Bridge Inspection Manual

Updated on 10/1/2024

Table of Contents

1. INTRODUCTION

The State of Hawaii Department of Transportation (HDOT) Bridge Inspection Program (BIP) was established in response to the National Bridge Inspection Standards (NBIS) published in the U.S. Code of Federal Regulations 23 CFR 650, Subpart C and National Tunnel Inspection Standards (NTIS) published in 23 CFR 650, Subpart E.

The NBIS and NTIS sets the national standard for proper safety inspection and evaluation of bridges, reportable structures and highway tunnels on all public roads and requires that each State transportation department must include an inspection organization for bridges and tunnels that is responsible for the following:

- Statewide inspection policies and procedures, quality assurance, quality control, and preparation and maintenance of the inventory of structures, except for bridges and tunnels that are owned by Federal Agencies.
- Structure Inspections, reports, load ratings and other requirements of these standards.
- The functions identified above may be delegated, but such delegation does not relieve the HDOT of any of its responsibilities under 23 CFR 650 Subpart C or Subpart E.

1.1. Purpose

This BIP Manual was developed to provide context of how the Inspection process relates to the Statewide Transportation Asset Management Program (TAMP), as well as provides guidelines, policy, and procedures to ensure compliance with federal regulations 23 CFR 650 Subpart C and CFR 650 Subpart E, respectively the National Bridge Inspection Standards and the National Tunnel Inspection Standards. Unless a Local Public Agency (LPA) develops its own BIP Manual or policies that are approved by HDOT and Federal Highway Administration (FHWA), LPAs are to adhere to the procedures within this document.

Each State must prepare and maintain an inventory of all bridges subject to the NBIS, and tunnels subject to the NTIS, in accordance with 23 CFR 650. The inventory includes the data needed for the Bridge Inspection Program and Bridge Asset Management Program (BAMP) to function and to comply with the FHWA requirements. This data includes Structure Inventory and Appraisal (SI&A) data and Element data stored in HDOT's Bridge Management database (BrM) with information submitted to FHWA no later than March 15 of each year.

This manual is not an engineering textbook or primer on the fundamentals of bridge inspection, instead the purpose of this BIP Manual is to provide statewide guidance on adopted bridge and tunnel inspection procedures and to assure that the inspections are being conducted in accordance with the requisite standards, quality data is being presented for programming into the TAMP goals and life cycle preventive maintenance of the Assets.

1.2. Using BIP Manual & BrM

New BrM users need to request a UserID and Password from brm.help@ hawaii.gov to access BrM at https://brm.hawaii.gov/. Help for using BrM is available from the AASHTOware website and can be accessed in the upper left-hand corner of any screen in BrM by clicking on the Logo.

The most current version of the Bridge Inspection Program (BIP) Manual is on the HDOT website. Suggested edits or errors should be emailed with a recommended correction to the Statewide Bridge Asset Program Manager (BAMP). Text changes to the BIP Manual will be highlighted in red text and will indicate the Revision Date (Rev Date) in red text below the Publication Date (Pub Date) at the bottom of the page.

1.3. Definitions and Terms

Definitions used within this manual can be found in 23 CFR 650. Subpart C contains terms related to bridges and Subpart E contains terms related to tunnels. Definitions from 23 CFR 650 that are repeated here may be paraphrased or quoted directly from CFR 650. Other terms are provided for clarity and may be specific to this BIP Manual for the State of Hawaii Department of Transportation.

Bridge is defined in 23 CFR 650.305 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 having an opening measured along the center of the roadway of more than 20 feet between under copings 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"

When used in this manual the term "bridge" includes all reportable structures which include bridges, culverts and tunnels unless stated otherwise.

Bridge Inspection Experience is defined as active participation in bridge inspections in accordance with the NBIS, in either a field inspection, supervisory, or management role. A combination of bridge design, bridge maintenance, bridge construction and bridge inspection experience, with the predominant amount in bridge inspection, is acceptable. The National Highway Institute training may be found at the following URL: *https://www.nhi.fhwa.dot.gov*

BIP is the abbreviation for Bridge Inspection Program.

Bridge ID number is a unique number as defined in National Bridge Inventory (NBI) Item 008- Structure Number in the FHWA Recording and Coding Guide.

Bridge File is a file containing historic and current information about a bridge as required per CFR 650.313(d) and containing the necessary information in Chapter 2 of the (American Association of State Highway and Transportation Officials (AASHTO) Manual for Bridge Evaluation (MBE).

Bridge Preservation is defined by FHWA as Actions or Strategies that prevent, delay, or reduce deterioration of bridges or bridge elements; restore the function of existing bridges; keep bridges in good condition; and extend their useful life. Preservation actions may be preventative, or condition driven.

23 CFR 650 is used as an abbreviation for the term "Code of Federal Regulations - Title 23". The Code of Federal Regulations (CFR) is a codification of the general and permanent rules published in the Federal Register by the departments and agencies of the Federal Government. Title 23 is the section designated for Highways, while Section 650 is designated for Bridges.

Certification Date is the date personnel were qualified to perform BIP tasks.

Complex Bridge is a movable, suspension, cable stayed, and other bridges with unusual characteristics.

Critical Finding (CF) is defined in Critical Find Reporting Section of the BIP.

HDOT is the abbreviation for Hawaii Department of Transportation.

HWY is the abbreviation for HDOT Highways.

Inspections is defined in the Inspection and Report Types Section of the BIP.

Local Public Agency (**LPA)** within the state of Hawaii that own and/or are responsible for roadway bridge structures include County of Kauai, City and County of Honolulu, County of Maui, and the County of Hawaii. Other LPA that do not own and/or are responsible for transportation infrastructure include the Oahu Metropolitan Planning Organization, and the Maui Metropolitan Planning Organization.

Manual for Bridge Evaluation (MBE) is the AASHTO publication that provides guidelines for the procedures and policies for determining the physical condition, maintenance needs, and load capacity of highway bridges. It was developed to assist bridge owners by establishing inspection procedures and evaluation practices that meet the National Bridge Inspection Standards (NBIS)

National Bridge Inspection Standards (NBIS) are the standards established over the safety inspections of highway bridges on public roads throughout the United States.

National Bridge Inventory (NBI) is the aggregation of structure inventory and appraisal data collected to fulfill the requirements of the National Bridge Inspection Standards (NBIS). Each State shall prepare and maintain an inventory of all bridges subject to the NBIS. Bridges that are part of the NBI are referred to as NBI Bridges. Similarly, bridges that are not part of the NBI are referred to as Non-NBI Bridges.

National Tunnel Inventory (NTI) is the aggregation of structure inventory and appraisal data collected to fulfill the requirements of the National Tunnel Inspection Standards. Each State shall prepare and maintain an inventory of all tunnels subject to the NTIS.

National Tunnel Inspection Standards (NTIS) are the Federal regulations establishing requirements for inspection procedures, frequency of inspections, qualification of personnel, inspection reports, and preparation and maintenance of a State tunnel inventory. The NTIS apply to all structures defined as tunnels located on all public roads.

Non-Reportable Structure is a structure that is not required to be included in the annual NBI or NTI data submittal but may be included and managed in the BrM database. Examples include pedestrian bridges, privately owned structures, culverts and bridges less than 20 feet.

Owner is defined as a person or entity who has the legal or rightful title and is held responsible by the law as the owner of the property.

Portal The term “portal” means the entrance and exit of the tunnel exposed to the environment; portals may include bare rock, constructed tunnel entrance structures, or buildings.

Quality Assurance (QA) The use of sampling and other measures to assure the adequacy of quality control procedures in order to verity or measure the quality level of the entire bridge inspection and load rating program.

Quality Control (QC) Procedures that are intended to maintain the quality of a bridge inspection and load rating at or above a specific level.

Scour is erosion of streambed or bank material due to flowing water; often considered as being localized

around piers and abutments of a structure.

Scour Countermeasure: Defined here as a scour feature placed during construction of a new bridge or added to an existing bridge that is designed and constructed to mitigate scour in accordance with the current Hydraulic Engineering Circular (HEC-23) requirements. See Scour Repair.

Scour Critical Bridge is a bridge with an SNBI Item B.AP.03 Scour Vulnerability coding C or D because of a foundation element that has been determined to be unstable for the observed or evaluated scour condition.

Scour Repair is defined here as a scour repair or feature that is not designed to meet Hydraulic Engineering Circular (HEC-23) requirements.

Shall is applied in this Manual to mean the same as must. Must is a regulatory or legal term and means that conformance is required and mandatory without exception.

Specification for the National Tunnel Inventory (SNTI) provides the recording and coding specifications for tunnel information to be entered into the NTI.

Structure is defined as a bridge, culvert or tunnel unless specified otherwise.

Statewide Transportation Asset Management Plan (TAMP) – The Statewide Transportation Asset Management Plan was prepared on June 30, 2019 as required by the FAST Act, describes the processes and formally defines HDOT's framework for asset management. This document can be found at https://hidot.hawaii.gov/highways/files/2019/06/HDOT_TAMP_Final_June2019.pdf

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

Under Bridge Inspection Truck (**UBIT)** A truck (also known as snooper truck or reach-all) with a bucket used to access elements under a bridge deck.

1.4. Standards and Regulatory Documents

All inspections and reports for bridges and tunnels must be in accordance with the following list of applicable standards, regulations & references. The current version or edition is applicable, including subsequent revisions, interims or errata unless stated otherwise. The current version for inspection contracts is the active version on the date the contract is awarded. The list indicates the Document Order of Precedence for inspections and a basis to resolve conflicts. Please notify the Statewide BIP Manager when there is unresolved or conflicting information.

The signs for bridges and tunnels must comply with the Manual on Uniform Traffic Control Devices or MUTCD.

1.4.1. Bridge Inspections Reference Documents

- State of Hawaii Statewide Transportation Asset Management Plan (TAMP)
- "FHWA Recording and Coding Guide" - FHWA Recording and Coding Guide for the Structure Inventory

and Appraisal of the Nation's Bridges, FHWA Report No. PD-96-001December 1995.

- FHWA Memo, "Revision of Coding Guide, Item 113 - Scour Critical Bridges", April 2001.
- AASHTO Manual for Bridge Evaluation (MBE); incorporated by reference in 23 CFR 650.317.
- Bridge Inspector's Reference Manual (BIRM), FHWA NHI 12-049
- HDOT Design Criteria for Bridges and Structures
- HDOT Design Criteria for Highway Drainage
- Inspection of Fracture Critical Bridge Members, FHWA Report No. IP-86-26, September 1986.
- FHWA Technical Advisory T 5140.23, Evaluating Scour at Bridges, dated October 28, 1991.
- HEC 18 Evaluating Scour at Bridges, FHWA-HIF-12-003, 2016.
- HEC 20 Stream Stability at Highway Structures, FHWA-HIF-12-004, 2012.
- HEC 23 Bridge Scour and Stream Instability Countermeasures, Volume 1 (FHWA-HNI-09-111, 2009) & Volume 2 (FHWA-HNI-09-112, 2009).
- HEC 25 Highways in the Coastal Environment, Volume 1 (FHWA-HNI-14-006, 2014) and Volume 2 (FHWA-HNI-07-096, 2008)
- 2D Hydraulic Modeling for Highways in the River Environment, FHWA-HIF-19-061, 2019.
- FHWA Memorandum "Scourability of Rock Formations," dated July 19, 1991.
- Underwater Bridge Inspection, FHWA-NHI-10-079, 2010
- ASCE Underwater Investigations: Standard Practice Manual, 2001
- FHWA Questions and Answers on the National Bridge Inspection Standards CFR 650 Subpart C (FHWA Q&A).

1.4.2. Tunnel Inspections Reference Documents

- Tunnel Operations Maintenance Inspection and Evaluation (TOMIE) Manual, FHWA-HIF-15-005, July 2015.
- National Tunnel Inspection Standards (NTIS), 23 CFR 650, Subpart E
- Specifications for the National Tunnel Inventory (SNTI)

2. BRIDGE INSPECTION PROGRAM

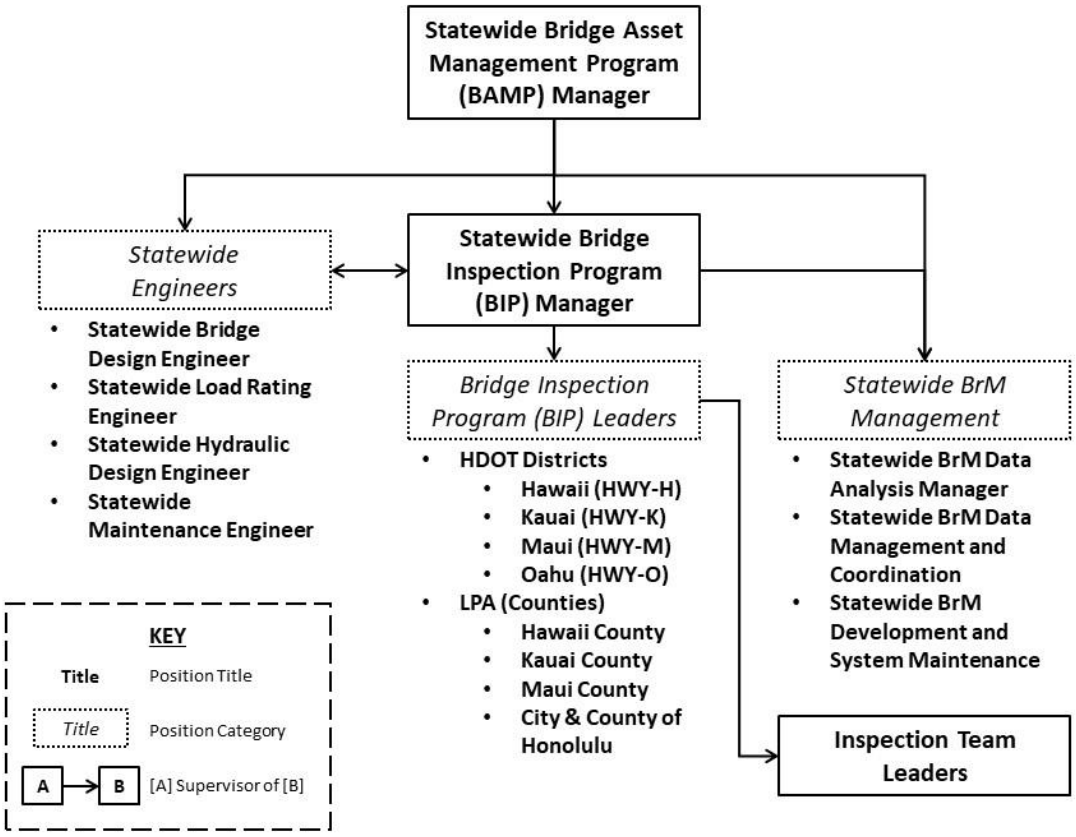
2.1. Organization

Per 23 CFR 650.307(a), “each State transportation department must inspect or cause to be inspected, all highway bridges located on public roads that are fully or partially located within the State’s boundaries, except for bridges that are owned by Federal agencies.”

HDOT’s Statewide Bridge Inspection Program (BIP) Manager administers this program as described below on the organizational chart and in Section 2.3, Roles and Responsibilities. The Bridge Inspection Program gathers the data on which the Asset Management Program is based on. The Statewide Bridge Asset Management Program Manager roles and responsibilities are for overall programmatic responsibilities for bridge and tunnel assets.

HDOT BIP Leaders are responsible for oversight and support of the LPA offices within the HDOT District. An LPA not in compliance could result in the suspension of Federal-Aid highways funding to HDOT until compliance is met.

2.2. Organizational Chart



2.3. Statewide Program Directory

POSITION TITLE	OFFICE LOCATION	NAME	PHONE NUMBER	EMAIL
Statewide Bridge Asset Management Program (BAMP) Manager	Bridge Design Section (HWY-DB)	Brent Ching	692-7610	Brent.k.ching@hawaii.gov
Statewide Bridge Design Engineer	Bridge Design Section (HWY-DB)	Brent Ching	692-7610	Brent.k.ching@hawaii.gov
Statewide BrM Data and Analysis Manager	Bridge Design Section (HWY-DB)	Brent Wakuzawa		Brent.a.wakuzawa@hawaii.gov
Statewide BrM Data Management and Coordination	Bridge Design Section (HWY-DB)	Kimberly Okamura Brent Wakuzawa		Kimberly.m.okamura@hawaii.gov Brent.a.wakuzawa@hawaii.gov
Statewide BrM Development and System Maintenance	Bridge Design Section (HWY-DB)	Lyle Nakashima		Lyle.m.nakashima@hawaii.gov
Statewide Load Rating and Repairs Engineer	Bridge Design Section (HWY-DB)	Brent Ching	692-7610	Brent.k.ching@hawaii.gov
Statewide Hydraulic Design Engineer	Hydraulic Design Section (HWY-DH)	Kevin Kasamoto	692-7561	Kevin.Kasamoto@hawaii.gov
Statewide Maintenance Engineer	Maintenance Section (HWY-CM)	Vacant	587-2183	
Statewide Bridge Inspection Program Manager	Bridge Design Section (HWY-DB)	Brent Ching	692-7610	Brent.k.ching@hawaii.gov
Hawaii District BIP Leader	HWY Hawaii District Office (HWY-H)	Nathan Ortega	896-4293	nathan.l.ortega@hawaii.gov
Hawaii Co BIP Leader	Hawaii County	Kason Pacheco	961-8586	Kason.Pacheco@hawaiicounty.gov
Kauai District BIP Leader	HWY Kauai District Office (HWY-KE)	Jeff Aguinaldo	241-3018	Jeff.J.Aguinaldo@hawaii.gov
Kauai Co. BIP Leader	Kauai County	Joel Bautista	241-4153	jbautista@kauai.gov
Maui District BIP Leader:	HWY Maui District Office (HWY-MD)	Annette Matsuda Derek Takahashi	873-3540 873-3535	Annette.dh.Matsuda@hawaii.gov derek.t.takahashi@hawaii.gov
Maui Co. BIP Leader	Maui County	Ty Takeno	270-7434	Ty.Takeno@co.maui.hi.us
Oahu District BIP Leader	HWY Oahu District Office (HWY-OM)	Ryan Nakata	862-6700	ryan.a.nakata@hawaii.gov
Oahu C&CH BIP Leader	City & County of Honolulu	Jacob Jinghai Yang	768-8824	jinghai.yang@honolulu.gov
BrM Help				BrM.Help@hawaii.gov
BIP Management				bip@hawaii.gov

2.4. Roles and Responsibilities

2.4.1. Owner Responsibilities

Owner (as specified in SNBI Item B.CL.01 – Owner), is defined as the individual or agency that legally owns the asset. BIP Leads represent each HDOT/HWY District and LPA in the Bridge Inspection Program and works within the Owner Agency to accomplish the necessary program activities. For instance, the Department of Land and Natural Resources (DLNR) may own the asset and the HDOT/HWY district has responsibility to ensure inspections are completed and that maintenance is done to provide safe passage by the traveling public. If the owner is unwilling, the district has the responsibility to enforce closure or block access (e.g., a gate).

Non-NBI Structures:

Owners may want to track or be aware of structures that do not meet the definitions contained in the NBIS or the SNTI such as: Pedestrian bridges, privately owned bridges, or Structures < 20 feet. These

structures are not included in the National Inventories but may be included in the BrM database at the Owners discretion. The Inspection Frequency is determined by the BIP Leader for these structures and should not exceed 48 months for structures more than 5 feet. Initial inspections and coding these structures should follow the same criteria.

2.4.2. Statewide Bridge Asset Management Program (BAMP) Manager

Role: Bridge Asset Management is a core bridge discipline that focuses on making informed and effective decisions on the operation, maintenance, preservation, replacement, and improvement on a program of bridges evaluating alternative strategies for addressing needs, and prioritizing investments, projects, and work types that satisfy the objectives of being cost effective while maintaining safety. These objectives can among other things be satisfied by implementing programs of projects that maximize overall bridge program performance where performance may include multiple factors such as condition, structural reliability, mobility, and minimizing the cost to achieve desired service life. Bridge Asset management also extends beyond identifying optimal investments, projects and work types and includes using optimal maintenance, preservation, and improvement design, material, and construction technologies that provide sustainable performance.

Bridge Asset management decision making is highly dependent on relevant and quality data and on methodologies and tools for analyzing that data across an inventory of bridges. In this regard FHWA promotes the use and understanding of data collection technologies and bridge management systems. The modeling and analyses performed by bridge management systems assists bridge owners in making informed and effective decisions that will achieve their programmatic goals and objectives and maximize returns on investment.

Responsibilities:

- Overall Statewide programmatic responsibility for all public bridge and tunnel assets.
- Provides overall leadership, directs and provides guidance to decision makers and county bridge or highway engineers in the planning, developing, programming, and implementing of effective and efficient capital programs and maintenance actions to preserve the bridge structures (bridges, culverts, tunnels, pedestrian bridges, and overpasses) in the State of Hawaii.
- Provides information to assist local agencies in understanding their bridge network, in preparation and implementation of a bridge preservation plan and to support applications for funding in the State of Hawaii Bridge Program. Works with the LPA BAMP Managers to determine priorities and critical infrastructure needs.
- Has regular communication with the Planning and Design Section Managers in support of the States BAMP and TAMP by providing technical assistance and guidance, and by publishing annual asset management reports, communicating infrastructure needs and implementing asset management principles.

Qualification Requirements:

- Be a professional structural engineer (SE) licensed in the State of Hawaii
- Preferably have a minimum of 10 years leading a program of similar scale.
- Successfully complete FHWA National Highway Institute's (NHI) comprehensive bridge inspection

training course and re-certify every 5 years or less by successfully completing FHWA NHI's bridge inspection refresher training.

- Be a nationally certified tunnel inspector and re-certify every 5 years or less; and be able to determine when a Team Leader must successfully complete FHWA NHI's tunnel inspection refresher training to maintain certification.

2.4.3. Statewide BIP Manager

Role: Has delegated responsibility for the statewide administration and oversight of the Bridge Inspection Program, which includes the Tunnel Inspection Program. Provides assistance with the State policy, procedures, quality assurance, and statewide guidance on bridge inspections in compliance with all Federal Regulations for bridges and tunnels. Provides support and oversight of BIP Leader duties.

Responsibilities:

- Maintains a registry of nationally certified tunnel and bridge inspectors that work in Hawaii and verify qualifications are up to date and satisfy CFR 650.309 and CFR 650.509. The registry contains Inspector ID number, contact information, copy of certification, and adverse action notes.

- Administers and conducts Quality Assurance for statewide bridge and tunnel inspection program. Refer to the Quality Assurance section of this manual.

- Determine when an inspection Team Leader's qualification must meet 23 CFR 650.509(b) under the direction of the BAMP Manager. Communicate and process the request for consideration of approval of each candidate from FHWA, as required for complex tunnels.

- Reports findings to the Bridge Asset Management Program Manager for any action required.

Qualification Requirements:

- Be a professional structural engineer (SE) licensed in the State of Hawaii.

- Successfully complete FHWA National Highway Institute's (NHI) comprehensive bridge inspection training course and re-certify every 5 years or less by successfully completing FHWA NHI's bridge inspection refresher training.

- Be a nationally certified tunnel inspector and re-certify every 5 years or less; and be able to determine when a Team Leader must successfully complete FHWA NHI's tunnel inspection refresher training to maintain certification.

2.4.4. Statewide Bridge Design Engineer

Role: Responsible for statewide bridge design by overseeing structural integrity, conducts technical reviews of inspection reports and uses data input into BrM to conduct analyses and to develop alternative strategies through a programmatic approach. Develops a program of projects that supports structural damage assessments and repairs Statewide;

Responsibilities:

- Works with the Statewide BIP Manager to enforce the standards and procedures Statewide.
- Is on call for Emergencies as they arise and responds with decisions on the structural integrity of impacted assets.
- Assists the BIP Leaders with Bridge Design and Maintenance Requirements and Reviews.
- Conducts technical review of inspection reports and checks for soundness of structural findings and recommended actions.
- Responsible for the structure inventory data and the BrM software.
- Supervises the Statewide Load Rating Engineer.

