.

5.3 Superstructure Elements and Quantities

For this example, the superstructure consists of the beam elements and neoprene bearings. The beams contain epoxy coated reinforcement over the full length. The appropriate element and quantity calculations are shown in Table 5.3-1.

Table 5.3-1 Superstructure Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION	SCALE FACTOR
104	P/S Concrete Closed Web/Box Girder	53′ Long x 4 Beams = 212 FT	$\frac{30\text{" Depth}}{12\text{" per Foot}} = 2.5$ FT
520	Reinforcing Steel Protective System	212 LF x 2.5 LF = 530 SF	N/A
310	Elastomeric Bearing	4 Beams x 2 Abutments = 8 Bearings	N/A

5.4 Substructure Elements and Quantities

Not included for this example.

5.5 Environmental States

All elements will be placed in environment 3 (Moderate), as per current policy.

5.6 Inspection Notes

The routine inspection provided detailed field notes and an element level assessment. Within each travel lanes, there are two distinct locations (wheel paths) of wear over the entire length of the bridge that exposed coarse aggregate. Each wheel path is 2′ wide. Within the right travel lane wheel path, there is a 4 SF spall with no exposed reinforcement. Along the left shoulder, there is a 14 SF patched area that is beginning to crack. There is also a spall around a scupper in the right shoulder at the far approach with exposed reinforcing (3″ x 3″ x 2″ Deep). The exposed reinforcing does not exhibit section loss. The defects for the spread box beams are documented in Table 5.6-1. The reinforcing steel used within the box beams and slab is epoxy coated as well as the reinforcing within the concrete barriers.

The neoprene strip seal exhibits debris impaction across the full width of the deck and but it is not limiting movement of the joint. There is a total of 5 LF of strip seal leaking (free flow) as noted from below the structure between Beams 1 and 2. The pourable joint exhibits surface cracking across the entire width of the deck. The concrete barriers exhibit no defects. The elastomeric bearings are generally in good condition. Beam 4 bearing (6″ thick) at the Far Abutment is exhibiting up to 5/8″ bulging. At the Far Abutment, all four bearings are in the expanded position when the inspection was completed at a temperature of 54°F.

Table 5.6-1 Spread Box Beam Field Conditions

BEAM NO.	CONDITION
1	There are very minor hairline cracks at the ends of the beams extending 4' from the bearings.
2	There is a 2 SF corner spall at the Near Abutment with exposed prestressing strands with no section loss.
3	No notable defects
4	No notable defects

5.7 Defect Code Condition State Assessment

12 – Reinforced Concrete Deck: There is wear along the wheel lines with exposed aggregate and a 4 SF spall in the right wheel line (216 SF CS-2 for exposed aggregate and 4 SF of CS-3 for the spall). There is a 14 SF patched area in the left shoulder which is considered CS-2. There is a 2" deep spall adjacent to the scupper which has exposed rebar and is considered CS-3.

> Noted Overlapping Defects: 4 SF of abrasion/wear in CS-2 are accounted for in 4 SF of a spall in CS-3 in the right wheel path and will not be counted separately under the condition state quantities. This defect should be noted in the BMS3 condition field.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 12): The only exposed steel shows no signs of distress; therefore, consider the entire protective systems as CS-1.

521 – Concrete Protective System (Applied to Element 12): Assume the concrete sealant has limited effectives in the deck areas with defects (235 SF total).

331 – Reinforced Concrete Bridge Railing: There is no defects on the barrier and is considered CS1.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 331): With no exposed reinforcing or visible rust staining, the entire protective system is considered in CS-1.

521 – Concrete Protective System (Applied to Element 331): With no exposed reinforcing or visible rust staining, the entire protective system is in CS-1.

301 – Pourable Joint Seal: There is surface cracking for the full length of the joint and is considered to be CS-2.

300 – Strip Seal Expansion Joint: There is debris impaction which is considered to be CS-2 for the full length. There is 5 feet of free-flow leakage which is considered as CS-4.

104 – P/S Concrete Closed Web/Box Girder: Beam 1 has very minor hairline cracking at the beam ends which is considered CS-1. Beam 2 has a 2 SF (2'L x 1'H) spall in CS-3 (greater than 6" diameter).

> Noted Overlapping Defects: The exposed prestressing strands in Beam 2 are covered by the spall defect in CS-3.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 104): The majority of the reinforcing is not visible and therefore in CS-1. There is no exposed mild steel reinforcement. Therefore, the coating is considered to be effective and in CS-1.

310 – Elastomeric Bearings: All 4 bearings at the Far Abutment are expanded in cooler temperatures and are considered CS-2.

> Noted Overlapping Defects: The bulging defect on the Beam 4 bearing at the Far Abutment is covered by the alignment defect.

Other Elements: The remaining elements that define the bridge have no defects and are in CS-1. A summary of the elements, condition states, and applicable Defect Codes is provided in Table 5.7-1.

Table 5.7-1 Summary of Element Identification and Assessment

ELEM. NUMBER	DEFECT CODE	ELEMENT / CODE DESCRIPTION	UNIT	TOTAL QTY.	CONDITION STATE QTY.			
					CS-1	CS-2	CS-3	CS-4
12	-	Reinforced Concrete Deck	SF	1727	1492	230	5	0
	1080	*Delamination / Spall / Patched Area*	*SF*	*19*	*0*	*14*	*5*	*0*
	1190	*Abrasion / Wear (PSC/RC)*	*SF*	*216*	*0*	*216*	*0*	*0*
520	-	Reinforcing Steel Protective Systems	SF	1727	1727	0	0	0
521		Concrete Protective System	SF	1540	1305	0	235	0
	3540	*Effectiveness*	*SF*	*235*	*0*	*0*	*235*	*0*
331	-	Reinforced Concrete Bridge Railing	LF	110	110	0	0	0
520	-	Reinforcing Steel Protective Systems	SF	385	385	0	0	0
521		Concrete Protective System	SF	957	957	0	0	0
301		Pourable Joint Seal	LF	31	0	31	0	0
	2340	*Seal Cracking*	*LF*	*31*	*0*	*31*	*0*	*0*
300		Strip Seal Expansion Joint	LF	31	0	26	0	5
	2310	*Leakage*	*LF*	*5*	*0*	*0*	*0*	*5*
	2350	*Debris Impaction*	*LF*	*26*	*0*	*26*	*0*	*0*
104	-	P/S Concrete Closed Web/Box Girder	LF	212	210	0	2	0
	1080	*Delamination/Spall/Patched Area*	*LF*	*2*	*0*	*0*	*2*	*0*
520	-	Reinforcing Steel Protective Systems	SF	530	530	0	0	0
310		Elastomeric Bearings	EA	8	4	4	0	0
	2220	*Alignment*	*EA*	*4*	*0*	*4*	*0*	*0*

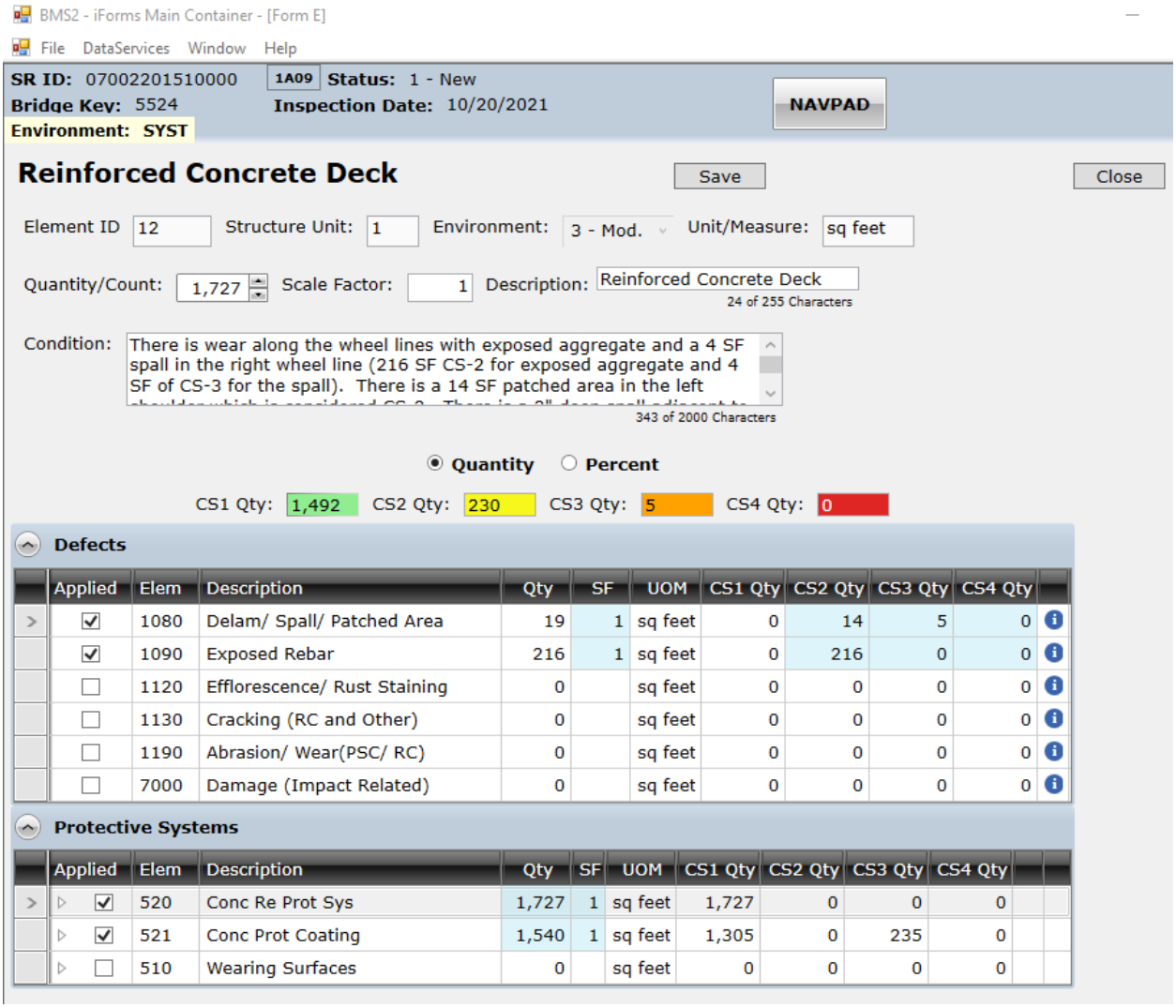

Figure 5.7-1 BMS3 Screen Shot for Element 12 Reinforced Concrete Deck (Quantity Mode)

6 Single Span Composite P/S I-Beam Bridge (Superstructure and above ONLY)

6.1 Structure Description

This structure, shown in Figure 6.1-1, is a single-span prestressed composite concrete I-beam bridge with a 112-foot span length (114-foot deck length and 117-foot structure length) and a 76 degree skew. There is a total of 7 I-beams. The superstructure supports a 42-foot roadway. The out-to-out width of the superstructure is 45'- 6". The I-beams are composite with the 7 ½ " concrete slab with a 1 ¼" latex overlay. There is a 3" neoprene strip seal at each end. Elastomeric bearings are visible at the abutments. The bridge carries a state route with an ADT of 7,417 vehicles per day over a two-lane roadway.

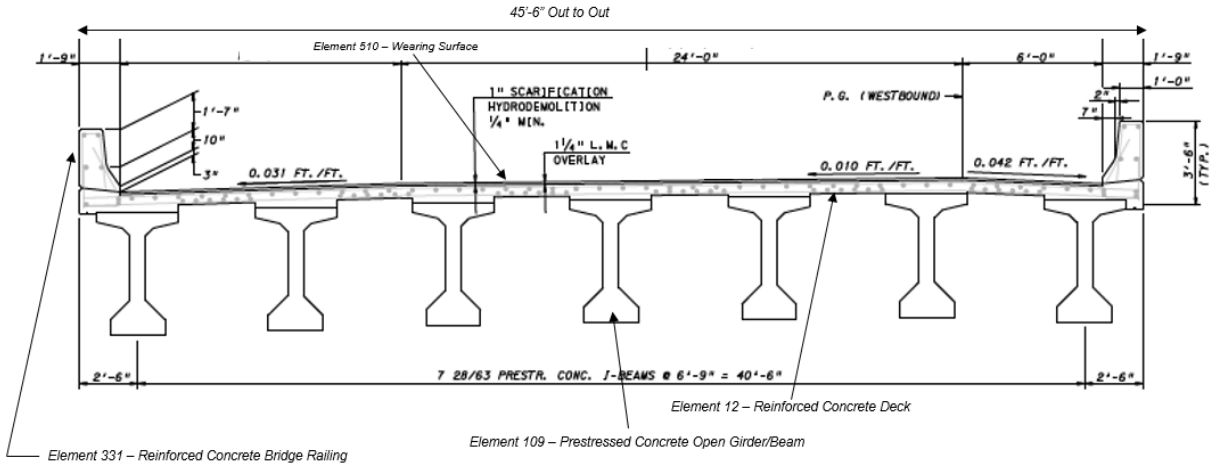

Figure 6.1-1 Typical Section of P/S I-Beam Bridge (looking ahead)

6.2 Deck Elements and Quantities

The typical section is shown in Figure 6.1-1. The deck contains epoxy coated reinforcement. The appropriate deck elements and quantity calculations are shown in Table 6.2-1.

Table 6.2-1 Deck Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION
12	Reinforced Concrete Deck	114′ Long x 45.5′ Wide = 5187 SF
510	Wearing Surface	114′ Long x 42′ Wide = 4788 SF
520	Concrete Reinforcing Steel Protective System	114′ Long x 45.5′ Wide = 5187 SF
300	Strip Seal Expansion Joint	$\frac{45.5' \text{ Long x 2 Joints}}{\sin(76°)} = 93.8$ LF
331	Reinforced Concrete Bridge Railing	117′ Long x 2 Rows = 234 LF
520	Concrete Reinforcing Steel Protective System	117′ Long x 6.33′ SF/LF = 741 SF

6.3 Superstructure Elements and Quantities

For this example, the superstructure consists of the beam elements and neoprene bearings. The beams contain epoxy coated reinforcement for a length of 9′ at each beam end. The appropriate element and quantity calculations are shown in Table 6.3-1.

Table 6.3-1 Superstructure Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION	SCALE FACTOR
109	P/S Concrete Open Girder/Beam	112′ Long x 7 Beams = 784 FT	$\frac{63\text{" Depth}}{12\text{" per Foot}} = 5.25$ FT
520	Concrete Reinforcing Steel Protective System	9′ x 2 ends x 7 Beams x 5.25′ wide = 661 SF	N/A
310	Elastomeric Bearing	7 Beams x 2 Abutments = 14 Bearings	N/A

6.4 Substructure Elements and Quantities

Not included for this example.

6.5 Environmental States

All elements will be placed in environment 3 (Moderate), as per current policy.

6.6 Inspection Notes

The routine inspection provided detailed field notes and an element level assessment. The latex overlay has one 4 SF area of a delaminated repair in the left lane near midspan which is assumed to extend into the concrete deck. The defects for the spread box beams are documented in Table 6.6-1. The reinforcing steel used within the box beams and slab as well as the reinforcing within the concrete barriers are not epoxy coated.

The neoprene strip seal exhibits no defects. The elastomeric bearings are generally in good condition.

Table 6.6-1 Spread Box Beam Field Conditions

BEAM NO.	CONDITION
1	There are very minor hairline cracks at the ends of the beams extending 3′ into the span. There is a 2′ Long x 1′ Wide spall with exposed prestressing strands at the bottom corner at the Near Abutment.
2	There is a 0.05″ wide crack at the far end extending 5′ into the span.
3-7	No notable defects.

6.7 Defect Code Condition State Assessment

12 – Reinforced Concrete Deck: There is a 4 SF delaminated repair area in the left lane in CS-2

510 – Wearing Surface (Applied to Element 12): 4 SF delaminated repair area in CS-2.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 12): There is no exposed reinforcing and the deck shows no signs of distress and therefore it's assumed the protective system is effective.

331 – Reinforced Concrete Bridge Railing: There is no defects on the barrier and is considered CS-1.

300 – Strip Seal Expansion Joint: There is defects on the joints and is considered CS-1.

109 – P/S Concrete Open Girder/Beam: Beam 1 has very minor hairline cracking at the beam ends which is considered CS-1 and a 2 FT spall in CS-3 at the Near Abutment. Beam 2 has a 5 FT long crack which is 0.05" wide in CS-2 (crack is moderate width, 0.012" to 0.05").

310 – Elastomeric Bearings: There is no defects on the bearings and is considered CS-1.

A summary of the elements, condition states, and applicable Defect Codes is provided in Table 6.7-1.

Table 6.7-1 Summary of Element Identification and Assessment

ELEM. NUMBER	DEFECT CODE	ELEMENT / CODE DESCRIPTION	UNIT	TOTAL QTY.	CONDITION STATE QTY.			
					CS-1	CS-2	CS-3	CS-4
12	-	Reinforced Concrete Deck	SF	5187	5183	4	0	0
	1080	*Delamination / Spall / Patched Area*	*SF*	*4*	*0*	*4*	*0*	*0*
510	-	Wearing Surface	SF	4788	4784	4	0	0
	3210	*Delamination/Spall/Patched Area/Pothole*	*SF*	*4*	*0*	*4*	*0*	*0*
520	-	Concrete Reinforcing Steel Protective System	SF	5187	5187	0	0	0
331	-	Reinforced Concrete Bridge Railing	LF	234	234	0	0	0
300	-	Strip Seal Expansion Joint	LF	94	94	0	0	5
109	-	P/S Concrete Open Girder/Beam	LF	784	779	5	0	0
	1110	*Cracking(PSC)*	*LF*	*5*	*0*	*5*	*0*	*0*
	1080	*Delamination / Spall / Patched Area*	*LF*	*2*	*0*	*0*	*2*	*0*
520	-	Reinforcing Steel Protective Systems	SF	661	661	0	0	0
310	-	Elastomeric Bearings	EA	14	14	0	0	0

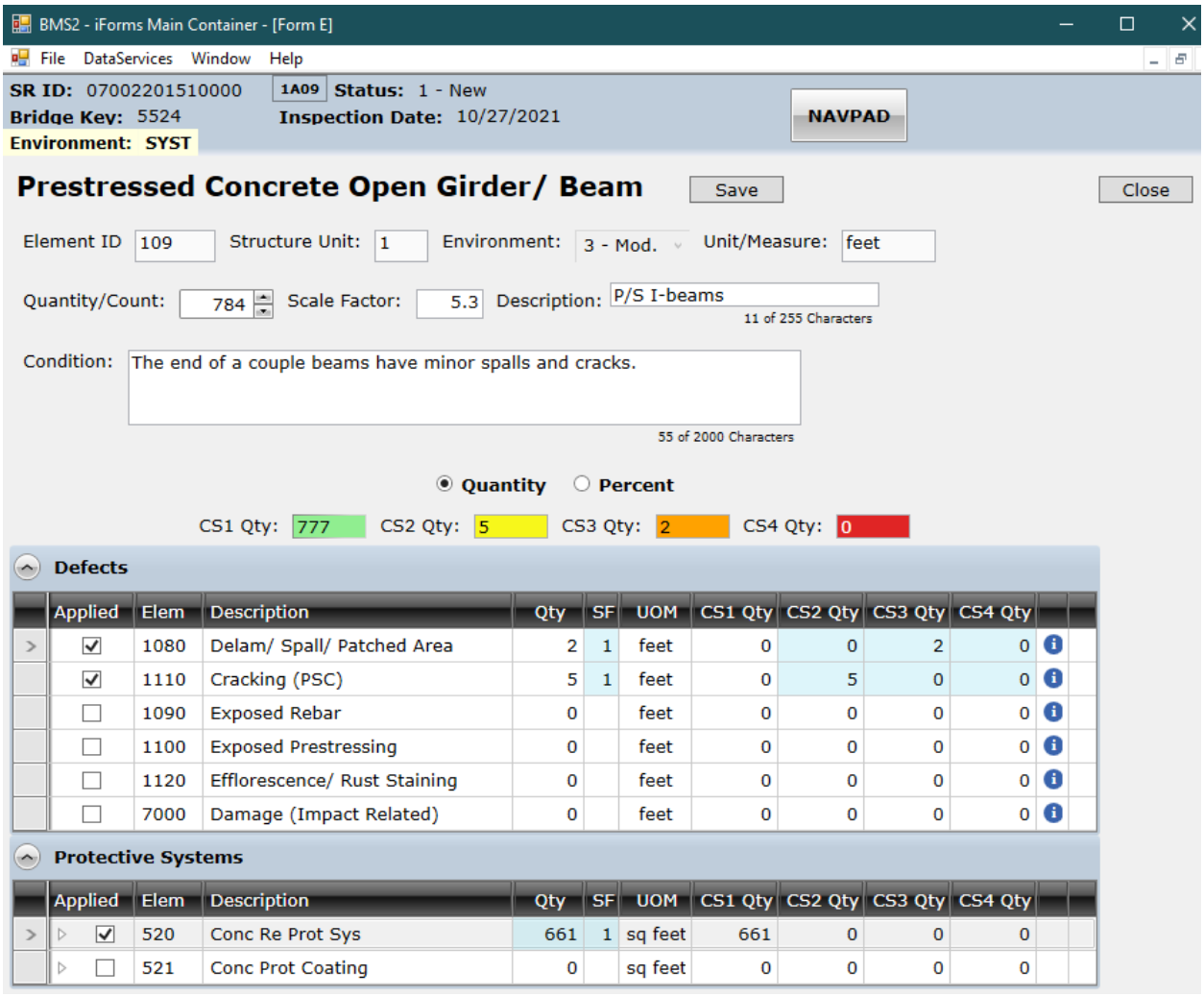

Figure 6.7-1 BMS3 Screen Shot for Element 109 Prestressed Concrete Open Girder/ Beam (Quantity Mode)

7 Precast Box Culvert

7.1 Structure Description

This structure, shown in Figure 7.1-1 and 7.1-2, is a precast box culvert with a 21-foot span length (21-foot structure length) and a 70° skew. The culvert length is 42.38′. There is a concrete distribution slab with an asphalt overlay. The bridge carries a state route with an ADT of 612 vehicles per day over a two-lane roadway.