Qualification Requirements:

- Be a professional structural engineer (SE) licensed in the State of Hawaii.
- Successfully complete FHWA National Highway Institute's (NHI) comprehensive bridge inspection training course and re-certify every 5 years or less by successfully completing FHWA NHI's bridge inspection refresher training.
- Be a nationally certified tunnel inspector and re-certify every 5 years or less; and be able to determine when a Team Leader must successfully complete FHWA NHI's tunnel inspection refresher training to maintain certification.

2.4.5. Statewide Load Rating Engineer

Role: Responsible for statewide load rating and overweight permitting policies and procedures for the safe load carrying capacity in accordance with the AASHTO Manual for Bridge Evaluation (MBE), for all legal vehicles and State routine permit loads.

Responsibilities:

- Ensures structures are posted or restricted statewide in accordance with MBE when the maximum unrestricted legal loads or State routine permit loads exceed the Rating Factor.
- Administers and conducts statewide Load Rating Program Quality Assurance. Refer to the Load Rating Section of this Manual for detailed program requirements.

Qualification Requirements:

- Be a professional structural engineer (SE) licensed in the State of Hawaii.

2.4.6. Statewide Hydraulic Design Engineer

Role: Responsible for statewide administration and oversight of the Scour Program for the State of Hawaii.

Responsibilities:

- Provides scour design policy and inspection procedures;
- Oversight of scour coding, scour repairs, and Scour Critical Plan of Actions;
- Provides technical expertise for scour evaluations and scour repairs.
- Administers and conducts statewide scour program Quality Assurance. Refer to the Scour Section of this Manual for detailed program requirements.

Qualification Requirements:

- Be a professional civil engineer (PE) licensed in the State of Hawaii

2.4.7. Statewide BrM Manager

Role: Responsible for Statewide administration, oversight and maintenance of the BrM data and system and provides software improvements to support all users.

Responsibilities:

- Provides NBIS and Element coding support Statewide.
- Responsible for running program, analyzing results, running scenarios, validating results, conducting alternatives analysis, and any other programmatic needs required.
- Responsible for Element changes in the BIP Manual and Element coding support for Inspectors. Responsible for processing changes to SI&A data.
- Submits NBI and NTI data submittals to FHWA in March of each year in support to the Bridge Asset Manager.

Qualification Requirements:

- Has 2 or more years of experience working with BrM or equivalent experience with similar databases.
- Must have experience in and understand the software validation, deterioration, and sufficiency rating tools in addition to programming utilities used for preventive maintenance and asset planning.

2.4.8. BIP Leader (BIP Lead)

Role: Each HDOT/HWY District and each LPA must have one person within their office serve as BIP Leader responsible for their respective bridge inspection program. Each HDOT/HWY District Office and LPA *should* have a second person in their office serve as alternate BIP Leader when the BIP Leader is unavailable. This ensures inspections, reporting, and BIP Lead duties function at times for emergencies and compliance.

Responsibilities: BIP Leader responsibilities are described in the BIP Leader Section of this manual. Responsibilities include, but are not limited to:

- Inspection Report QC and maintenance of the Bridge File documents
- Responsible for Storm Reporting and Post Event Inspection of Scour Critical bridges
- Initiate unscheduled Inspections for Damage and completed construction prior to opening to traffic
- Notify the Statewide BAMP Manager if lack of funding threatens the effective execution of the Program mandates
- Other Duties include:
    - Organizing, scheduling, and ensuring compliance with programmatic responsibilities.
    - Verify and maintain a Certification Records (digital or paper) as required by NBIS: BIP Leaders must maintain a record of their certification, Team Leads, and Inspectors. For inspections performed under contract service agreements, BIP Leaders are responsible for verifying all inspectors are qualified for the duration of the contract. New certifications or re-certifications must be requested and forwarded to the Statewide BIP Manager to update the Statewide database.
    - Responsible for obtaining and maintaining all proper federal certification requirements including retaining their own personal certification records and notifying the Statewide BIP Manager 1 year in advance of the need for re-certification training to ensure continued compliance.
    - Ensures inspections can be completed safely, timely and efficiently.

Qualification Requirements:

The BIP Leader must, at a minimum:

- Meet one of the four qualifications listed below:
    - Be a registered Professional Structural Engineer and have 6 months of bridge inspection experience;
    - Have 5 years of bridge inspection experience;
    - Have all of the following:

        - A bachelor's degree in engineering or engineering technology from a college or university accredited by or determined as substantially equivalent by the Accreditation Board for Engineering and Technology; and
        - Successfully passed the National Council of Examiners for Engineering and Surveying Fundamentals of Engineering examination; and
        - Two (2) years of bridge inspection experience; or
    - Have all of the following:
        - An associate's degree in engineering or engineering technology from a college or university accredited by or determined as substantially equivalent by the Accreditation Board for Engineering and Technology; and
        - Four (4) years of bridge inspection experience.

- Successfully complete a Federal Highway Administration (FHWA) approved comprehensive bridge inspection training course;
- Complete a cumulative total of 18 hours of FHWA-approved bridge inspection refresher training over each 60 month period;
- Provide documentation supporting the satisfaction of these requirements;
- If the BIP Leaders District has tunnel(s) the BIP Leader must also successfully complete FHWA National Highway Institute's (NHI) comprehensive tunnel inspection training course and re-certify every 5 years or less by successfully completing FHWA NHI's tunnel inspection refresher training.
- If the BIP Leaders District has Nonredundant Steel Tension Member (NSTM) structures the BIP Leader must also successfully complete FHWA National Highway Institute's (NHI) comprehensive Nonredundant Steel Tension Member inspection training course.

The following positions can be filled by either the owner's employee or by a contracted consultant. All of the positions described prior, while can be contracted to a consultant, requires that the owner still maintains the responsibilities and authority associated with the position as described.

2.4.9. Team Lead Inspector (Team Leader or Team Lead)

Role: The individual that is on-site and in responsible charge of the inspection team and the inspection. Responsibilities include planning, preparing, performing, and reporting on the inspections.

Plans, inspects, prepares reports, and timely submits documentation to a BIP Leader for Bridge and/or Tunnel Inspections. Inspections must be in accordance with the Standards, Regulations & References listed in the Standards and Regulatory Document Section of this Manual.

Responsibilities:

- Be present at all times during inspection and for all Inspection Types.
- Immediately notify the BIP Lead of significant or critical findings which might impact public safety

and/or the integrity of the structure.

- Transmitting certification of inspection teams to BIP Lead prior to conducting bridge/tunnel inspections.

- Understanding and take responsibility for the planning and execution of the inspection team and product as described in the Inspection Section of this Manual.

Qualification Requirements:

A team leader must, at a minimum:

- Meet one of the four qualifications listed below:
    - Be a registered Professional Structural Engineer and have 6 months of bridge inspection experience;
    - Have 5 years of bridge inspection experience;
    - Have all of the following:
        - A bachelor's degree in engineering or engineering technology from a college or university accredited by or determined as substantially equivalent by the Accreditation Board for Engineering and Technology; and
        - Successfully passed the National Council of Examiners for Engineering and Surveying Fundamentals of Engineering examination; and
        - Two (2) years of bridge inspection experience; or
    - Have all of the following:
        - An associate's degree in engineering or engineering technology from a college or university accredited by or determined as substantially equivalent by the Accreditation Board for Engineering and Technology; and
        - Four (4) years of bridge inspection experience.
- Successfully complete a Federal Highway Administration (FHWA) approved comprehensive bridge inspection training course;
- Complete a cumulative total of 18 hours of FHWA-approved bridge inspection refresher training over each 60 month period;
- Provide documentation supporting the satisfaction of these requirements;
- Team leaders on Nonredundant Steel Tension Member (NSTM) inspections must also successfully complete FHWA National Highway Institute's (NHI) comprehensive Nonredundant Steel Tension Member inspection training course.

Team Lead for Tunnel Inspections: The above Section 2.3.9 Requirements apply as well as the following:

There are four ways to qualify as a Team Lead for tunnel inspections as stated in CFR 650.509 (b). If licensed as a Professional Engineer, the engineer must be licensed as a PE in the State of Hawaii.

- Meet at least one of the following qualifications:
    - Be a registered professional engineer and have six months of tunnel or bridge inspection experience.
    - Have 5 years of tunnel or bridge inspection experience,
    - Have all of the following:
        - A bachelor's degree in engineering or engineering technology from a college or university accredited or determined as substantially equivalent by the Accreditation Board for Engineering and Technology.
        - Successfully passed the National Council of Examiners for Engineering and Surveying Fundamentals of Engineering Examination.
        - Two (2) years of tunnel or bridge experience.
    - Have all of the following:
        - An associate's degree in engineering or engineering technology from a college or university accredited or determined as substantially equivalent by the Accreditation Board for Engineering and Technology.
        - Four years of tunnel or bridge inspection experience. or
- Be a Nationally certified tunnel inspector. or
- Provide documentation supporting the satisfaction of paragraphs 1 and 2 above to the BIP Leader. or
- Be a registered Professional Engineer and have six (6) months of tunnel or bridge inspection experience if the BIP Leader determines through the approved process that the tunnel being inspected in complex or has distinctive features or functions that warrant this level of qualification.

2.4.10. Underwater Inspection Diver (UW Diver)

Role: An Underwater Inspection Diver is responsible for evaluating and assessing scour, material conditions, structures or construction underwater and fulfills the responsibilities of an Inspector for Underwater Inspections.

Responsibilities: see the UW Inspection Requirements Section

Qualification Requirements:

- Successfully complete FHWA NHI's comprehensive bridge inspection training course or UW Diver Bridge Inspection course and maintain such certification by successfully completing FHWA NHI's bridge inspection refresher training course or UW diver bridge inspection course every 5 years or less.

- Underwater inspectors must be qualified as divers in accordance with OSHA 29 CFR Part 1910, Subpart T—Commercial Diving Operations, as well as other state regulations related to commercial diving safety. An UW Diver should also have commercial diving training and bridge inspection experience which demonstrates his/her competence.

2.4.11. Specialty Contractors

Specialty contractors are beneficial when the regular inspection staff lacks the specialized skills and experience necessary to inspect sophisticated equipment of complex systems such as power distribution systems, fire protection and detection systems, security systems, and SCADA systems. In these circumstances, specialty contractors must be used when inspecting complex units that pose elevated risks to safety such as boiler units, electrical systems, or energized equipment like transformers. This minimizes health and safety risks to the inspection crew and prevents damage to very expensive equipment.

Electrical and Electronic Inspectors - To inspect elements with advanced electronic circuitry, the staff furnished by the specialty contracts should have the following education, training and experience:

- Certified by an organization meeting the requirements of the International Electrical Testing Association (NETA); or

- All of the following qualifications:

    - Be nationally recognized as an electrical testing laboratory.

    - Be regularly engaged in the testing of electrical systems and equipment for the past 5 years.

    - Have at least one professional engineer on staff that is licensed in the State of Hawaii.

    - Have in house or lease sufficient calibrated equipment to do the testing required.

3. BRIDGE and TUNNEL INVENTORY and CODING

Per 23 CFR 650.315 and 650.515, each State must prepare and maintain an inventory of all bridges subject to the NBIS and NTIS. The inventory consists of the data needed for the Bridge Asset Management Program (BAMP) to function and to comply with the FHWA requirements. This data includes Structure Inventory and Appraisal (SI&A) data and Bridge Element data which is stored in HDOT's Bridge Management database (BrM). HDOT/HWY's BAMP is administered by the Statewide BIP Manager and the Statewide Bridge Engineer. The Statewide BrM Manager manages the BrM asset management software and submits the data annually to FHWA.

3.1. Bridge & Tunnel Number & Format

The Bridge Number (SNBI Item B.ID.01) and Tunnel Number (SNTI Item I.1) must be unique in the State Inventory and should not be re-used. Re-using a number provides inconsistent FHWA historical data. Bridge and tunnel numbers are a 15-digit format that allows Alpha and Numeric characters.

Structures owned or maintained by HDOT uses the following format. For LPAs, the first three digits must be the HDOT District. The other 12 characters should follow a consistent naming convention desired by the LPA.

123 **45678** 9 10 **11 12 13.14 15**

District – The first three digits (1 thru 3) indicate the HDOT District/County (SNBI Item B.L.02, or SNTI Item I.4) where the structure is located in Hawaii: 001 (Hawaii), 003 (Oahu), 007 (Kauai), or 009 (Maui)

Route – The next five digits (4 thru 8) indicate the Inventory Route Number (SNBI Item B.RT.02, or SNTI Item I.7).

Functional Class – The next two digits (9 & 10) indicate Functional Classification (SNBI Item B.H.01 led by 0)

Mile Post – The last five digits (11 thru 15) indicate the milepost in miles as xxx.xx (SNBI Item B.H.07, or SNTI I.12.

Per the Specification for the National Tunnel Inventory, Section 2.2 (Item I.1), the Tunnels have Tunnel Numbers like the below example:

NTI Tunnel Number	NTI Tunnel Name
003000H30200544	Harano Tunnel (Inbound)
003000H30200545	Harano Tunnel (Outbound)

3.1.1. New Bridges

Structure Replacement projects that remove an existing structure and build a new one must have a new Bridge Number and a new Bridge File because the existing data and history no longer apply. The Team Lead must request a Bridge Number from the BIP Lead before data can be entered in BrM. If a

Bridge Number has not been provided, Team Leads should request a new Bridge Number prior to inspection.

To create a new ID for a replacement bridge that will be on the same location as the old replaced bridge, the last digit of the previous code (referring to the second decimal place of milepost) should be added or subtracted one unit.

3.1.2. Rehabilitation, Strengthening, or Widening Existing Structures

Construction projects that rehab, strengthen, or widen the existing structure are not considered new structures and must not change the bridge or tunnel number.

3.1.3. Temporary Structures

Temporary structures used during construction must have a new Bridge Number assigned. Temporary structure bridge numbers use the bridge number of the structure being bypassed with the first digit replaced with a "T", as in T23 **4568** 9 10 **11 12** 13 14 **15.**

3.2. Bridge and Tunnel Names

The Bridge Name does not have an NBI specified format. Hawaii does not have any specific naming criteria and the format is to be determined by the BIP Leader with the approval of the Statewide BIP Manager. Generally, unless named by the State Legislature, the stream crossing, the route the structure is on, or a local reference is used. With the adoption of SNBI coding, more than one name can be entered separated by the pipe symbol |.

There are no national policies established for assigning unique tunnel names. Therefore, as with the Bridge's, the BIP Leader with the approval of the Statewide BIP Manager shall establish a name.

3.3. Inspection Frequency

To be compliant with FHWA requirements, Routine (RTN), Nonredundant Steel Tension Member (NSTM), Underwater (UW), and Tunnel (TUN) bridge inspections are to be completed within the month of the Inspection Due Date. RTN, NSTM, and TUN (NTI Item D.3) inspection frequencies are not to exceed (NTE) **24 months**. For example, the last inspection was on September 15, 2018 and the next routine inspection must be completed by September 30, 2020 within the same month.

The UW frequency shall not exceed **48 months**; and should be the same month as the RTN inspection.

Regularly scheduled UW and NSTM Inspections should be conducted concurrently or within the same month, with the RTN Inspections. The State of Hawaii combines the UW and NSTM inspections to simplify reporting and contracting. Inspection frequency greater than 24 months (or greater than 48 months for UW inspections) must be approved by the Statewide BAMP Manager.

See Inspection Schedule for coding Inspection Date and Frequency of unscheduled inspections.

3.3.1. Reducing Inspection Intervals

Inspection intervals should be reduced when it is deemed necessary or as a precautionary measure to protect the traveling public or monitor field conditions. Reductions are recommended to be increments of 12, 6, 3, or 1-month inspections unless more frequent or odd numbered are justified. Reducing the inspection interval is at the discretion of the inspector's professional judgement and is recommended to the District/LPA BIP Leader for approval. The Statewide BIP Manager should be notified by the BIP Leader for situational awareness and tracking.

If a reduced inspection interval is desired, then a Monitor Report type, Inspection Date, and Frequency should be coded as an "Other Special" in BrM. Monitoring a specific structural item for an extended period can overlap or extend beyond and miss the regularly scheduled inspections. Therefore, Team Leads must not change the Inspection Date or Inspection Frequency for the RTN, NSTM, UW, and TUN inspections unless the BIP lead receives approval from the Statewide BAMP Manager.

3.3.2. Late Inspections

All late Inspections should return to the previous or original schedule for the next inspection, unless the schedule change is permanent and approved by FHWA in writing. Any late inspection is considered non-compliant in the annual Bridge or Tunnel Metrics and late or rescheduled inspections approved by FHWA are considered compliant.

For Late Inspections: The Team Lead must email the District/LPA BIP Leader and the Statewide BIP Manager stating the reason why a TUN, RTN, NSTM, or UW inspection was not inspected within the month due. When these inspections are late, it is imperative that the District/LPA BIP Leader inform the Statewide BIP Manager the Plan of Corrective Action (PCA) to complete the inspection.

For Rescheduled Inspections: Prior to the regularly scheduled inspection date, the Team Leader must justify in an email to the District/LPA BIP Leader and the Statewide BIP Manager why a TUN, RTN, NSTM, or UW inspection needs to be re-scheduled. If Inspections are being done by a hired consultant, the District/LPA BIP Leader must send the justification email to the Statewide BIP Manager. The Statewide BIP Leader coordinates and seeks authorization of approval by FHWA. Rescheduling inspections must have prior written FHWA approval before the regularly scheduled inspection date. Justification for late inspections may include: Severe weather, Inspector safety, Inspection quality, or Statewide schedule adjustment approved by the FHWA Bridge Safety Engineer.

3.4. Latitude & Longitude

Bridge Latitude (SNBI Item B.L.05) and Longitude (SNBI Item B.L.06) and Tunnel SNTI Item I.13 (Latitude) & I.14 (Longitude) must be coded in decimal degrees with 6 decimal places. A negative sign indicates southern hemisphere for latitude and western hemisphere for longitude (e.g., longitude 166º32'23.7" W must be coded -166.539917)

The values recorded should be consistent with the Linear Referencing System (LRS) data that uses the North American Datum 1983 (NAD83). GPS readings for all structures should be recorded at the rightmost lane, at the right edge of pavement solid line, looking towards increasing Milepost at the abutment joint or the portal at the beginning of the bridge or tunnel.

3.5. Design Load

The Design Load coding (SNBI B.LR.01) for older bridges without plans may be assumed based on the year built or era and shown in Table below:

Year Built before	NBI Item 31	SNBI Item B.LR.01	Design Load	Truck Weight Lbs. (Tons)	Standard Specification
1910	0	U	H7/80psf/Unknown	14,000 (7)	1914 Eng. News Mag.
1920	1	H10	H10 Truck	20,000 (10)	AASHTO 1st Ed. 1931
1931	2	H15	H15 Truck	30,000 (15)	AASHTO 1st Ed. 1931
1936	4	H20	H20 Truck	40,000 (20)	AASHTO 1st Ed. 1931
1941	3	HS15	H15-S12 Truck	54,000 (27)	AASHTO 3rd Ed
1944	5	HS20	HS20-44 (14'V)	72,000 (36)	AASHTO 4th Ed. Lane

3.6. Scour Vulnerability

Scour Vulnerability (SNBI Item B.AP.03) uses a single-digit code to identify the current status of the bridge regarding its vulnerability to scour. Scour analyses shall be performed by a hydraulic, geotechnical or structure engineer. Details on conducting a scour analysis are included in the FHWA Technical Advisory T5140.23 titled, "Evaluating Scour at Bridges"."

The Scour Evaluation Report (SER) provides the engineering justification for the SNBI Item B.AP.03 code and must not be changed without the approval of the Statewide Hydraulics Engineer. If a scour inspection finds the field condition is beyond the limits described in the SER, the SER must be updated to justify the new scour code. The Team Lead should immediately contact the Statewide Hydraulic Engineer for approval to change the SER and notify the District/LPA BIP Leader.

The Team Leader recommends the code for the SNBI Item B.AP.03, the District/LPA BIP Leader must concur, and the code is then submitted to the Statewide Hydraulic Engineer for concurrence. If SNBI Item B.C.03 (Substructure Condition Rating) is less than or equal to 4 due to scour, or SNBI Item B.C.04 (Culvert Condition Rating) is less than or equal to 5 due to scour, the Team Leader should contact the District/LPA BIP Leader who should contact the Statewide Hydraulic Design Engineer for bridges under the jurisdiction of HDOT. For bridges under the jurisdiction of a Local Public Agency (LPA), the Team Leader should make a recommendation to the LPA BIP Leader. The LPA BIP Leader should contact the Statewide Hydraulic Engineer for concurrence.

The Team Leader is responsible for 1) Updating a SER and POA, 2) Changing the SNBI Item B.AP.03, 3) Submitting the updated scour documents (docx & PDF) with the other Inspection Report files.

Scour Repairs

HDOT defines Scour Repairs as repairs that are not designed and installed in accordance with HEC-23. Therefore, Inspector Repair recommendations and other existing repairs to the waterway or substructure are considered Scour Repairs unless documented as HEC-23 compliant. Accordingly, Scour Repairs should be inspected carefully for performance and condition and must not raise the SNBI Item B.AP.03 (Scour Vulnerability) code.

3.7. NBI & NTI Data Submittal to FHWA

The deadline for the Statewide BrM Manager to submit the annual NBI and NTI data to FHWA Hawaii Representative is March 15th annually. The process to submit inspection and element data is as follows:

- HDOT/HWY generates the submittal data files and completes a NBI Submittal File Check and NTI Submittal File Check which analyzes for inconsistencies and errors.
- District/LPA BIP Leaders will be required to correct all Fatal Errors and address general (Non-Fatal) errors. Fatal errors prevent acceptance of the entire submittal where it is HDOT policy to address all Non-Fatal errors. Most of the data associated with Non-Fatal errors is required for the Bridge Management System to function, with exceptions such as Half-Bridges.
- The Data and Element Check spreadsheets are emailed by the Statewide BIP Manager, or delegated assistant, to the FHWA Hawaii Division for review of the exceptions.
- FHWA Hawaii Division will respond to the Statewide BIP Manager within 48 hours with data corrections or approval.
- The Statewide BrM Manager, or delegated assistant, submits the data to the FHWA UPACS website.

The remainder of this page is intentionally left blank

4. INSPECTION REPORTS

This Section describes the Team Leader report requirements to inspect all structures in the State of Hawaii. The Team Leader prepares and signs off on the Inspection Report and the required data that is then entered into BrM. All required information prepared is then submitted to FHWA by March 15th each year by the Statewide BrM Manager, or delegated assistant. Reports are public legal documents and the contents should be factual, clear and concise to avoid ambiguity in meaning.

4.1. Report Contents and Format

The following basic format and order sequence of information applies to all HDOT Inspection Report Types. A complete Inspection Report consists of several 8 1/2" x 11" pages consolidated in one PDF for the Bridge File. Pages may be one or two sided. The order of information presented in a report is as follows. The use of Company Logo on the report cover, header, footer, Plan Sheets is acceptable.

4.1.1. Report Cover Sheet

The Report Cover Sheet should be one page with the following information from top to bottom:

- Title: Report Type
- Subtitle: Bridge Name and Bridge Number
- Report Date: Date the structure was inspected.
- Color Elevation photo (if cannot be obtained, then a bridge approach).
- Prepared For: Owner Name (Centered)
- Prepared By:
    - Left side: Team Lead name, Certification Date and company if consultant
    - Right side: Signed Engineering Stamp if Team Lead is licensed Structural Engineer in the State of Hawaii.