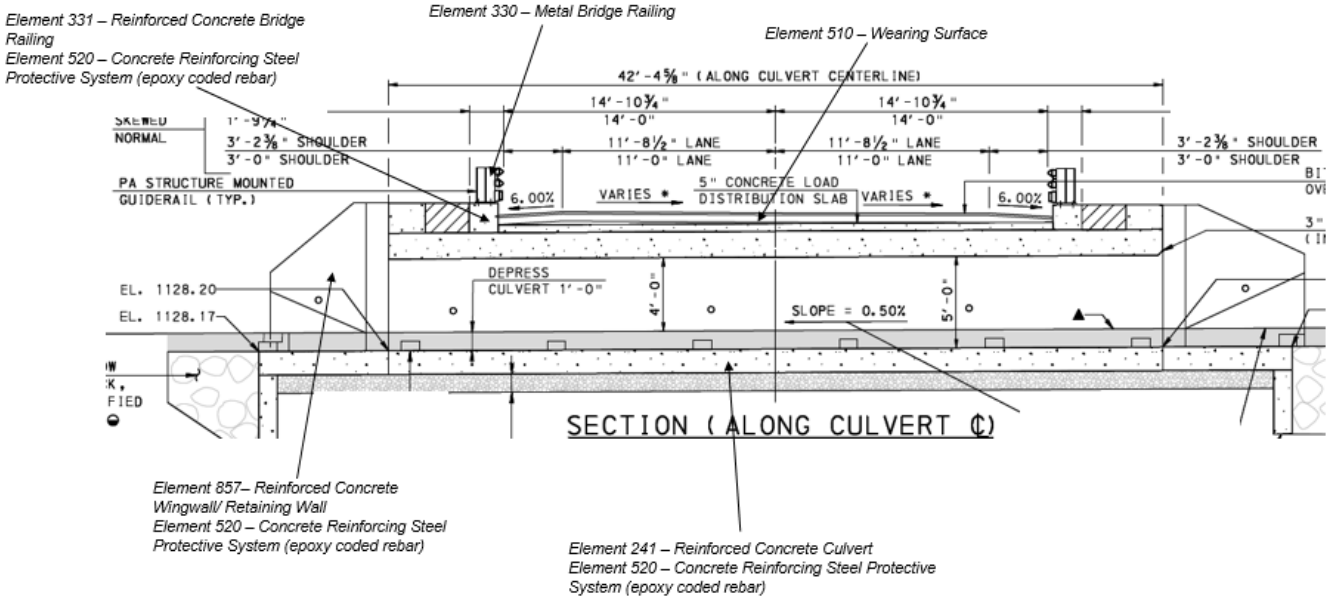

Figure 7.1-1 Typical Section Along Centerline of the Culvert

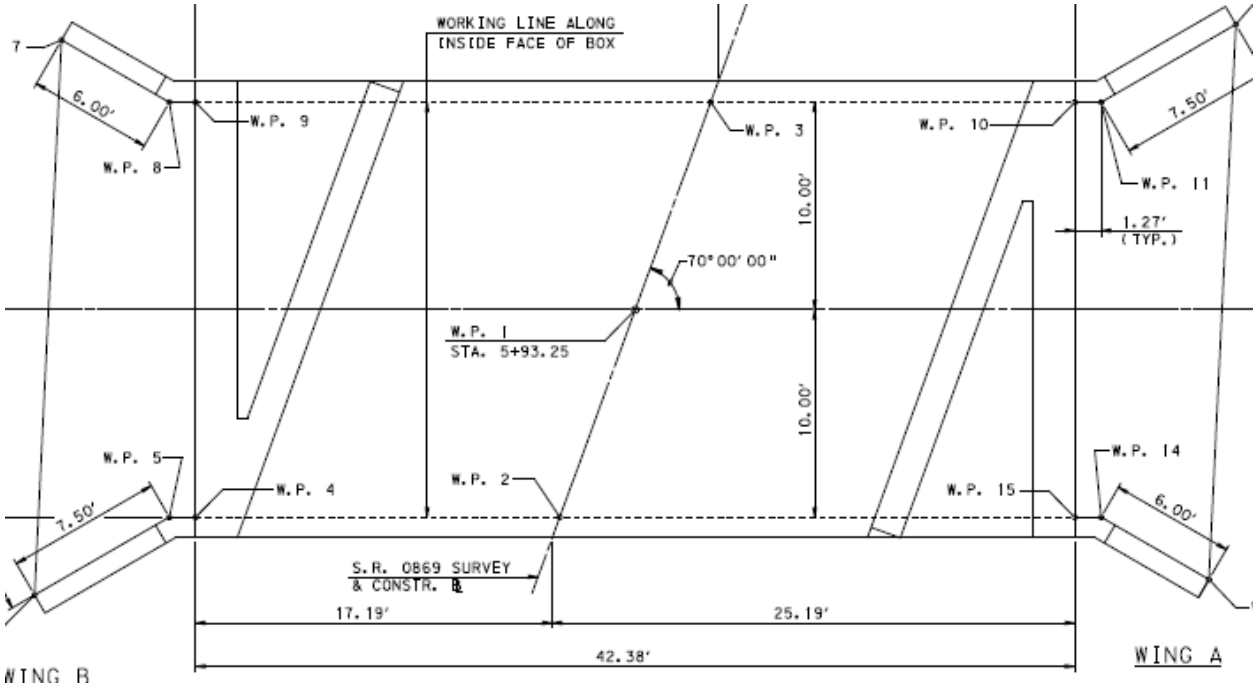

Figure 7.1-2 Framing Plan of the Culvert

7.2 Elements and Quantities

The typical section is shown in Figure 7.1-1 and the Framing Plan is shown in Figure 7.1-2. The culvert and wingwalls contain epoxy coated reinforcement. The appropriate elements and quantity calculations are shown in Table 7.2-1.

Table 7.2-1 Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION	SCALE FACTOR
241	Reinforced Concrete Culvert	42.38 LF x 1 Opening = 42.38 LF	N/A
510	Wearing Surface	21′ Long x 28′ Wide = 588 SF	N/A
520	Concrete Reinforcing Steel Protective System	42.38′ Long x (5′ High x 2 + 20′ Wide x 2) = 2,119 SF	N/A
330	Metal Bridge Railing	21′ Long x 2 Rows = 42 LF	N/A
515	Steel Protective Coating	4′ SF/LF x 21′ Long x 2 Rows = 168 SF	N/A
331	Reinforced Concrete Bridge Railing	21′ Long x 2 Rows = 42 LF	N/A
520	Concrete Reinforcing Steel Protective System	4.5 SF/LF x 21′ Long x 2 Rows = 189 SF	N/A
857	Reinforced Concrete Wingwall/ Retaining Wall	(6′+1.3′) + (7.5′+1.3′) + (7.5′+1.3′) + (6′+ 1.3′) = 32 FT	Ht = 8 LF (average height)
520	Concrete Reinforcing Steel Protective System	8′ Avg Height x 32′ Long = 256 SF	N/A

7.3 Environmental States

All elements will be placed in environment 3 (Moderate), as per current policy.

7.4 Inspection Notes

The routine inspection provided detailed field notes and an element level assessment. There are no significant defects in the railings or wings. The culvert exhibits a 1/16″ wide crack at midspan, which extends 10′ along the flow line.

7.5 Defect Code Condition State Assessment

241 – Reinforced Concrete Culvert: There is one 1/16″ wide by 10′ long crack which is CS-3.

510 – Wearing Surface (Applied to Element 241): There are no defects and is considered CS-1.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 241): There are no defects and is considered CS-1.

330 – Metal Bridge Railing: There is no defects on the railing and is considered CS-1.

331 – Reinforced Concrete Bridge Railing: There are no defects on the barrier and is considered CS-1.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 331): There are no defects and is considered CS-1.

857 – Reinforced Concrete Wingwall/Retaining Wall: There are no defects on the wings and is considered CS-1.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 857): There are no defects and is considered CS-1.

A summary of the elements, condition states, and applicable Defect Codes is provided in Table 7.5-1.

Table 7.5-1 Summary of Element Identification and Assessment

ELEM. NUMBER	DEFECT CODE	ELEMENT / CODE DESCRIPTION	UNIT	TOTAL QTY.	CONDITION STATE QTY.			
					CS-1	CS-2	CS-3	CS-4
241	-	Reinforced Concrete Culvert	LF	42	32	0	10	0
	1130	*Cracking (RC and Other)*	*LF*	*10*	*0*	*0*	*10*	*0*
510	-	Wearing Surface	SF	588	588	0	0	0
520	-	Concrete Reinforcing Steel Protective System	SF	2119	2119	0	0	0
330	-	Metal Bridge Railing	LF	42	42	0	0	0
515	-	Steel Protective Coating	SF	168	168	0	0	0
331	-	Reinforced Concrete Bridge Railing	LF	42	42	0	0	0
520	-	Concrete Reinforcing Steel Protective System	SF	189	189	0	0	0
857		Reinforced Concrete Wingwall/ Retaining Wall	LF	32	32	0	0	0
520	-	Concrete Reinforcing Steel Protective System	SF	256	256	0	0	0

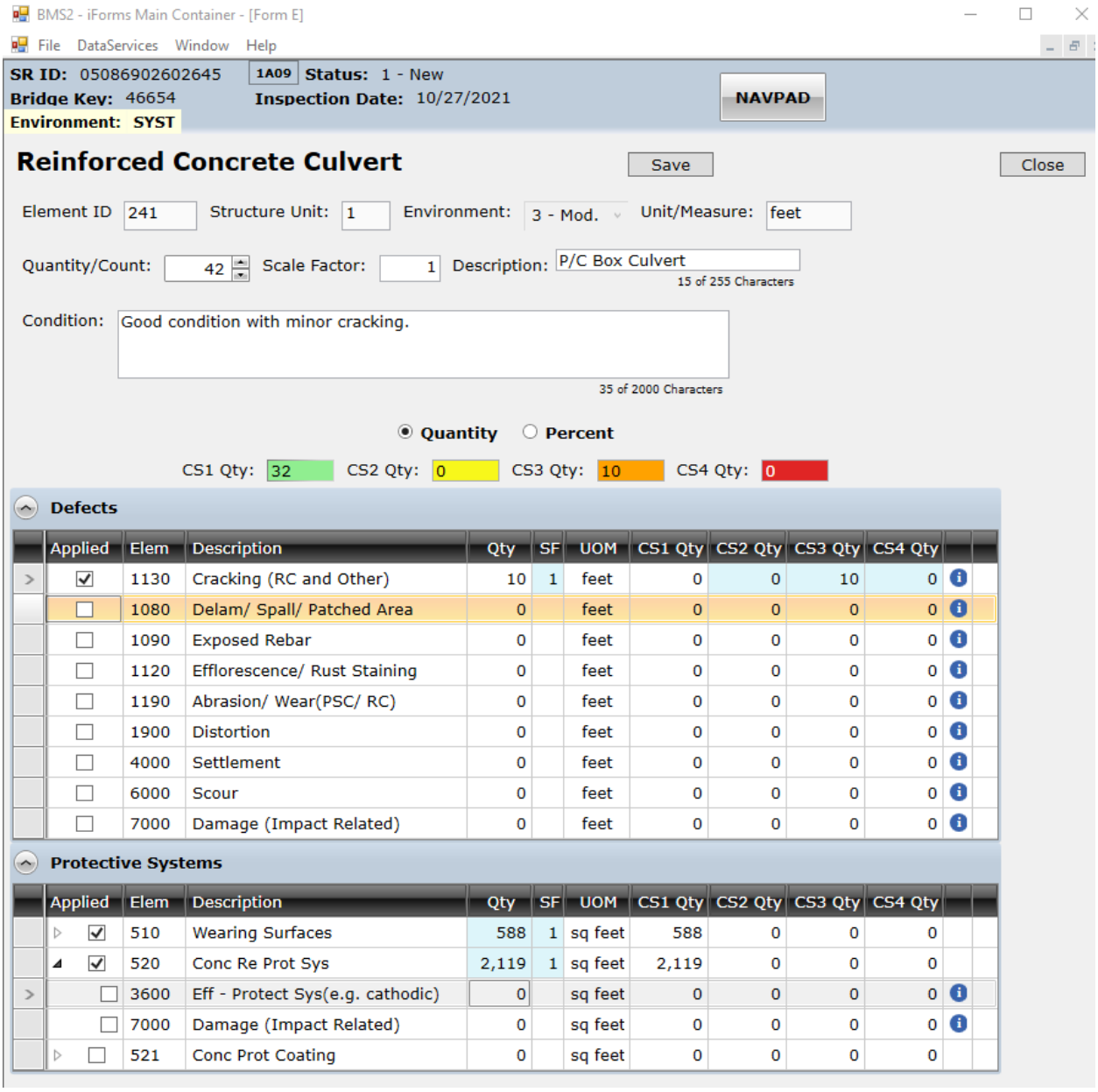

Figure 7.5-1 BMS3 Screen Shot for Element 241 Reinforced Concrete Culvert (Quantity Mode)

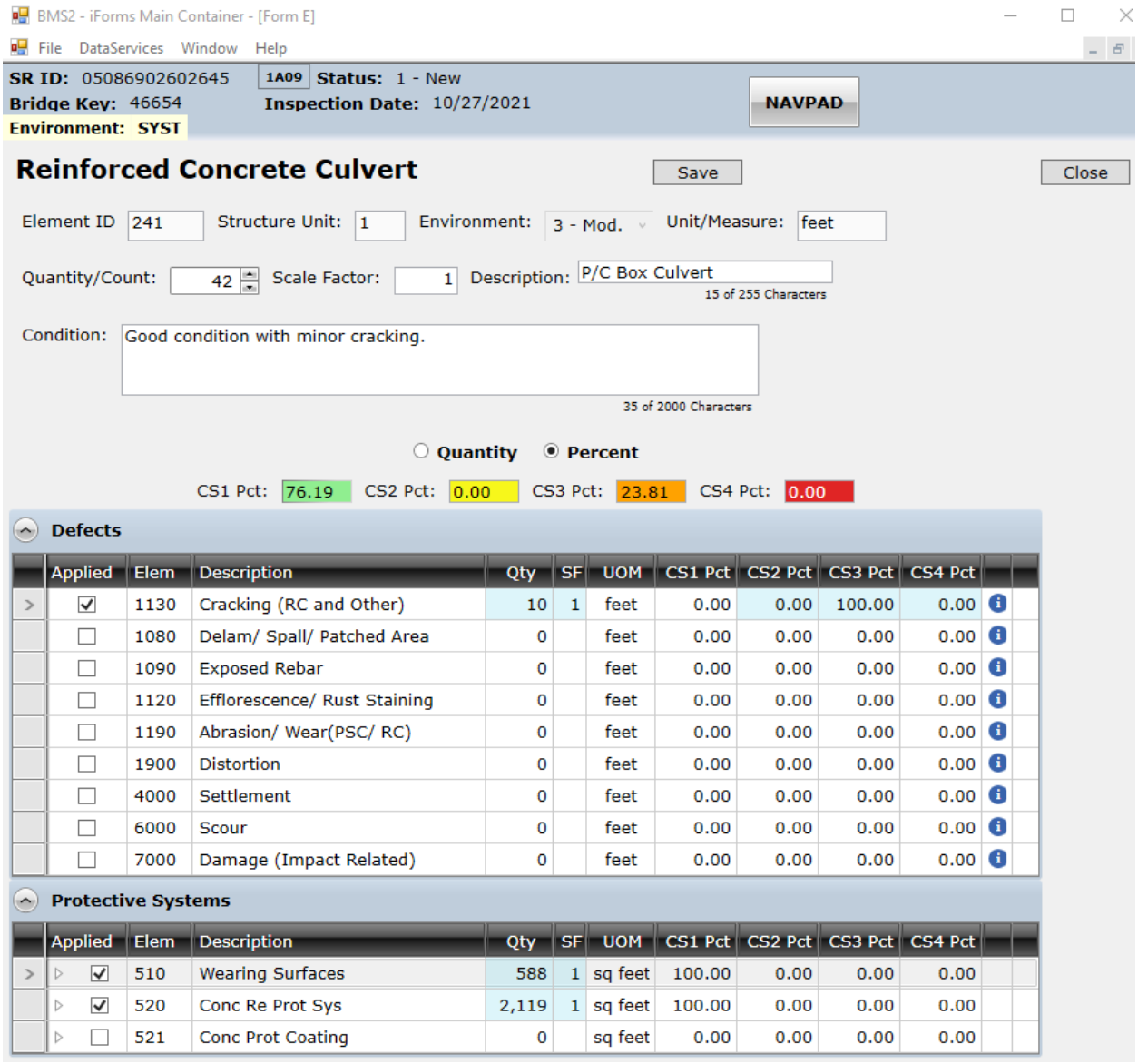

Figure 7.5-2 BMS3 Screen Shot for Element 241 Reinforced Concrete Culvert (Percent Mode)

8 Single Span Slab Beam Bridge (Superstructure and above ONLY)

8.1 Structure Description

This structure, shown in Figure 8.1-1, is a single span slab beam bridge with a 24-foot span length (25' structure length) and an 80° skew. The 6'W by 1'-5" deep beams are reinforced with mild epoxy coated steel. There is a total of 5 beams. The superstructure supports a 28-foot roadway consisting of two 10-foot lanes as well as a 6' and 2' shoulder on the left and right sides of the bridge, respectively. The out-to-out width of the superstructure is 29.8'feet and the curb-to-curb is 28.0'. The deck has an asphalt overlay and no deck joints. The bridge carries a state route with an ADT of 300 vehicles per day over a two-lane roadway.

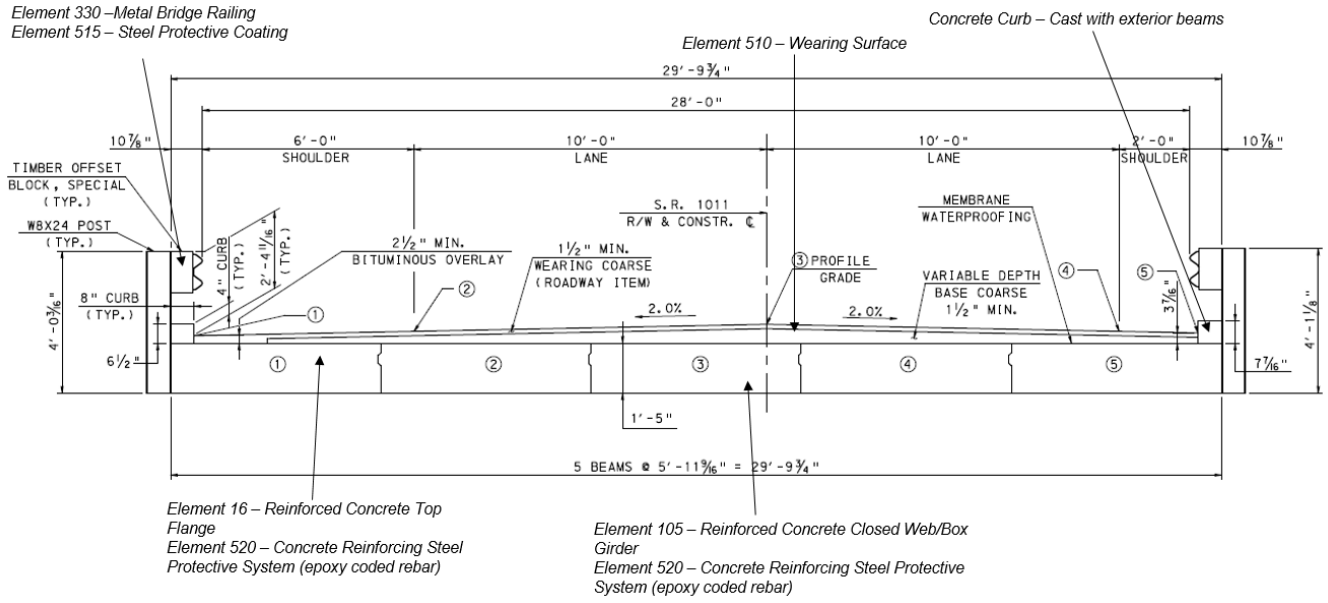

Figure 8.1-1 Typical Section of Slab Beam Bridge (looking ahead)

8.2 Deck Elements and Quantities

The typical section is shown in Figure 8.1-1. The appropriate deck elements and quantity calculations are shown in Table 8.2-1.

Table 8.2-1 Deck Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION
16	Reinforced Concrete Top Flange*	25' Long x 29.8' Wide = 745 SF
510	Wearing Surfaces	25' Long x 28.5' Wide = 712 SF
520	Reinforcing Steel Protective System	25' Long x 29.8' Wide = 745 SF
330	Metal Bridge Railing	25' Long x 2 Rows = 50 LF
515	Steel Protective Coating	4' SF/LF x 25' Long x 2 Rows = 200 SF

. * Reinforced Concrete Top Flange selected because no prestressing stands are present in the top flange of the adjacent box beams.

8.3 Superstructure Elements and Quantities

For this example, the superstructure consists of the beam elements and fixed bearings. The appropriate element and quantity calculations are shown in Table 8.3-1.

Table 8.3-1 Superstructure Elements and Quantity Calculations

ELEMENT	DESCRIPTION	QUANTITY CALCULATION	SCALE FACTOR
105	Reinforced Concrete Closed Cell Web/box Girder	24′ Long x 5 Beams = 120 FT	$\frac{19\text{" Depth}}{12\text{" per Foot}} = 1.6$ FT
520	Reinforcing Steel Protective System	120 LF x 2.75 LF = 330 SF	N/A
313	Fixed Bearing	5 Beams x 2 Abutments = 10 Bearings	N/A

8.4 Substructure Elements and Quantities

Not included for this example.

8.5 Environmental States

All elements will be placed in environment 3 (Moderate), as per current policy.

8.6 Inspection Notes

The routine inspection provided detailed field notes and an element level assessment. There are no notable defects in the wearing surface, railing, or bearings. Beams 1 and 5 exhibit 5 - 0.01″ wide cracks in the ends of the beams, which extend 5′ from the bearings.

8.7 Defect Code Condition State Assessment

16 – Reinforced Concrete Top Flange: The top flange of the beams is generally covered by the asphalt wearing surface. There are no signs of distress and is considered CS-1.

510 – Wearing Surface (Applied to Element 16): There are no notable defects and is considered CS-1.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 16): The top flange is hidden and shows no signs of distress and therefore it's assumed the protective system is effective.

330 – Metal Bridge Railing: There are no notable defects and is considered CS-1.

515 – Steel Protective Coating: There are no notable defects and is considered CS-1.

105 – Reinforced Concrete Closed Cell Web/ box Girder: The cracks in the ends of Beams 1 and 5 are less than 0.012″; therefore, they are considered insignificant and CS-1.

520 – Concrete Reinforcing Steel Protective System (Applied to Element 105): The reinforcing is not visible and therefore in CS-1.

313 – Fixed Bearing: There are no notable defects and is considered CS-1.

A summary of the elements, condition states, and applicable Defect Codes is provided in Table 8.7-1.

Table 8.7-1 Summary of Element Identification and Assessment

ELEM. NUMBER	DEFECT CODE	ELEMENT / CODE DESCRIPTION	UNIT	TOTAL QTY.	CONDITION STATE QTY.			
					CS-1	CS-2	CS-3	CS-4
16	-	Reinforced Concrete Top Flange	SF	745	745	0	0	0
510	-	Wearing Surfaces	SF	712	712	0	0	0
520	-	Reinforcing Steel Protective Systems	SF	745	745	0	0	0
330	-	Metal Bridge Railing	LF	50	50	0	0	0
515	-	Steel Protective Coating	SF	200	200	0	0	0
105	-	Reinforced Concrete Closed Cell Web/ box Girder	LF	120	120	0	0	0
520	-	Reinforcing Steel Protective Systems	SF	330	330	0	0	0
313	-	Fixed Bearing	EA	10	10	0	0	0

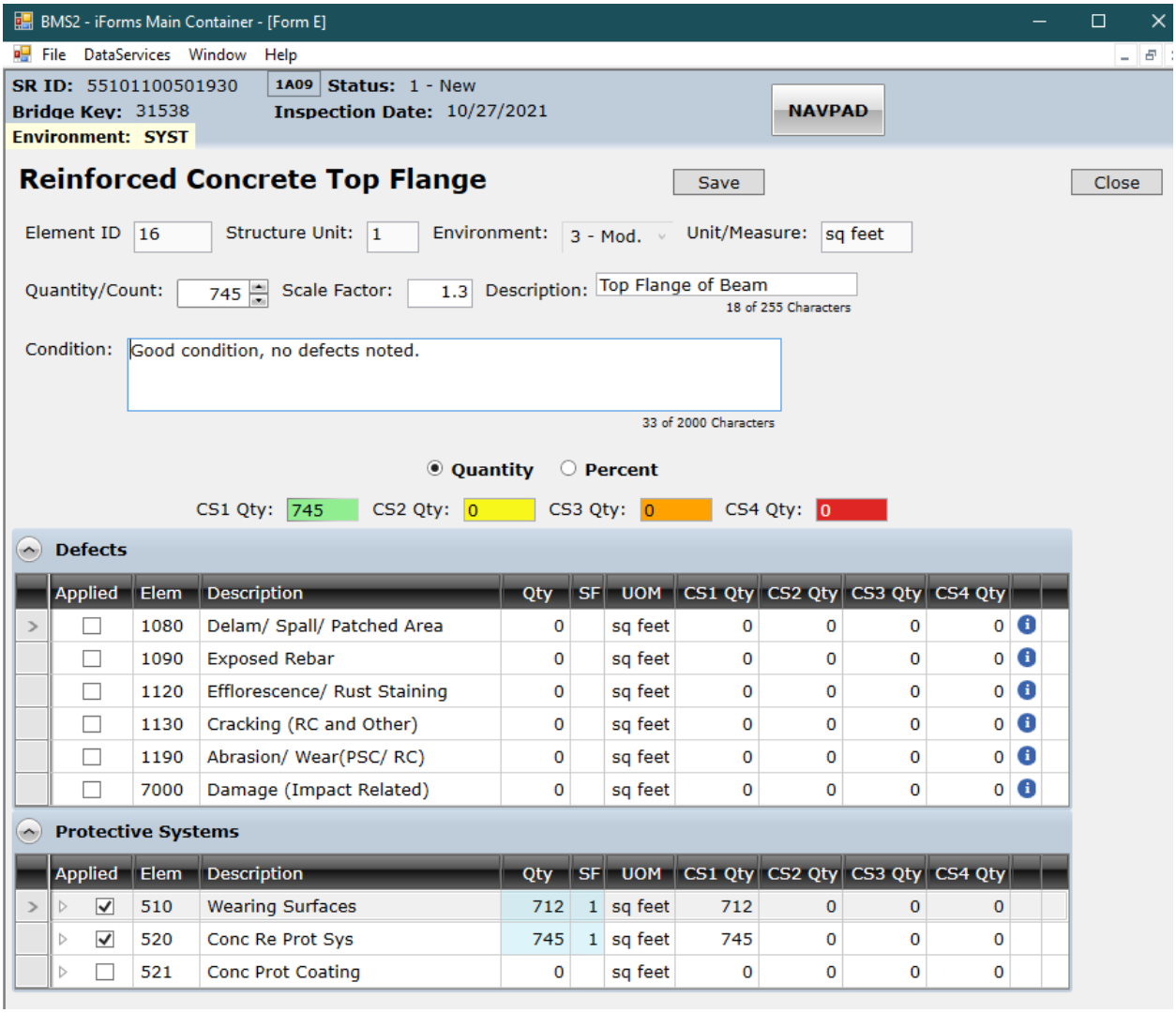

Figure 8.7-1 BMS3 Screen Shot for Element 16 Reinforced Concrete Top Flange (Quantity Mode)

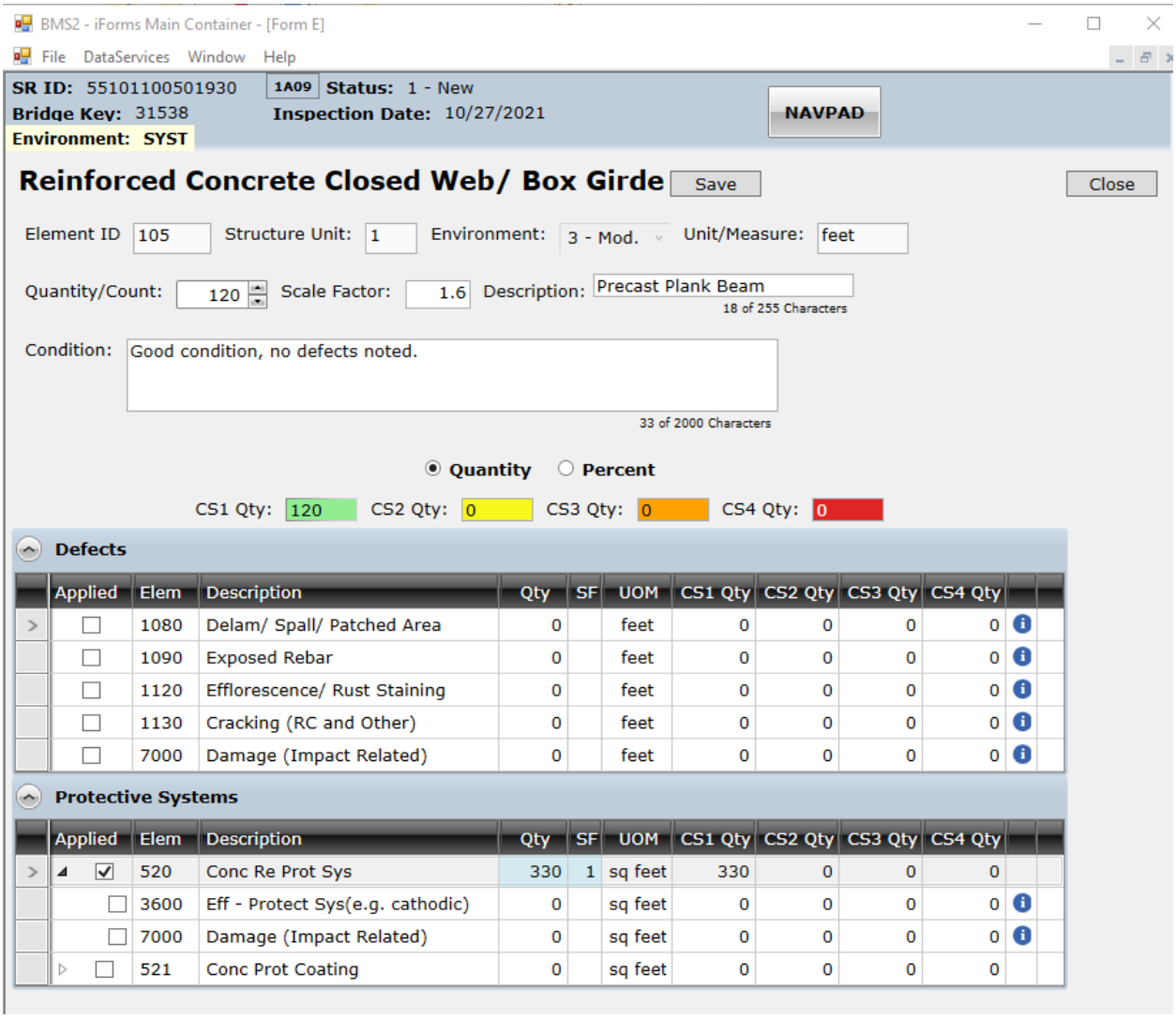

Figure 8.7-2 BMS3 Screen Shot for Element 105 Reinforced Concrete Closed Web/ Box Girder (Quantity Mode)

Appendix K

PennDOT Agency Developed Elements
Tunnel Subcomponents

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APPENDIX K
PennDOT Agency Developed Elements – Tunnel Subcomponents

The following condition states can be used for all the tunnel subcomponents listed in this appendix.

Condition State Definitions

Defects	Condition States			
	1	2	3	4
	GOOD	FAIR	POOR	SEVERE
Deterioration	Insignificant. The functional capacity has not been affected.	Breakdown or deterioration has initiated.	Significant deterioration or breakdown without impacting the serviceability of the sub-element, element or tunnel.	The condition warrants an evaluation to determine the effect on serviceability of the elements or tunnel. Ora review has been completed and the defects impact strength or serviceability of the elements or tunnel. If the condition is the result of impact damage, then damage is the predominant defect recorded for this location on the element.

Element # 10030 — Steel Cross Passageway

Description: This element defines 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.

Classification: ADE –Agency-Developed Element **Units of Measurement:** ft

Quantity Calculation: Sum of the length of the passageways as measured from door to door.

Condition State Definitions

See page K-1.

Element Subcomponents:

50805 – Cross Passageway	**Units of Measurement:** ft
50806 – Cross Passageway Door	**Units of Measurement:** each
50807 – Support Space Lighting	**Units of Measurement:** each
50808 – Light Fixtures	**Units of Measurement:** each
50809 – Switches	**Units of Measurement:** each
50810 – Passageway Control Panels	**Units of Measurement:** each
50811 – Conduit	**Units of Measurement:** ft

Element # 10031 — Concrete Cross Passageway

Description: This element defines 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.

Classification: ADE –Agency-Developed Element **Units of Measurement:** ft

Quantity Calculation: Sum of the length of the passageways as measured from door to door.

Condition State Definitions

See page K-1.

Element Subcomponents:

50805 – Cross Passageway	**Units of Measurement:** ft
50806 – Cross Passageway Door	**Units of Measurement:** each
50807 – Support Space Lighting	**Units of Measurement:** each
50808 – Light Fixtures	**Units of Measurement:** each
50809 – Switches	**Units of Measurement:** each
50810 – Passageway Control Panels	**Units of Measurement:** each
50811 – Conduit	**Units of Measurement:** ft

Element # 10033 — Shotcrete Cross Passageway

Description: This element defines 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.

Classification: ADE –Agency-Developed Element **Units of Measurement:** ft

Quantity Calculation: Sum of the length of the passageways as measured from door to door.

Condition State Definitions

See page K-1.

Element Subcomponents:

50805 – Cross Passageway	**Units of Measurement:** ft
50806 – Cross Passageway Door	**Units of Measurement:** each
50807 – Support Space Lighting	**Units of Measurement:** each
50808 – Light Fixtures	**Units of Measurement:** each
50809 – Switches	**Units of Measurement:** each
50810 – Passageway Control Panels	**Units of Measurement:** each
50811 – Conduit	**Units of Measurement:** ft

Element # 10034 — Timber Cross Passageway

Description: This element defines 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.

Classification: ADE –Agency-Developed Element **Units of Measurement:** ft

Quantity Calculation: Sum of the length of the passageways as measured from door to door.

Condition State Definitions

See page K-1.

Element Subcomponents:

50805 – Cross Passageway	**Units of Measurement:** ft
50806 – Cross Passageway Door	**Units of Measurement:** each
50807 – Support Space Lighting	**Units of Measurement:** each
50808 – Light Fixtures	**Units of Measurement:** each
50809 – Switches	**Units of Measurement:** each
50810 – Passageway Control Panels	**Units of Measurement:** each
50811 – Conduit	**Units of Measurement:** ft

Element # 10035 — Masonry Cross Passageway

Description: This element defines 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.

Classification: ADE –Agency-Developed Element **Units of Measurement:** ft

Quantity Calculation: Sum of the length of the passageways as measured from door to door.

Condition State Definitions

See page K-1.

Element Subcomponents:

50805 – Cross Passageway	**Units of Measurement:** ft
50806 – Cross Passageway Door	**Units of Measurement:** each
50807 – Support Space Lighting	**Units of Measurement:** each
50808 – Light Fixtures	**Units of Measurement:** each
50809 – Switches	**Units of Measurement:** each
50810 – Passageway Control Panels	**Units of Measurement:** each
50811 – Conduit	**Units of Measurement:** ft

Element # 10036 — Unlined Rock Cross Passageway

Description: This element defines 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.

Classification: ADE –Agency-Developed Element **Units of Measurement:** ft

Quantity Calculation: Sum of the length of the passageways as measured from door to door.

Condition State Definitions

See page K-1.

Element Subcomponents:

50805 – Cross Passageway	**Units of Measurement:** ft
50806 – Cross Passageway Door	**Units of Measurement:** each
50807 – Support Space Lighting	**Units of Measurement:** each
50808 – Light Fixtures	**Units of Measurement:** each
50809 – Switches	**Units of Measurement:** each
50810 – Passageway Control Panels	**Units of Measurement:** each
50811 – Conduit	**Units of Measurement:** ft

Element # 10039 — Other Cross Passageway

Description: This element defines 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.

Classification: ADE –Agency-Developed Element **Units of Measurement:** ft

Quantity Calculation: Sum of the length of the passageways as measured from door to door.

Condition State Definitions

See page K-1.

Element Subcomponents:

50805 – Cross Passageway	**Units of Measurement:** ft
50806 – Cross Passageway Door	**Units of Measurement:** each
50807 – Support Space Lighting	**Units of Measurement:** each
50808 – Light Fixtures	**Units of Measurement:** each
50809 – Switches	**Units of Measurement:** each
50810 – Passageway Control Panels	**Units of Measurement:** each
50811 – Conduit	**Units of Measurement:** ft

Element # 10200 — Ventilation System

Description: This element defines the components that provide the supply of fresh air to the tunnel while removing stale air and contaminants.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the ventilation systems in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50200 – Airways	**Units of Measurement:** ft
50201 – Sound Attenuators	**Units of Measurement:** each
50202 – Dampers	**Units of Measurement:** each
50203 – Damper Motor	**Units of Measurement:** each
50204 – Damper Controller (Sensors for Emergency stop)	**Units of Measurement:** each
50205 – Air Quality Monitoring Equipment (e.g. CO, oxygen, explosive gases)	**Units of Measurement:** each
50206 – Ventilation System Conduit	**Units of Measurement:** ft
50207 – Airway Control Panels (for power)	**Units of Measurement:** each

Element # 10201 — Fans

Description: This element defines the components that produce a current of air which provides the supply of fresh air to the tunnel while removing stale air and contaminants.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the fans in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50208 – Fan Drive (shaft, belt, chain)	**Units of Measurement:** each
50209 – Fan Drive Coupling	**Units of Measurement:** each
50210 – Fan Housing	**Units of Measurement:** each
50211 – Fan Blades	**Units of Measurement:** each
50212 – Fan Bearings	**Units of Measurement:** each
50213 – Fan Supports	**Units of Measurement:** each
50214 – Fan Motors	**Units of Measurement:** each
50215 – Fan Motor Drive	**Units of Measurement:** each
50216 – Fan Motor Bearing	**Units of Measurement:** each
50217 – Fan Motor Housing	**Units of Measurement:** each
50218 – Fan Motor Base / Fan Supports	**Units of Measurement:** each
50219 – Control System	**Units of Measurement:** each
50220 – Fan (local) Controller	**Units of Measurement:** each

Element # 10300 — Draining and Pumping System

Description: This element defines all 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.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the draining and pumping systems in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50300 – Control Panel Indicator Lights	**Units of Measurement:** each
50301 – Piping	**Units of Measurement:** ft
50302 – Piping Supports and Guards	**Units of Measurement:** each
50303 – Piping Accessories (expansion devices)	**Units of Measurement:** each
50304 – Piping Accessories (check valve)	**Units of Measurement:** each
50305 – Piping Accessories (gauges for flow)	**Units of Measurement:** each
50306 – Drains	**Units of Measurement:** each
50307 – Water Treatment Equipment	**Units of Measurement:** each
50308 – Water Storage Tank	**Units of Measurement:** each
50309 – Enclosures	**Units of Measurement:** each
50310 – Inlet (walls / floors)	**Units of Measurement:** each
50311 – Grate	**Units of Measurement:** each

Element # 10301 — Pumps

Description: This element defines all pumps that move water that may enter the tunnel from the portals, vent shafts, and cracks in the tunnel lining.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the pumps in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50312 – Sump Pumps	**Units of Measurement:** each
50313 – Pump Motors	**Units of Measurement:** each
50314 – Pump Shafts	**Units of Measurement:** each
50316 – Pump Seals	**Units of Measurement:** each
50317 – Pump Supports and Fasteners	**Units of Measurement:** each
50318 – Pump Controller	**Units of Measurement:** each
50319 – Sump Level Indicators (Floats)	**Units of Measurement:** each

Element # 10400 — Emergency Generator System

Description: This element defines the mechanical components of an emergency generator and power system which consists of fuel delivery, fuel storage, and engine cooling and exhaust systems.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the emergency generator systems in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50400 – Fuel Main Storage Tank	**Units of Measurement:** each
50401 – Fuel Day Tanks	**Units of Measurement:** each
50402 – Circulating Fuel Pumps	**Units of Measurement:** each
50403 – Fuel Tank Venting	**Units of Measurement:** each
50404 – Fuel Tank Sensors	**Units of Measurement:** each
50405 – Coolant Systems	**Units of Measurement:** each
50406 – Exhaust Manifold Insulation and Lagging	**Units of Measurement:** each
50407 – Exhaust Air Louver and Damper Actuator	**Units of Measurement:** each
50408 – Supply Air Louver and Damper Actuator	**Units of Measurement:** each
50409 – Generator	**Units of Measurement:** each
50410 – Generator Control Equipment	**Units of Measurement:** each
50411 – Control Panels	**Units of Measurement:** each
50412 – Conduit	**Units of Measurement:** ft

Element # 10500 — Electrical Distribution System

Description: This element 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.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the electrical distribution systems in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50500 – Switchgear	**Units of Measurement:** each
50501 – Unit Substations	**Units of Measurement:** each
50502 – Switchboard	**Units of Measurement:** each
50503 – Motor Control Centers	**Units of Measurement:** each
50504 – Starters	**Units of Measurement:** each
50505 – Transformers	**Units of Measurement:** each
50506 – Transfer Switches	**Units of Measurement:** each
50507 – Panelboards	**Units of Measurement:** each
50508 – Conduits and Raceways	**Units of Measurement:** ft
50509 – Electrical Outlets / Receptacles	**Units of Measurement:** each
50550 – Uninterruptable Power Supply (UPS)	**Units of Measurement:** each
50551 – Transfer Switches	**Units of Measurement:** each
50552 – Batteries	**Units of Measurement:** each
50553 – Battery Charging Equipment	**Units of Measurement:** each

Element # 10550 — Emergency Distribution System

Description: This element consists of the electrical equipment, wiring, and cable used for providing electrical power in case of utility service failure. Equipment included in this system consists of emergency generators and/or uninterruptable power supply systems, transfer switches, and other equipment supplying emergency power.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the emergency distribution systems in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50550 – Uninterruptable Power Supply (UPS)	**Units of Measurement:** each
50551 – Transfer Switches	**Units of Measurement:** each
50552 – Batteries	**Units of Measurement:** each
50553 – Battery Charging Equipment	**Units of Measurement:** each

Element # 10600 — Tunnel Lighting Systems

Description: This element consists 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.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the tunnel lighting systems in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50601 – Photo Controls / Sensors **Units of Measurement:** each

Element # 10601 — Tunnel Lighting Fixtures

Description: This element includes the physical housing of the tunnel lights and their connections to the tunnel.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the tunnel lighting fixtures in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50602 – Lamps	**Units of Measurement:** each
50603 – Lamp Housing	**Units of Measurement:** each
50604 – Support System	**Units of Measurement:** each
50605 – Control Panels	**Units of Measurement:** each
50606 – Switches	**Units of Measurement:** each
50607 – Conduit	**Units of Measurement:** ft
50608 – Ballasts / Drivers	**Units of Measurement:** each
50609 – Sensors	**Units of Measurement:** each

Element # 10620 — Emergency Lighting Systems

Description: This element consists 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.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the emergency lighting systems in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50552 – Batteries	**Units of Measurement:** each
50611 – Exit Signs	**Units of Measurement:** each
50807 – Support Space Lighting	**Units of Measurement:** each

Element # 10621 — Emergency Lighting Fixtures

Description: This element consists of the physical housing of the emergency lights and their connections to the tunnel.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the emergency lighting fixtures in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50612 – Lamps	**Units of Measurement:** each
50613 – Lamp Housing	**Units of Measurement:** each
50614 – Support System	**Units of Measurement:** each
50615 – Emergency Light Ballasts / Drivers	**Units of Measurement:** each

Element # 10650 — Fire Detection System

Description: This element consists of control panels, initiating devices, notification appliances, wiring, conduit, and cable used to detect a fire in the tunnel.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the fire detection systems in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50650 – Sensors	**Units of Measurement:** each
50651 – Controls	**Units of Measurement:** each
50652 – Alarms	**Units of Measurement:** each
50653 – Pull Station	**Units of Measurement:** each
50654 – Door Alarms	**Units of Measurement:** each

Element # 10700 — Fire Protection System

Description: This element consists 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.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the fire protection systems in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50700 – Main Fire Pump	**Units of Measurement:** each
50701 – Pressure Maintenance / Jockey Pump	**Units of Measurement:** each
50702 – Dry Pipe Valve	**Units of Measurement:** each
50703 – Valves and Tamper Switches	**Units of Measurement:** each
50704 – Storage Tanks	**Units of Measurement:** each
50705 – Tunnel Stand Pipe	**Units of Measurement:** each
50706 – Pressure Relief and Air Release Valves	**Units of Measurement:** each
50707 – Backflow Prevention	**Units of Measurement:** each
50708 – Hose Stations	**Units of Measurement:** each
50709 – Hose Reels	**Units of Measurement:** each
50710 – Building Sprinklers	**Units of Measurement:** each
50711 – Fire Department Connections	**Units of Measurement:** each
50712 – Fire Hydrants	**Units of Measurement:** each

Element # 10750 — Emergency Communications System

Description: This element consists of the emergency communications system including the communication device itself, receivers, wiring, exchange devices, etc.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the emergency communication systems in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50750 – Signs	**Units of Measurement:** each
50751 – Controller	**Units of Measurement:** each
50752 – Speakers	**Units of Measurement:** each
50753 – Audio Input Equipment	**Units of Measurement:** each
50754 – Cross Passageway Phone	**Units of Measurement:** each

Element # 10800 — Tunnel Operations and Security System

Description: This element consists of the communication equipment used to provide communication within and from the tunnel.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the tunnel operations and security systems in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50800 – Closed Circuit TV (CCTV)	**Units of Measurement:** each
50801 – Cell Phone Antennas	**Units of Measurement:** each
50802 – Door Access	**Units of Measurement:** each
50803 – Security System Controller	**Units of Measurement:** each
50804 – Tunnel Ops and Security System Radio	**Units of Measurement:** each

Element # 10890 — Variable Message Board

Description: This element consists of the variable message board, supports, and associated electrical connections.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the variable message boards in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50890 – Illuminated Display Signs **Units of Measurement:** each

Element # 10911 — Lane Signal Fixture

Description: This element consists of the tunnel lane signal fixtures including the fixtures themselves, the supports, and the wiring.