4.1.2. Vicinity Map

The Vicinity Map should be a one-page map of the island showing the vicinity around the bridge and an exploded view of the exact location of the structure on the route. The island map should show the State routes and Local routes in or near the structure.

4.1.3. Table of Contents (TOC)

TOC page numbering should be able to identify if pages are missing in the Report. Sections should identify the concepts presented here.

4.1.4. Inspection Summary

This can be used for any justifications, instructions, or summary statements deemed appropriate by

the Team Lead for topics such as: load rating, actions taken, NSTM, or underwater inspections. If there is a change in condition ratings, a brief statement directing the reader to the appropriate section should be added here (even if such section is in a different report, e.g., the underwater inspection report). Also, if Deck, Superstructure, Substructure, or Culvert rating is 5 or below, it is recommended to include a narrative statement on the rating, even if it has not changed from last inspection. Plans, sketches, and test results should be included on separate pages following this section.

Damage, Monitoring, or other non-scheduled inspection report should summarize the inspection and results here. All details of the inspection observations, findings, repairs, and structural evaluation must be labeled and dated in BrM Element notes but may be referenced in this section. The Element Notes are assumed to be Routine Inspection notes unless labeled and dated otherwise. The label format for non-Routine Inspection notes is RPT MM/YY. For example: DAM 01/20, MON 03/20, or UW 04/20.

The following topics are required, as a minimum, for the inspection summary.

- Orientation: The orientation will use increasing stations of the route (MP) on the bridge and is stated first in the Inspection Summary for all readers– regardless of Plan orientation. Exceptions to increasing station orientation for large structures or trusses a require a documented approval statement by the Statewide Program Manager in the Inspection Summary. Relative to increasing stationing, the orientation of cardinal directions (N, NE, E, etc.) and (Mauka or Makai) used for locating defects is defined in this section and shown on drawings.

  For overcrossings with no route direction, the orientation of increasing numbering (Stations) will be in accordance to the Plans. If Plans do not exist, then the orientation is from left to right, looking up station of the main route On, Under, or Over the structure. Off system structures should assume the increasing station is from the nearest main route.

- Inspection Methods and Access: This should describe required equipment, lane closures, and procedures used to inspect the defects such as: Sounding concrete/timber, Depth meter, Non Destructive Testing (NDT), Long term crack gauges. If defects are out of reach, describe the method or equipment used to access and measure the defects such a section loss. Provide justification of why and what portions of the structure could not be accessed this inspection. Lack of equipment or scheduling are not acceptable justifications for not accessing defects.

- Load Rating: The date of the last load rating. A reason why or why the structure did not need to be re-rated in accordance with BIP Manual Section 5.3.5.

- Bridge Access: Describe parking and necessary directions.

- Safety Issues: Inspection Hazards, Required equipment, Terrain, Presence of Homeless, or Traffic Safety.

4.1.5. Load Rating Summary (LRS)

A LRS must be included in the Report if the structure was re-load rated as part of the inspection. Load Rating calculations with a Load Rating Summary are submitted as a separate PDF and submitted to the Bridge File for reference in future inspections.

4.1.6. BrM Element and SI&A Reports

The final report must have the SI&A Report and the BrM Element Report with Team Lead and BIP Lead signatures printed from BrM.

4.1.7. Report Photos

All photos must be colored photos and clearly show details. Supplemental photo markups are welcome such as Arrows, Text, etc. All photos must be numbered for reference in the Report. The Report should not include photos that do not show a defect or fail to add value.

- Four (4) photos per page is preferred with a description in a Photo Title.
- First 4 photos should show two (2) bridge deck approach and two (2) elevations from upstream and downstream to get the reader oriented.
- Photo Description:
    - Photo Number, Direction, Location on structure, Date, Defect description
    - Include direction of observation such as “Looking Upstream”, “Up Station”, etc. References to cardinal points (N, S, E, W, NE, SW, etc.) should be avoided.
    - Defect Description that includes Condition Element Rating or Condition State (CS#) and Quantity of defect found, including a short description that indicates what the reader should look for in the photo.
    - Date stamp (MM/DD/YY) on photo preferred to a date in Photo Description for assurances that photos collected at time of inspection.
    - Posting Signs require a photo to be taken of the sign, as well as provide enough detail in the description to identify where the sign is located.

4.1.8. Plan Sheets

Drawings as necessary to include minimum of a Plan View, Elevation, & Cross Section. If Plans do not exist, use field dimensions to provide drawings and note this on the Drawings. AutoCAD generated drawings are recommended but not required. At a minimum, the following information should be included:

- Plan View: Show NBI (SNTI) all dimensions coded on SI&A such as: Structure length, Roadway (curb-to-curb), Curb or Sidewalk, Deck width (out-out) or Culvert approach width, Skew angle, Median width, Traffic barrier height.
- Locate and label deck patches and spalling on the Plan View for ease of reader and follow on inspector to check for changes.
- Elevation View: Vertical Clearance to roadway under/over structure and measurement location.
- Scour extent at piers must be shown (sketched) and dimensioned (HxWxL) in Plan and Elevation to support notes. Separate drawings may be used to show this.
- All defect quantities in CS3 and CS4 should be labeled and located on Plan Sheet Drawings to support the element notes. Defects may be shown by hand if not practical to show defects with drafting software.
- Stationing for long structures: The locations of many devices on the Interstate H-3 corridor, such as electronic traffic signs and surveillance cameras, are often described by their stationing. Stationing is a method used to describe location along a linear alignment, such as the interstate H-3 corridor or the Tunnel. For example, the station “435+20 refers to a point 43,520 feet away from the predefined location. As another example, the station 301_65 is 165 feet away from station 300+00.
    - Tunnels require stationing

- Utilize clock format
- Grid lines with major tick marks labeled for scaling and finding defects

4.2. BrM Data and Coding

This Section 4.2. only applies to BrM versions prior to BrM version 7 (scheduled to be released in November 2024). It also only applies to collection of 1995 Coding Guide (i.e., it does not apply to SNBI data collection). It describes the inspection data inputs for BrM. Clarifications or questions should be directed to the Statewide Program Manager (bip@hawaii.gov).

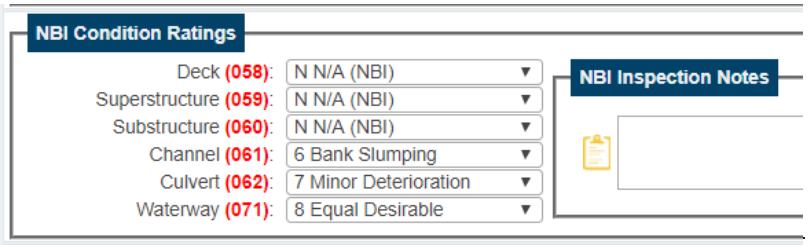
4.2.1. Traffic Safety Features Notes

The Traffic Safety Features notes should justify coding of "0" - not acceptable and "N" – not required or direct the reader to the appropriate Rail Element(s).

4.2.2. NBI Condition Ratings Notes

The NBI Inspection Notes should direct the report reader to the Elements that justify or support the NBI coding of the Deck, Superstructure, Substructure, or Culvert. If the NBI Items are in Good condition, this can be left blank. If there is a change in condition ratings, a brief statement directing the reader to the appropriate section should be added here (even if such section is in a different report, e.g., the underwater inspection report). Also, if Deck, Superstructure, Substructure, or Culvert rating is 5 or below, it is recommended to include a narrative statement on the rating, even if it has not changed from last inspection.

Channels and Waterways that do not have Elements and comments to support coding should be included here.



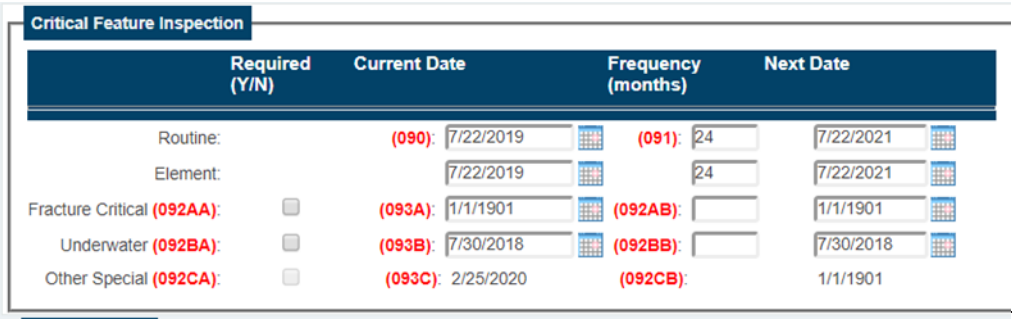
4.2.3. Coding Report Type, Date, & Frequency

All Reports must complete the *Inspection* > *Schedule* > *Summary* & *Schedule* menus to record the Inspection Type, Inspection Date, Frequency, and the Next Date the Inspection is due.

The Inspection Date or Current Date is the date the structure was inspected. If the inspection is completed over several days, the first day of inspection is the Current Date.

The Inspection Frequency and Inspection Date for the following Report types are defined in the FHWA Coding Guide and must be coded in the *Inspection* > *Schedule* > *Summary* & *Schedule* or the Inspection > *HDOT Inspection* > *Critical Feature* menu pictured below.

- RTN Ins. Date = Item 90 Freq = Item 91
- FC Ins. Date = Item 93A Freq = Item 92A
- UW Ins. Date = Item 93B Freq = Item 92B

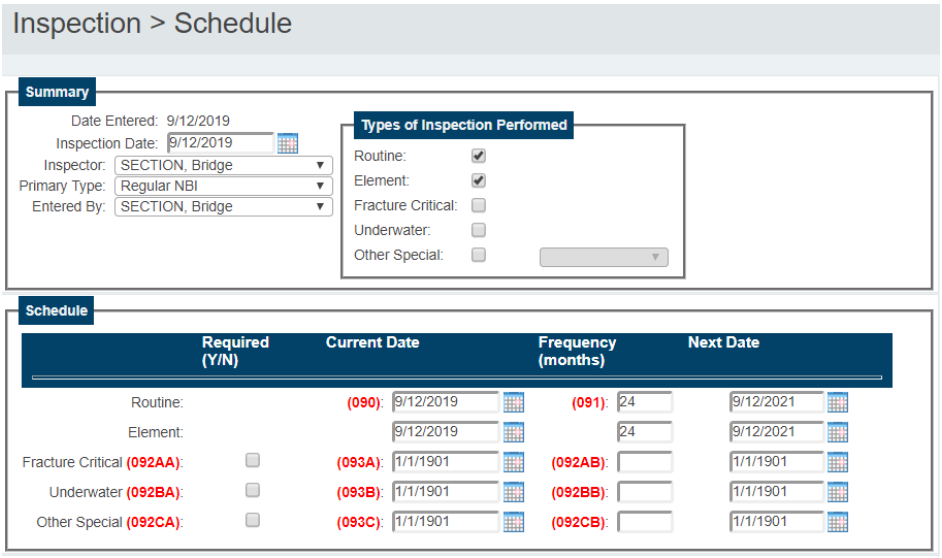


Inspection Schedule

The *Inspection* > *Schedule* > *Summary & Schedule* menus are completed for all Reports and indicate the Report Type of: RTN, FC, UW, or "Other Special" Report in the Check Box. The Element Report type can be ignored.

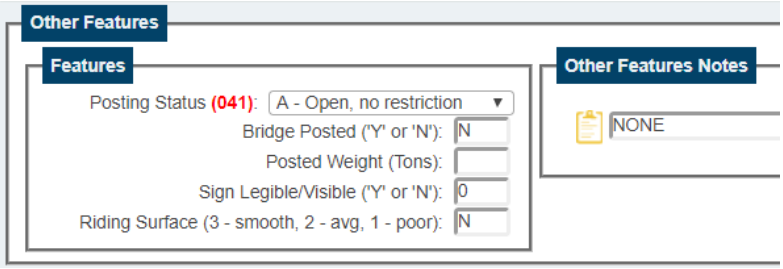
Checking "Other Special" inspection must indicate the Report Type: DAM, MON, POSTE, IN-DEPTH in the Pull-Down menu. These are unscheduled inspections that do not have an assigned frequency and must be provided by the Team Lead. If the structure does not need another inspection, then the Next Date should be blank. The Next Inspection Date or Next Date is defined as the number of Inspection Frequency months added to the last Inspection Date. Code "Other Special" Report in BrM as follows:

- Check 092CA to indicate an unscheduled report.
- Current Date 093C is the Inspection Date.
- Frequency 092CB is the number of months the next inspection is due. Decimal month acceptable for weeks.
- Next Date is the number of Inspection Frequency months added to the last Inspection Date.



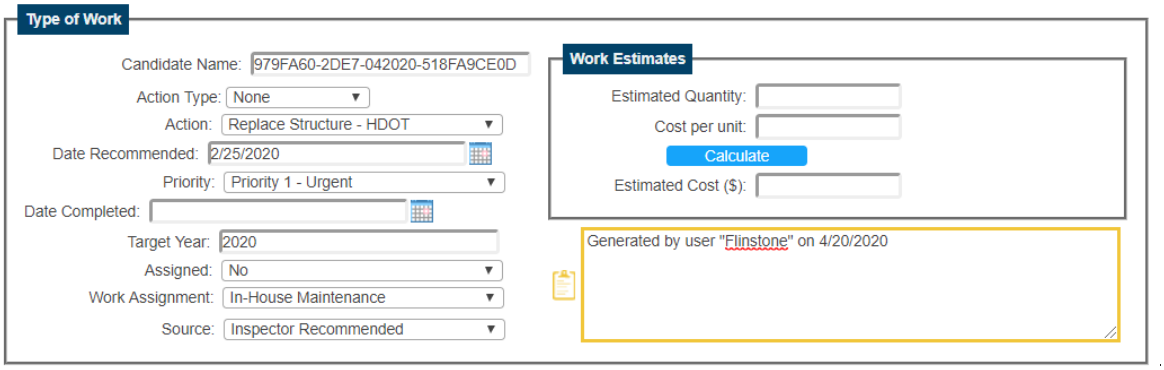
4.2.4. Other Features Notes

The “Other Features Notes” should describe weight restriction signs present at both ends of the structure, and the Report should include photos of each. The description should include the Posted weight (Tons) and where they are located. Team Lead is responsible for ensuring compliance with MUTCD which includes advanced warnings signs. Repairs should be recommended when signs are missing, dirty, or not compliant with MUTCD in Proposed Work.



4.2.5. Proposed and/or Recommended Work

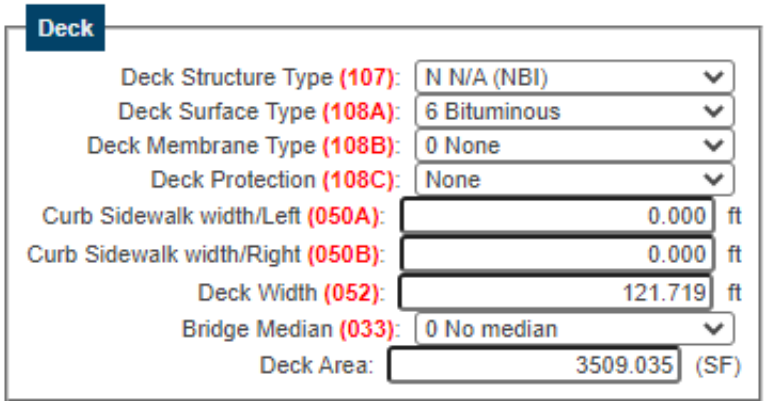
All repair recommendations must describe the repair in Inspection > Work > Work Candidates. Repairs should include critical repairs as well as routine.



4.2.6. Deck Types

All inspections shall include appropriate updates to the Deck Types in accordance with NBI Item No. 107 – Deck Structure Type, and NBI Item 108 – Wearing Surface/Protective System. This includes updating the following information listed in the Inspection>Inventory>Design> Deck menu.

- Deck Structure Type (NBI Item 107)
- Deck Surface Type (NBI Item 108A)
- Deck Membrane Type (NBI 108B)
- Deck Protection (NBI 108C) listed in the Inspection>Inventory>Design> Deck menu.



The inspector shall provide updates using the latest SI&A Template.

The remainder of this page is intentionally left blank

5. INSPECTION AND REPORT TYPES

This Section describes the inspections and report types defined by HDOT to document different types of inspection and facilitate contract work.

5.1. General Inspection Criteria

All Inspections must follow the inspection procedures, coding, defect descriptions, and documentation in accordance with MBE, BIRM, and FHWA Coding Guide for bridges and the TOMIE and SNTI for tunnels. Inspections are to follow the national elements as stated in the manuals, unless stated otherwise in this BIP Manual.

Reporting of structure conditions should focus on Element Condition State 3 and Element Condition State 4 where defects and conditions are quantified, located, and dimensioned for others to effectively detect a change in the condition. Element Condition State 4 quantities must be documented to the extent necessary for a load rating engineer to revise the Load Rating calculations.

The Team Leader is responsible for the following general items prior to all inspections.

- Personnel, qualifications, equipment, traffic control, permissions, or permits.
- Previous inspection reports, Plan or Design information, and Scour POAs.
- Review recommended Owner Actions in previous reports. Contact the Statewide BIP Manger if a lack of Owner Action threatens the safety of the structure or traveling public.
- Signing the Report.

5.1.1. Inspection Methods and Drones

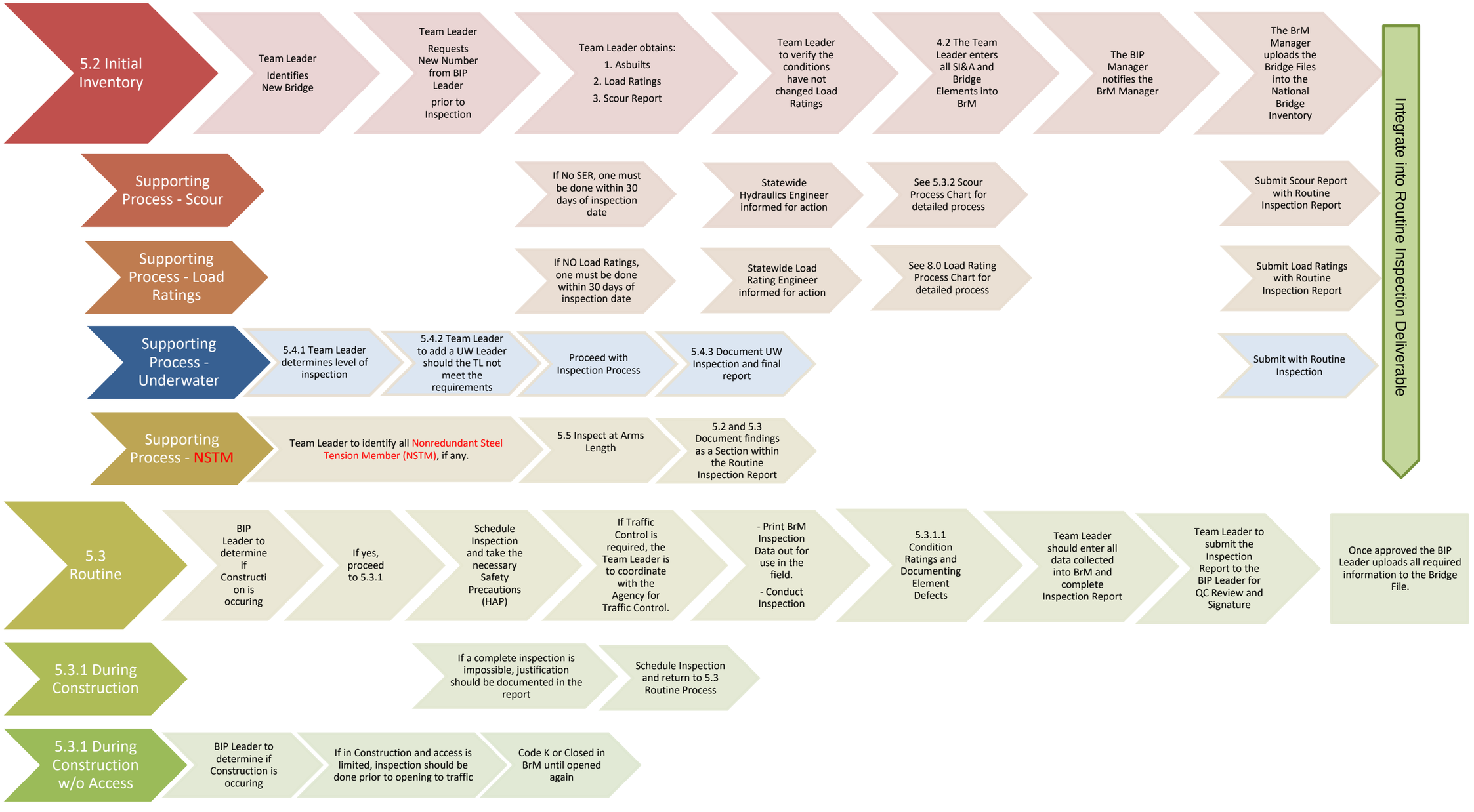
When more than one method is used to inspect a structure, the Report must state the limits of what was inspected by each method. For example, if an Under-Bridge Inspection Truck (UBIT), ropes, and ground inspection is used to inspect a large truss, then which portions were inspected by what method should be documented. Drone cameras are an acceptable bridge inspection method and considered equivalent to a hand-held camera. Drones do not replace the need for other close-up inspection procedures or requirements such as: crack inspections, sounding concrete or bolts, measurement of marks, installing crack monitoring.

5.1.2. Inspection Process Diagram

The diagram on the following page outlines the process for Inspections and details decision points and by whom.

STATE OF HAWAII

BRIDGE AND TUNNEL INITIAL AND ROUTINE INSPECTION PROCESS DIAGRAM



5.2. Initial Inventory

An initial inspection, also referred to as an inventory inspection, is the first inspection of a new bridge or an existing bridge after a construction alters structure elements such as a deck replacement, superstructure replacement, widening. This is a Routine Inspection with additional effort to establish new Structural Inventory and Appraisal (SI&A) data and reporting. Depending on the structural design, additional types of inspections, such as Fractural Critical Inspection and Underwater Inspection, may be required and must be performed at the same time.

In addition to a Routine Inspection, new structures and existing structures with contracted work or structures new to the BrM database have the following initial inspection requirements.

- For new structures and discovered structures not in the BrM database, the Team Lead must request a Bridge Number from the BIP Lead before data can be entered in BrM. If a Bridge Number has not been provided, Team Leads should request a new Bridge Number prior to inspection.

- Within one week of identifying that the bridge/tunnel requires a bridge number the following steps should be taken simultaneously:

    - The Team Leader is to obtain the original As-Built Plans from the BIP Lead. These are required to determine the proper Elements, SI&A coding, and used to design repairs. Submit an As-Built Plans PDF with the Initial Inspection report.

    - The Team Leader is to obtain Load Rating calculations and Load Rating Summary from the Statewide Bridge Design Engineer. The Team Leader is responsible for verifying the field conditions have not changed in the Load Rating calculations.

        - HDOT and/or the County should have Load Ratings available as part of the Design Contract. In accordance with CFR 650.313(c), if Load Ratings are not available for new or existing structures, a Load Rating and Summary must be completed within 30 days of the Inspection Date; and submitted with the Routine Inspection Report.

    - The Team Leader is to obtain the Scour Evaluation Report (SER) for bridges over a waterway from the Statewide Hydraulics Engineer. Inspector must review the SER for completeness, As-Built changes, or change in conditions; and complete an initial Channel Cross Section. If a SER is not available, then SER must be completed within 30 days of the Inspection Date; and submitted with the Routine Inspection Report.