Classification: ADE –Agency-Developed Element **Units of Measurement:** each

Quantity Calculation: Sum of the lane signal fixtures in service in the tunnel.

Condition State Definitions

See page K-1.

Element Subcomponents:

50911 – Control Station (control system)	**Units of Measurement:** each
50912 – Control Cabinets (control system)	**Units of Measurement:** each
50913 – Conduit	**Units of Measurement:** ft

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Appendix L

BMS2 Security Profiles

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APPENDIX L
BMS2 Security Profiles

ORG	TITLE	BMS2 BROWSER	BMS2 INSPECTOR	BMS2 INSP SUPER	BMS2 POWER USER	BMS2 SUPER USER	APRAS BROWSER	APRAS EDIT
District	Bridge Engineer	S	S	(S)			(S)	(S)
District	Assistant DBE Inspection	S	S	S	(S)		(S)	(S)
District	Bridge Inspection Supervisor	S	S	S	(S)		(S)	(S)
District	BMS2 Coordinator	S	S	S	(S)		(S)	(S)
District	Bridge Load Rating Engineer	S	S	S			(S)	S
District	Inspection Team Leader	S	S	(S)				
District	Inspection Team Member	S	S					
District	Design Engineer	S	S	(S)				
District	Design Technician	S						
District	Bridge Maintenance Coordinator	S	S	S				
District	Permit Supervisor	S						
District	Permit Clerk	S						
District	All	S						
District	RMS Coordinator	S						
District	Planning Engineer	S						
District	Planning Technician	S						
District	Other Users	S						
BOMO	BIS Chief	S	(S)	S	(S)	(S)	S	(S)
BOMO	BMS2 Manager	S	S	S		S	S	(S)
BOMO	BMS2 Coordinator	S	S	S		S	S	(S)
BOMO	Bridge Maintenance Manager	S						
BOMO	Inspection QA Engineer	S	S	(S)			(S)	(S)
BOPD	Chief Bridge Engineer	S	(S)	S			S	(S)

APPENDIX L
BMS2 Security Profiles

ORG	TITLE	BMS2 BROWSER	BMS2 INSPECTOR	BMS2 INSP SUPER	BMS2 POWER USER	BMS2 SUPER USER	APRAS BROWSER	APRAS EDIT
BOPD	APRAS Coordinator	S	S	S		S	(S)	S
BOPD	All	S						
BOMO	RMS Coordinator	S						
BOMO	Permit Manager	S						
BOMO	All Others	S						
COMPT	All	S						
BSM	APRAS/BMS2	S						
BSM	Other Staff	S						
Program Center	All	S						
Planning & Research	All	S						
Aviation	All	S						
PTC	Bridge Engineer	T	(T)	(T)				
PTC	Bridge Inspection Engineer	T	T	T				
PTC	Bridge Maintenance Engineer	T	(T)	(T)				
PTC	Bridge Design Engineer	T	(T)	(T)				
DCNR	Bridge Engineer	E	(E)	(E)				
DCNR	Bridge Inspection Engineer	E	E	E				
DCNR	Bridge Inspection Technician	E	E					
FHWA	All	S	S					
PUC	All	S						

Functions: BMS2 Browser - Inquiry to data only
BMS2 Inspector - Update unapproved inspection and inventory data
BMS2 Insp Super - Update and approve inspection and inventory data
BMS2 Power User - Update and approve inspection and inventory data. Delete bridge inspection records
BMS2 Super User - Full authority for all data
APRAS Browser - Inquiry APRAS data only via BMS2
APRAS Edit - Update APRAS data via BMS2

Authorizations: S – All bridges – Statewide
T – Turnpike bridges only
E – DCNR bridges only
( ) – Indicates optional authorization

Refer to Section 1.5 for additional information on individual roles.

Appendix M

Detailed Coding Examples

APPENDIX M
Detailed Coding Examples

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Background:

The purpose of this appendix is to provide more detailed coding information to explain specific fields with BMS2 and BMS3 . These explanations are provided in this appendix to avoid disruption in the normal flow of the main coding manual. These explanations may only apply to specific bridges rather than the entire population. The description, procedure and coding from the main portion of Publication 100A is provided for ease of reference and then the more detailed coding explanation is provided.

*5C15 Detour Length - Bypass Detour Length

Inventory > Features > Highway

Description:

This item is used to code the availability of a ground level bypass at a bridge site or to record the length of a detour which would result from closing of the bridge to highway traffic.

Procedure:

If a ground level bypass is available at the bridge site for the route, enter "00" in both positions. Otherwise, enter the actual length to the nearest mile of the feasible detour to the nearest comparable structure. If the bridge is one of twin bridges not at an interchange, code "01" to indicate that the other twin bridge can be used as a temporary bypass. In the other cases, enter the actual length to the nearest mile of the detour length. This item must be entered.

The detour length should represent the total additional travel for a vehicle, which would result from closing of the bridge.

The factor to consider when determining if a bypass is available at the site is the potential for moving vehicles, including military vehicles, around the structure, particularly, when the structure is in an interchange. For instance, a bypass likely would be available in the case of diamond interchanges, interchanges with service roads available, or other interchanges where the positioning and layout of the ramps is such that they could be used without difficulty to get around the bridge.

The detour length also needs to evaluate restrictions on the detour route. The restrictions along the detour length should not be more restrictive then the original route. For example, if the original bridge being detoured is not restricted for weight, any bridges along the detour length should not be posted for weight. A similar review of vertical clearance restrictions beneath 14'-6" should also be evaluated.

The detour route selected should be of an equal or better classification of highway if possible, including any bridges located on the highway. Functional classification maps are available from PennDOT here:

https://www.penndot.pa.gov/ProjectAndPrograms/Planning/TrafficInformation/Pages/County-Functional-Class-Maps.aspx

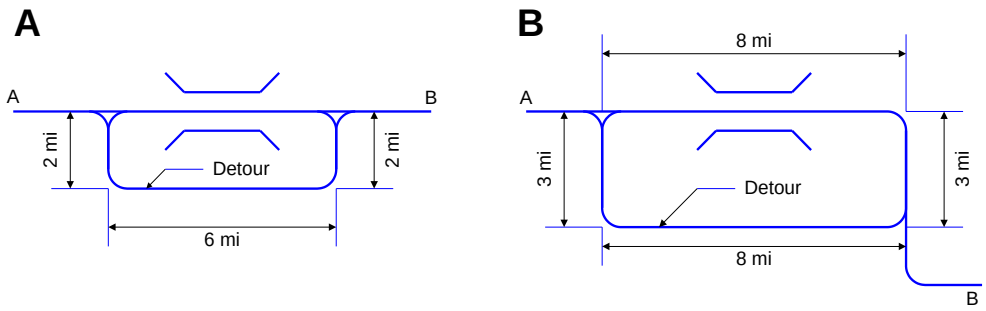
Enter this item for each ON feature of a bridge that carries highway traffic.

Coding:

0	Ground level bypass
1 - 98	Actual length of the detour route to the nearest mile
99	Detour length of 99 miles or more; or bridge on a dead-end road

Examples

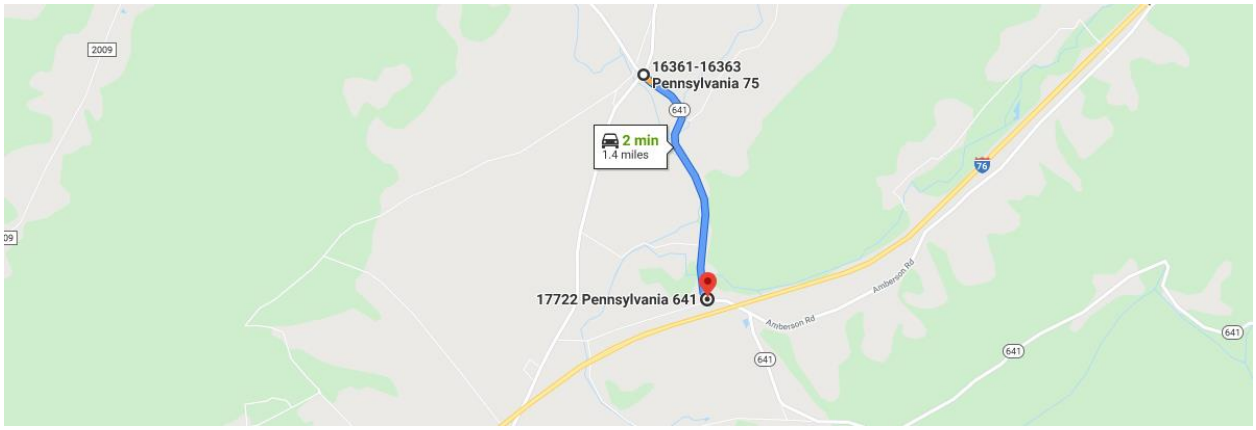
Twin bridge used as a temporary bypass or additional travel length less than or equal to 1 mile.	*1*
Detour Figure A, 4 mile additional travel length.	*4*
Bridge over river, 121 mile additional travel.	*99*
Detour Figure B, 0 mile additional travel length.	*0*
Detour has 5.7 mile additional travel length.	*6*



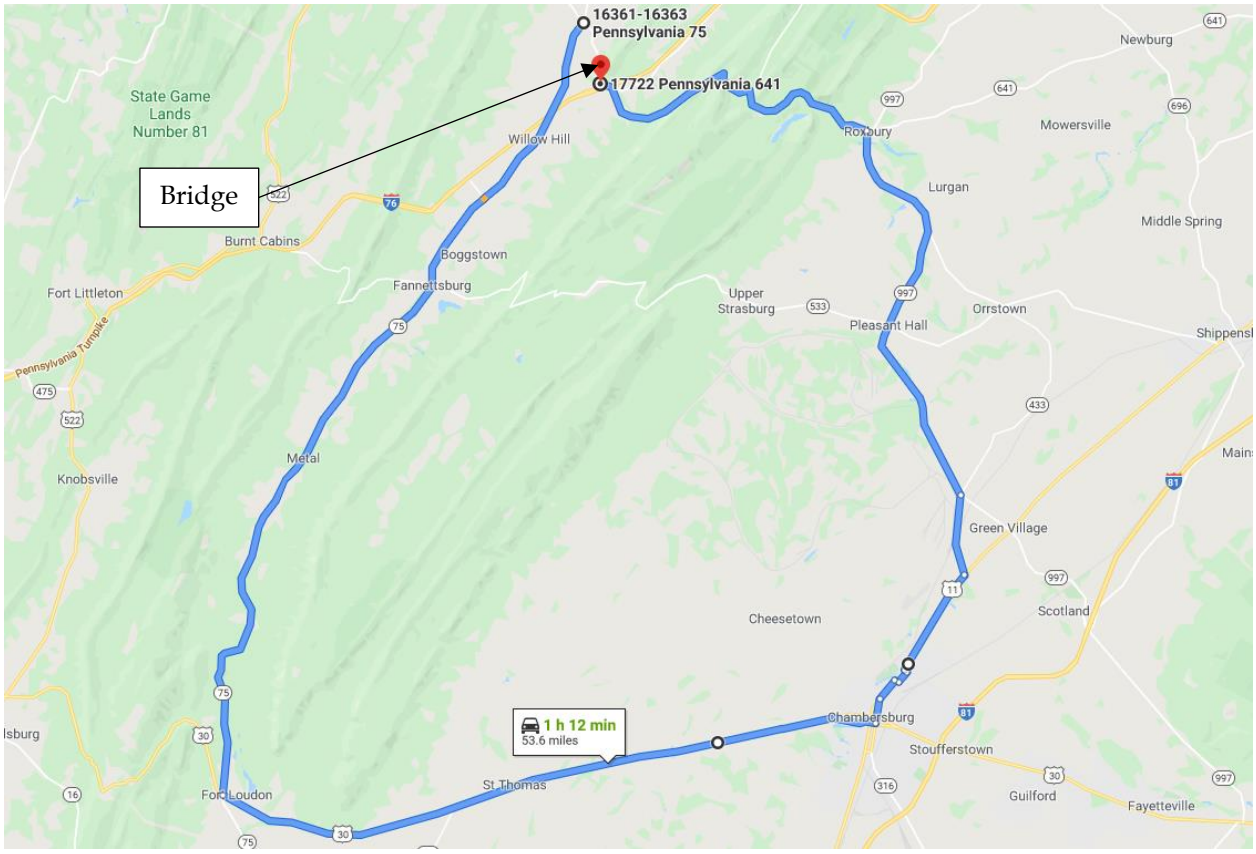
Expanded Coding Examples:

Example C:

Bridge C is located on a three-digit state route and is classified as a "Minor Arterials". Even though there is a four-digit state route classified as a local road near the structure, the functional classification cannot be maintained. Detours can cross county lines; however, in the example shown below, the shortest detour length on an equal or better roadway was within the county.

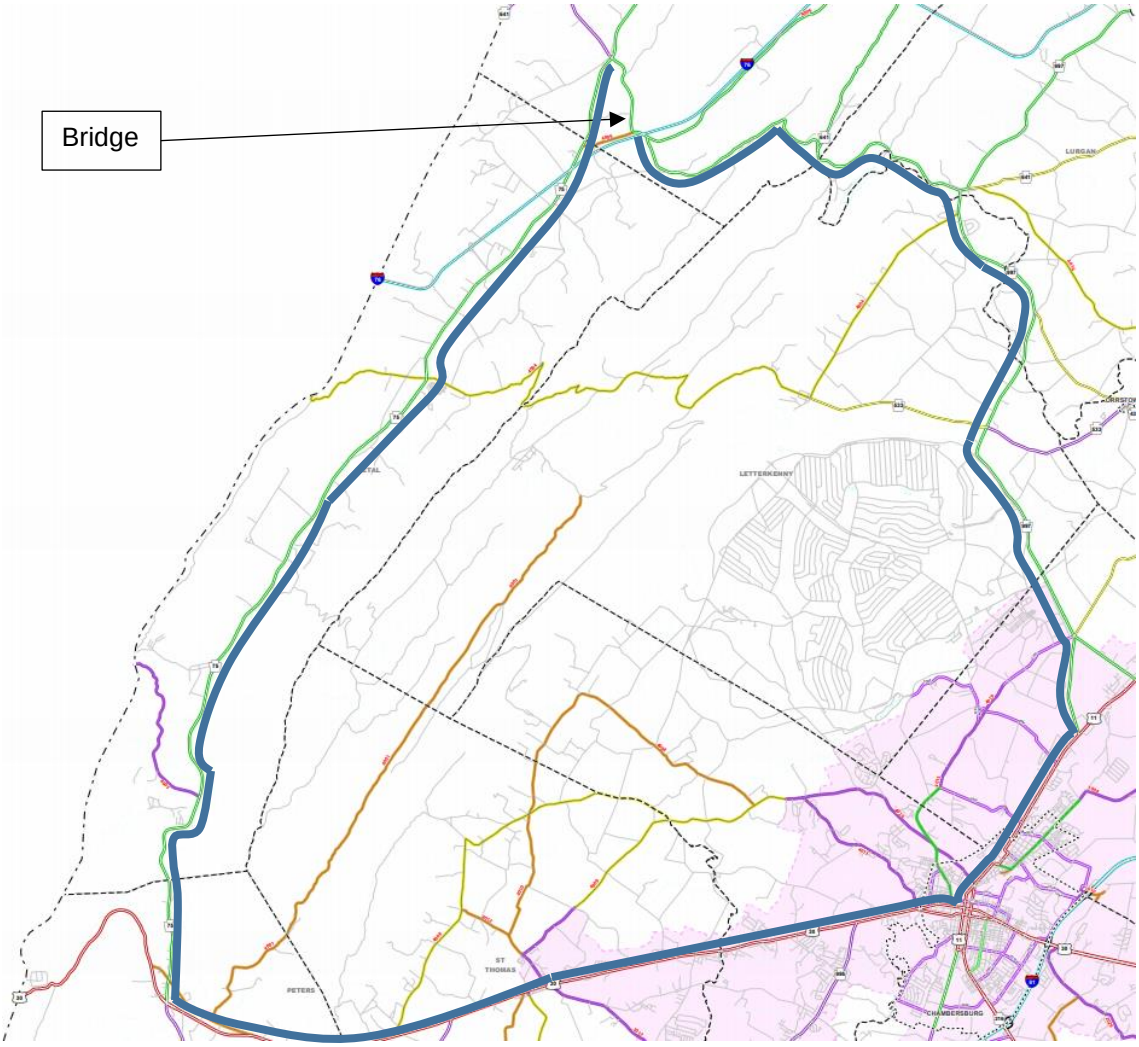


1. Original Road Segment: 1.4 Miles (FC per map = Minor Arterials – Green)



2. Detour Road Segment: 53.6 Miles

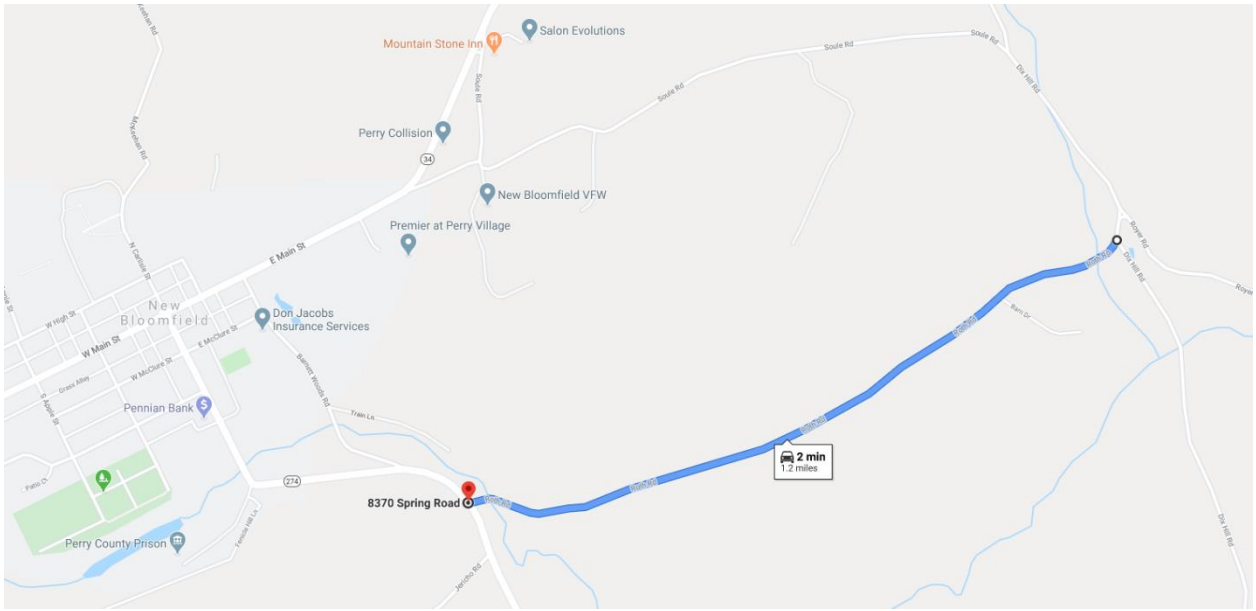
3. Detour Length calculation: 53.6 Miles – 1.4 Miles = 52.2 Miles; round to 52 Miles.



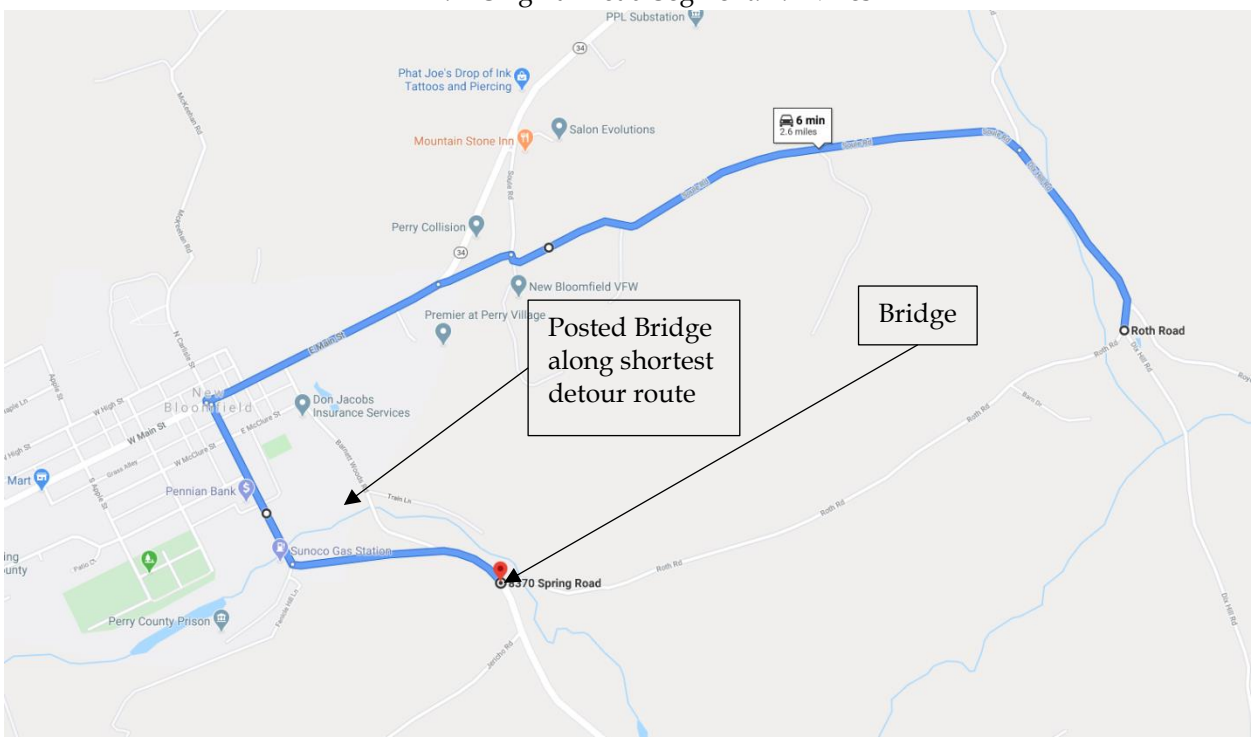
Functional Classification map with the detour route shown in blue offset from the actual roadways.