        - HDOT and/or the County should have SER available as part of the Design Contract. In accordance with CFR 650.313(e)(3), if the SER is not available for new or existing structures, a SER and POS for scour (if necessary) must be completed within 30 days of the Inspection Date; and submitted with the Routine Inspection Report.

- Upon receipt of each of the above, proceed to the following steps:

    - Initially code the bridge using Plan data. Conduct Routine Inspection. Verify Element and SI&A coding match to constructed components and conditions in the field.

    - All SI&A Items and Bridge Elements must be coded carefully this first time to avoid errors in the

FHWA data submittal and future inspection re-coding. Coding is done by filling an excel spreadsheet that is provided by the BIP Management under request. Coding questions may be directed to the BIP Lead or Statewide BIP Manager (bip@hawaii.gov).

- HDOT and/or the County should have Load Ratings available as part of the Design Contract. In accordance with CFR 650.313(c), if Load Ratings are not available for new or existing structures, a Load Rating and Summary must be completed within 30 days of the Inspection Date; and submitted with the Routine Inspection Report.

- HDOT and/or the County should have SER available as part of the Design Contract. In accordance with CFR 650.313(e)(3), if the SER is not available for new or existing structures, a SER and POS for scour (if necessary) must be completed within 30 days of the Inspection Date; and submitted with the Routine Inspection Report.

- More specific inspections such as Underwater and Nonredundant Steel Tension Member (NSTM) Inspections must be completed with the Initial Inventory Inspection.

- Obtain documents proving ownership (SNBI Item B.CL.01) if the new structure is a result of a change in ownership; and include the document as a separate PDF submittal for the BrM Bridge File. Include all pertinent agreements that also indicate if maintenance (SNBI Item B.CL.02) is the responsibility of another agency.

5.3. Routine Inspection

Structural Inspections document the field condition and findings in one of the HDOT Inspection Report types. CFR 650.305 defines a Routine Inspection as a “Regularly scheduled inspection consisting of observations and/or measurements needed to determine the physical and functional condition of the bridge or tunnel, to identify and document changes from initial or previously recorded conditions, and to ensure that the structure continues to satisfy present service requirements.”

The inspection data is used to determine the Load Rating of a structure, which is used for posting weight limits and truck permits. Reports are also a legal record, which may form an important element in some future litigation. Reports should include the source(s) of all information contained in the report, including the names/date of other inspections, as well as any other source of data.

Routine inspections are conducted from the deck, ground, or water level, permanent walkways and may require a UBIT or ropes to access elements. Photos should be provided for all described defects in the Report. Routine inspection activities include:

- Concrete element sounding to determine the limits of delamination/deterioration

- Timber sounding and probing/drilling to determine the limits of internal deterioration, rot, and decay

- Connection inspections (bolts, rivets, welds) to identify failing welds/rivets and loose/failing bolts

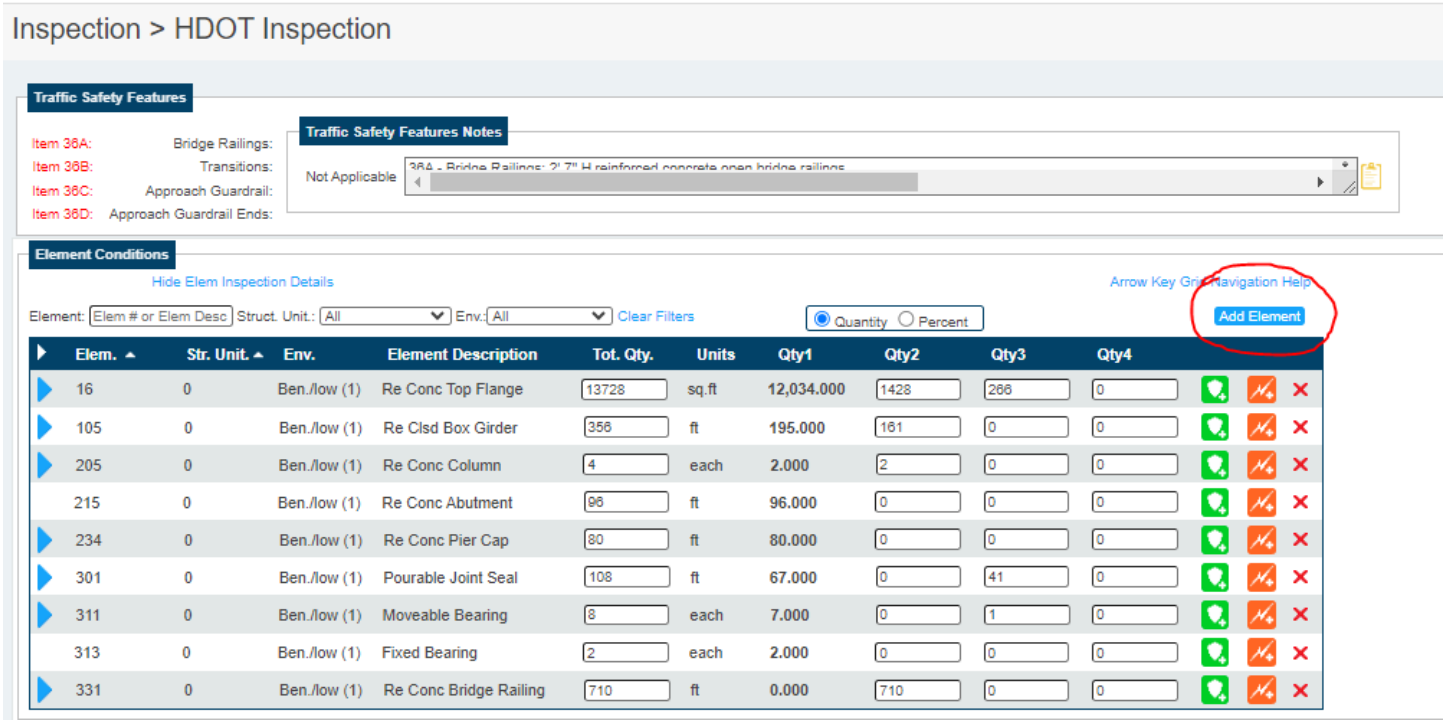
- Measurement of remaining steel or rebar section

- Inspection of bearings, paints, or finishes and other miscellaneous structural elements.

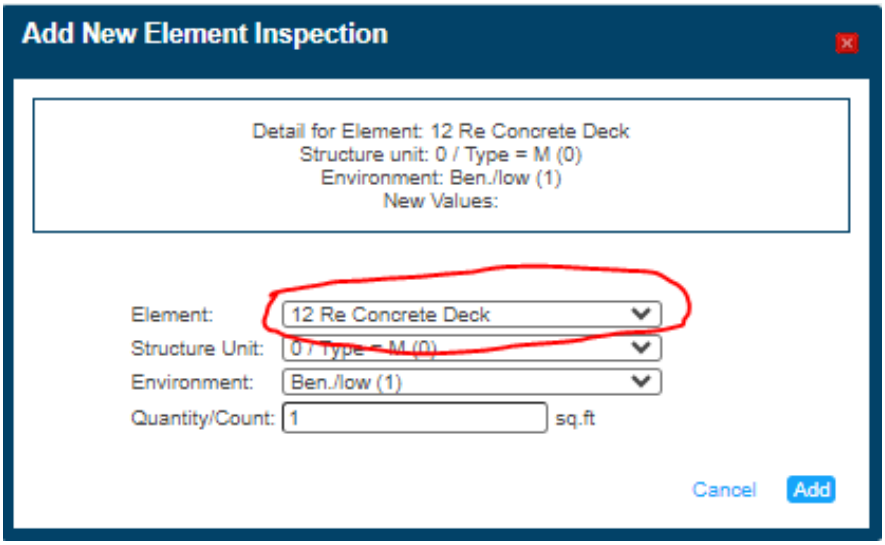
5.3.1. Adding New Elements

BrM had a recent update and included new Elements that were not available in the past, and therefore might not have been in the Initial Inventory. These Elements, if missing, should be added through the following procedure:

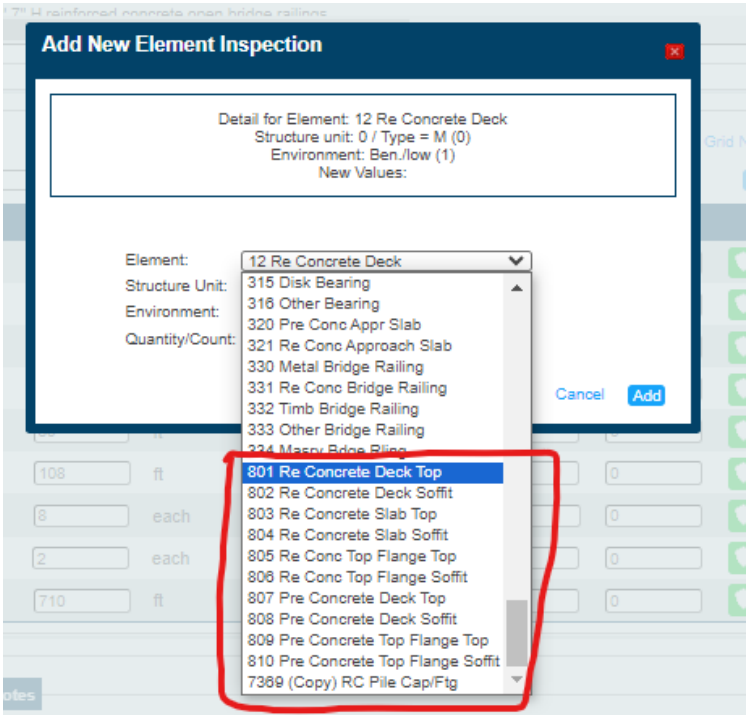
In BrM > HDOT Inspection, with a bridge selected, click on the “Add Element” button (circled in red).



This will pop up with a drop down for the Elements (circled in red).



In the drop down menu, scroll all the way down to see the new Elements (circled in red).



5.3.2. Routine Inspection During Construction

If a scheduled inspection occurs during construction, the inspection of the structure or the temporary structure, must still be performed as scheduled where all accessible elements are inspected. If necessary, Team Leads should contact the BIP Lead for access to the construction site. Inspection must follow any site-specific safety protocols. If construction operations prevent a complete inspection, then the Report must provide a detailed description what prevented the inspection and the limits of what elements were not inspected.

If a structure is closed to traffic without a temporary structure, then SNBI Item B.PS.01 Load Posting Status is coded C or Closed; and the structure should be re-inspected before it is open to traffic. See Coding Section in the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (FHWA Report No. FHWA-PD-96001).

5.3.3. Condition Ratings

In order to promote uniformity between the Statewide Bridge Inspectors the guideline in the referenced Coding Section of the Recoding and Coding Guide for the Structural Inventory and Appraisal of the Nation's Bridges (FHWA Report No. PD-96001) will be used.

Condition ratings are used to describe the existing, in-place bridge as compared to the as-built condition. Evaluation is for the materials related, physically condition of the deck, superstructure, and substructure components of a bridge. The condition evaluation of channels and channel protection and culverts is also included. Condition ratings 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 rating 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 following are the condition ratings to be used:

CONDITION RATINGS:

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

5.3.4. Documenting Element Defects

The object of the Hawaii defect reporting convention is to locate defects clearly and uniformly for

reference on the report drawing, but also to orient the reader's mental viewpoint to find the defect on the structure. The standard convention is based on the assumed orientation:

- If facility carried on bridge has mileposts (MP), orientation is facing the direction of the increasing route station.
- If route doesn't have mileposts, but it connects a major artery with MPs to other smaller roads or it has a dead-end, then orientation is looking away from the major artery.
- If route loops from a major artery with MPs returning to the same artery, orientation is parallel to what would be on major artery.
- If route connects two major arteries with MP, orientation is looking away from artery with highest ADT.
- For any other condition, orientation needs to be described in the Inspection Summary orientation.

Standard abbreviations (see Abbreviations) must be used that include, but are not limited to:

- Abutment 1 (A1) is at the minimum station.
- Super and Sub elements such as: Girders (G1) and Columns (C1) are numbered from **left to right**.
- In accordance with Hawaii Pavement Management System (HPMS), Traffics Lanes (L1) are numbered from **right to left**, for all lanes on the structure. The exception is for bridges with traffic in the decreasing direction only should be numbered left to right, looking up station. Using numbers avoids the need for a lane label of NB/SB or IB/OB with each lane and the orientation is consistent with pavement data systems. Lane numbers should be labeled on report drawings for the reader.
- Trusses are 3 dimensional and each truss in the bridge must be labeled as E/W, N/S, or other where Mauka and Makai Mu/Mi is not allowed; Each panel supported by floorbeams are numbered (P1); Truss members including cross bracing with a defect (L1U1) are identified by their connecting truss nodes using the Plan convention, or provided by inspection, and the convention must provided in the report drawings such as: Upper (U0), Lower (L1), Middle (M2), etc. Floorbeams (FB2) are identified by the truss node.
- References to places must be avoided to describe defect location such as Hilo side of pier.
- Other abbreviations for reporting North Side (NS) must be defined in the Inspection Methods of the Inspection Summary.

Each defect note starts will a standard convention to locate defect and end with a (Photo Number) as follows:

- Span Number (S1)
- Element letter: G1, Deck Lane(L1)

- Element letter measured from: Abutment (A1), Pier (2)
- "@ Distance to defect:"
- Defect description with measurements for all CS4
- Defect quantity such as: 2 SF=CS4 where the total quantity of the element defects described in the notes add to the total recorded in the defect.
- individual defects using the element units.
- Photo number in parenthesis

Examples:

Deck/Slab defect: S3 L1 P3 @ 10': 2 patches 2'x 3', 12 SF=CS3 (Photo 2)

S10 L2 P9 @ 30': 2' x 2' x4" spall, N wheel line, 1-#6 (0.75"=D) exposed bottom bar D measures 0.5" at location shown in photo, 4 SF=CS3 (Photo 8)

S4 L2 P4 @ 30': 3 spalls 1'x1' in shoulder, 3 SF=CS3 (Photo 3)

PS girder defect: S2 G1 A1 @ 5'-7": 1' x 2' x2", N side of bottom flange, 2 LF=CS2 (Photo 9)

S3 G4 P3 @ 10': Bottom flange NS, Exposed strand with no section loss, 2 LF=CS2 (Photo 9)

Truss defect: E S14 P13 L13U12 @ 10' from U12: 1 of 20 rivet heads missing on W side of W gusset PL, Based on engineering judgement this is considered CS1 (Photo 21)

EW S1 P1 U0 @ 12' from E UO, High load hit in portal over Lane 1, Gouge in N side is 1" wide x 2" long x 1" deep, 1" deflection of bottom edge centered over 12' - marked and measured, Heavy rust indicates damage was not recent, Analysis indicates internal stresses of the defect does affect the function or capacity of the truss portal or the truss, 1LF=CS2 (Photo 22).

As with trusses, following the location convention for substructure defects may require adjustments. By indicating the Span first in substructure defects, the side or viewpoint of the abutment/pier wall/ bearing is identified. This is redundant for abutments but clearly identifies all defects that need to be field inspected in the span. Further location can be provided as Left/Right side, N/S, etc. of column as necessary.

Column defect: S3 P4 C1 Right Side @ 10' from top: 3'x1'x4" spall, 3-#4 (0.5"=D) exposed stirrups, Measurements of the min. dia. are 0.45", 0.37", 0.48" at locations shown in photo, Section loss does not affect the capacity of the column, 1 EACH CS3 (Photo 12)

Pier wall defects: S1 A1 G1 @ 10': 2'x3' delam 4' to the left of G1 2LF=CS2 (Photo 4)

S9 A2 G5 @ 15': Vertical x 0.325" wide crack below G5, Crack monitor installed 1/1/11, Movement undetermined at this time, 1 LF=CS3 (Photo 10-12)

5.3.5. List of Abbreviations

A#	abutment number
B#	bent number
BM#	beam number
C#	column number
CL#	culvert cell number
FB#	floor beam number
G#	girder number
L#	lane number
P#	pier number
PKT#	picket number
Pile#	pile number
PLK#	plank number
Post#	post number
S#	span number
SN#	sounding number
ST#	stringer number
UPSTRM	upstream
DNSTRM	downstream
N	North
S	South
E	East
W	West
VR	varies/vary/various
ASM	assumed
OC	on center
SP	spacing
PTC	pitch

DKS	deck soffit
FTG	footing
GRS	girder soffit
HW	headwall
JT	joint
PARA	parapet
PVMT	pavement
RAIL	railing
SLS	slab soffit
WW	wingwall
FH	full height
FS	full span length
FW	full width
LN	long/length
WD	width/wide
DP	depth/deep
HT	height/high
HRZ	horizontal
VRT	vertical
LNG	longitudinal
TRN	transverse
DGN	diagonal
SKW	skew/skewed
STG	stagger/staggered
EXB	exposed rebar
SCL	section loss
PRM	percent remaining

5.3.6. Routine Inspection for Scour

Scour is the movement of channel bed material by the action of the moving water, and it has been the leading cause of bridge failures. Scour can raise or lower the stream, erode the stream banks, and create holes around or under the substructure and pose an unseen threat to safety. Scour is generally most severe during periods of high flow. When flows recede to normal levels, the presence of scour is often hidden by silt or debris, making detection of compromised foundations difficult.

Routine Inspections of a structure over a waterway must include an inspection for scour, collect Channel Cross Sections, and incorporate the results of a required UW inspection. The scour condition is required to code SNBI Items B.C.03 Substructure Condition Rating, B.C.09 Channel Condition Rating, B.C.04 Culvert Condition Rating, and B.C.11 Scour Condition Rating. Therefore, the full height or face of any substructure in the water must be inspected for scour, and substructures that have the potential of being in the water.

5.3.7. Scour Inspection

Scour inspections must document a change in condition of the: Stream Channel, Stream Banks, Material supporting substructures, Countermeasures, and Scour Repairs. Inspectors must look for changes in the field conditions as compared to previous reports, channel cross sections, and the Scour Evaluation Report (SER). HEC 18 "Evaluating Scour at Bridges" as well as the BIRM and MBE discuss inspection procedures for bridges over water. The field inspection includes the specific location and extent of any deterioration, damage, or undermining in:

- The stream channel and stream banks.
- The substructure elements. (i.e., footings and seals).
- Channel protection devices (i.e., dams and levees).
- Scour countermeasures (i.e., riprap or shielding).

5.3.7.1. Scour Conditions in Element Defect 6000

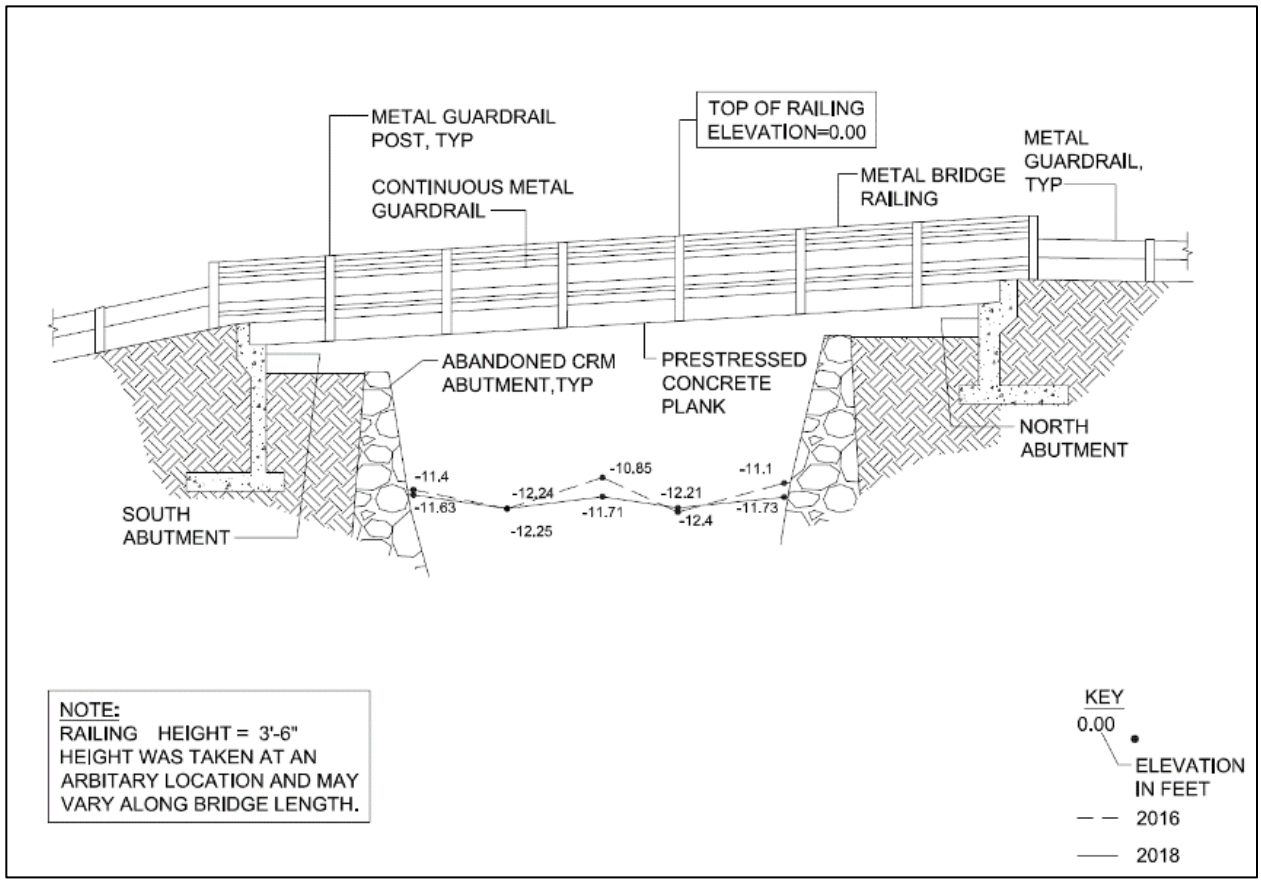
Scour reporting must describe the scour and location in the substructure Elements using the Scour Condition Defect 6000. When inspecting scour conditions, the inspector must document the following:

- Locate and dimension exposed foundations/piles, undermined footings, and scour holes within 50 feet upstream and downstream.
- Follow any special inspection requirements documented in a Scour or Countermeasure POA. Existing Countermeasure repairs should be coded as NBI Scour Item 113 = "7" and inspected for deterioration and effectiveness.
- Complete cross section profile in accordance with Channel Cross Section Profiles and compare current cross section profiles with: 1) The initial and previous channel profile, 2) Soundings documented under Element Condition 6000 Scour Defect, and 3) Foundation and/or pile tip elevations to determine if the bridge has experienced scour activity or infill of scour holes. If there is unexpected or undocumented scour or lateral movement of the streambed, notify the Statewide Scour Engineer for possible changes to the SNBI Item B.C.11 Scour Condition Rating Code.
- Channel and channel protection devices should be inspected for signs of flooding or excessive water velocity which may affect undermining, erosion of banks, and realignment of the stream. If stream behavior is different from the assessment described in the Scour Evaluation Report, see Changing SNBI Item B.C.11 Scour Condition Rating Code.
- Measure and record the extent of foundation exposure and undermining.
- Recommend any repairs, replacement, or maintenance required.
- Perform soundings on bridges as identified by the Scour Engineer using the Scour Defect 6000.