Example D:

Bridge D is located on a locally-owned road and therefore is not shown in a color on a functional classification map. The shortest detour route around the bridge includes a posted bridge. Therefore, an alternate route is required. The location of the posted bridge is shown on the map.



1. Original Road Segment: 1.2 Miles



2. Detour Road Segment: 2.6 Miles

3. Detour Length calculation: 2.6 Miles – 1.2 Miles = 1.4 Miles; round to 1 Mile.

*6A29 Struct Config - Structural Configuration Used for Main Unit, Approach Unit, Sign Structure, and Walls (Department)

Inventory > Agency Bridge; Form A > Structure Description; Form F

Description:

This two-part item is used to indicate the basic structural configuration for the main unit, approach unit, sign structure and walls.

Procedure:

Select the code for the structural configuration for each unit from the dropdown list. The main unit applies to all spans of most bridges, to the major unit of sizable structures or to a unit of material or design different from that of the approach spans.

This field also applies to sign structures, high mast lights, retaining walls and noise walls. Select the code for the structural configuration for the structure from the dropdown list.

Coding:

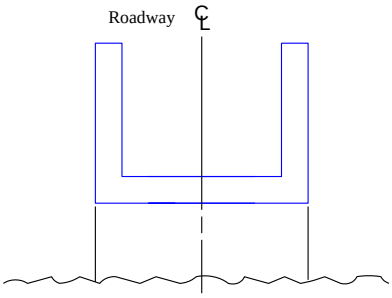
Bridges and Culverts:

BMS2	Description	BMS2	Description
01	Slab or slab beams (solid)	20	*Arch – deck – closed spandrel
02	Slab or slab beams (hollow)	21	*Arch – thru
03	T-beams – single or multiple (includes NEXT beams)	22	Rigid Frame
04	I beams (include rolled wide flange beams w/ or w/o cover plate, prestressed concrete I beams or p/s concrete Bulb Tee Beams – single or multiple	23	Orthotropic
		24	Suspension
		25	Stayed girder
05	Box beam – single	26	Movable - lift
06	Box beam – multiple (spread)	27	Movable – bascule
07	Box beam – adjacent	28	Movable – swing
08	Channel beams	29	Tunnel
09	I-welded beams – single or multiple	30	Frame culvert#
10	I-riveted beams – single or multiple	31	**Box culvert#
11	Girder/floorbeam (GF) system, welded – deck	32	*Arch culvert#
12	GF system, welded – thru	33	Tied arch culvert#
13	GF system, riveted – deck	34	Pipe culvert#
14	GF system, riveted – thru	35	Pipe – arch culvert#
15	GF system, welded with overhang bracket - deck	36	Solid timber beams
16	GF system, riveted with overhang bracket -deck	37	Glue-laminated timber beams
17	Truss - deck	38	Stressed timber
18	Truss - thru	52	Segmental box girder
19	*Arch – deck – open spandrel	99	Other

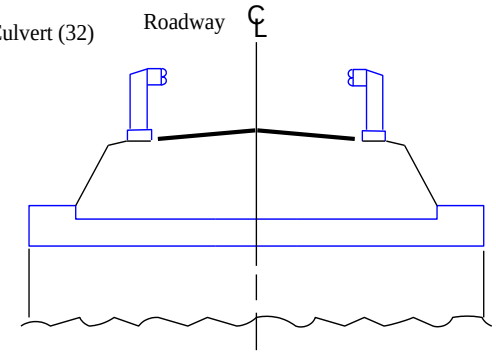
If a combination of types exists, code the most critical one. See *, **, and # notes on the following page.

*The preferred distinction between a closed spandrel deck arch and an arch culvert structure type is based on the fill slope's relation to the headwall. The structure should be considered a closed spandrel deck arch when the roadway passes through the headwalls (see sketch below). The structure should be considered a culvert when the headwalls are below the roadway (see sketch below).

Closed Spandrel Deck Arch (20)



Arch Culvert (32)



**The distinction between a box culvert and a slab bridge is based on the construction technique and is independent of the grade. A slab bridge will have a distinct break between the superstructure and the substructure, while a box culvert will be monolithic. Slab bridges and box culverts can be found at grade or under fill. A monolithic structure without a floor is a frame. As with arch structures, the distinction between a frame bridge and a frame culvert is based on the grade. Frame structures at grade are coded as bridges, while frame structures under fill are coded as culverts. The Structure Type Coding Item Comparison Chart before Item 1A01 gives an overview of these coding requirement differences.

There is an important distinction between a culvert with an integral bottom and a culvert without a bottom. Culverts without a bottom must be coded as 30 or 32. These structures must also have abutments coded for structure units and piers if applicable. Culverts with an integral bottom should be coded as 31, 33, 34, or 35. They must also be coded as CIN and COU for structure units. If there is conflicting information, the SCBI calculator will return a value of a "6" and the bridge will be subjected to a 6-month inspection frequency as SCBI = 6 is considered Scour Category "A". The distinction between an arch culvert and a pipe-arch culvert is the pipe-arch culvert has a bottom. Additional information on culvert structure types are shown in FHWA's Bridge Inspection Reference Manual, Chapter 14.

Photographs of specific structure types are provided on the following pages.

Structure Type 20: Arch – Deck – Closed Spandrel (Closed Spandrel Arch Bridge)

Structure Type 22: Rigid Frame

Structure Type 30: Frame Culvert

Structure Type 32: Arch Culvert

Structure Type 33: Tied-Arch Culvert

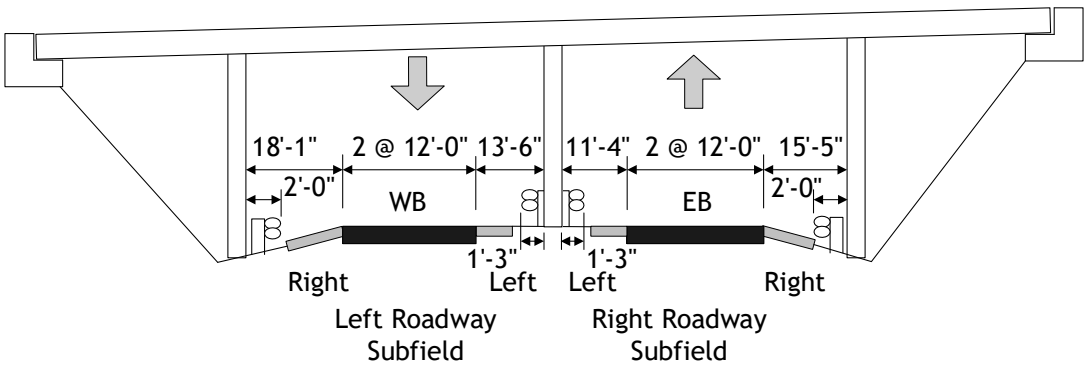
Structure Type 34: Pipe Culvert

Structure Type 35: Pipe-Arch Culvert

Vertical and Horizontal Clearance Example (Items 6C18 through 6C23)

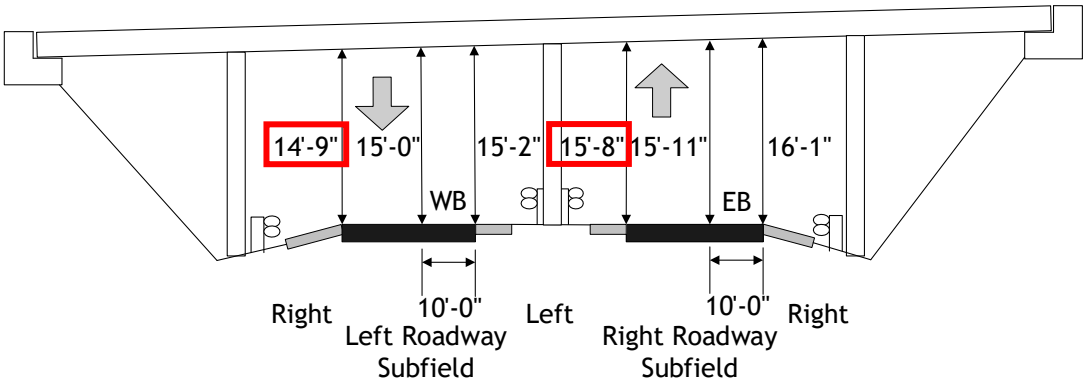
The following example covers Items 6C18 and 6C19 (Horizontal Clearance), Items 6C20 and 6C21 (Vertical Clearance) and Items 6C22 and 6C23 (Defense Vertical Clearance).

Example 1:



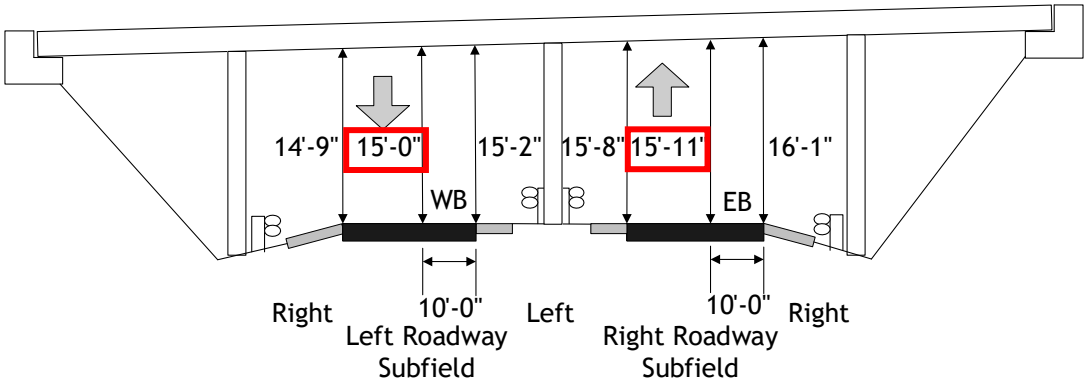
Item 6C18 Horiz (L): 52.3 ft = [(18′ - 1′ + 24′ - 0″ + 13′ - 6″) – (2′ – 0″ + 1′ – 3″)]

Item 6C19 Horiz (R): 47.5 ft = [(11′ - 4′ + 24′ - 0″ + 15′ - 5″) – (2′ – 0″ + 1′ – 3″)]



Item 6C20 Min Vert (L): 14.75 ft

Item 6C21 Min Vert (R): 15.67 ft

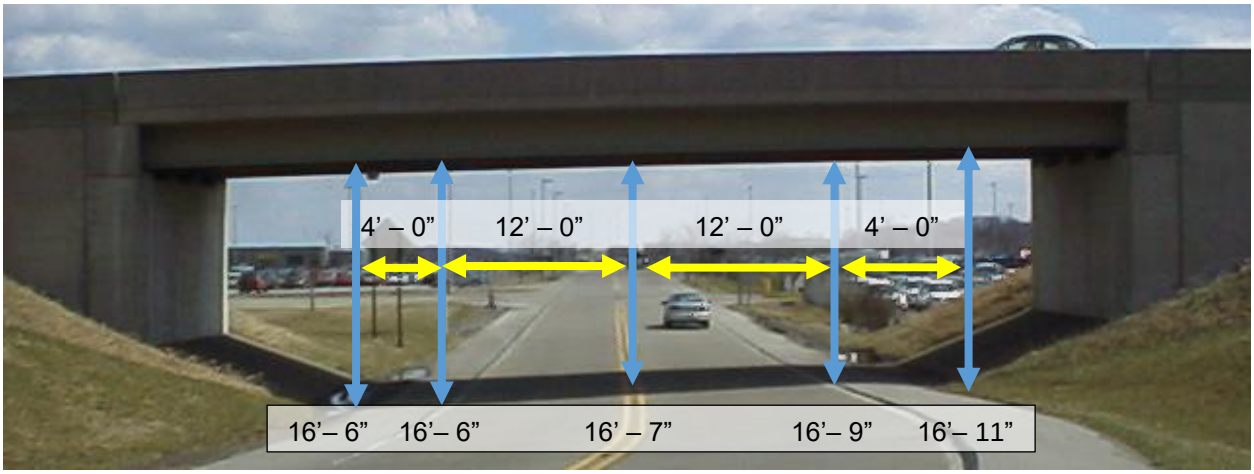


Item 6C22 Def Vert (L): 15.00 ft

Item 6C23 Def Vert (R): 15.92 ft

Example 2:

Bi-Directional Traffic on Feature with no Median



(Shoulders are constructed of the same construction as the main roadway)

Under Feature: Item 6C18 Horiz (L): 0.0 (5C06 = 0; 6C25 = 0)

Under Feature: Item 6C19 Horiz (R): 32′ – 0″ = 4′ - 0′ + 12′ - 0″ + 12′ - 0″ + 4′ – 0″

Under Feature:	Over Feature:
Item 6C20 Min Vert (L): 0.00 ft	Item 6C20 Min Vert (L): 99.90 ft*
Item 6C21 Min Vert (R): 16.50 ft	Item 6C21 Min Vert (R): 99.90 ft
Item 6C22 Def Vert (L): 0.00 ft	Item 6C22 Def Vert (L): 99.90 ft*
Item 6C23 Def Vert (R): 16.50 ft	Item 6C23 Def Vert (R): 99.90 ft

* No restriction = 99.90′ value

Scour Critical Bridge Indicator (SCBI)

Item 4A08: Inspection > Underwater; Form G
Item IU04: Inspection > Underwater > SCBI; Form G > SCBI Calculation Data
Item IU27: Inspection > Underwater > Sub Units; Form G > Sub Units > OSA and Condition Rating Details
Item IU28: Inspection > Underwater > Sub Units; Form G > Sub Units > OSA and Condition Rating

The information provided below and on the following pages is the input used by the Scour Calculator to generate an SCBI for code (IU27) and case (IU28) for each individual sub-unit. The controlling IU27 from the bridge is then used to populate the calculated SCBI for the bridge (IU04). The bridge's SCBI (4A08) will be set equal automatically to the calculated SCBI when the SCBI source (IU03) is observed.

Example A (IU03 = Observed):

Sub-Unit	IU27/IU28		IU04	4A08
Near Abutment	Code 5	Case 1		
Pier 1	Code 8	Case 4	Code 7 (controls)	Code 7
Far Abutment	Code 7	Case 2		

Example B (IU03 = Observed):

Sub-Unit	IU27/IU28		IU04	4A08
CIN	Code 8	Case 1		
			Code 2 (controls)	Code 2
COU	Code 2	Case 2		

Scour Calculator Documentation

IU27 Calculation

A subunit may meet the criteria for more than one code, however it receives the IU27 code that is closest to the top of the ordered list below. A code of 6 indicates further evaluation is required for the subunit by PennDOT.

Code 6, Cases 1 or 3
Code 1
Code 2
Code 8
Code 5
Code 7
Code 4
Code 3
Code 6, case 4

IU04 Calculation

Because the subunits are components of the overall structure code, the overall bridge structure receives the IU04 code equal to the code for the subunit rated closest to the top of the ordered list below

Code 6
Code 1
Code 2
Code 3
Code 4
Code 7
Code 5
Code 8

SCBI Code 8

Code 8 - Bridge foundations determined to be stable for assessed or calculated scour conditions

SCBI Case IU28	Changes Since Last Insp IN04	Scour Hole IN05	Abutment Type IN12	Pier Type IN12	PA Found Type IN13	OSA Found Type IN14	Streambed Matl IN15	Movement Indicator IN19	Notes
1	4 - 9 Medium - None	3 - 9 Serious - None	------	------	------	------	------	Unchecked	5D04 = C AND 6A29 - Structure Config equals: 31 - Box Culvert, 33 - Tied-Arch Culvert, 34 - Pipe Culvert or 35 Pipe-Arch Culvert
2	4 - 9 Medium - None	5 - 9 Advanced - None	1 Stub 2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete 6 Stone Masonry	21 Timber 23 Concrete 24 Stone Masonry	A	1-Bedrock	A4, A5, A6, R7, R8, R9	Unchecked	
3	------	------	------	------	------	------	------	------	Not Applicable, removed the entire case.
4	6 - 9 Minor - None	7 - 9 Minor - None	1 Stub 2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete 6 Stone Masonry 7 Piles / Bents	21 Timber 22 Steel 23 Concrete 24 Stone Masonry	B, C, D, E, F, G, H, I, J, S	3 - Piles/Caissons	A5, A6, R7, R8, R9	Unchecked	

SCBI Code 7

Code 7 - Countermeasures have been installed to mitigate an existing problem with scour and to reduce the riskof bridge failure during a flood event.

SCBI Case IU28	Changes Since Last Insp IN04	Scour Hole IN05	Abutment Type IN12	Pier Type IN12	PA Found Type IN13	OSA Found Type IN14	Streambed Matl IN15	Movement Indicator IN19	Notes
1	------	------	------	------	------	------	------	------	Not Applicable, removed the entire case.
2	4 - 9 Medium - None	5 - 9 Advanced - None	1 Stub 2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete 6 Stone Masonry 7 Piles / Bents	21 Timber 22 Steel 23 Concrete 24 Stone Masonry	All Types	All Types	C7, C8	Unchecked	

SCBI Code 6

Code 6 - Scour calculation/evaluation has not been made.

SCBI Case IU28	Changes Since Last Insp IN04	Scour Hole IN05	Abutment Type IN12	Pier Type IN12	PA Found Type IN13	OSA Found Type IN14	Streambed Matl IN15	Movement Indicator IN19	Notes
1	------	------	Blank 10 Other	Blank 25 Other	Blank	Blank 4 Other	------	------	5D04 = C AND 6A29 - Structure Config does not equals: 31 - Box Culvert, 33 - Tied-Arch Culvert, 34 - Pipe Culvert or 35 Pipe-Arch Culvert
2	------	------	------	------	------	------	------	------	Not Applicable, removed the entire case.
3	------	------	------	------	------	------	------	------	For subunits for which BMS data and USGS data for subunit type and subunit foundation type are incompatible (See below and Procedures for Scour Assessments at Bridges in Pennsylvania for a list of incompatible subunits and foundations)
4	------	------	------	------	------	------	------	------	For subunits that do not meet any case criteria for assigning codes 2-5, 7-8, code 6 case 1.

Code 6, Case 3: Incompatible Abutment / Foundation Combinations

Abutment Type (IN12)	Abutment Foundation Type (IN14)
1 - Stub	2 - Alluvium
1 - Stub	5 - Not Observed
7 - Piles / Bents	1 - Bedrock
7 - Piles / Bents	2 - Alluvium
7 - Piles / Bents	5 - Not Observed
8 - Concrete w/o Piles	3 - Piles / Caissons
10 - Other	1 - Bedrock
10 - Other	2 - Alluvium
10 - Other	3 - Piles / Caissons
10 - Other	5 - Not Observed

Code 6, Case 3: Incompatible Pier / Foundation Combinations

Pier Type (IN12)	Pier Foundation Type (IN14)
22 - Steel	1 - Bedrock
22 - Steel	2 - Alluvium
22 - Steel	5 - Not Observed
25 - Other	1 - Bedrock
25 - Other	2 - Alluvium
25 - Other	3 - Piles / Caissons
25 - Other	5 - Not Observed

SCBI CODE 5

Code 5 - Bridge foundations determined to be stable for assessed or calculated scour conditions.

SCBI Case IU28	Changes Since Last Insp IN04	Scour Hole IN05	Abutment Type IN12	Pier Type IN12	PA Found Type IN13	OSA Found Type IN14	Streambed Matl IN15	Movement Indicator IN19	Notes
1	6 - 9 Minor - None	7 - 9 Minor - None	2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete	23 Concrete	R, K, L	2 Alluvium	A5, A6, R7, R8	Unchecked	
2	6 - 9 Minor - None	7 - 9 Minor - None	1 Stub 2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete	23 Concrete	A	1-Bedrock	A3, R4	Unchecked	
3	6 - 9 Minor - None	5 - 9 Advanced - None	1 Stub 2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete 7 Piles / Bents	22 Steel 23 Concrete	B, C, D, E, F, G, H, I, J, S	3 - Piles/Caissons	A5, A6, R7, R8, R9	Unchecked	

SCBI CODE 4

Code 4 - Bridge foundations determined to be stable for assessed or calculated scour conditions; field reviewindicates action is required to protect exposed foundations.

SCBI Case IU28	Changes Since Last Insp IN04	Scour Hole IN05	Abutment Type IN12	Pier Type IN12	PA Found Type IN13	OSA Found Type IN14	Streambed Matl IN15	Movement Indicator IN19	Notes
1	4 - 9 Medium - None	5 - 9 Advanced - None	2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete	23 Concrete	R, K, L P, X	2 Alluvium 5- Not Observed	A5, A6, R7, R8	Unchecked	
2	4 - 9 Medium - None	5 - 9 Advanced - None	1 Stub 2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete	23 Concrete	A	1-Bedrock	A3, R4	Unchecked	
3	4 - 9 Medium - None	3 - 9 Serious - None	1 Stub 2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete 7 Piles / Bents	22 Steel 23 Concrete	B, C, D, E, F, G, H, I, J, S	3 - Piles/Caissons	A5, A6	Unchecked	
4	6 - 9 Minor - None	3 - 9 Serious - None	1 Stub 2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete 7 Piles / Bents	22 Steel 23 Concrete	B, C, D, E, F, G, H, I, J, S	3 - Piles/Caissons	A3, A4, R4	Unchecked	
5	------	9 None	9 Mechanically Stabilized Earth (MSE)	------	------	------	------	Unchecked	
6	6 - 9 Minor - None	7 - 9 Minor - None	6 Stone Masonry	21 Timber 24 Stone Masonry	R, K, L P, X	2 Alluvium 5- Not Observed	A5, A6, R7, R8	Unchecked	
7	6 - 9 Minor - None	5 - 9 Advanced - None	6 Stone Masonry	21 Timber 24 Stone Masonry	A	1-Bedrock	A3, R4	Unchecked	
8	4 - 9 Medium - None	5 - 9 Advanced - None	6 Stone Masonry	21 Timber 24 Stone Masonry	B, C, D, E, F, G, H, I, J, S	3 - Piles/Caissons	A5, A6	Unchecked	
9	6 - 9 Minor - None	5 - 9 Advanced - None	6 Stone Masonry	21 Timber 24 Stone Masonry	B, C, D, E, F, G, H, I, J, S	3 - Piles/Caissons	A3, A4, R4	Unchecked	

SCBI CODE 3

Code 3 - Bridge is scour critical; foundations determined to be unstable for assessed or calculated scour conditions: (1) Scour within limits of footing or piles, OR (2) Scour below bottom of spread footing or pile tips .

SCBI Case IU28	Changes Since Last Insp IN04	Scour Hole IN05	Abutment Type IN12	Pier Type IN12	PA Found Type IN13	OSA Found Type IN14	Streambed Matl IN15	Movement Indicator IN19	Notes
1	4 - 9 Medium - None	5 - 9 Advanced - None	2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete	23 Concrete	R, K, L P, X	2 Alluvium 5- Not Observed	A3, A4, R4	Unchecked	
2	4 - 5 Medium	3 - 9 Serious - None	1 Stub 2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete 7 Piles / Bents	22 Steel 23 Concrete	B, C, D, E, F, G, H, I, J, S	3 - Piles/Caissons	A3, A4, R4	Unchecked	Added R4, No IN04=6,7,8,9 since this is Code 4, Case 4
3	4 - 9 Medium - None	7 - 8 Minor	9 Mechanically Stabilized Earth (MSE)	------	------	------	------	Unchecked	
4	4 - 9 Medium - None	5 - 9 Advanced - None	6 Stone Masonry	21 Timber 24 Stone Masonry	R, K, L P, X	2 Alluvium 5- Not Observed	A3, A4, A5, A6, R4, R7, R8	Unchecked	Addes R7 and R8
5	4 - 9 Medium - None	5 - 9 Advanced - None	6 Stone Masonry	21 Timber 24 Stone Masonry	A	1-Bedrock	A3, R4	Unchecked	Added A3
6	4 - 9 Medium - None	3 - 4 Serious	1 Stub 2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete	23 Concrete	A	1-Bedrock	------	Unchecked	
7	4 - 9 Medium - None	5 - 9 Advanced - None	6 Stone Masonry	21 Timber 24 Stone Masonry	B, C, D, E, F, G, H, I, J, S	3 - Piles/Caissons	A3, A4, R4	Unchecked	Added R4

APPENDIX M
Detailed Coding Examples

SCBI CODE 2

Code 2 - Bridge is scour critical; field review indicates that extensive scour has occurred at bridge foundations, which are determined unstable by: (1) A comparison of calculated scour and observed scour during the bridge inspection, OR (2) An engineering evaluation of the observed scour condition reported by the bridge inspector in Item 1A02 (Substructure Condition Rating).

SCBI Case IU28	Changes Since Last Insp IN04	Scour Hole IN05	Abutment Type IN12	Pier Type IN12	PA Found Type IN13	OSA Found Type IN14	Streambed Matl IN15	Movement Indicator IN19	Notes
1	------	3 - 6 Serious - Advanced	9 Mechanically Stabilized Earth (MSE)	------	------	------	------	------	
2	------	------	------	------	------	------	------	Checked	
3	------	3 - 4 Serious	2 Cantilever 3 Gravity Concrete 4 Spill-through 5 Unknown Concrete	23 Concrete	R, K, L O P, X	2 Alluvium 4- Other 5- Not Observed	------	------	Appendix C does also list pier foundation type 1-Bedrock; however, the scour calculator returns a 3 for this case.
4	------	3 - 4 Serious	6 Stone Masonry	21 Timber 24 Stone Masonry	------	------	------	------	
5	------	------	8- Concrete without Piles/bents	------	------	------	------	------	
7	3 High	------	------	------	------	------	------	------	

SCBI CODE 1

Code 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: (1) A comparison of calculated scour and observed scour during the bridge inspection, OR (2) An engineering evaluation of the observed scour condition reported by the bridge inspector in Item 1A02 (Substructure Condition Rating).

SCBI Case IU28	Changes Since Last Insp IN04	Scour Hole IN05	Abutment Type IN12	Pier Type IN12	PA Found Type IN13	OSA Found Type IN14	Streambed Matl IN15	Movement Indicator IN19	Notes
1	0 - 2 Failure - Critical	------	------	------	------	------	------	------	
2	------	0 - 2 Failure - Critical	------	------	------	------	------	------	

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Appendix N

Incorporation of the *Specification for the National Bridge Inventory* (SNBI)

APPENDIX N
Incorporation of the *Specification for the National Bridge Inventory (SNBI)*

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APPENDIX N
Incorporation of the *Specification for the National Bridge Inventory (SNBI)*

The purpose of this appendix is to provide a bridge between Publication 100A as it exists to support BMS2 and moving forward as PennDOT transitions to BMS3, the removal of *i*Forms and the inclusion of the policy and procedures outlined in FHWA's *Specification for the National Bridge Inventory* (SNBI). As PennDOT adds additional coding items to BMS2 and/or BMS3 from the SNBI, this appendix will be updated. There will also be markups made throughout the main portion of Publication 100A, Chapters 2 and 3, that will redirect inspectors to this Appendix for clarification of coding items as outlined in the SNBI. The order of the fields in this Appendix will follow the order of fields specified on Page 3-1 of this publication.

Portions of the description, procedure and/or coding provided below are excerpts from FHWA's Specification for the National Bridge Inventory, March 2022 Edition.

~~To promote uniformity between inspectors, these guidelines will be used to rate and code Items 1A01 (B.C.01), 1A02 (B.C.03), 1A03 (B.C.04), 1A04 (B.C.02), 1A05 (B.C.09), 1A05b (B.C.10), 1A13 (B.C.11), 1A14 (B.C.14), 1A15 (B.C.15), IA02 - Railing (B.C.05), IA02 - Transition (B.C.06), IB01 (B.C.07), and IJ01 (B.C.08).~~

Condition ratings indicate the existing field conditions of the bridge components and waterway. A condition rating code must therefore consider the type, location, and severity of the defects; the extent to which they exist throughout the item being evaluated; and the degree to which the defects affect strength and/or performance of the bridge or component.

Determine the condition rating codes for the bridge components (Items B.C.01 through B.C.07, B.C.14 and B.C.15) by correlating field observations with Table 20. The remaining condition ratings (Items B.C.08 through B.C.11) can be determined using the tables embedded in the item descriptions. These tables define the condition ratings in terms of defect severity, extent, and effect on strength and/or performance of the bridge or component. The term "defect", used in these tables indicates a problem with the bridge component that may be caused by deterioration, damage, or an inherent defect.

As used in the condition rating tables, an inherent defect is not indicative of damage or deterioration but is characteristic of the material or results from normal construction practices. A minor defect is one where damage or deterioration has initiated but is not yet considered significant. A moderate defect is one where damage or deterioration are significant, but the strength and performance of the component are not affected. A major defect affects the strength and/or performance of the component, as determined by a structural and/or hydraulic review. For joints, bearings, railings, and railing transitions, a major defect prevents the component from functioning as intended.

A defect is considered widespread when it is present in many separate areas of the component, while an isolated defect occurs in one or a few concentrated locations. The term "some" is used when the defect prevalence is more than isolated and less than widespread.

Load posting alone, for an existing bridge designed for less than current legal loads, is not considered a defect and does not affect the condition rating code.

Evaluate portions of bridge components that are supported or strengthened by temporary members also considering the condition of the temporary members.

Optional tables provided in Appendix C give additional guidance on various defects and deterioration mechanisms.

Use Table 20 to determine condition rating codes for the bridge component items in this section (Items B.C.01 through B.C.07). The entire code description must be satisfied for the code to apply.

Table 20. Codes and descriptions for component condition ratings.

Code	Condition	Description
N	Not Applicable	Component does not exist.
9	Excellent	Isolated inherent defects.
8	Very Good	Some inherent defects.
7	Good	Some minor defects.
6	Satisfactory	Widespread minor or isolated moderate defects.
5	Fair	Some moderate defects; strength and performance of the component are not affected.
4	Poor	Widespread moderate or isolated major defects; strength and/or performance of the component is affected.
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	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	Imminent Failure	Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service.
0	Failed	Bridge is closed due to component condition, and is beyond corrective action. Replacement is required to restore service.

1A01/B.C.01 – Deck Condition Rating

SNBI Field B.C.01
Inspection > Ratings & Schedule; BMS3: Ratings and Deck

Description:

Report the deck component condition rating using one of the codes in Table 20.

Procedure:

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 destructive testing results.

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. Otherwise, condition of the wearing surface/protective system joints, expansion devices, curbs, sidewalks, parapets, bridge railing, and scuppers should not be considered when evaluating the overall deck condition.

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.

For bridge decks with overlays, the inspector must make a judgment from a previous inspection report and/or review underneath the bridge deck for evidence of decay.

Adjacent box beam structures that do not have a separate concrete deck shall have the top flange of the adjacent box beams treated as a deck for the purpose of establishing a deck condition rating. If the box beams have been covered by asphalt wearing surface, the deck rating may be based on:

- The condition of the top of the beams before the wearing surface was placed, if known.
- The condition of the underside of the superstructure.
- Because the condition of the wearing surface gives an indication of the deck condition, the deck condition typically should not be higher than the wearing surface condition rating unless there is strong evidence to support otherwise.

The use of the condition indicators table on Page 3-7 of Publication 100A should be discontinued and inspectors should use Table 20 and related defect codes to determine the condition rating for this item.

Report a value of "N" for bridges under fill. For guided examples, refer to FHWA's SNBI under Item B.C.01.

Coding:

Refer to the condition codes in Table 20.

1A02/B.C.03 – Substructure Condition Rating

SNBI Field B.C.03
Inspection > Ratings & Schedule; BMS3: Ratings & Substructure

Description:

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

Procedure:

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

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 (Item 1A13/B.C.11 > 4). The condition rating given to this item should be consistent with the on given to Item 4A08 whenever the value of Item 4A08 = 2 or less.

Report a value of "N" culverts. For guided examples, refer to FHWA's SNBI under Item B.C.03.

Coding:

Refer to the condition codes in Table 20.

1A03/B.C.04 – Culvert Condition Rating

SNBI Field B.C.04
Inspection > Ratings & Schedule; BMS3: Ratings & Culvert

Description:

Report the culvert component condition rating using one of the codes in Table 20.

Procedure:

This item addresses the condition of culverts. This condition assessment includes footings, piles and other foundation members when present.

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 (Item 1A13/B.C.11 > 4). The condition rating given to this item should be consistent with the on given to Item 4A08 whenever the value of Item 4A08 = 2 or less.

Refer to Appendix G for the coding of Item 1A03/B.C.04 for stone masonry arches.

Report a value of "N" structures other than culverts. For guided examples, refer to FHWA's SNBI under Item B.C.04.

Coding:

Refer to the condition codes in Table 20.

1A04/B.C.02 – Superstructure Condition Rating

SNBI Field B.C.02
Inspection > Ratings & Schedule; BMS3: Ratings & Superstructure

Description:

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

Procedure:

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

Consider primary load carrying members when determining the condition rating code for this item. 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 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.

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 (Item 1A13/B.C.11 > 4).

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.

Refer to Appendix G for the coding of Item 1A03/B.C.04 for stone masonry arches.

Report a value of "N" structures without a superstructure. For guided examples, refer to FHWA's SNBI under Item B.C.02.

Coding:

Refer to the condition codes in Table 20.

Superstructure condition rating guidelines for Non-Composite Prestressed Concrete Adjacent Box Beams are in the table below. The use of this table is a departure from the normal condition rating procedure which is based on an overall characterization of the general condition of the entire component being rated. Instead, base the overall rating of the superstructure for this bridge type on the **lowest condition rating** of any single beam's strand exposure or deterioration in accordance with the following table:

Condition Rating	Percent # Strands Exposed (single beam)	Deterioration of P/S Concrete Beams (single beam)	
9 – Excellent	0%		No cracks, stains or spalls
8 – Very Good	0%		No cracks, stains or spalls
7 – Good	0%		Map cracks and miscellaneous hairline cracks
6 – Satisfactory	0%	Spalls	Minor Spalls/Delaminations, < 5%
		Cracks	Map cracks and misc. hairline cracks
5 – Fair	1-5%	Spalls	Spalls/Delaminations, < 15%
		Longitudinal Cracks	Hairline longitudinal cracks in bottom flange
		Longitudinal Joints	Leakage at joints with light efflorescence
4 - Poor	6-15%	Spalls	Spalls/Delaminations, 15 – 25%
		Transverse Cracks	Hairline flexure cracks across bottom flange
		Longitudinal Cracks	Minor efflorescence and/or minor rust stains
		Longitudinal Joints	Heavy leakage efflorescence and/or minor rust stains
		Transverse Tendons	Loose or heavily rusted
		Web Cracks	Initiation of vertical or diagonal cracks in P/S beam near open joints in barrier (< 3" length)
3 - Serious	15-20%	Spalls	Spalls/Delaminations, > 25%
		Transverse Cracks	Open flexure cracks in bottom flange
		Web Cracks	Vertical or diagonal cracks in P/S beam near open joints in barrier
		Camber	Sagging/Loss of camber
		Transverse Tendons	Broken or missing
2 – Critical	> 20%	All	Any condition worse than detailed above

Type text here

1A05/B.C.09 Channel Condition Rating

SNBI Field B.C.09
Inspection > Ratings & Schedule; BMS3: Ratings & Waterway

Description:

This item is used to provide a condition rating for channel at the bridge.

Procedure:

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.

The condition of channel protection devices is addressed under a separate item. Refer to Item B.C.10 (Channel Protection Condition Rating).

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).

Coding:

Code	Condition	Description
N	NOT APPLICABLE	Bridge does not cross over water.
9	EXCELLENT	No defects.
8	VERY GOOD	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.
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.

1A05b/B.C.10 Channel Protection Condition Rating

SNBI Field B.C.10
Inspection > Ratings & Schedule; BMS3: Ratings & Waterway

Description:

This item is used to provide a condition rating for channel protection devices beneath a bridge.

Procedure:

This item is used to provide a condition rating for channel protection devices. 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).

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

Coding:

The initial population of the values in this field were from the 1A05 Channel Condition Rating from the last overall inspection on the structure. Bridges not over water were set to a value of N.

Code	Condition	Description
N	NOT APPLICABLE	Bridge does not cross over water or channel protection devices do not exist.
9	EXCELLENT	Isolated inherent defects.
8	VERY GOOD	Some inherent defects.
7	GOOD	Some minor defects.
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.

1A13/B.C.11 Scour Condition Rating

SNBI Field B.C.11
Inspection > Ratings & Schedule; BMS3: Ratings & Waterway

Description:

This item is used to provide an overall scour condition rating for a bridge beneath a bridge. This field differs from IN05, which provides a scour condition rating at a specific subunit.

Procedure:

Refer to BMS2 Item IU29/SNBI Item B.AP.03 (Scour Vulnerability) to verify if the bridge has been determined to be stable or unstable for appraised scour conditions.

Consider design scour depth and critical scour depth, commonly found in hydraulic designs, scour evaluations, and POAs, when determining the scour condition ratings.

When observed conditions are not consistent with the scour design or the assumptions used in the scour appraisal, this indicates a need to reevaluate BMS2 Item IU29/SNBI Item B.AP.03 (Scour Vulnerability).

Coding:

The initial population of the values in this field were from taken from the lowest individual IN05 value on a given bridge from the last overall inspection on the structure. Bridges not over water were set to a value of N.

Code	Condition	Description
N	NOT APPLICABLE	Bridge does not cross over water.
9	NO SCOUR	No scour.
8	INSIGNIFCANT SCOUR	Insignificant scour.
7	MINOR SCOUR	Some minor scour.
6	MINOR/MODERATE SCOUR	Widespread minor or isolated moderate scour.
5	MOD. SCOUR/NO IMPACT	Moderate scour; strength and stability of the bridge are not affected.
4	MOD/MAJ SCOUR W/IMP	Widespread moderate or isolated major scour; strength and/or stability of the bridge is affected.
3	MAJOR SCOUR; SER. IMP.	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; SEV. IMP.	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	CLOSED/SCOUR – REHAB	Bridge is closed to traffic due to scour condition. Channel rehabilitation may return the bridge to service.
0	CLOSED/SCOUR – REPL.	Bridge is closed due to scour condition and is beyond corrective action. Bridge replacement is needed to restore service.

1A14/B.C.15 - Underwater Condition Rating

SNBI Field B.C.15
Inspection > Ratings & Schedule, Inspection > Underwater; BMS3: Ratings & Waterway

Description:

This item is used to report the condition rating of the underwater members of the substructure or culvert based on the underwater inspection using one of the codes below.

Procedure:

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.

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 is not required. This applies only if the low flow condition is truly unusual and is not likely to reoccur during the next inspection interval.

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 .

If the bridge is not over water or no substructure units require an underwater inspection (IN16 = A, B or C), then this value should be coded as "N". This item is used to determine the inspection interval required for the subunits requiring an underwater inspection by divers.

Coding:

Refer to the condition codes in Table 20.

The initial population of the values in this field were from taken from the lowest condition rating on a bridge from 1A02 – Substructure or 1A03 – Culvert from the last overall inspection on the structure. Bridges not over water were set to a value of N.

1A15/B.C.14 NSTM Condition Rating

SNBI Field B.C.14
Inspection > Ratings & Schedule; BMS3: Ratings & NSTM/Fatigue

Description:

This item is used to report the condition rating of the non-redundant steel tension members (NSTM) that are a part of the superstructure or substructure during the inspection using one of the codes below.

Procedure:

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 ratings.

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).

Coding:

Refer to the condition codes in Table 20.

The initial population of the values in this field were from taken from the value of 1A04 – Superstructure Condition Rating. Bridges without a NSTM (6A44 > 4) were set to a value of N.

1A16/B.C.13 Lowest Condition Rating

SNBI Field B.C.13
Inspection > Ratings & Schedule; BMS3: Ratings

Description:

This item is used to report the lowest condition rating of the following items: 1A01 – Deck Condition Rating, 1A02 – Substructure Condition Rating, 1A03 – Culvert Condition Rating and 1A04 – Superstructure Condition Rating.

Procedure:

This item is **automatically filled in by the system** based on the detailed lowest value from Items 1A01 (B.C.01), 1A02 (B.C.03), 1A03 (B.C.04), and 1A04 (B.C.02).

Coding:

Code	Condition
N	NOT APPLICABLE
9	EXCELLENT
8	VERY GOOD
7	GOOD
6	SATISFACTORY
5	FAIR
4	POOR
3	SERIOUS
2	CRITICAL
1	IMMINENT FAILURE
0	FAILED

IA02 - Railing/B.C.05 – Bridge Railing Condition Rating

SNBI Field B.C.05
Inspection > Ratings & Schedule; BMS3: Ratings & Superstructure

Description:

Report the bridge railing component condition rating using one of the codes in Table 20.

Procedure:

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.

Do not consider pedestrian railings when coding this item, except to the extent that the pedestrian railing is integral to the traffic barrier.

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.

Report "N" when there are no bridge railings present. For guided examples, refer to FHWA's SNBI under Item B.C.05.

IA02 - Transition/B.C.06 – Bridge Railing Transition Condition Rating

SNBI Field B.C.05
Inspection > Ratings & Schedule; BMS3: Ratings & Superstructure

Description:

Report the bridge railing transition component condition rating using one of the codes in Table 20.

Procedure:

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.

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 material.

Report "N" when there are no bridge railing transitions present. For guided examples, refer to FHWA's SNBI under Item B.C.06.

Coding:

Refer to the condition codes in Table 20.

5E06/B.CL.04 – SNBI Historical Significance

SNBI Field B.CL.04
Inventory > Structure Home; BMS3: TBD (Release 2.0)

Description:

This item is used to indicate the historical significance of the bridge and involves a variety of characteristics: the bridge may be a particularly unique example of the history of engineering; the crossing itself might be significant; the bridge might be associated with a historical property or area; or historical significance could be derived from the fact that the bridge was associated with significant events or circumstance. This field is similar to PennDOT's Item 5E04, however, the coding options are slightly different for the SNBI and the need for separate fields will be evaluated in the future.

Procedure:

This field is automatically filled in by the system if the structure integrates with PA SHARE and will be displayed as a read-only value. If the structure does not integrate with PA SHARE, the field will be editable and should be coded as follows below.

Coding:

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 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 contribute to a historic district, but has not been evaluated according to the criteria for the 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
X Bridge superstructure has been removed or replaced

Translation from PA SHARE to Items 5E04 and 5E06

PA SHARE MASTER ELIGIBILTY	Item 5E04 (Existing)	Item 5E06 (SNBI)
Listed	1	1
Eligible	2	2
National Historic Landmark	1	1
Undetermined	4	7
Not Eligible	5	N
Demolished	6	X

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.

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.

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.

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.

Use code N when the other codes do not apply.

B.G.13 – Maximum Bridge Height

BMS3 > Deck Page
Inventory > Structure Home

Description:

This item is used to report the maximum bridge height from the top of the bridge deck to a groundline or water surface elevation beneath the bridge.

Procedure:

Record the maximum height from top of the deck to the ground line or water surface elevation, whichever yields the largest value, rounded to the nearest foot.

For double-deck bridges inventoried as one bridge, measure from the 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.

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 floor slab or ground line when the bottom is unexposed, or the bridge is bottomless. For closed spandrel arches, measure from the top of roadway surface.

A ground line represents dry terrain or pavement. Use the water surface elevation at the time the value for this time is established. This item does not need to be updated due to fluctuations in water surface elevations.

This item may be estimated by field observation or taken from plans when it is not practical or infeasible to measure, or when the height is greater than 30 feet.

Coding:

Record the maximum height to the nearest foot.

Refer to the example on Page 132 of the Specification for the National Bridge Inventory (PDF Page 151 of 366). An example will be provided in the next edition of Publication 100A.

B.IE.01 – SNBI Inspection Type

BMS3 > Schedule Page
Inspection > Ratings & Schedule

Description:

This item is used to record the inspection types completed as part of the single inspection record.

Procedure:

For each inspection type performed during the field inspection, enter a separate inspection record within the overall inspection key. Based on the individual inspection records entered in this field, Item 7A03 will be automatically populated. Refer to SNBI Field B.IE.01 for additional coding commentary provided by FHWA. Inspection types with a numeric code (1 through 9) are from the SNBI and codes Z, P, E, and Q are PennDOT specific inspection types.

These inspection types apply to both NBIS length and non-NBIS lengths structures recorded in BMS2. For tunnels, signs, walls, and high-mast light poles, record the inspection type completed. For example, if a sign structure received an inspection of the entire structure, code 2 – Routine. Refer to the coding examples included following this section.