5.3.7.2. Scour Sketches and Photos

Scour Sketches, and photos if scour is visible, must be included in the inspection report for Critical Findings, Condition State 3, and Condition State 4 defects. A Plan and Elevation drawing for each scour defect must provide adequate dimensions for the next Inspector to determine a change in scour volume. If previous drawings exist in the Bridge File, the current scour voids may be plotted over previous drawings for ease of comparison with the information labeled by date. Sketches must show the following minimum bridge information in addition to the scour defect:

- Bridge Name, Bridge Number, and Waterway Name (Feature Intersected)
- Orientation direction, Direction of flow, and Substructure labels.
- Substructure footing/pile cap top and bottom Elevations with dimensions.
- Scour depth dimensions provided in the Scour Evaluation Report (not shown)
- Label cross-section reference points within the sketched area.



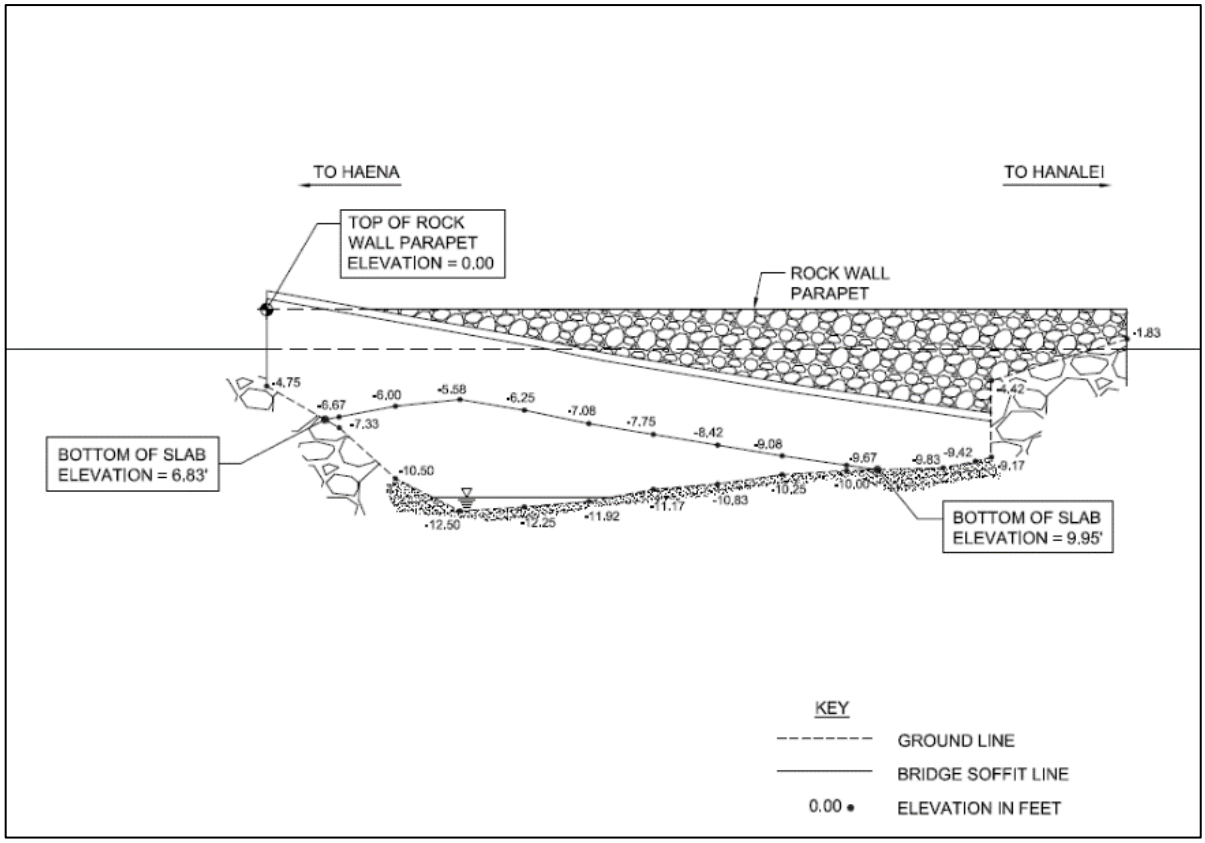
5.3.7.3. Channel Cross Section Profiles in BrM

Profiles will be collected during each scour inspection and Post Event inspections for scour. New structures may use the as-built plan information for the initial cross section and the next inspection must collect field measurements.

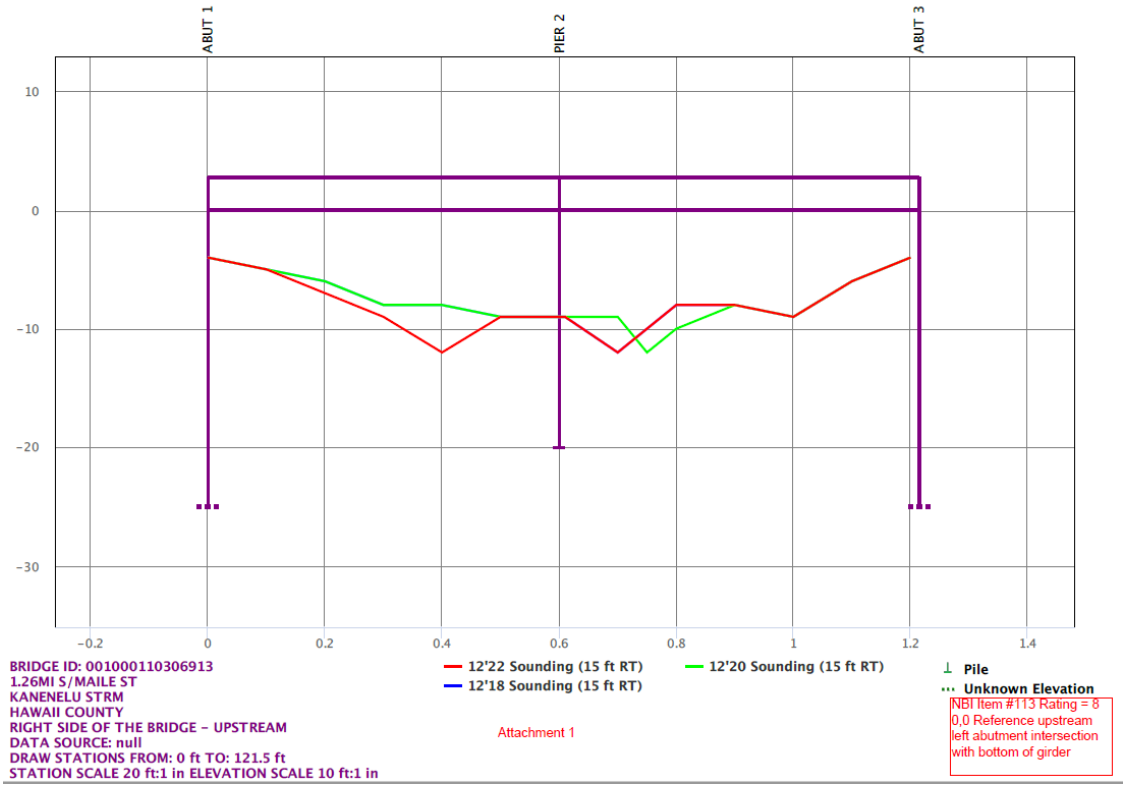
Scour Inspections must collect Profiles for all bridges and floorless bridge-length culverts with the SNBI Item B.C.11 Scour Condition Rating **not coded "N"**. If an initial Profile is not in BrM, then an initial profile must be provided by the Scour Inspection. Structures with SNBI Item B.C.11 Scour Condition Rating coded 9 are historically stable channels and embankments such as a concrete lined channel. Some of the structures coded 8 do not require a Channel Cross Section with each scour inspection as follows:

- If scour is observed at any time, a Channel Cross Section Profile is required, and the Statewide Hydraulics must be informed, see Changing SNBI Item B.C.11 Scour Condition Rating Code.

- Profiles are required when scour is observed for non-NBI structures such as: Pipes, Box culverts, and Floorless culverts. Profile collection for non-NBI structures may be discontinued at the discretion of the Owner.



Each scour inspection must collect a minimum of two channel cross section profiles in the *BrM Inspection > Cross Sections* tab. The frame of reference for the channel cross sections are always ***looking downstream***, 1) One section is measured from the upstream top of rail, or Left View and 2) One section is measured from the downstream top of rail, or Right View. Additional cross-sections may be needed to capture stream movement or scour holes further away from the bridge. These additional sections need to be well documented and repeatable by another Team Lead. Inspectors may contact the Statewide Hydraulic Design Engineer for assistance or for questions about whether additional cross sections should be taken. See the following figure for an example:



Channel Cross-Section Reference Points

Reports must document an X coordinate reference point of 0 at the left bridge abutment looking downstream, at the top of the rail such as a: Rail contraction joint, Expansion joint, or some other readily identifiable and repeatable location at the abutment. Reports must document the same for a Y coordinate reference elevation of 0 at the top of the rail at the right bridge abutment looking downstream. Some structures such as trusses or culverts, may have to reference a different horizonal element for X and Y. The same X and Y reference points must be used in all future cross-section's profiles.

The following guidelines provide the minimum data points for consistency in the cross-section data. It is at the Team Lead's discretion to adjust or add more points to locate scour holes or for breaks in the ground line especially in the streambed.

- For bridge spans 50 feet or less, take measurements at all piers/abutments, span ¼ points, and lowest point of the channel.

- For Bridge spans greater than 50 feet, take measurements at maximum 1/10 span up to a maximum of 20 feet on center.

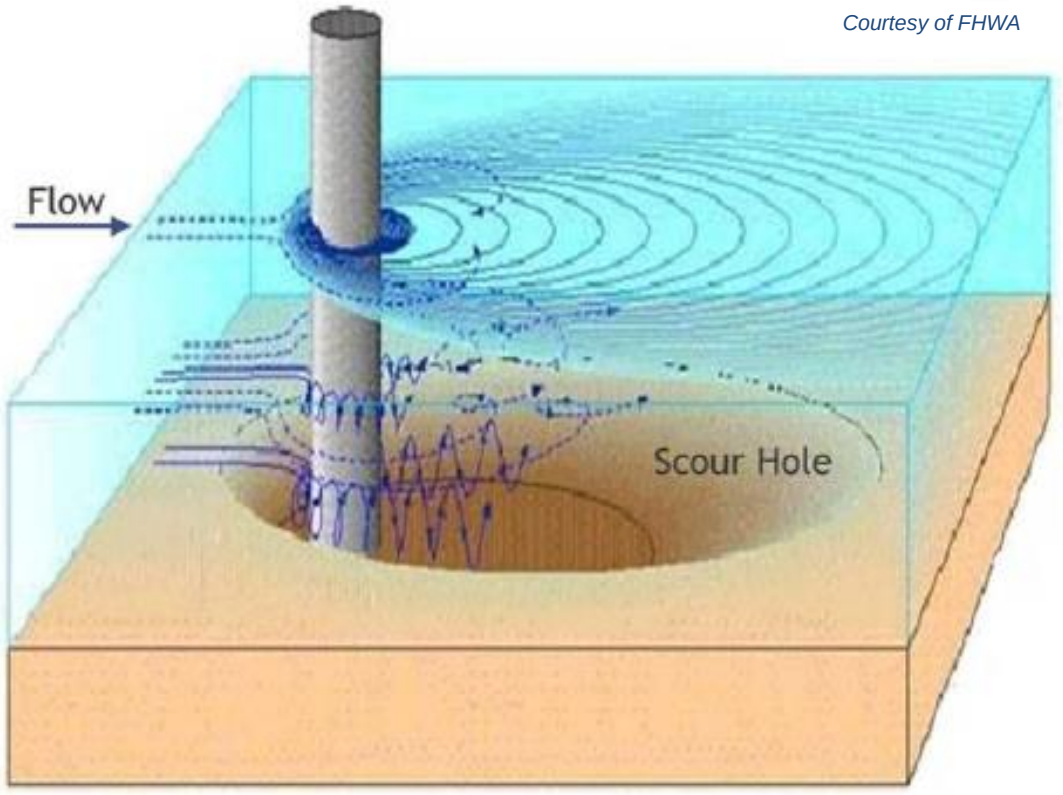
Long bridges with a small, clearly defined channel only need to record Profiles near the channel and not the entire length of the bridge. In these cases, X and Y should start at a bridge Pier and end at a bridge Pier that includes the stream channel Q_{100} Elevations. An initial cross section inspection for these structures must verify and document the Contract Plan Profile elevations reasonably represent the elevations in the field.

5.3.7.4. Scour Critical Findings

Scour Critical Finding must follow the Critical Finding Reporting policy and are generally defined as newly discovered conditions of:

- **Spread footing** undermining that reduces design capacity below legal or posted limits,
- **Deep Foundations**: Wooden piles newly exposed for any length, with brackish or tidal saltwater. Any pile newly exposed more than 3 feet, more than 1/3 of the front row, more than 10% of the pile height, or more than 10 feet of piles with unknown length.

Courtesy of FHWA



5.3.8. Re-Load Rating during Inspection

Whenever a bridge's load carrying capacity changes or is affected in any way, a new load rating must be completed as part of the Inspection. Team Leaders are responsible for submitting the updated rating calculations with a Load Rating Summary and NBI coding. Re-rating may or may not require posting. The following minimums are provided as to when HDOT recommends a load rating should be reviewed or a new load rating is required.

- Change in field conditions.
    - A **rehabilitation, widening, or any construction** is complete and load rating has not been updated.
    - Adequacy or condition of repairs or temporary shoring are questionable, see SNBI Item B.PS.01.

- Increases in Dead Load on a Bridge:
    - If the asphalt thickness is more than 2" of load rated depth.
    - If the asphalt thickness is 6" or more, verify the existing depth and the load rated depth.
    - If the asphalt has a variable thickness more 3”.
- The need for a new Load Rating is also determined by SNBI Items B.C.02 - Superstructure Condition Rating, B.C.03 - Substructure Condition Rating, and B.C.04 - Culvert Condition Rating. If any of these codes changes from 6 or above to 5 or below a new Load Rating is required, and each time it is further reduced from 5 or below to a lower value, a new Load Rating is required again.
- Additionally, a new load rating must be performed if any new CS4 defects are identified which affect bridge capacity or if there are any changes to previously identified CS4 defects.

In these cases, for a Load Rating to be considered complete:

- The Inspection Report in BrM must include a Work Candidate with Scope, Schedule, and Cost to restore the capacity of the controlling member(s). Do not include other items in the repair (Work Candidate) such as traffic control or other structural deficiencies that exist on the structure.
- The Load Rating must include a second Load Rating with a Summary that assumes the repair provided was completed. The second Load Rating must explain the BrR input changes, and indicate the improved Load Rating factors and NBI ratings in a second Load Rating Summary.
- The Team Lead and Load Rating Engineer is responsible for the following SNBI Items when a Load Rating requires posting.
    - Team Lead must notify the BIP Lead
    - Update SNBI Sections 5.2 and 5.3 (items B.PS.01, B.PS.02, B.EP.01, B.EP.02, B.EP.03, and B.EP.04)
    - Upload Load Rating submittal files to the **Bridge File** – Load Rating folder.

5.3.9. Posting & Pictures

It is the Team Leader’s responsibility to verify the posted signs comply with MUTCD requirements, including cases where the MUTCD requires additional advanced warning signs. All Posted structures must have a picture of each sign in the Bridge File PDF named POST, see Document ID. Routine Inspections must submit a new POST.PDF if the Bridge File does not have one.

5.3.10. Repair Recommendations and Work Candidates

Team Leads should keep in mind that repairs are managed, and funding is allocated based on the quality and accuracy of the element information and the repair description. Write repairs in a manner to be easily understood by all stakeholders with clear instructions others can follow.

The following are required information that the Team Leader should provide to the LPA/District BIP Leader when reporting recommendations:

- Inspection Report
- Plan of Action Required as described in Work Candidates in BrM Section:
    - Scope of work
    - Work Candidate Priority
    - Temporary closure or action while recommended remedy is underway.
    - Estimated Cost

The LPA/District BIP Leader will analyze and discuss the recommended actions with the LPA/District BIP Manager for programming into future budgets and/or emergency repair programs. This process requires the involvement of the BAMP Manager for reviews and approvals as well as the Statewide BAMP Manager for Statewide Funding implications and forecasting need.

5.3.10.1. Work Candidates in BrM

Repairs are documented as Work Candidate in the *Inspection* > *Work* > *Work Candidates* tab in BrM for structural defects in Element Condition State 4 or other repairs recommended by the Team Lead. The repair should be described in the Work Candidate with a scope, *Priority*, and a cost. The Element with the defect should have a reference to the repair in the notes.

Repair Scope for contract repairs should briefly describe the work required. Maintenance repairs should provide repair instructions and include: Product recommendation or Material description, Quantities, Methods, etc.

Work Candidate Priority must be assigned as follows:

Priority 1 (Critical Findings) – Critical Finding Repairs are documented in the BrM database as Priority 1 repairs. These repairs required an immediate action to stabilize the bridge or protect the public such as a Posted weight restriction.

Priority 2 (High) – Contract Repair is needed within a 3 years where deteriorating Element conditions could threaten the safety or load capacity of the structure. The Load Rating has been revised and reduced the load capacity and structure may or may not require posting. Team Leads should consider a reduced frequency for these structures.

Scour defects**:** For spread footing or unknown foundations the bottom edge of the footings is exposed for less than 1/3 of the horizontal length of the footing. For deep foundations or spread footings on rock: 1) Any piling exposed above or below water more than 3 feet high. 2) More than 1/3 of the front row of piling exposed less than 10% of pile height. 4) Assume 10-foot-deep pile if pile lengths are unknown. These bridges should be monitored every 2 months as the project is being programmed.

Priority 3 (Medium) – Repairs should be completed within 6 years.

Scour defects: For spread footing or unknown foundations, scour has fully exposed the footing less than 1/3 the horizontal length of the footing. For deep foundations or spread footings on rock, one or two pilings are visible less than 10% of the piling height (Assume 10-foot-deep pile if foundation plans do not exist). These bridges should be monitored every 6 months as the project is being programmed.

Contract Repair Cost

Repairs that are assumed to be completed by contract must provide a contract scope work and an estimated cost by the Team Leader. The scope for scour defects should provide HEC-23 Countermeasure design; or justify why not with an alternate scour repair.

The estimated cost to complete the work should be based on HDOT contract costs or other sources such as “RS Means Heavy Construction Cost”. The cost should include two costs: 1) Design cost and 2) Repair construction cost. The repair construction estimate should not include other contract costs such as overhead, traffic control, mobilization, etc.

Maintenance Repair Cost

Repairs assumed to be completed by the Owners maintenance forces need a detailed scope of work or instructions, and an estimated maintenance cost. The Team Leader should verify the scope acceptable and cost is reasonable with the BIP Lead for planning. If the scope or cost is not acceptable to the Owner, then the repair should be documented as contract repair.

5.3.10.2. Completed Repairs

Inspections must verify repairs are completed properly and move the repaired quantity to Condition State 1 and fill out the “Date Completed” field in Work Candidates. If the repair is of poor quality or is deteriorating, then the quantity should be coded appropriately.

Scour repairs do not change the Scour Vulnerability coding of SNBI Item B.AP.03. Designed scour countermeasures repairs should be coded a B. The Design should have prepared a POA for Scour Countermeasures (POAC). The Team Lead must obtain a copy of the POAC for inspection and submit the PDF with the Report.

5.4. Underwater (UW) Inspections

Underwater inspections (UW) are to be performed under CFR 650.313(e)(2) and are defined in Section 650.305 as the “Inspection of the underwater portion of a bridge substructure and the surrounding channel, which cannot be inspected visually at low water by wading or probing, generally requiring diving or other appropriate techniques.” Per CFR 650.313(e)(2), the underwater inspections must “Identify the location of underwater elements and include a description of the underwater portion of the elements, the inspection frequency and procedures in the inspection records… Inspect those elements requiring underwater inspections according to these procedures.”

5.4.1. UW Level of Effort

UW Level of Effort should be stated in the Inspection Summary of the UW Report. Due to limited underwater visibility, the inherent access restrictions of the underwater environment, and the presence of marine growth, the required underwater inspection precision depends on the level of effort. The Team Lead is responsible for deciding which of the three underwater diving inspection levels are appropriate as described here and in the BIRM Section 13.3.2.

Level I: A visual and tactile inspection of **100 percent of all underwater elements** to provide a general overview of the substructure condition and verify the as-built drawings. If undermining is detected, the scour volume must be documented to the extent necessary to detect changes in the next inspection.

Level II: Inspection requires portions of the structure be cleaned of marine or aquatic growth to allow an inspection of at least 10% of all underwater elements. In some cases, cleaning is time consuming, particularly in saltwater and the Team Lead should consider a risk-based sampling of critical areas if the marine or aquatic growth is difficult to remove. This level of inspection is intended to detect and identify high stress, damaged and deteriorated areas that may be hidden by surface growth. The UW inspection report must clearly state the total quantity of underwater elements, and the quantity 10% represents (for example, 80 sqft total and 8 sqft sampled). The location of the 10% sampled area needs to be clearly documented in sketches or drawings and must be at a different location every inspection.

Level III: A highly detailed inspection of critical structures or structural elements. Or a member where extensive repair or possible replacement is contemplated. The purpose of this type of inspection is to quantify hidden or interior damage and section loss prior to an element repair or replacement. This level of inspection includes extensive cleaning, detailed measurements, and selected nondestructive and other testing techniques such as ultrasonic, sample coring or boring, physical material sampling, and in-situ hardness testing. The use of testing techniques is generally limited to key structural areas; areas that are suspect; or areas that may be representative of the entire bridge element in question.

5.4.2. UW Requirements

Underwater Inspection is required in Hawaii when normal water depths are more than three and a half feet at a submerged element; and a safe inspection of submerged elements requires a diver. The Team Lead may request an UW Inspection be delayed due to temporarily high water by emailing the Statewide BIP Manager (bip@hawaii.gov) for approval and notify the BIP Leader.

A qualified Team Leader must ensure elements are inspected and reported properly. A Team Lead must be present during the entire dive inspection. A separate inspection Team Lead is not required if the underwater bridge inspection diver meets the qualifications of an inspection Team Leader, in accordance with MBE 4.2.5.7. If a UW Team Leader is not conducting the associated Routine Inspection, then a separate UW Report is required to document the UW inspection.

UW findings can't raise but can lower SNBI Item codes in the UW or Routine Inspection. If the Team

Leader determines the Scour code should be changed or updated, the Team Lead should directly contact the Statewide Hydraulic Design Engineer for a coding consensus and notify the BIP Lead. This applies to State and LPA bridges.

5.4.3. UW Reporting

Routine Inspections must either conduct an UW Inspection or verify the previous UW was timely and incorporate the results.

Stand-a-lone UW Reports should contain the following items in the given order for consistency as per CFR 650.313.

- **Cover Page, Vicinity Map, TOC** is the same as for a Routine Inspection, see Routine Contents and Format.
- **Inspection Summary** should include: Level of Effort performed; Justification for code changes to SNBI Item B.C.03 Substructure Condition Rating, B.C.09 Channel Condition Rating, B.C.10 Channel Protection Condition Rating, B.C.04 Culvert Condition Rating, and B.C.11 Scour Condition Rating; Previous and new inspection report findings; Recommended Actions.
- **Inspection Notes:** Procedures employed, ingress and egress locations, equipment used, problems encountered, and additional information helpful to future dives. For example:
    - Inspection frequency for each element
    - Inspection procedures **to be followed** for each element
    - Inspection procedures that were followed during current inspection.
- **Existing channel conditions** must be described and include the approximate surface water velocity at the deepest point in the channel and the approximate visible distance (ft) into the water. Channel materials adjacent to all foundations must be described, above and below the waterline.
- **Scour Defects** including dimensioned location, section loss dimensions, sketches, and pictures if conditions permit. A record of investigation at foundations that includes soil sampling and probing to determine backfilling of scour holes.
- **Scour Findings** must have a brief description and labeled as "**UW Note MM/DD/YY:**" in the substructure element Defect 6000 for scour with a quantity and location. Determination of if a Scour Evaluation is necessary, refer to Section 7.0.
- **Designed** Scour Countermeasures, not built with the original construction, must report the existing conditions and summarize performance of the countermeasures.
- **BrM Elements and SI&A Reports**.
- **Photographs** taken looking upstream, downstream, debris at piers, scour repairs, scour countermeasures. If site conditions permit a photo of typical soil materials above and below the waterline, channel conditions (stability), substructure above and below waterline.

- **Plan Sheets:** Use a Plan and Elevations to identify the UW elements inspected and show: High Waterline and date, Normal Highwater Line, Waterline elevation on each element, Stream shoreline, Direction of Flow, North arrow.
    - Sketch of bottom elevations of scour critical members including locations and volume of backfilled scour holes. Include a line that indicates the calculated level of scour determined by the Scour Evaluation Report.
    - Location of underwater elements
- **Evaluation** of the stream and underwater substructure elements to complete the Routine Inspection Report.
- **Scour Repairs** constructed that are not designed and do not meet HEC 23 requirements. Report the existing conditions or performance of the repair.
- **Scour Repair recommendations** with a scope, schedule and direct cost for the work.
- **Review of SI&A data** pertaining to underwater elements against the current condition.
- **Report Critical Finding** if applicable, in accordance with the CF procedures.

5.5. Nonredundant Steel Tension Member (NSTM) Inspection

A Nonredundant Steel Tension Member (NSTM), formerly known as Fracture Critical (FC), is a steel tension member that is not load path redundant. Failure of an NSTM has the potential to cause the bridge or a portion of the bridge to collapse. CFR 650.305 defines an NSTM Inspection as “A hands-on and conducted at arms-length inspection of a Nonredundant Steel Tension member or member components that may include visual and other nondestructive evaluations.” An NSTM Inspection is a Routine Inspection that includes the additional inspection requirements stated in the Nonredundant Steel Tension Member Procedures (NSTMP). See Inspection Frequency if bridge conditions require a reduced inspection interval.

The identification of NSTMs are typically in the Design/As-built Plans. Per Section 6.6.2 of the AASHTO LRFD Bridge Design Specifications states, “The Engineer shall have the responsibility for determining which, if any, component is an NSTM.” Unless a rigorous analysis with assumed hypothetical cracked components confirms the strength and stability of the hypothetically damaged structure, the location of all NSTMs shall be clearly delineated on the contract plans.

Identification of NSTMs for in-service inspection protocol includes the analysis of demonstrating that a structure has adequate strength and stability sufficient to avoid partial or total collapse and carry traffic in the presence of a totally fractured member (by structural redundancy), the member does not need to be considered Nonredundant Steel Tension for in-service inspection protocol. If determined as such, the assumptions and analyses conducted shall become part of the permanent inspection records in the BrM. Older structures fabricated before 1978 are not eligible for relief from NSTM in-service inspection. The inspector must verify and document that the materials and fabrication specifications of any existing bridge being assessed for structural redundancy would meet the NSTMP.

5.5.1. Nonredundant Steel Tension Member Procedures (NSTMP)

The Nonredundant Steel Tension Member Procedures (NSTMP) identify and locate the NSTM limits within a member and the inspection method. Steel structures must have a Plan set indicating the required limits and methods where other structures with NSTMs. The engineer developing this plan may use a Word.docx to document the plan. The NSTMP must be in the BrM Bridge File for reference by inspectors.

5.5.2. NSTM Reporting

NSTM Reports are to be included with the Routine Inspection Report as a separate summary section of findings and recommendations. The NSTM Inspection findings should be documented in the Element notes and labeled as "**NSTM Note MM/DD/YY:"** where NSTM labels distinguish NSTM findings from the RTN element comments.

Due to scheduling, access, equipment, etc. the NSTM inspection may not be completed at the same time as the Routine Inspection. In these cases, the 90-day deadline to complete the Routine Report with the NSTM Inspection still applies.

5.6. Damage Inspection (DAM)

A Damage Inspection is an unscheduled inspection to investigate, evaluate and document the structural damage resulting from environmental factors or human actions such as a superstructure traffic impact or high load hit. A Damage Report documents the findings, prior to a repair, for reference by future inspections and a Load Rating. The damage must document in detail for a structural engineer to design a repair.

Team Leads should provide a complete Damage Inspection Report with a recommendation to the BIP Lead within 3 days of notification. A load rating must be revised if the structural damage will not be repaired within 6 months, or the repair does not restore the original design capacity.

Damage discovered during a Routine or scheduled inspection should be documented in the scheduled inspection and should not complete a Damage Report.

5.6.1. Damage Inspection Procedures

All normal expectations of a Routine Inspection Report apply to a Damage Inspection Report, except only the damaged elements are inspected. The following guidelines describe the addition issues to be addressed in a Damage Inspection.

5.6.2. Damage Inspection

The first step in a Damage Inspection, the Team Lead must verify the site and structure is safe to inspect. Any safety issues must be resolved by the BIP Leader before the inspection can proceed.

5.6.3. Damage Report

A Damage Report will follow the template for a Routine Inspection Report with the following exceptions:

- A Damage Report in BrM is considered a Special Inspection for frequency and signature. Inspectors must not change the Routine Inspection frequency for the structure.

- All Damage Element Notes should be appended to the existing BrM Element notes and labeled as "**DAM Note MM/DD/YY:**" where DAM labels distinguish inspection findings from the RTN element comments. The DAM comments should remain in the Element notes until the damage has been repaired.

    - To properly describe the deficiency(ies), as mentioned below, provide a narrative and also provide sketches, photographs, marked up drawings, etc. It is important to provide a numbering scheme in the narrative and in the sketches, photographs, marked up drawings, etc. so that the narrative description of a deficiency readily matches up with the sketches, photographs, marked up drawings, etc.

    - For a structural engineer (contracted or DOT/LPA) to make a competent structural assessment of the critical damage, it is important to accurately describe the deficiency(ies).

    - Provide a narrative describing the deficiency(ies)

    - Provide sketches, photographs, etc. that corresponds to the narrative describe above. As mentioned above, provide a numbering scheme so that the narrative matches up easily with the sketch, photograph, marked up drawing, etc,

    - For a girder bridge, if there are deficiencies in a girder, provide a sketch or drawing showing that portion of the deficient girder within the entire deck area.

    - For a concrete deck, if there are critical spalls in the deck, provide a sketch or drawing showing the spalled areas within the entire deck area.

- If the damage is determined to be a Critical Finding, a CF Notification is needed. In addition, the Damage Report also needs to include:

    - Immediate Actions – describe actions needed to immediately safeguard the public until recommended corrective measures can be made. The Team Leader, in coordination with the BIP Leader, is responsible for the following:

      For example:

        - Should the bridge be closed?

        - Should one lane be closed?

        - Should shoring be provided?

        - Should portable concrete barriers be placed?

        - Should a snooper truck or scaffolding be needed to measure section loss more accurately?

    - Recommended Corrective-Measures Plan – describe actions, beyond the immediate actions taken, being planned, or taken. The Team Leader, in coordination with the BIP Leader, is

responsible for the following:

- Identify what is needed to resolve the Critical Finding. This would most likely involve repairs but could also involve rehabilitation or replacement of the bridge.
- Provide an estimate and timeline for the items needed to resolve the Critical Finding.

5.7. In-Depth Inspection (DEPTH)

An In-Depth inspection is generally defined in CFR 650.305 as "a close-up inspection to identify any deficiencies not readily detectable while conducting routine inspection procedures and conducted at arms-length." An In-Depth inspection may be required routinely by an inspection procedure or specified by the Team Lead.

In-Depth inspections are a specialized structural inspection usually completed as contract work. Generally, these are non-visual or non-destructive inspection such as: Investigation of unknown foundations, Ultrasonic Testing, Ground Penetrating Radar (GPR), Concrete strength testing, Deck Chain Drag Testing, etc.

Measuring and quantifying large and small areas of exposed corrosion, deterioration or member thickness is considered Routine Inspection work required for load rating analysis and not considered an In-Depth Inspection.

5.7.1. In-Depth Report

An In-Depth Report will follow the template for a Routine Inspection Report with the following exceptions:

- An In-Depth Report in BrM is considered a Special Inspection for frequency and signature. Inspectors must not change the Routine Inspection frequency for the structure.
- All In-Depth Element Notes should be appended to the existing BrM Element notes and labeled as "**DEPTH Note MM/DD/YY:**" where DEPTH labels distinguish DEPTH findings from the RTN element comments. The following Routine Inspections may include some, all, or delete the comments.

5.8. Special Inspections

5.8.1. Monitor Inspection (MON)

A Monitor Inspection observes a specific known or suspected deficiency, such as cracks, settlement, or scour at an increased inspection interval less than 24 months. The Team Lead must assess the risk to the public and determines the inspection frequency and notify the Statewide BIP Manager. Monitor inspections are scheduled at the discretion of the BIP Leader.

Monitor Inspections are scheduled when a structural item needs a follow up after a RTN, NSTM, UW, DAM, or POSTE inspection. The originating Inspection Report must be specific as to 1) What is the monitored threat with the Element quantity and location stated. 2) What the monitor inspection must document or measure. 3) What is threshold(s) for Owner Action(s).

Monitor Report

A Monitor Report will follow the template for a Routine Inspection Report with the following exceptions:

- A Monitor Report in BrM is considered a type of Special Inspection for frequency and signature. Inspectors must not change the Routine Inspection frequency for the structure.

- All Monitor Element Notes should be appended to the existing BrM Element notes and labeled as "**MON Note MM/DD/YY:**" where MON labels distinguish MON findings from the RTN element comments. The monitoring history and measurements should be retained in the Elements until the structural issue has been repaired or addressed to the satisfaction of the BIP Lead.

5.8.2. Post Event Inspection (POSTE)

A Post Event Inspection investigates the structural conditions after any event such as: Scour POA triggers, Earthquake, Lava, after any repairs are completed, and as a follow up to structural damage.

When performing a Post Event Inspection after completion of repairs, any corresponding Work Candidates in BrM must be updated with the Final Cost ($), Federal Funds (%), and Date Completed.

The Team Lead must determine the scope of the inspection based on the situation in the field, and then inspect the appropriate elements. If inspecting a completed repair that was a Critical Finding, investigation of construction records or staff should confirm construction followed all the design requirements.

A Post Event Inspection for a scour event should document the following items:

- Storm event peak water surface elevation. This should be determined from debris lines, description from personnel, rain gauge station, etc.

- Changes in stream bed elevations

- Dimensions of scour hole or undermining at foundations

- Debris at waterway openings

- Structure movement or settlement

- Other post-event inspection requirements listed in the POA.

Post Event Report

A Post Event Report will follow the template for a Routine Inspection Report with the following exceptions:

- A Post Event Report in BrM is considered a Special Inspection for frequency and signature. Inspectors must not change the Routine Inspection frequency for the structure.

- All Post Event Element Notes should be appended to the existing BrM Element notes and labeled as "**POSTE Note MM/DD/YY:**" where POSTE labels distinguish POSTE findings from the RTN

element comments. The following Routine Inspections may include some, all, or none of the comments.

5.8.3. Critical Finding (CF)

A Critical Finding is defined as a structural or safety related deficiency that requires immediate follow-up inspection or action, as described in CFR 650.313(h). When Team Leaders discover a structural or safety related deficiency that threatens public safety, they must act immediately to protect the public and contact the BIP Leader. If necessary, call 911. In these situations, the BIP and Team Lead must be proactive and timely to protect the public. Immediate actions associated with a Critical Finding include, but not are limited to:

- Reducing the speed limit, Diverting the traffic, or Lane closure
- Shoring of unstable elements
- Emergency weight restriction
- Coding SNBI Item to "3" for Deck Condition Rating (B.C.01), Superstructure Condition Rating (B.C.02), Substructure Condition Rating (B.C.03), and Culvert Condition Rating (B.C.04).
- Creating a Plan of Action that describes both immediate actions to address safety issues, and future actions to completely resolve the Critical Finding condition.
- Bridge Closure should follow Agency Emergency Closure protocols.

It is the Owner's responsibility to implement immediate actions and complete the temporary or permanent corrective measures timely. Until corrective measures have restored structural integrity or safety, a Critical Finding status remains "Open". The Statewide BAMP Manager will determine when the deficiency is no longer a threat to the public and "Close" the Critical Finding. All Critical Findings and the monthly progress are reported to FHWA until the Critical Finding is Closed.

5.8.3.1. Critical Finding Notification

The BIP Lead must email a Critical Finding Notification to bip@hawaii.gov immediately or by the close of business (COB) that day. The report or email should be uploaded to the BrM Bridge File the same day. The Bridge Design Engineer should forward the Critical Finding Report to FHWA by the COB the following day and cc the Statewide BIP Manager. The Critical Finding Report email or PDF should report the following information.

- **Subject:** Critical Finding: Date/Time discovered, Bridge Name, Bridge Number, Owner
- **Immediate actions taken** to safeguard the public.
- **Description of damage or conditions of elements and probable cause of Critical Finding.**
    - If known, source of discovery.
    - Description of damage or typical conditions.

- Include at least one photo of the damage or typical conditions.
- Estimated scope, schedule, and cost to repair Critical Finding.
- Team Lead, Inspection Report Date, or when it is expected to be complete.
- Load Rating Engineer and Load Rating Date, or when it is expected to be complete.

- **Plan of Action: Brief statement of current planned actions for the Short Term (days), or Long Term (months) with Monitor Inspection frequency.**

This is a highlighted summary of the situation and field conditions for the Statewide BIP Manger. The inspection assessment and detailed information is documented in the appropriate HDOT Inspection Report type: if a Critical Finding is observed during a scheduled inspection, then that inspection will contain the finding. Otherwise, a new inspection needs to be created to document the Critical Finding. Under *Bridges* > *New Inspection* tab, select Other Special as the type, and then under *Inspection* > *Schedule* select the sub-type Critical Findings. The Inspection Report (with updated Element, NBI, and SI&A data) should be uploaded to the Bridge File as soon as possible for the Statewide BIP Manager. If the observed Critical Finding changes load capacity or element condition that affects Load Rating, then the Load Rating must be evaluated and updated as required.

5.8.3.2. Critical Finding Repairs

All Critical Finding repairs must be listed as Priority 1 – Critical Findings in Work Candidates. All Critical Finding repairs must be designed by a Licensed Structural Engineer. If the repair cannot restore the design capacity of the structure, the Load Rating must be revised and submitted to the Bridge File to reflect the current conditions. Repairs that resolve the Critical Finding need to be documented (photos) and the files uploaded to the BrM inspection folder. If repairs change conditions from either previous or ongoing RTN inspection, then either a Post Event inspection must be done or the ongoing RTN inspection must be updated to report the changes. The Work Candidate corresponding to the completed Critical Finding repair(s) must be updated with the Date Completed in BrM.

5.8.3.3. Critical Finding Monthly Status Report

The BIP Lead must follow up each CF and send a Critical Finding Monthly Status Report (CFMSR) by the 15th of every month to the Statewide Bridge Design Engineer and Statewide BAMP Manager until the Critical Finding status is Closed. The CFMSR can be an email or spreadsheet stating:

- Prior month's activity such as: Inspection Results, Design update, or percent Completed Construction.
- Schedule of next Activities or Actions.
- Expected Completion date of safety measures.
- File format: YYYY Month CFMSR BridgeName such as: 2017 Sept CFMSR BridgeName

5.9. Tunnel Inspection (TUN)

Tunnel Inspections always require the Team Lead to be present during each initial, routine, and special inspection, which may not occur at the same time. Tunnel inspections document the findings in a Tunnel Inspection Report. The tunnel report contents, format, documenting practice, and submittal requirements are same as the requirements for a Routine Inspection with the additional requirements described in this Section.

Tunnel inspections are documented in the Tunnel Inventory and Tunnel Inspection tabs in BrM, and do not use the Bridge tabs.

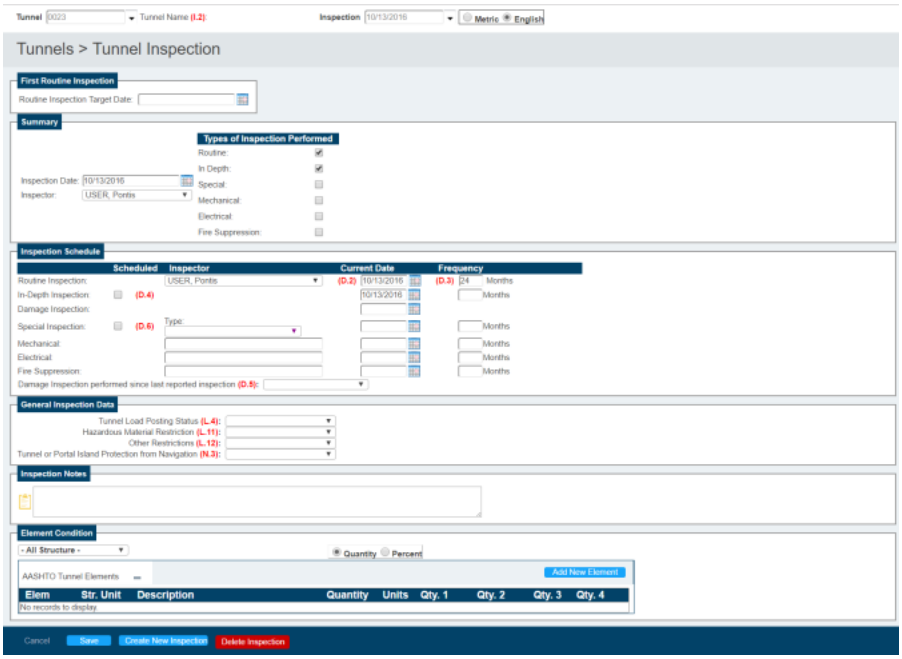
Tunnel inspection must be conducted in a safe manner. Rescue in tunnel facilities can be complicated because tunnels have limited access points and areas of confined space. Some of the dangers in tunnels include energized equipment, highway traffic, service and emergency vehicles, power supply, rigid objects, sharp edges, working from heights, flying debris, and hazardous materials.

The activities of the inspection team should be closely coordinated with the personnel at the tunnel facility. The traveling public should also be protected from any hazards of the inspection work. A written health and safety plan shall be submitted to the TIP Leader prior to inspection. That plan should focus on preventing injury, death, and equipment damage to ensure the overall success of the inspection program. The goal should be to complete the inspection with zero accidents.

Refer to the TOMIE manual Section 4.7 for details on inspection health and safety plans and procedures, including personal protective equipment (PPE), public safety measures, incident reporting, confined space entry, working from heights, lock out/tag out (LOTO), hazardous materials (asbestos, lead), etc.

5.9.1. NTI Data and Coding

Follow the detailed instructions for data organization and coding in the SNTI.

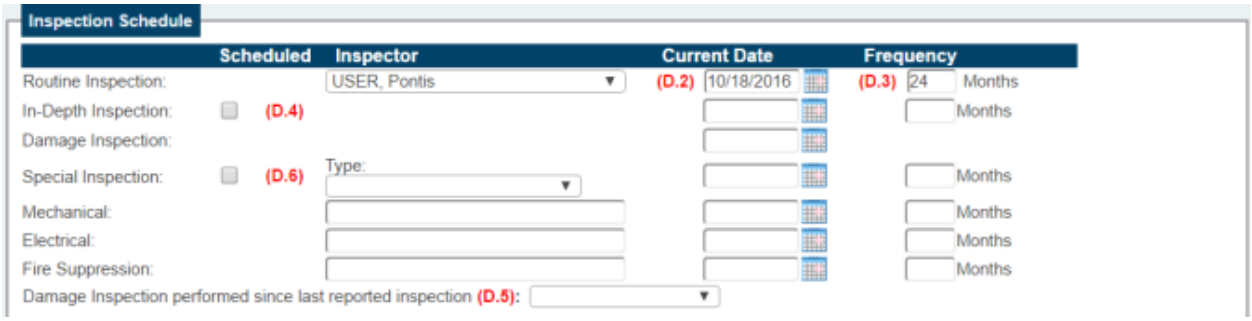


5.9.2. Coding Report Type, Date, & Frequency

All Reports must complete the *Tunnels* > *Tunnel Inspection* menus to record the Inspection Type, Inspection Date, Frequency, and the Next Date the Inspection is due.

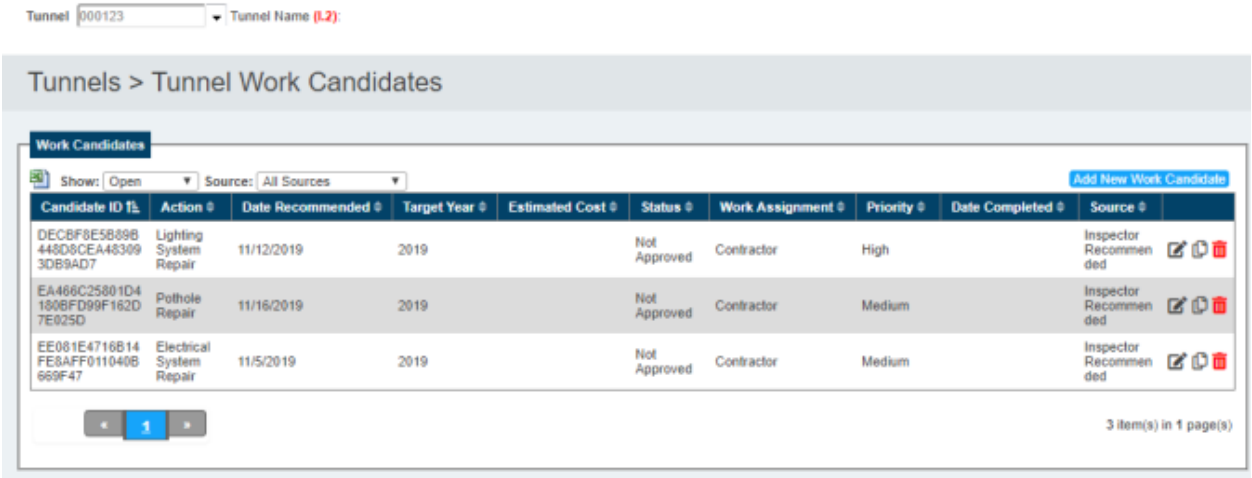
The Inspection Date or Current Date is the date the structure was inspected. If the inspection is completed over several days, the first day of inspection is the Current Date.

The Inspection Frequency and Inspection Date for the following Report types are defined in the FHWA Coding Guide and must be coded in the Tunnels > *Tunnel Inspection* menu pictured below.



5.9.3. Proposed and/or Recommended Work

All repair recommendations must describe the repair in Tunnels > Tunnel Work Candidates.



5.9.4. General Inspection Criteria and Preparation

Refer to the TOMIE Manual for additional details on tunnel inspections and the HDOT Special Procedures for complex tunnel inspections such as the Interstate Route H-3 Tunnel and Wilson Tunnels.

Prior to any inspection the Team Leader must have the following in order to identify problem areas, formulate appropriate inspection procedures, check assumptions, verify schedules and develop inspection documents:

- Prior Inspection Reports (Routine, Monitor, Damage, etc.)
- Available Sketches
- Crash data
- A pre-inspection visit that prepares the team for the inspection. The team should understand the tunnel configuration, current site conditions, methods of access, and traffic condition.
- Prepare As-built sketches, diagrams and schematics, if not already available, of the structural, electrical, mechanical, hydraulic systems for use during the inspection.
- Confirmed communication procedures with tunnel personnel including having contact information for onsite scheduling for equipment use and power down processes.

5.9.5. General Tunnel Inspection Practices

The tunnel inspection organization should develop a set of best practices to help maintain the quality of the tunnel inspection program. Some common types of general inspection practices include cleaning, field measurements, and establishing survey control. Refer to TOMIE manual for additional information.