Coding:

Coding	Description	PennDOT Commentary
1	Initial	- Similar scope to a Routine Inspection. - Used when a new bridge is ready to be opened to traffic or after a major reconstruction of the bridge. - NSTM's, as indicated on the F&F plan, must receive an inspection within arm's reach. - Element inspection required if state-owned or local NHS.
2	Routine	- Complete inspection of the entire bridge. - Access equipment must be used to determine the condition of all elements that are not directly visible from the ground. - NSTM's, as indicated on the F&F plan, must receive an inspection within arm's reach.
3	Underwater	- Used when portions of the bridge are inspected by divers. - When underwater inspections are required on a bridge but is inspected by wading or probing during low flow, record this inspection type as well. Refer to additional guidance in Item IN16.
4	NSTM	- Record this inspection type when some or all NSTM's are inspected as part of an inspection record. - Refer to the inspection requirements in the F&F plan for the specific bridge. - When used in conjunction with a Routine, all NSTM's are required to be inspected within arms distance.
5	Damage	- Record this inspection type for unplanned inspections due to damage (vehicular impact, fire, overload, etc.). - If this inspection recorded causes newly required reduced interval inspections, add a "Special" inspection record as well.
6	In-Depth	- Record this inspection type when a specific scope limited to a portion of the bridge is completed and is not required based on other interval policy requirements. - In-depth inspections can be completed in conjunction with other inspection types.
7	Special	- Record this inspection type when only specific areas of the bridge are inspected as required by PennDOT's reduced interval inspection criteria in Publication 238. - The scope of the inspection must be defined and adhered to. - NSTM's, as indicated on the F&F plan, must receive an inspection within arm's reach. - Previously referred to as "Other Special (Interim)".
8	Service	- Record this inspection type on bridges with a Routine interval of 48-months and the owner wishes to complete a cursory inspection at 24-months. - Record this inspection type for non-highway bridges/structures over a highway or local roadway.
9	Scour Monitoring	- Record this inspection type when scour monitoring is completed during a storm or when a Post-Flood Inspection is completed. - Only record one event for the entirety of a storm event
Z	Inventory Only	- This inspection record is automatically created by the system when a new structure is created. - This inspection type cannot be changed or added with other inspection types.
P	Problem Area	- Record this inspection type to document the completion of a priority maintenance item or other critical areas, not caused by a "Damage" event.
E	Element	- Use this inspection type in conjunction with other inspection types when element level data is assessed. - Record this inspection type if elements previously did not exist and were added without field verification. If added without field verification, no other inspection records should exist with this record.
Q	QA Inspection	- Reserved for Future Use.

The following shows which inspection types can be recorded together:

	1	2	3	4	5	6	7	8	9	Z	P	E	Q
1	X		X	X#		X	X					X	
2		X	X	X#		X	X					X	
3	X	X	X	X#	X	X	X					X	
4	X#	X#	X#		X#	X#	X#						
5			X	X#	X		X*					X	
6	X	X	X	X#		X	X					X	
7	X	X	X	X#	X*	X	X		X*			X	
8								X				X	
9							X*		X			X	
Z										X		X	
P											X	X	
E	X	X	X		X	X	X	X	X	X	X	X	
Q													X

Notes:

#*An inspection type 4 – NSTM, cannot be a stand-alone inspection record and must be completed with another inspection type such as a 2 – Routine or routine or special, etc.*

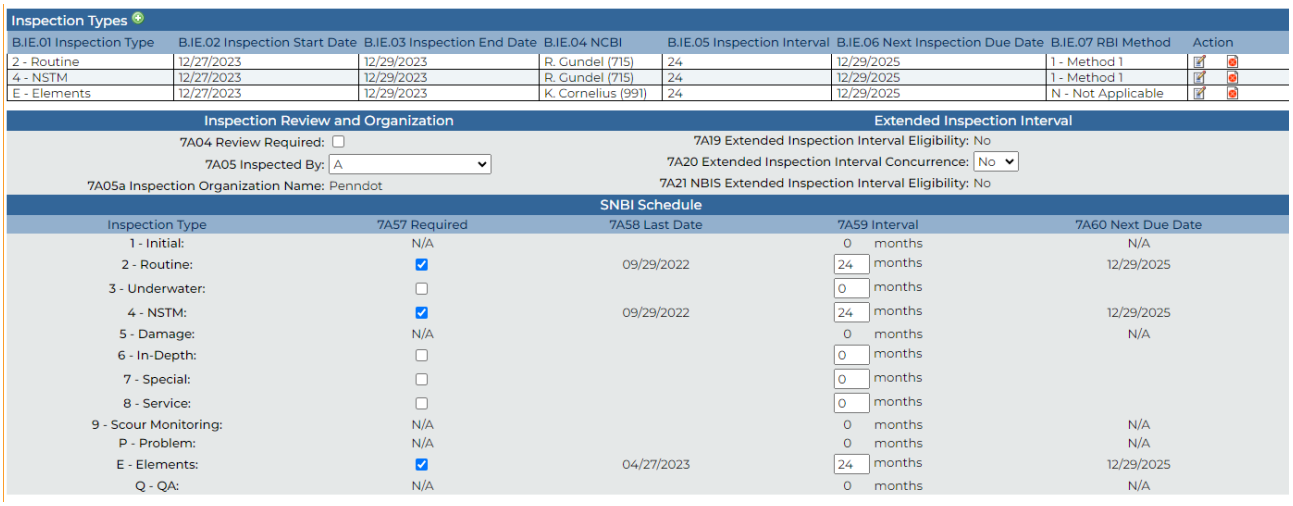
**When an inspection type 5 – Damage or 9 – Scour Monitoring is recorded and the inspection findings initiate the need for reduced interval inspections, record a 7 – Special inspection record as well.*

The following pages provide detailed coding examples of how inspection types should be recorded. The examples mirror the examples provided following Item 7A09, however, these use the new coding fields added to BMS2 with Release 83 (September 2023) to align with the SNBI.

The rows highlighted in orange represent the inspection records that would be recorded in the "Inspection Types" section of BMS2 or "SNBI Inspection Performed" in BMS3. Items shaded in grey are read-only for every inspection record and cannot be coded by the user.

Examples for Coding Scheduling and Compliance Data:		Insp. Type	7A57 Insp Req'd	B.IE.05 Insp Int'l	B.IE.02 Insp Start Date	B.IE.03 Insp End Date
1.	**Routine inspection of a state-owned 168' long through truss carrying a highway over a stream.** • Bridge contains NSTM. • Structure is open without a weight restriction. • Bridge does not meet the extended interval inspection requirements (bridges contains NSTM's). • NSTM, superstructure and substructure conditions do not warrant an inspection interval < 24 months. • Substructure units can be inspected by wading and probing under normal conditions. • An element level inspection was required (state NBIS) and performed. • Inspection crane was utilized to complete the inspection. • The inspection of all NSTM's was completed on the 1st two days of the inspection. **7A53 Concatenated SNBI Insp. Type = 24E**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24	12/27/23	12/29/23
		3 – UW	☐	0		
		4 – NSTM	☒	24	12/27/23	12/29/23
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☐	0		
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24	12/27/23	12/29/23
		Utilize B.IE.12 to record the snooper crane usage and future crane needs in Item 6B21. Example B.IE.11 Coding for NSTM record: *Hands-on inspection of all NSTM members in the truss.*				

Below is an example of how the inspection record above will appear in BMS2:



Inspection Types

B.IE.01 Inspection Type	B.IE.02 Inspection Start Date	B.IE.03 Inspection End Date	B.IE.04 NCBI	B.IE.05 Inspection Interval	B.IE.06 Next Inspection Due Date	B.IE.07 RBI Method	Action
2 - Routine	12/27/2023	12/29/2023	R. Gundel (715)	24	12/29/2025	1 - Method 1	
4 - NSTM	12/27/2023	12/29/2023	R. Gundel (715)	24	12/29/2025	1 - Method 1	
E - Elements	12/27/2023	12/29/2023	K. Cornelius (991)	24	12/29/2025	N - Not Applicable	

Inspection Review and Organization

7A04 Review Required: ☐
7A05 Inspected By: A
7A05a Inspection Organization Name: Penndot

Extended Inspection Interval

7A19 Extended Inspection Interval Eligibility: No
7A20 Extended Inspection Interval Concurrence: No
7A21 NBIS Extended Inspection Interval Eligibility: No

SNBI Schedule

Inspection Type	7A57 Required	7A58 Last Date	7A59 Interval	7A60 Next Due Date
1 - Initial:	N/A		0 months	N/A
2 - Routine:	☑	09/29/2022	24 months	12/29/2025
3 - Underwater:	☐		0 months	
4 - NSTM:	☑	09/29/2022	24 months	12/29/2025
5 - Damage:	N/A		0 months	N/A
6 - In-Depth:	☐		0 months	
7 - Special:	☐		0 months	
8 - Service:	☐		0 months	
9 - Scour Monitoring:	N/A		0 months	N/A
P - Problem:	N/A		0 months	N/A
E - Elements:	☑	04/27/2023	24 months	12/29/2025
Q - QA:	N/A		0 months	N/A

Examples for Coding Scheduling and Compliance Data:		Insp. Type	7A57 Insp Req'd	B.IE.05 Insp Int'l	B.IE.02 Insp Start Date	B.IE.03 Insp End Date
2.	**Routine inspection of a 98' long state-owned GFS bridge over a stream.** • Bridge contains NSTM. CR: Super & NSTM = 4, Sub = 6. • Bridge does not meet the extended interval inspection requirements (bridges contains NSTM's). • Weight restricted – Posted for 20 Tons due to loss of section in NSTM (floorbeam). • Rigging used to access NSTM's. • Substructure units can be inspected by wading and probing. • An element inspection was required and performed. • The entire inspection was completed in a single day by multiple inspection teams. **7A53 Concatenated SNBI Insp. Type = 247E**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24	11/4/23	11/4/23
		3 – UW	☐	0		
		4 – NSTM	☒	12	11/4/23	11/4/23
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☒	12	11/4/23	11/4/23
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24	11/4/23	11/4/23
		Utilize B.IE.12 to record the rigging usage and future rigging needs in Item 6B21. Example B.IE.11 Coding for NSTM record: *Hands-on inspection of all NSTM members in the GFS.*				
3.	**Routine inspection of a state-owned 72' long P/S concrete spread box beam bridge carrying a highway over a stream.** • Bridge does not meet extended inspection interval requirements (Superstructure CR = 5). • No NSTM present and the bridge is open without a weight or posting restriction. • Condition ratings do not warrant an inspection interval < 24 months. • Substructure units can be inspected by wading and probing. • An element inspection was required and performed. • The inspection was completed in a single day. **7A53 Concatenated SNBI Insp. Type = 2E**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24	5/15/23	5/15/23
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☐	0		
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24	5/15/23	5/15/23

	Examples for Coding Scheduling and Compliance Data:	Insp. Type	7A57 Insp Req'd	B.IE.05 Insp Int'l	B.IE.02 Insp Start Date	B.IE.03 Insp End Date
4.	**In-Depth inspection of a local, non-NHS, 86' GFS bridge carrying a highway over a stream. In-Depth inspection met all requirements for a Routine inspection.** • Bridge contains NSTM's and is open without restriction (no posting). • Bridge does not meet the criteria for extended interval inspections (local bridge). • Condition ratings (deck, super, sub) do not warrant an inspection interval < 24 months. • Rigging is used to access the NSTM's. • Substructure can be inspected by wading and probing under normal conditions. • An element level inspection was not required and was not performed. • The NSTM and Routine inspection both lasted four days. • The local owner has defined an in-depth inspection scope to be completed every six years in conjunction with the Routine inspection. **7A53 Concatenated SNBI Insp. Type = 246**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24	4/1/24	4/4/24
		3 – UW	☐	0		
		4 – NSTM	☒	24	4/1/24	4/1/24
		5 – DMG	N/A	N/A		
		6 – IND	☒	72	4/1/24	4/4/24
		7 - SP	☐	0		
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☐	0		
		Code Item B.IE.11 for both the NSTM and In-Depth inspection records to explain the members inspected during this inspection record. Utilize B.IE.12 to record the rigging usage and future rigging needs in Item 6B21. Record the future In-Depth inspection scope in Comment Type #481.				
5.	**In-Depth inspection of a local, NHS, 40' RC T-Beam carrying a highway over a stream. Inspection limited to hands-on inspection of beams only.** • Bridge does not contain NSTM's and is open without restriction (no posting). • Bridge does not meet the criteria for extended interval inspections (local bridge). • Condition ratings (deck, super, sub) do not warrant an inspection interval < 24 months. • Substructure was not inspected but can normally be inspected by wading and probing. • An element inspection was performed in the past but was not updated during this inspection. • The In-Depth inspection was scheduled for a specific reason and a future in-depth inspection is not currently planned. • The inspection was completed in a single day. **7A53 Concatenated SNBI Insp. Type = 6**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24		
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☒	0	6/19/24	6/19/24
		7 - SP	☐	0		
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24		
		Code Item B.IE.11 for the In-Depth inspection record to explain the members inspected during the limited scope inspection.				

	Examples for Coding Scheduling and Compliance Data:	Insp. Type	7A57 Insp Req'd	B.IE.05 Insp Int'l	B.IE.02 Insp Start Date	B.IE.03 Insp End Date
6.	**Special inspection of a state-owned, 120′ long steel multi-girder bridge over a stream.** • Bridge does not contain NSTM's. • Bridge is posted for "One Truck at a Time". • Bridge does not meet the criteria for extended interval inspections (posted bridge). • Deck, super and sub condition ratings are in FAIR condition (FAIR = 5). • Substructure can be inspected by wading and probing under normal conditions. • An element level inspection was performed in the past but not updated during the Special inspection. • The inspection lasted a single day. **7A53 Concatenated SNBI Insp. Type = 7**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24		
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☒	12	4/30/24	4/30/24
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24		
		Code Item B.IE.11 for the Special inspection record to explain the members inspected during this inspection record. Record the future inspection scope in Comment Type #481.				
7.	**Underwater inspection by divers of a local NHS, 70′ long steel multi-girder bridge carrying a highway over a stream.** • Bridge does not contain NSTM's. • Bridge is posted for "One Truck at a Time". • Bridge does not meet the criteria for extended interval inspections (posted bridge and SCBI = 3). • Deck, super and sub condition ratings are in FAIR condition (FAIR = 5). • 4A08 SCBI = 3; Minimum water depth at Far Abutment is 5′. • An element level inspection was performed in the past but not updated during the inspection. • The inspection lasted a single day. **7A53 Concatenated SNBI Insp. Type = 3**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24		
		3 – UW	☒	24	9/10/23	9/10/23
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☒	12		
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24		
		Engineer-in-Charge required UW inspection due to water depth and poor visibility through water that prevented direct observation of NAB and FAB. Record current scope in B.IE.11 and future scope in Comment Type #481.				

Examples for Coding Scheduling and Compliance Data:		Insp. Type	7A57 Insp Req'd	B.IE.05 Insp Int'l	B.IE.02 Insp Start Date	B.IE.03 Insp End Date
8.	**Routine inspection of 100′ steel 4 chord truss overhead sign structure over a highway.** • Built in 2000. • IS10 Overall Sign Condition = 8 Very Good • Element Inspection is not applicable. • Sign inspection interval per Publication 238 is 72 Months. • The inspection was completed in a single day. **7A53 Concatenated SNBI Insp. Type = 2** **** Note: In AMS Release 83, the "Sign Inspection" type will no longer be an option to code. Moving forward, inspectors should code the inspection type in accordance with the scope instead of the service type for signs. Inspectors will need to continue coding IS01 until it's removed in AMS Release 84. User wil also only use iForms to complete inspections of signs until further notice. ****	1 – INIT	N/A	N/A		
		2 – ROU	☒	72	4/1/24	4/1/24
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☐	0		
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☐	0		
		Code the inspection equipment used to complete the Routine inspection in Item B.IE.12.				
9.	**Routine inspection of a state-owned, 60′ long P/S concrete spread box beam bridge carrying a highway over a stream.** • Bridge meets all the criteria for extended interval inspection as outlined in Publication 238, Chapter IP02 as indicated by Item 7A21. • Substructure units can be inspected by wading and probing. • An element inspection was required and performed. • The inspection was started and finished on the same date. **7A53 Concatenated SNBI Insp. Type = 2E**	1 – INIT	N/A	N/A		
		2 – ROU	☒	48	9/10/23	9/10/23
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☐	0		
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	48	9/10/23	9/10/23

Examples for Coding Scheduling and Compliance Data:		Insp. Type	7A57 Insp Req'd	B.IE.05 Insp Int'l	B.IE.02 Insp Start Date	B.IE.03 Insp End Date
10.	**Special inspection of a state-owned, 120' long steel multi-girder bridge over a stream.** • Bridge does not contain NSTM's. • Bridge is posted for "One Truck at a Time". • Bridge does not meet the criteria for extended interval inspections (posted bridge). • Deck, super and sub condition ratings are in FAIR condition (FAIR = 5). • Substructure can be inspected by wading and probing under normal conditions. • An element level inspection was performed in the past but not updated during the Special inspection. • The inspection lasted a single day. **7A53 Concatenated SNBI Insp. Type = 7**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24		
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☒	12	4/30/24	4/30/24
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24		
		Code Item B.IE.11 for the Special inspection record to explain the members inspected during this inspection record. Record the future inspection scope in Comment Type #481.				
11.	**Initial inspection of a posted, local, NHS pony truss bridge <u>after</u> its super has been replaced.** • Bridge does not qualify for extended interval inspection requirements (Bridge must receive an Initial Inspection and one Routine separated by 24 months in order to qualify). • The new superstructure is a multi-girder P/S beam type with no load posting. • The inspection scheduling data has been updated for the new superstructure. • The BRKEY for the original structure was maintained. Inventory items were reviewed and updated. This inspection is needed to verify the substantive repair has been made the bridge safe to re-open. • Initial Inspection done prior to re-opening. • An element inspection was required and performed. Posting lifted as a result of rehab. • The inspection lasted one day. **7A53 Concatenated SNBI Insp. Type = 1E**	1 – INIT	N/A	N/A	8/9/23	8/9/23
		2 – ROU	☒	24		
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☐	0		
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24	8/9/23	8/9/23
		The inspection codes above reflect the condition of the bridge after the superstructure replacement. Prior to the replacement, additional coding's would have existed for NSTM and Special inspection types.				

Examples for Coding Scheduling and Compliance Data:		Insp. Type	7A57 Insp Req'd	B.IE.05 Insp Int'l	B.IE.02 Insp Start Date	B.IE.03 Insp End Date
12.	**Inspection of a state-owned, steel multi-girder bridge with an SCBI = 2, requiring an Other Special (Interim) Inspection due to undermining of the Near Abutment with a water depth of 6'.** • Bridge does not meet extended inspection interval requirements (SCBI < 5 and Substructure Condition Code < 6). • The bridge requires an underwater inspection by divers due to the water depth. • The substructure is in CRITICAL condition. • Serious undermining of the Near Abutment was recorded by the divers. • The bridge will continue to require a reduced interval inspection of the Near Abutment until repairs are made. • An element inspection performed in past, but not updated at this time. • The inspection was completed in one day. **7A53 Concatenated SNBI Insp. Type = 37**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24		
		3 – UW	☒	6	4/1/23	4/1/23
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☒	6	4/1/23	4/1/23
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24		
		Record current scope in B.IE.11 and future scope in Comment Type #481.				
13.	**Damage inspection of a state-owned, steel, multi-girder structure, with impact damage to a fascia girder.** • Fascia girder struck by an overheight vehicle. The impact damaged caused a tear in the girder. • The ends of the tear have been clearly marked to monitor for future growth. • The owner has determined a reduced interval of 6-months is required to monitor the size of the tear. • Bridge does not meet extended inspection interval requirements (Reduced interval required). • An element inspection performed in past, but not updated at this time. • The inspection was completed in one day. **7A53 Concatenated SNBI Insp. Type = 57**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24		
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A	9/15/23	9/15/23
		6 – IND	☐	0		
		7 - SP	☒	6	9/15/23	9/15/23
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24		
		Record current scope for the Damage and Special inspections in B.IE.11 and future scope for the special inspection in Comment Type #481.				

Examples for Coding Scheduling and Compliance Data:		Insp. Type	7A57 Insp Req'd	B.IE.05 Insp Int'l	B.IE.02 Insp Start Date	B.IE.03 Insp End Date
14.	**Special inspection of a state-owned, 24' long multi-steel girder bridge with a steel open grid deck carrying a highway over a stream.** • Deck is in POOR condition; superstructure and substructure are in FAIR condition. • Bridge meets reduced interval of inspection requirements (Deck condition < 5 for steel open grid deck). • Substructure units can be inspected by wading and probing. • An element inspection performed in past, but not updated at this time. • The inspection was completed in one day. **7A53 Concatenated SNBI Insp. Type = 7**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24		
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☒	12	3/30/24	3/30/24
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24		
		Code Item B.IE.11 for the Special inspection record to explain the members inspected during this inspection record. Record the future inspection scope in Comment Type #481.				
15.	**Routine inspection of a state-owned, 22' long metal arch culvert carrying a highway over a stream.** • Culvert is in SERIOUS condition. • Culvert meets reduced interval of inspection requirements (Culvert Condition < 4 and 6A29 = 30, 32, 33, or 35). Culvert requires a 12-month Routine. • Culvert can be inspected by wading and probing. • An element inspection is required and performed. • The inspection was completed in one day. **7A53 Concatenated SNBI Insp. Type = 27E**	1 – INIT	N/A	N/A		
		2 – ROU	☒	12	8/9/23	8/9/23
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☒	6	8/9/23	8/9/23
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	12	8/9/23	8/9/23
		Record the future inspection scope in Comment Type #481.				

Examples for Coding Scheduling and Compliance Data:		Insp. Type	7A57 Insp Req'd	B.IE.05 Insp Int'l	B.IE.02 Insp Start Date	B.IE.03 Insp End Date
16.	**Routine inspection of a state-owned, 12' long precast concrete arch culvert carrying a highway over a stream.** • Culvert is in good condition. • The bridge is considered scour critical (SCBI = 3) and therefore not eligible for extended interval inspections. • Culvert can be inspected by wading and probing. • An element inspection is required and performed. • The inspection was completed in one day. **7A53 Concatenated SNBI Insp. Type = 2E**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24	7/25/23	7/25/23
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☐	0		
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24	7/25/23	7/25/23
17.	**Routine inspection of a state-owned, 32' long, two-span steel I-Beam bridge carrying a highway over a stream.** • The bridge is in overall good condition. • Bridge does not meet reduced interval of inspection requirements. • The water around the pier was over 4' deep during this inspection and probing could not be completed. • A follow-up inspection was scheduled at 3-months to return for the completion of the probing around the pier. *(Note: Alternatively, the Bridge Owner can elect to keep the inspection in submitted status and update the record upon completion of the probing within 3-months after the inspection begun. Refer to Item IN16 for additional guidance.) • IN16 for the pier was set to D – Incomplete, Return during Low Water. • An element inspection is required and performed. • The inspection was completed in one day. **7A53 Concatenated SNBI Insp. Type = 27E**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24	7/25/23	7/25/23
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☒	3	7/25/23	7/25/23
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24	7/25/23	7/25/23
		Record the future inspection scope in Comment Type #481.				