Cleaning – Debris, efflorescence, rust, or other foreign substances should be removed to better observe the condition of the defect. The appropriate tools and equipment should be used to remove corrosion and limit damage to any applied finishes. In many cases, wire brushes may be appropriate to remove corrosion; while in other cases, foreign substances can be removed using water, solvent, compressed air, or another cleaning fluid in conjunction with a soft bristled brush.

Field Measurements – After visually inspecting all exposed surfaces, the defects and deficiencies should be properly measured and recorded. The location of the defect is important for subsequent monitoring and repair work. For example: Spalls in the concrete are characterized by their length, width, and depth. Length and width are noted for cracks. Corrosion of steel members is measured along the length and width. The depth of corrosion is measured. Similar measurements can be made on wood members to document any deterioration. Accurate measurements ensure quality results.

Survey Control – It is important to be able to locate a defect once it has been documented. A survey control system helps to locate defects during follow-up inspections, monitoring or repairs.

Most highway tunnels have a baseline or stationing system already established. Using this information, the tunnel inspectors can accurately record the location of the defects and deficiencies. To take this one step further, some tunnel facilities use wall panels that have defined widths that can be used as part of the survey control system. By establishing a grid incorporating the panels, defects can be measured from the panel joints and their location converted to the stationing system.

In addition to locating a defect by panel number and station in the longitudinal direction of the tunnel, the position of the defect within the tunnel cross-section (perpendicular to the tunnel axis) should be recorded. The direction to face must be established. For example, a defect in a circular tunnel located at 4 o'clock facing in the direction of traffic would be at 8 o'clock when facing against the direction of traffic. The areas of horseshoe, rectangular, and other shaped tunnels can be divided into convenient sections that uniquely define the location such as the top, left, right, or bottom. For example, a defect in a rectangular tunnel at Station 10+55.33 may be written as "located 3.5 feet up from the bottom right wall when facing up-station" or abbreviated as "3.5BRW/US@10+55.33".

5.9.6. Tunnel Special Procedures (TSPs)

Hawaii has four complex tunnels that require Tunnel Special Procedures (TSPs) for inspection which are:

Wilson Tunnels (IB 003000630400575 & OB 003000630400576)

Harano Tunnels (IB 003000H30200544 & OB 003000H30200545)

The tunnel special inspection procedures describe the requirements to inspect specialized systems in the complex tunnels such as fire protection, lighting and ventilation. These systems must be kept in good working order to minimize the risk of death and injury during an emergency such as a vehicle collision, fire, flood, earthquake, or criminal act.

TSPs are in the Bridge File and the Tunnel Inspection must document the special procedures were followed in the Tunnel Inspection reporting.

The remainder of this page is intentionally left blank

6. LOAD RATING & POSTING

6.1. Load Ratings

For the Load Rating to be considered complete, the Load Rating Engineer must upload all documents to the Bridge File in BrM and notify the State Load Rating Engineer within 60 days of the Inspection date. The NBIS requires that a load-carrying capacity must be determined for all NBI bridges, culverts, and tunnels with suspended roadways. CFR 650.313(c) requires each bridge to be rated for its "safe load-carrying capacity in accordance with the AASHTO Manual for Bridge Evaluation (MBE), … and Post or restrict the bridge in accordance with the MBE, when the maximum unrestricted legal loads or State routine permit loads exceed that allowed under the equivalent rating factor.", and is supplemented by the HDOT Design Criteria for Bridges and Structures. Load Rating questions may be directed to Statewide Load Rating Engineer (see Statewide Program Directory for contact information).

6.1.1. Load Rating and Software

Load Ratings for bridges and tunnels must use **the LRFR method** and use the **AASHTOWare Bridge Rating (BrR) Version 7** software which supports the HDOT oversize and overweight Permitting Program for commercial vehicles. Load Factor Design (LFD) or other methods are not allowed. In cases such as concrete arches, where the bridge cannot be load rated with BrR software, then HDOT requires the structure be analyzed using the **Midas Civil Version 3.0** software. Submittals must include all electronic files required to properly run the Load Rating analysis on any computer with the same licensed software installed.

6.1.2. Load Rating Calculations

Load Rating calculations must justify assumptions, estimates, or averaging using documented Inspection information, including assumptions for: Asphalt depth, Live Load Factors, and Dynamic Load Allowance. Load Rating calculations are unacceptable unless members with a reduced capacity, especially areas with section loss, are documented in an Inspection Report with cross section sketches showing the material measurements of reduced capacity. Sketches must show the locations of the material measurements, and indicate the minimum and maximum values. Cross sections should be perpendicular to the load path in the member unless justified otherwise. Field sketches must show:

- Inspection Date, Orientation with Element number, quantity, and CS.
- Method of field verification or measurement such as: D-Meter, calipers, survey rod, tape measure, pacometer.
- Member design and description includes but not limited to: Field dimensions, Rebar layout and sizes, Grade of steel or rebar, timber properties.
- Show measurement locations and remaining material thickness as necessary to support Load Rating calculations and sufficient detail to detect a change in condition.

6.1.3. Load Rating Summary (LRS)

Each Load Rating must have a Load Rating Summary in the Bridge File – Load Rating folder for reference in future inspections. The summary includes the inputs and results of the current Load Rating factors for the vehicles specified. Inspectors are responsible for verifying the accuracy of the field condition inputs and posting requirements. Asphalt thickness often changes and should be checked & measured frequently. If the Load Rating Summary is not correct or does not reflect the current bridge conditions, a new Load Rating is required.

6.1.4. Gusset Plate Load Rating report

On August 1, 2007, the I-35W truss bridge collapsed in Minneapolis, MN. This tragedy brought attention to the fact that truss load ratings normally consider gusset plates to be stronger than the members they connect. This was not the case on I-35W and should be checked in the load rating process. Based on the January 15, 2008 recommendations of the National Transportation Safety Board (NTSB) "Safety Recommendation H-08-1" and FHWA Technical Advisory 5140.29, all non-load-path-redundant steel truss bridges in Hawai'i must use **field dimensions** to determine the capacity of all gusset plates that carry live load. Using actual field dimensions assures design or construction deviations that existed on the I-35W bridge are included in the gusset plate capacity load rating for permitting heavy trucks. Publication FHWA-HRT-14-063, "Guidelines for Design and Rating of Gusset-Plate Connections for Steel Truss Bridges" contains recommendations and references for analysis.

Each truss that requires a gusset plate load rating must have a Gusset Plate Load Rating report (GPLR) stored in the BrM Bridge File – Load Rating folder. Normally gusset plates have odd shapes and the method of analysis may not be obvious. Therefore, the report must document the field dimensions, controlling node location(s) and loads, analysis method, and assumptions made in the calculations for **each different gusset plate**. All section loss and connection defects must be quantified (measured) and addressed in the analysis.

6.2. Bridge File - Load Rating folder Submittal

For the Load Rating to be considered complete, the Load Rating Engineer must upload all documents to the **Bridge File** – Load Rating folder in BrM and notify the State Load Rating Engineer within **60 days of the Inspection date**. All submittals, including County Agencies, are subject to State review. Comments or errors are addressed and resubmitted within 5 work days at no additional expense to the owner. See Section 6.1 for Bridge File Document Name Format. As a minimum, a Load Rating folder must include:

- Signed and stamped Load Rating Summary (LRS) sheet.
- Signed and stamped Load Rating calculations including hand calcs or other software not included in the BrR analysis
- The Bridge File - Load Rating folder contain copies of all relevant Load Rating information uploaded such as:
    - Software input files.
    - Field sketches.

- As-built, re-built, widening, or other plans
- Gusset Plate Load Rating (GPLR) report
- Testing reports.

6.3. LRFR Load Rating Factor Less than 1.0

When the initial load rating factor is less than 1.0, the structure must be posted. If a Load Rating is < 1.0, the Load Rating Engineer or Team Leader must inform the BIP Leader and the Statewide Load Rating Engineer of the Load Rating Summary results by the end of that day. This allows the Owner the maximum time to respond to the low rating.

The Load Rating Engineer should minimize the hardship related to emergency vehicles and economic hauling without jeopardizing the safety of the public. The Owner Agency has 30 days to complete the following steps and post. If these steps cannot be completed within 30 days, the structure must be temporarily posted and revise or remove the sign pending the finalized load rating in accordance with FHWA.

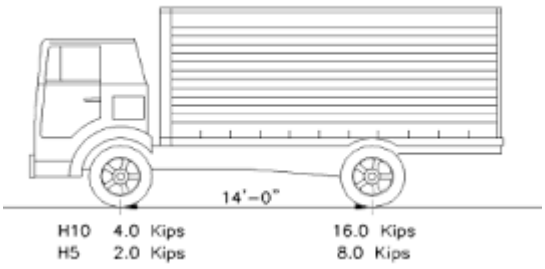
- Review field conditions for consistency with the load rating assumed values where actual field conditions may indicate a higher load rating.
- Review conservative load rating factors and assumptions for a justified increase in the load rating.
- Use finite element analysis to improve the load path model.
- Conduct material strength tests to determine if higher material strengths exist.
- Load test the bridge with a verified truck and axle weight to a determine the load rating.

For asset management purposes, the load rating for all posted bridges must include a recommendation for at least one rehab and cost to strengthen a structure that would obtain a legal load rating > 1.0.

6.3.1. Load Ratings Less than 0.5

If the governing load rating for legal loads is less than 0.5, then the load rating should include a Load Rating Factor for an H10 truck.

When the Load Rating Factor for the H10 truck is less than 0.3, which is less than 3 Tons, the structure must be closed immediately to the traveling public and code the SNBI Item B.PS.01 a "C" within 90 days.



6.3.2. After the Structure is Posted

After the bridge is posted by the Owner, the BIP Leader must email the State Load Rating Engineer, the Statewide BIP Manager, and update the Bridge File when the structure is posted with pictures. The pictures document all signs for future inspections such as, two pictures for bridges with two-way traffic,

one picture for bridges with one-way traffic, or more if necessary. The Load Rating Engineer, District Permit Engineer and State BIP Manager should be notified within 5 working days after the structure is posted. The Bridge File must be updated within 90 days of receipt of the weight restriction recommendation.

6.4. Concrete Bridges with Unknown Plans

In accordance with MBE 6.1.4, a concrete bridge without plans or known reinforcement does not need load rating calculations if the following conditions are met:

- The original design Live Load is verified with historical evidence.
- The bridge shows **no significant level of distress**.
- The bridge has been carrying normal traffic for an appreciable length of time

In these cases, the Statewide Load Rating Engineer will document the justification of the safe load carrying capacity, and maximum permit axle weights and spacing, in a memo to the Bridge File for State and Local Agency bridges.

Load Rating Bridges with Unknown Plans

A Load Rating based on a field investigation is required if a concrete bridge is in Fair condition, Poor condition, or showing signs of distress such as structural cracking, corrosion, spalling, etc. The field investigation must document all information necessary for a load rating such as: concrete strength, concrete cover, concrete dimensions, existing rebar size and spacing. A minimum effort for a rebar investigation should use a pacometer and visually verify the size of each load bearing bar size in tension. Structures in Poor Condition must test at least one core sample to determine the concrete strength.

For large or more complex concrete structures, an alternate method would be to reverse engineer the safe load capacity based on measured deflections of several trucks with known axle weights.

The remainder of this page is intentionally left blank

7. SCOUR EVALUATION REPORTS & POA's

7.1. Scour Evaluation

Each bridge over potential flowing water shall be evaluated for scour by a professional civil engineering team of hydraulic, geotechnical, and structural engineers licensed in the State of Hawaii per the requirements of 23 CFR 650.117. Design of new bridges and substructure rehabilitations within the design storm waterway must prepare a **Scour Evaluation Report (SER)**.

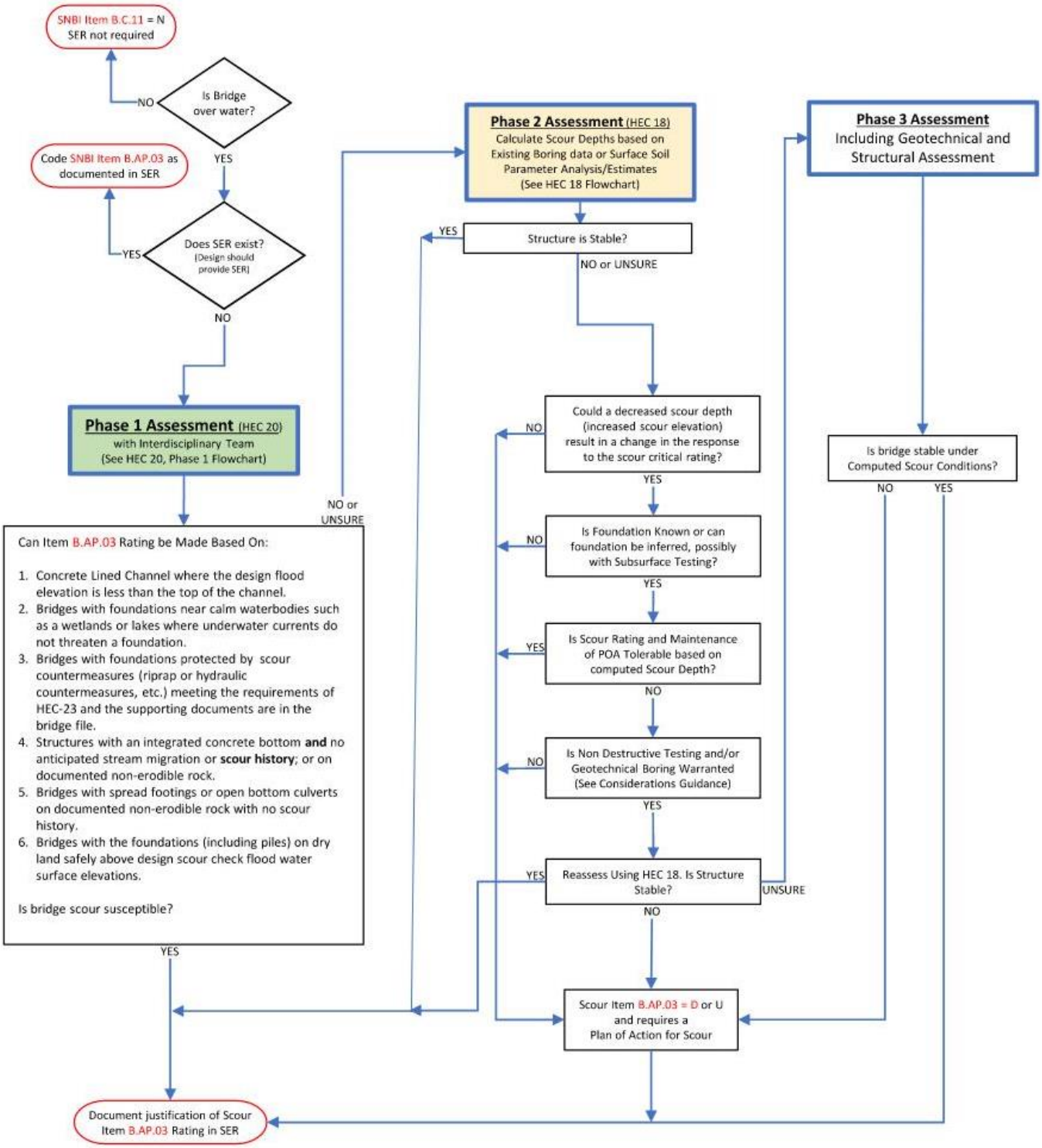
HEC-18 Analysis

All bridges over water require a HEC 18 analysis unless the Hydraulics, Geotechnical, and location of foundation can all safely justify the bridge is stable for scour. All bridges require a SER that documents the engineering assumptions and justifies the SNBI B.AP.03 code for the bridge. Circumstances that may not require a HEC 18 analysis are as follows where the circumstances are documented in the SER.

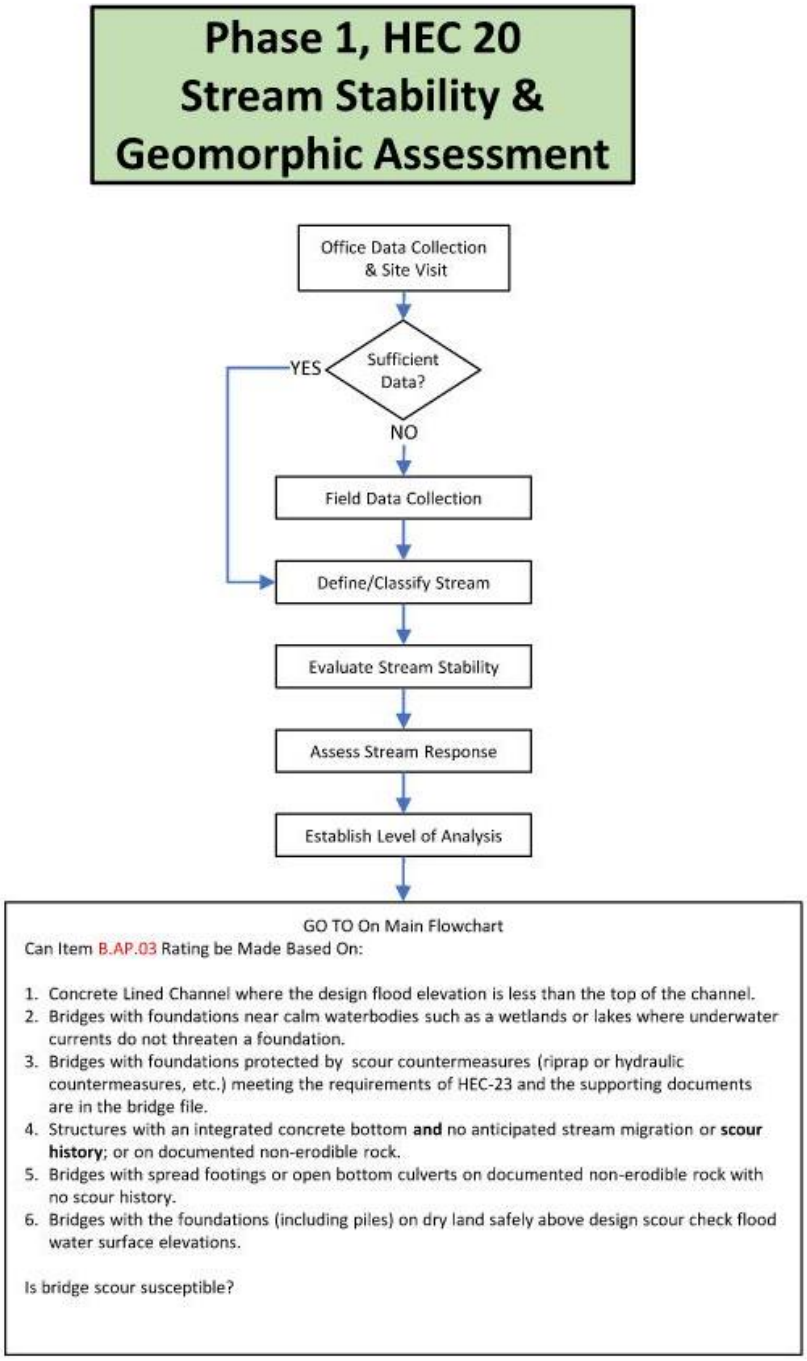
- Bridges with a Concrete Lined Channel where the design flood elevation is less than the top of the channel.
- Bridges with foundations near calm waterbodies such as a wetlands or lakes (reservoirs) where underwater currents do not threaten a foundation.
- Bridges with foundations protected by structural countermeasures (e.g. riprap or hydraulic countermeasures, etc.) meeting the requirements of HEC 23 and the supporting documents are in the bridge file.
- Culverts or bridges with an integrated concrete bottom, no stream migration or scour history; or on documented non-erodible rock.
- Bridges with spread footings or open bottom culverts on documented non-erodible rock with no scour history.
- Bridges with the foundations (including piles) on dry land safely above design flood water elevations.

Scour Evaluation Report Decision Flow Charts are on the following pages for reference and guidance.

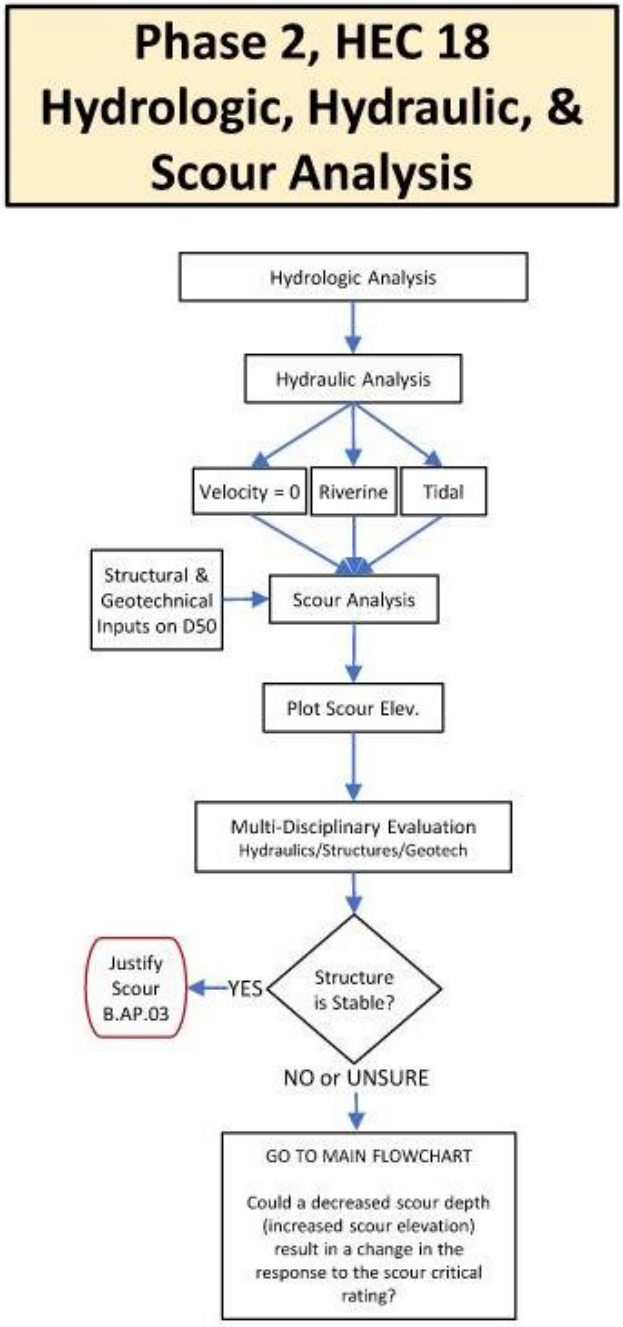
SCOUR EVALUATION REPORT (SER) FLOWCHART



Phase 1, HEC-20 FLowchart



Phase 2, HEC-18 Flowchart



7.2. Requirements of a Plan of Action for Scour

Alternate formats may be acceptable upon concurrence from the Statewide Hydraulic Engineer. Include the following POA sections:

- Scour Vulnerability
    - Scour Evaluation Summary – Include current SNBI Item B.AP.03 Scour Vulnerability rating and evidence of observed scour or calculated scour analysis, debris on piers and abutments, and countermeasures present and damaged.
    - Scour History – Include history from inspection reports
    - Foundation Type
    - Foundation Material
    - Persons writing the POA
- NBIS Coding Information
- Recommended Actions – Include summary of recommended actions and whether they are implemented or not
- Hydraulic/Structural Countermeasures (If applicable)
    - Existing Countermeasures – Describe countermeasures installed; include date (month and year) installed.
    - Proposed Countermeasures – Include proposed countermeasures.
- Inspection Frequency
    - Include Recommended Inspection Intervals and items to watch.
- Monitoring Devices (If applicable) – Include recommendations for use and type of flood monitoring devices.
- Flood Monitoring Plan– Describe the flood monitoring plan including
    - Initiation of Flood Monitoring including predetermined level marked on the bridge if applicable.
    - Post-flood Monitoring Requirements
- Bridge Closure Plan
    - Include information on when to alert personnel of possible/immediate bridge closure
    - Criteria for reopening bridge

- Closure Plan Summary
- Personnel Responsible for Closure
- Contact Personnel
- Personnel Responsible for Reopening after Inspection

- Detour Route – Include Detour route if any.
- Bridge Scour Schematic – Include a schematic of the bridge with water surface elevations and critical scour levels if calculated.