Examples for Coding Scheduling and Compliance Data:		Insp. Type	7A57 Insp Req'd	B.IE.05 Insp Int'l	B.IE.02 Insp Start Date	B.IE.03 Insp End Date
18.	**A follow-up inspection of a state-owned, 32′ long, two-span steel I-Beam bridge carrying a highway over a stream because the water depth was too high for probing during the last Routine.** • The bridge is in overall good condition. • The water around the pier was over 4′ deep during this inspection and probing could not be completed during the last Routine inspection. • Probing was completed. • IN16 for the pier was set to F – Probing Completed. • The Other Special (Interim) interval is removed because a future inspection is not required, and the required box unchecked. • An element inspection is not required and not performed. • The inspection was completed in one day. **7A53 Concatenated SNBI Insp. Type = 7**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24		
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☐	0	10/25/23	10/25/23
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24		
		Utilize B.IE.12 to record the rigging usage and future rigging needs in Item 6B21. Example B.IE.11 Coding for NSTM record: *Hands-on inspection of all NSTM members in the GFS.*				
19.	**Special inspection of a 9′ long state-owned metal arch culvert over a stream.** • The culvert is in poor condition (Super = 4) • Bridge does not meet extended inspection interval requirements (Superstructure is poor condition). • Super condition warrants a reduced interval of 12 months • Substructure units can be inspected by wading and probing. • An element inspection is not required and not performed. • The inspection was completed in one day. **7A53 Concatenated SNBI Insp. Type = 7**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24		
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☒	12	9/25/23	9/25/23
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24		
		Record current scope for the Damage and Special inspections in B.IE.11 and future scope for the special inspection in Comment Type #481.				

Examples for Coding Scheduling and Compliance Data:		Insp. Type	7A57 Insp Req'd	B.IE.05 Insp Int'l	B.IE.02 Insp Start Date	B.IE.03 Insp End Date
20.	**Routine inspection of a 19′ long state-owned concrete slab over a pedestrian walkway.** • The bridge is in good condition (Deck/Super/Sub = 7/8/6) • Bridge meets extended inspection interval requirements. • Substructure units can be inspected by wading and probing. • An element inspection is required and performed. • The inspection was completed in one day. **7A53 Concatenated SNBI Insp. Type = 2E**	1 – INIT	N/A	N/A		
		2 – ROU	☒	48	5/20/23	5/20/23
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☐	0		
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	48	5/20/23	5/20/23
21.	**Special inspection of a 9′ long state-owned metal arch culvert over a stream.** • The culvert is in poor condition (Super = 4) • Bridge does not meet extended inspection interval requirements (Superstructure is poor condition). • Super condition warrants a reduced interval of 12 months • Substructure units can be inspected by wading and probing. • An element inspection is not required and not performed. • The inspection was completed in one day. **7A53 Concatenated SNBI Insp. Type = 7**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24		
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☒	6	4/15/23	4/15/23
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A		
		E - ELEM	☒	24		
		Record current scope for the Damage and Special inspections in B.IE.11 and future scope for the special inspection in Comment Type #481.				

Examples for Coding Scheduling and Compliance Data:		Insp. Type	7A57 Insp Req'd	B.IE.05 Insp Int'l	B.IE.02 Insp Start Date	B.IE.03 Insp End Date
22.	**Problem Area Inspection of a state-owned, steel multi-girder bridge to verify the completion of a PR 1 maintenance item. The item was addressed, and Problem Area Inspection was completed 2 months after the need was identified.** • The bridge is in fair condition (all CR's = 5) • The bridge is not posted for weight restriction. • Bridge does not meet extended inspection interval requirements. • The maintenance item was completed, and the bridge no longer requires a Special inspection. • # notes were added to the maintenance item and it was marked completed. • An element inspection performed in past, but not updated at this time. • The inspection was completed in one day. **7A53 Concatenated SNBI Insp. Type = P**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24		
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☐	0		
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A	10/4/23	10/4/23
		E - ELEM	☒	24		
		Record current scope for the Problem Area inspection in B.IE.11.				
23.	**Problem Area Inspection of a state-owned, steel multi-girder bridge to verify the completion of a PR 1 maintenance item. The item was addressed, and Problem Area Insp. was completed 8 months after the need was identified during the last routine insp. (2 months after the 6-month Special to monitor the PR 1 maintenance item).** • The bridge is in poor condition (Deck/Super/Sub = 4/4/4) • The bridge is posted for a weight restriction. • Bridge does not meet extended inspection interval requirements. • The maintenance item was completed, and the bridge no longer requires a 6-month interval Special inspection. However, a 12-month interval Special inspection is required for the load posting. Therefore, a 6-month Special has been scheduled to keep the bridge on a normal 12-month insp. interval (Note, a 6-month interval is based on the time between the last Special and the next Special for the posting). • # notes were added to the maintenance item and it was marked completed. • The inspection was completed in one day. **7A53 Concatenated SNBI Insp. Type = P**	1 – INIT	N/A	N/A		
		2 – ROU	☒	24		
		3 – UW	☐	0		
		4 – NSTM	☐	0		
		5 – DMG	N/A	N/A		
		6 – IND	☐	0		
		7 - SP	☒	6		
		8 – SERV	☐	0		
		9 – SCM	N/A	N/A		
		P – PROB	N/A	N/A	10/22/23	10/22/23
		E - ELEM	☒	24		
		Record current scope for the Problem Area inspection in B.IE.11.				

B.IE.02 – Inspection Begin Date

BMS3 > Schedule
Inspection > Ratings and Schedule; BMS3: Schedule

Description:

This item is used to record the inspection start date for the specific inspection type recorded.

Procedure:

Report the date for the inspection type performed. For multiple day inspections, record the first day that that field inspection type begins.

If multiple site visits occur for scour monitoring inspections, for a triggering storm event, report the first site visit date for that storm event.

Based on the inspection types recorded and a prescribed hierarchy, Item 7A01 will be automatically filled in for the overall inspection start date.

Coding:

The inspection date (mm/dd/yyyy). Prefix with zeros where necessary.

Example:
The routine inspection type started on March 24th, 2023. Record 03/24/2023.

B.IE.03 – Inspection Completion Date

BMS3 > Schedule
Inspection > Ratings and Schedule; BMS3: Schedule

Description:

This item is used to record the inspection end date for the specific inspection type recorded.

Procedure:

Report the date for the inspection type performed. For single day inspections, record the same date the inspection began. For multiple day inspections, record the last day that that field inspection type begins.

If multiple site visits occur for scour monitoring inspections, for a triggering storm event, report the last site visit date for that storm event.

Based on the inspection types recorded and a prescribed hierarchy, Item 7A01e will be automatically filled in for the overall inspection end date.

Coding:

The inspection date (mm/dd/yyyy). Prefix with zeros where necessary.

Example:
A bridge routine bridge inspection on a bridge that contains NSTM's was completed between May 1st and May 5th. The last NSTM was inspected on May 3rd.

Record the routine inspection end date as May 5th, 2023, and the NSTM inspection end date as May 3rd, 2023.

B.IE.04 – Nationally Certified Bridge Inspector (Team Leader)

BMS3 > Schedule
Inspection > Ratings and Schedule; BMS3: Schedule

Description:

This item is used to record the Nationally Certified Bridge Inspector (NCBI) (Team Leader) for the specific inspection type recorded.

Procedure:

Report the NCBI (team leader) for the inspection type performed. This individual can be different for each inspection type recorded. To appear in the list, the user must have their current inspection credentials completed on the user preference screen and qualify as a team leader.

Coding:

Name of NCBI (team leader) who performed the current inspection type.

B.IE.04a – Nationally Certified Bridge Inspector Number

BMS3 > Schedule
Inspection > Ratings and Schedule; User Preferences

Description:

This item is used to record the identification number associated with the Nationally Certified Bridge Inspector (NCBI) (Team Leader) for the specific inspection type recorded. This identification number is unique to the team leader and will remain with the team leader, regardless of their place of employment. If a team leader changes employment, the change should be reported to **Central Office** so the identification number can be reassociated with the team leader's new username.

Procedure:

This item is **automatically filled in by the system** based on information in Item B.IE.04. The team leader identification number should be verified when the team leader is selected for the inspection type.

Coding:

PA######

B.IE.05 – Inspection Interval

BMS3 > Schedule
Inspection > Ratings and Schedule; BMS3: Schedule

Description:

This item is used to record the number of months between inspection, by type of inspection. Some inspection types are not planned, and therefore an interval for the inspection type does not exist.

Procedure:

This item is **automatically filled in by the system** based on information in Item 7A59. This data should be established prior to the inspection and reviewed and updated after the inspection for any changes need in the planning of future inspections.

When an inspection type is populated, if the interval existed on the previous record, the interval will be prepopulated. Otherwise, update the item directly in 7A59.

Coding:

Refer to acceptable inspection intervals in Publication 238, Chapter IP 02. Typical intervals include 3, 6, 12, 24, 48, 60 and 72 months. However, other intervals can be used to schedule future inspections at within a certain month in the future.

B.IE.06 – Inspection Due Date

BMS3 > Schedule
Inspection > Ratings and Schedule; BMS3: Schedule

Description:

This item is used to the date the next inspection is due for each specific inspection type.

Procedure:

This item is **automatically filled in by the system** using two different methods. When an inspection type is first created on the inspection record, the inspection due date is automatically calculated by the system based on B.IE.03, B.IE.05 and Item 7A57.

After the inspection type has been added or if the inspection type does not exist but must be scheduled in the future, the data for this field is set equal to Item 7A60.

For Inspection Types (B.IE.01) of 1, 5, 9, P, or Q, the inspection due date will be set to a value of "N/A" because the inspection types do not have a defined inspection interval.

Coding:

The date the next inspection is due (mm/dd/yyyy). Prefix with zeros where necessary.

B.IE.07 – Risk-Based Inspection Interval Method

BMS3 > Schedule
Inspection > Ratings and Schedule; BMS3: Schedule

Description:

This item is used to indicate the Risk-Based Inspection Interval method that is applied to the bridge.

Procedure:

This item is **automatically filled in by the system** because PennDOT only applies Method 1 to NBIS length bridges (5A24 = A1, L1, or S1). Method 2 is currently not used by PennDOT.

For the remaining report groups and any inspection types besides 2 – Routine, 3 – Underwater and 4 – NSTM, this field is coded as "N" because it does not apply.

Coding:

N	Not Applicable
1	Method 1
2	Method 2

B.IE.08 – Inspection Quality Control Date

BMS3 > Schedule
Inspection > Ratings and Schedule; BMS3: Schedule

Description:

This item records the date that the inspection report was reviewed and accepted in the bridge management system.

Procedure:

This item is **automatically filled in by the system** based on when Item 1A09 is set to a value of "9-Accepted".

Coding:

Enter the date the inspection record was reviewed and accepted (mm/dd/yyyy). Prefix with zeros where necessary.

B.IE.09 – Inspection Quality Assurance Date

BMS3 > Schedule
Inspection > Ratings and Schedule; BMS3: Schedule

Description:

This item records the date that bridge received a Quality Assurance review by an independent 3rd party. This review is completed using a specific Central Office agreement.

Procedure:

Enter the date the Quality Assurance inspection was completed. This field can only be modified by staff within the Bridge Inspection Section at Central Office.

Coding:

Enter the date the bridge received a Quality Assurance inspection (mm/dd/yyyy). Prefix with zeros where necessary.

B.IE.10 – Inspection Data Update Date

BMS3 > Schedule
Inspection > Ratings and Schedule; BMS3: Schedule

Description:

This item is used to record when any data on the inspection fields are updated.

Procedure:

This item is **automatically filled in by the system** when any field on the inspection screens is updated.

Coding:

Enter the date the data on the inspection links was updated (mm/dd/yyyy). Prefix with zeros where necessary.

B.IE.11 – Limited Scope Description

BMS3 > Schedule
Inspection > Ratings and Schedule; BMS3: Schedule

Description:

This item is used to record a brief description of the members or features inspected when limited portions of the bridge are inspected.

Procedure:

Enter the description using common and consistent terms to describe the scope of the inspection.

This item is intended to capture a brief description of the members inspected when limited portions of the bridge are inspected such as Underwater, NSTM, In-depth, Special, Damage, Scour Monitoring, and Problem Area inspection types. This item can also be used to describe the purpose or cause of the inspection. For example, a scour monitoring inspection was caused by "Hurricane Addyson". This field is required when B.IE.01 = 3, 4, 5, 6, 7, 8, 9, P.

Coding:

Enter a note, up to 300 characters per inspection type.

B.IE.12 – Inspection Equipment

BMS3 > Schedule
Inspection > Ratings and Schedule; BMS3: Schedule

Description:

This item is used to provide information about the access and inspection equipment used in addition to standard equipment for each inspection.

Procedure:

Record all access and inspection equipment used to perform the specific inspection type. At least one access equipment coding and at least one equipment coding is required per inspection type.

Use code AN when no access equipment applies to the inspection performed. Use code IN when no inspection equipment listed was used to perform the inspection.

Coding:

Access Equipment		Inspection Equipment	
Code	Description	Code	Description
AN	No Access Equipment Used	IN	No Inspection Equipment Used
A01	Ladder	I01	Ultrasonic
A02	Bucket Truck Vehicle	I02	Ground-Penetrating Radar
A03	Under Bridge Inspection Vehicle	I03	Infrared Thermography
A04	Rigging	I04	Radiographic Testing
A05	Waders	I05	Impact Echo
A06	Boat	I06	Electromagnetic Methods
A07	Snorkel	I07	Rebound & Penetration Methods
A08	SCUBA	I08	Acoustic Emissions Testing
A09	Surface Supplied Air	I09	Dye Penetrant
A10	Remotely Operated Vehicle (ROV)	I10	Magnetic Particle
A11	Video Pole	I11	Eddy Current
A12	Borescope	I12	Boring or Drilling
A13	Unmanned Aerial System (UAS)	I13	Underwater Imaging
A14	Service Traveler	I14	Depth Finder/Fathometer
AX	Other Access Equipment	I15	Stress Wave Timer
		IX	Other Inspection Equipment

Remotely operated vehicles include any remotely controlled device used to provide video access to members of a bridge via ground, water surface, or underwater.

Use code A13 when unmanned aerial systems (UAS), also referred to as drones, are used to supplement inspections.

Use code I13 when underwater imaging technologies such as side scan sonar are used to supplement underwater inspections.

NDE and testing inspection equipment listed represent only more common or general types. Use the most closely related code, or use code IX for types not listed.

The following pages are direct excerpts from Appendix C of the SNBI, March 2022 Edition. The purpose of this guidance is to provide guidance on defect severity. Defects are referred to throughout the condition rating tables provided in Chapter of the SNBI and earlier in Appendix N. This defect guidance should only be used when determining condition ratings and should not be used in place of guidance in other appendices of Publication 100A for element level coding.

Furthermore, until direction is given in this appendix, users should continue to use the guidance in the main body of Chapter 3 for the condition rating descriptions for Items 6B39, 6B40, 1A06, 4A02, 4A09, 4A10, 4A11.

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Component Condition Rating Guidance

From Appendix C of the SNBI

The following provides defect severity guidance that can be used in combination with the various condition rating code definition tables, in Subsection 7.1 – Component Condition Ratings, to determine the appropriate condition rating codes.

Table 46. All Materials - defect severity guidance for component condition ratings.

Defect	Minor	Moderate
Distortion	Distortion that has been mitigated or does not require mitigation.	Distortion that requires mitigation but has not been addressed.
Settlement	Exists within tolerable limits or arrested with no observed structural distress.	Exceeds tolerable limits.
Scour	Exists within tolerable limits established for the bridge.	Exceeds tolerable limits, but is less than the critical limits established for the bridge.

The Settlement defect applies to substructure components, pipes, and other components that may be directly affected by settlement. Superstructure and deck components that indirectly show the effects of settlement are evaluated by the resulting defects. Tolerable settlement can be considered as uniform or differential settlement that is not causing other bridge defects or increased impact on the bridge.

The critical limit for scour is the scour depth at which the bridge becomes unstable.

Table 47. Concrete - defect severity guidance for component condition ratings.

Defect	Minor	Moderate
Delamination, Spalling, Patched Area	Delamination, small spall, or patched area that is sound.	Large spall or patched area that is unsound or showing distress.
Exposed Rebar	Present without measurable section loss.	Present with measurable section loss.
Exposed Prestressing	Present without section loss.	Present with section loss.
Cracking	Unsealed medium width cracks or unsealed medium pattern (map) cracking.	Wide cracks or heavy pattern (map) cracking.
Abrasion, Wear, Scaling	Exposed coarse aggregate, but the aggregate remains secure in the concrete.	Coarse aggregate is loose or has popped out of the concrete matrix.
Efflorescence, Rust Staining	Surface white or leaching with little or no build-up. No rust staining present.	Rust staining or heavy build-up of efflorescence.

The concrete crack defect description definitions describe generalized distress, but the width, spacing, location, orientation, and structural or non-structural nature of the cracking should also be considered.

In general, cracks can be considered:

- Insignificant – crack width less than 0.004 inches (prestressed) or 0.012 inches (reinforced), or medium width cracks that have been sealed.
- Medium – crack width ranging from 0.004 – 0.009 inches (prestressed) or 0.012 to 0.05 inches (reinforced).
- Wide – crack width wider than 0.009 inches (prestressed) or 0.05 inches (reinforced).
- Medium pattern (map) – crack spacing of 1 ft. to 3 ft.
- Heavy pattern (map) – crack spacing less than 1 ft.

In general, spall size can be considered:
- Small spall – 1 inch or less deep or 6 inches or less in diameter.
- Large spall – greater than 1 inch deep or greater than 6 inches in diameter.

The rust staining defect applies only to reinforcing steel.

Table 48. Steel - defect severity guidance for component condition ratings.

Defect	Minor	Moderate
Corrosion	Freckled rust. Corrosion has initiated.	Section loss is evident.
Cracking	Crack that has been effectively arrested.	Crack that has not been arrested.
Connection	Loose fasteners, or pack rust without distortion. Connection is in place and functioning as intended.	Missing bolts, rivets or fastener; broken welds; or pack rust with distortion.

A well-formed patina on weathering steel is considered a protective coating and is not considered a defect.

The Connection defect applies to any members of a component that are fastened by bolts, rivets, or welds.

Table 49. Masonry – defect severity guidance for component condition ratings.

Defect	Minor	Moderate
Efflorescence, Rust Staining	Surface white or leaching with little or no build-up. No rust staining present.	Rust staining or heavy build-up of efflorescence.
Mortar Breakdown	Cracking or partial depth voids.	Full depth voids.
Splits, Spalls	Block or stone has split or spalled with no shifting.	Block or stone has split or spalled with shifting.
Patched Area	Sound patch.	Unsound patch.
Displacement	Block or stone has shifted slightly out of alignment.	Block or stone has shifted significantly out of alignment or is missing.

Table 50. Timber – defect severity guidance for component condition ratings.

Defect	Minor	Moderate
Cracking	Crack that has been effectively arrested.	Crack that has not been arrested.
Connection	Loose fasteners, or pack rust without distortion. Connection is in place and functioning as intended.	Missing bolts, rivets or fastener; broken welds; or pack rust with distortion.
Decay, Section Loss	Affects up to 10% of the member section.	Affects more than 10% of the member section.
Checks, Shakes	Penetrates 5% to 50% of the thickness of the member; note in a high stress zone.	Penetrates more than 50% of the member thickness and length equal to or greater than the member depth, or penetrates more than 5% of the member thickness in a high stress zone.
Splits, Delamination	Length less than member depth or arrested with effective actions taken to mitigate.	Length equal to or greater than the member depth.
Abrasion, Wear	Affects up to 10% of the member section.	Affects more than 10% of the member section.

In general, checks and shakes can be considered insignificant when there is surface penetration less than 5% of the member thickness regardless of location.

Table 51. Other Materials - defect severity guidance for component condition ratings.

Defect	Minor	Moderate
Deterioration	Breakdown or deterioration has initiated.	Significant deterioration or breakdown.

For "Other Materials" the deterioration defect or other applicable defects shown within this table may apply. "Other Materials" include FRP, iron, aluminum, or materials other than concrete, steel, timber, or masonry. The "Other" category can also be considered when FRP is used as a repair material and is the predominant material type visible for inspection.
The following types of deterioration are common for FRP members:

- Blistering, discoloration, or wrinkling (Deterioration)
- Delaminations or voids (Delamination)
- Fiber exposure (Spall or Cracking)
- Scratches or cracks (Cracking)
- Creep or shrinkage (Distortion)

Table 52. Bearings - defect severity guidance for component condition ratings.

Defect	Minor	Moderate
Movement	Minor restriction.	Restricted.
Alignment	Lateral or vertical alignment that is inconsistent with temperature conditions, but is tolerable.	Approaching limits of lateral or vertical alignment for the bearing.
Bulging, Splitting, Tearing	Bulging less than 15% of bearing thickness.	Bulging 15% or more of bearing thickness. Splitting or tearing. Bearing's surface are not parallel.
Loss of Bearing Area	Up to 10%.	More than 10%.
Corrosion	Freckled rust. Corrosion has initiated.	Section loss is evident.
Connection	Loose fasteners, or pack rust without distortion. Connection is in place and functioning as intended.	Missing bolts, rivets or fastener; broken welds; or pack rust with distortion.

Table 53. Bridge Joints – defect severity guidance for component condition ratings.

Defect	Minor	Moderate	Major
Leakage	Minimal. Minor dripping through the joint.	Moderate. More than a drip and less than free flow of water.	Free flow of water through the joint.
Seal Adhesion	Adhered for more than 50% of the joint height.	Adhered 50% or less of joint height but still some adhesion.	Complete loss of adhesion.
Seal Cracking	Surface crack.	Crack that partially penetrates the seal.	Crack that fully penetrates the seal.
Seal Damage	Seal abrasion without punctures.	Punctured, torn, or partially pulled out.	Punctured completely through, pulled out, or missing.
Debris Impaction	Partially filled with hard-packed material, but still allowing free movement.	Completely filled; impacts joint movement.	Completely filled; prevents joint movement.
Adjacent Deck or Header	Edge delamination or spall 1″ or less deep or 6″ or less in diameter. No exposed rebar. Patched area that is sound.	Spall greater than 1″ deep or greater than 6″ diameter. Exposed rebar. Delamination or unsound patched area that makes the joint loose.	Spall, delamination, unsound patched area, or loose joint anchor that prevents the joint from functioning as intended.
Metal Deterioration or Damage	Freckled rust. Metal has no cracks or impact damage. Connection may be loose but functioning as intended.	Section loss, missing or broken fasteners, cracking of the metal, or impact damage. Joint still functioning.	Section loss, cracking of the metal, damage, or connection failure that prevents the joint from functioning as intended.

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 30-45 degrees with respect to the bridge substructure, or 15-30 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.