7.3. Scour Evaluation Report Criteria

The Scour Evaluation Report (SER) must describe the assumptions used to evaluate the risk of scour and not limited to the list below. The latest copy of Design Criteria for Highway Drainage has additional requirements to complete a SER.

- Site Conditions – Describe the existing foundation type and elevations, stream geology, channel hydraulics, and relevant information regarding whether a HEC 18 analysis is not required per the criteria above.
- Hydrology and Hydraulics – Include the design storm(s) analyzed and water surface elevation(s) and velocities.
- Scour Depth Calculations and Results – Provide calculated scour depths in tabular format and in elevation view at the upstream face of the bridge (If applicable).
- Structural Review/Foundation Stability Analysis (If applicable).
- Conclusions/Recommendations – Include the recommended SNBI Item B.AP.03 Scour Vulnerability code.

The following QC checklist for Scour Evaluations will be used by HDOT to ensure the necessary items are included in the Scour Evaluations as well as a guide for those preparing the SER. The Statewide Hydraulic Design Engineer will review the Scour Evaluations for HDOT.

Local Public Agencies are responsible for reviewing the SER. They may use this QC checklist as a guide in their review. BIP Leaders may contact the Statewide Hydraulic Design Engineer for any questions on the checklist.

BRIDGE SCOUR REPORT
ABBREVIATED QUALITY CONTROL REVIEW

PROJECT DETAILS

Bridge Asset ID: ______________________
Route: ______________________
Stream Crossing: ______________________
County: ______________________

Preparer: ______________________
Organization: ______________________

QC Certification: ______________________

Instructions:

1. On QC comments spreadsheet, reviewer shall and provide comments as necessary and indicate status of each item.
2. Originator shall make corrections as indicated by comments, provide comment if necessary and resubmit the scour study to reviewer.
3. Reviewer shall update status of resubmitted items, and provide additional comments as needed.
4. If additional comments or corrections are necessary, originator shall make corrections and resubmit until all items have a status of Pass, Fail, or N/A
5. This checklist is intended to provide documentation that a quality control review was performed. All applicable sheets must be completed and included, along with this summary sheet, for Scour Study Report submission.

1 of 1

Bridge Asset ID: 0

QC Review - Phase 1

HDOT Scour Critical Assessment and Management System

	Initial	Date
Originator (Name):		
Technical Reviewer (Name):		
Date QC Certified for Submittal:		

Instructions:

1. Populate "originator" & "review by" cells to left
2. Provide comments below
3. For each round of comment, add additional lines.
4. When all comments are satisfied, reviewer fills in date certified for submittal

ID	Item	Quality Control Review		
		Status (Included)	QC Review Comment	Originator Response
	Coversheet			
1	Is bridge location and number properly identified?			
2	Is scour vulnerability properly classified?			
3	Has Item B.AP.03 been coded?			
4	Have field personel and reviewers been properly identified?			
	Findings			
5	Have the findings been appropriately summarized?			
6	Has a recommendation for classification been made?			
7	Has the Basis for Evaluation been made clear?			
8	Are the Materials and Documentation all properly listed?			
	Location Map			
9	Is a map provided that clearly shows the location of the structure?			
	Plan View			
10	Does the sketch have a north arrow?			
11	Are substructure units clearly labeled?			
12	Is the flow direction of the stream labeled?			
13	Are banks labeled with possible vegetation growth or obstructions?			
14	Are obstructions in the stream labeled?			
	Scour Evaluation			
15	Has the vulnerability been classified with appropriate reasoning?			
16	Have recommendations been provided?			
17	Is evidence of scour at the site reported?			
18	Are abutment and pier type/locations called out correctly?			
19	Has the channel stability been reported according to site conditions?			
20	Has the geomorphology been reported according to site conditions?			
21	Have stream conditions been properly reported?			
22	Is there a photo log with proper comments?			
	Appendix			
23	Are structure plans attached?			
24	Is there a FEMA flood map attached?			

1 of 1

Bridge Asset ID: 0

QC Review - Phase 2

HDOT Scour Critical Assessment and Management System

	Initial	**Date**
Originator (Name):		
Technical Reviewer (Name):		
Date QC Certified for Submittal:		

Instructions:
1. Populate "originator" & "review by" cells to left
2. Provide comments below
3. For each round of comment, add additional lines.
4. When all comments are satisfied, reviewer fills in date certified for submittal

ID	Item	Quality Control Review		
		Status (Included)	QC Review Comment	Originator Response
	General Information and Report Requirements			
1	Bridge Structure Number			
2	County			
3	Descriptive Bridge Location			
4	Bridge Owner			
5	Facility Carried			
6	Scour Mode			
7	Scour Critical			
8	Scour Susceptible			
9	Item B.AP.03 Code			
10	Foundation Type (Known or Unknown)			
11	Report Originator and Credentials			
12	Quality Control Engineer and Credentials			
13	Plot of Bridge Foundation Elements and Scour Profile for the 200-year and 500-year events are available.			
14	Summary of conclusions and recommendation			
15	If data are needed for an analytical assessment, details on the types of data (i.e., geology or unknown foundation determination) required are identified.			
	Hydrologic Data Checklist			
	General			
16	Summary of flood history			
17	Hydrologic data source applied and documented: (1) Frequency analysis of observed (gauge) data (i.e., StreamStats, FEMA FIS cross section at upstream end of bridge) (2) Regional or local regression data from Hawaii DOT Design Criteria for Highway Drainage (only if (1) is not available and the drainage area > 200 acres) (3) Rational equation method (only if (1) is not available and for drainage areas <= 200 acres)			
18	If a previously accepted model is used as the source for peak discharge(s),the source model is identified			
19	If peak discharge(s) are from a previously accepted model, discharges used agree with the source.			
20	Determination of 200-year and 500-year flood events			

1 of 4

	USGS StreamStats			
21	Basin delineation			
22	Confirm appropriate region regression scenario			
23	Basin characteristics			
24	Peak-flow report appears reasonable			
	Hydraulic Data Checklist			
	General			
25	A tabular summary of hydraulic analysis outputs is provided.			
26	A summary of the hydraulic analysis conducted with details on methods, model versions, assumptions, and data inputs is provided.			
	Bridges			
27	An appropriate numerical model, such has HEC-RAS, SRH2D, or similar computer program, was applied for the analysis.			
28	All supporting modeling input and output files are provided in digital format with key input/output files included in the report.			
29	Confirm bridge geometry is appropriately incorporated into the model.			
	Bridge-Culverts			
30	The most recent version of HEC-RAS was applied at the time of the analysis.			
31	All supporting modeling input and output files are provided in digital format with key input/output files included in the report.			
32	Confirm geometry is appropriately incorporated into the model.			
	Grain Size Analysis Checklist			
33	Particle size gradation curves available for bed and bank samples collected during Phase 1.			
34	Material depths provided.			
35	Description of sediment characteristics and erodibility available.			
36	D50 applied for analysis matches curves.			
	Channel Stability Evaluation			
37	Incipient Motion Analysis provided following the guidelines in FWHA's HEC-20 and Highways and the River Environment			
38	Discussion of analysis and results provided.			
39	Identify whether a natural armoring layer occurs.			
	HEC-18 Scour Checklist			
	General			
40	If a scour assessment or tool was applied for the analysis, all accompanying input and output files are provided with pertinent data available in the report.			
41	Confirm scour analyses are available for the 200-year and 500-year event.			
42	Report clearly identifies types of scour analyzed. If any type of scour is excluded from the analysis (i.e., abutment scour in the case of pressure flow), then justification is provided.			

	Abutment scour			
43	Computation method used is reasonable			
44	Abutment type			
45	Angle of approach			
46	Centerline length of embankment			
47	Length of active flow obstructed by embankment			
48	Flow obstructed by abutment and approach embankment			
49	Flow area obstructed by embankment			
50	Velocity at abutment toe (HIRE)			
51	Flow depth at abutment toe (HIRE)			
52	Width of floodplain			
53	Unit discharge at upstream section			
54	Unit discharge in contracted section			
55	D50			
56	Upstream flow depth			
57	Flow depth in contracted section prior to scour			
	Live bed contraction scour			
58	Energy gradient at approach section			
59	Upstream discharge transporting sediment			
60	Upstream bottom width transporting sediment			
61	Discharge transporting sediment in contracted section			
62	Bottom width transporting sediment in contracted section (less pier widths)			
63	Depth in contracted section prior to scour			
	Clear water contraction scour			
64	Discharge in contracted section			
65	Bottom width in contracted section (less pier widths)			
66	Depth in contracted section prior to scour			
67	D50 and Dm (1.25*D50) appropriately specified			
68	If cohesive soils are noted at the bridge, ultimate scour equations are provided.			
	Contraction scour for pressure flow			
69	The study accurately resports the need for pressure flow analysis (i.e., water level exceeds low chord elevation).			
70	If overtopping occurs, discharge through the bridge was appropriately extracted from a numerical model (i.e., HEC-RAS, SRH2D) and accounts for flow blockage due to girders, deck, and parapet.			
71	If overtopping occurs, the effective channel discharge for live-bed conditions (Que) was applied in live-bed scour calculations.			
72	Vertical size of bridge opening prior to scour			
73	Deck thickness			
74	Flow separation thickness, t, is correctly determined.			
75	Calculation of scour depth is accurate.			
	Long term Degradation			
76	Confirm basis for long term estimate			

	Pier scour				
77	Pier shape				
78	Pier width and length				
79	Angle of attack				
80	Channel bed condition				
81	Confirm flow depth upstream of pier				
82	Confirm flow velocity upstream of pier				
83	D50 and D84 of bed material (for complex piers)				
84	Thickness of pile cap or footing (for complex piers)				
85	Height of pile cap or footing above bed before scour (complex piers)				
86	Distance from front of pile cap or footing to pier stem (complex piers)				
87	Number of columns per bent				
88	Pier spacing				
	Pier scour in cohesive bed materials				
89	Identify bed material				
90	Correct equations used				
	Pier scour in coarse bed materials				
91	Correct equations used				

Bridge Asset ID:		0			
QC Review - Phase 3			**HDOT Scour Critical Assessment and Management System**		
	Initial	**Date**	**Instructions:**		
Originator (Name):			1. Populate "originator" & "review by" cells to left		
Technical Reviewer (Name):			2. Provide comments below		
			3. For each round of comment, add additional lines.		
Date QC Certified for Submittal:			4. When all comments are satisfied, reviewer fills in date certified for submittal		

ID	Item	Quality Control Review		
		Status (Included)	**QC Review Comment**	**Originator Response**
	Preparation of Geotechnical Report			
1	Summary of Site Conditions.			
	Submission of Boring Logs			
2	Documentation of soil properties.			
3	Soil properties match assumptions in Phase 2 Analysis?			
	Determination if Structure is Scour Critical			
4	Summary of Geotechnical Analysis			
5	Recommendations Based on Analysis			
	Provide Calculations of Foundation Structural Stability			
6	Foundation structural stability calculations			
	If Foundation is Scour Critical, Assess the foundation structural vulnerability of foundation			
7	Instability of spread footings for < Q200 Scour Depth			
8	Depth of deep foundation instability, predicted failure mode			
9	Deep Foundation/Pile Vertical & Lateral Load Capacity for 200-yr scoured stream bottom			

1 of 1

Bridge Asset ID: 0				
QC Review - Phase 4		**HDOT Scour Critical Assessment and Management System**		
Originator (Name):	**Initial** / **Date**	**instructions:** 1. Populate "originator" & "review by" cells to left 2. Provide comments below 3. For each round of comment, add additional lines. 4. When all comments are satisfied, reviewer fills in date certified for submittal		
Technical Reviewer (Name):				
Date QC Certified for Submittal:				

ID	Item	Quality Control Review		
		Status (Included)	**QC Review Comment**	**Originator Response**
	General Information			
1	Bridge Structure Number			
2	Owner			
	Scour Vulnerability			
3	A scour evaluation summary is included			
4	Current Item B.AP.03 rating			
5	Source of Item B.AP.03 rating (observed, assessed, calculated, other)			
6	Scour history			
7	Foundation Type			
8	Foundation Material			
9	POA Originator Listed (name, company/title, contact information, date)			
10	POA Quality Control Engineer Listed (name, company/title, contact information, date)			
	SNBI Coding			
11	Inspection Date (current and previous)			
12	Item B.C.11 - Scour Condition Rating (current and previous)			
13	Item B.C.03 - Substructure Condition Rating (current and previous)			
14	Item B.C.09 - Channel Condition Rating (current and previous)			
15	Item B.C.10 - Channel Protection Condition Rating (current and previous)			
16	Item B.AP.02 - Overtopping Likelihood (current and previous)			
	Recommended Actions			
17	Identify whether increased inspection frequency is recommended and/or implemented			
18	Identify whether fixed monitoring devices are recommended and/or implemented			
19	Identify whether a flood monitoring program is recommended and/or implemented			
20	Identify whether hydraulic and/or structural countermeasures are recommended and/or implemented			
	Hydraulic/Structural Countermeasures			
21	Description of existing countermeasures provided			
22	The installation date of existing countermeasures (month and year) provided			
23	Proposed countermeasures identified and described			

1 of 2

	Inspection Frequency			
24	Recommended inspection intervals provided (regular inspection program, increased inspection frequency, underwater inspection required, increased underwater inspection frequency)			
25	Notes on items to watch during inspections provided			
	Monitoring Devices			
26	Monitoring device type recommended			
27	Description of flood monitoring device use provided			
	Flood Monitoring Plan			
28	Flood monitoring type specified (visual inspection, portable instrument, geophysical, sonar, other)			
29	Is a flood monitoring event defined for the initiation of flood monitoring? (i.e., discharge, stage, rainfall rate, flood forecasting information, level on bridge)			
30	Post flood monitoring required?			
31	Time to inspection after event			
32	Frequency of post-flood monitoring provided			
33	Criteria for termination of post-flood monitoring provided			
	Bridge Closure Plan			
34	Criteria to alert personnel of possible and immediate bridge closure provided			
35	Bridge closure plan summary provided			
36	Personnel responsible for bridge closure	Pass	The state or county will specify this information.	
37	Personnel contact information (name, title, agency/organization, phone number, email)	Pass	The state or county will specify this information.	
38	Criteria for re-opening bridge provided			
39	Personnel responsible for reopening after insepection	Pass	The state or county will specify this information.	
	Detour Route			
40	Detour route map provided			
	Bridge Scour Schematic			
41	Bridge schematic provided			
42	Water surface elevations provided (200-year event required)			
43	Scour profile accurately delineated at the bridge			
44	Critical scour elevations noted at the piers and abutments			

2 of 2

8. BRIDGE FILE and REPORT DEADLINES

This Section describes the Bridge Inspection Program Bridge File and the Tunnel File required documentation, the maintenance process, and reports deadlines for the State of Hawaii.

The Bridge File and Tunnel File must be maintained to document the structure's history and relevant information, including non-inspection activities such as: Preservation, Repairs, Rehabilitation, and Improvements, ref CFR 650.313(d) and CFR 650.513(h). The BIP Leader is responsible for maintaining an up-to-date Bridge File or Tunnel File for each structure that is within their jurisdiction.

The official **Bridge and Tunnel File** for Previous Inspection Reports is the *BrM Inspection Multimedia* tab. The official Bridge File for all other information such as Load Rating, Scour reports, As-built data, and all other files as defined in section 6.2. are located within the HDOT Bridge Servers where all electronic documents are stored and secure. An Inspection Report is not considered complete until the document is stored in BrM and available as a public document within 90 days, ref CFR 650.315 and HDOT policy.

All original signed bridge documents submitted to BrM, paper or digital, must remain in BIP Lead Bridge File until the files are verified by the BIP Leader to be in the BrM Multimedia folder. If all historical and relevant information is scanned and posted in the BrM Multimedia folder, the BIP Lead may dispose of the paper and delete the digital BIP Files.

All current and previous inspection report types with SI&A sheets must be in the Bridge File.

The Inspection > Multimedia task allows the bridge inspector to upload inspection files, photos and data directly to a selected bridge or bridge inspection in the BrM. This Multimedia Directory contains bridge entries for all the inspections entered into the BrM. Each inspection will have files that can be uploaded. This function will also allow files to be downloaded, and access to older files and reports. This function will provide immediate information sharing and report submission.

For access to information not stored on the BrM Inspection Multimedia tab, please contact BrM.Help@hawaii.gov and request the information required. Please provide specific information such as Bridge ID, Island, type of document/information and any other specifics that may help assist in the team providing the appropriate information to you.

8.1. Bridge File Document Name Format

A Bridge File for each structure should include but not be limited to the items listed in this Section. Documents must be a PDF electronic format, unless specified otherwise, and use the filename format as follows:

Bridge Number (space) **DocID** (space) Bridge Name (space) **Inspection Date** (MMDDYY)**.PDF**

Bridge File Document Name Examples:

003000610300568 **TUN** Pali Tunnel No. 1A (Outbound) 010915
009003400900927 **RTN** Kahakuloa 093015
007000500001419 **NSTM** Kaumakani Pedestrian Overpass 012501
009000320400050 **LRS** Waiale Road Overpass 011108
001000190308146 **SER** Nanue 060513
007401111440001 **PLAN** Puuopae 090816

8.2. Document IDs

Document ID is an abbreviation for the type of inspection report or document and defined as follows. If there is more than one report in the PDF, combine the Report ID's using the format: (space)**Doc ID**(space)**Doc ID**(space) as needed.

Inspection & Report Type	Doc ID	Format Comment
Critical Finding Report	CFR	Critical Finding summary of RTN or DAM inspection
Damage	DAM	
In-Depth	DEPTH	
Nonredundant Steel Tension Member	NSTM	If NSTM not included in a Routine Inspection
Monitor	MON	
Post Event	POSTE	
Routine	RTN	Routine Inspection Report & relevant docs
Scour	SCO	
Tunnel	TUN	
Underwater	UW	If UW not included in a Routine Inspection

Bridge File Documents	Doc ID	Format Comment
FHWA Critical Finding Notification		CFNote Use Date of critical finding
Cover Page	COVER	Use Date completed or revised .docx (**NOT PDF**)
Report Drawings/Sketches	DRAW	Software file format: .DGN, .DWG, etc. (**NOT .PDF**)
NSTM Procedure	NSTMP	Use Date PDF completed or revised
Historical Evaluation Summary	HIS	Use Date PDF completed or revised
Load Rating Calcs	LRC	Use Load Rating Date instead of Inspection Date
Load Rating Summary	LRS	Use Load Rating Date instead of Inspection Date
Maintenance Repairs	MAIN	Use Date work was completed
Other	OTHER	
Ownership/transmittal Docs	OWN	Use Date transmittal was effective
Bridge Plans	PLAN	Use Plan Date or structure Year Built
POA for Countermeasure	POAC	Use Date PDF completed or revised
POA for Scour	POAS	Use Date PDF completed or revised
Posting Notification	POST	Use Date posted
Posting Picture	PostP	Use Date Picture Taken
Scour Calculations	SCalc	Use Date PDF completed or revised
Scour Evaluation Report	SER	Use Date PDF completed or revised
Scour Plan sheet	SPLAN	Use Date PDF completed or revised
Tunnel Special Procedures	TSP	Use Date PDF completed or revised
Vicinity Map	VIC	Use Date PDF completed or revised

Document ID Descriptions (Alphabetical)

CFR	The Critical Finding Report and subsequent actions taken unless included is other Reports.
DRAW	Digital drawing file of structure Plan, Elevation, Section, or Details and Sketches used in a Report. The file extension is the file format of the software, not a .PDF file format. If more descriptors are needed to identify more than one file, then add no more than 5 characters to the end of the Bridge Name: Bridge Name(space)DESCR.
LRC	Documents that provide the basis for the reported rating value; calculations with software input/output or engineering justification for assigned ratings.
PLAN	Bridge Plans and Special Provisions for all contract work and structure types. Original Contract, widening, rehab, and repair plans will be distinguished by the Contract Date. The Contract Date (MMDDYY) should be the date indicated on the first sheet.
POST	Notification of need to Post (email); and email stating when posted & weight (picture with date).
OTHER	Documents relevant information such as: Special reports, Studies, News articles, Rehab planning. General correspondence regarding: Planned projects, High water events, or matters relevant to inspection.
RTN	This ID is used for Routine and Initial Inspections
SP	Scour Plan sheet that shows the Scour data: Hydraulic data, Footing Elev./Dimensions, & Scour depths. This should be on the Cover sheet of the Bridge Plans.
SIA UW NSTM	Use these if the SI&A sheet, Underwater, or Nonredundant Steel Tension Member Report is submitted separately and not included in a Routine Inspection Report.

8.3. Finalizing Reports & Bridge File Submittal

Submitting Inspection Reports is a two-step process if there are changes to SI&A data that does not normally change.

8.3.1. Final Report Timeline & Deadlines

A signed Report is considered complete when the Report is stored in the BrM Bridge File for all scheduled and unscheduled inspections performed. The submittal process for all Reports has several steps with deadlines for a report to be complete within 90 days. The procedure applies Statewide and is the same for the HDOT and LPAs. The deadlines for the steps to be completed are based on the number of days from inspection date as follows.

Before signature, all Initial and Routine Inspection data must checked by the Team Leader on the FHWA website for errors. A TNI data file or, NBI data file and Element data file must generated by BrM and checked on the website and be error free. All Fatal and Non-Fatal error codes must be corrected, or justified in the report, before the Report is submitted or considered complete. This fundamental data check prevents a long list errors during the HDOT annual submittal process. The

check is not comprehensive or assure quality. Coding questions may be directed to the BIP Lead or Statewide BIP Manager.

- **Day 0:** **Team Lead** conducts field inspection within the calendar month the inspection is due.

- **Day 30:** **Team Lead** completes a report with signature, uploads to BrM Multimedia along with all applicable inspection files, and notifies via email both the BIP Leader and BIP@hawaii.gov, within 30 days of Inspection, that the report and bridge files have been uploaded to BrM. The body of the email message must include Bridge File PDF names for all uploaded files.

  The submittal must include all documents for review by the BIP Lead, including LRS, Drawings, Photos, etc. as required.

- **Day 60:** **BIP Lead** reviews Report and returns for re-submittal, or signs as QC in BrM and notifies Team Lead. C&C Honolulu LPA provides additional QC signatures at this step. Team Lead provides final Report PDFs with BIP QC signature.

- **Day 90:** Deadline for all final reports, including load ratings and other bridge files, to be all signed and uploaded to BrM and all temporary files (previous versions) removed.

8.3.2. Annual BrM Data Submittal to FHWA

HDOT is required per Federal guidelines to submit a complete NBI data file with no fatal data errors annually in March. The BrM Coordination team made up of BrM development and maintenance personnel, managed by the Statewide BrM Manager, runs a validation check in January and corrects any errors that may arise. The process defined in section 6.3.1 is in place to minimize the errors found at this time. The BrM Manager will make the final submission of both NBI and NTI data no later than March 15 annually. See also Section 3.6 for more general information on the submission requirements.

The step by step process for data checking is as follows:

- Select your NBI bridges in BrM and click the Validate button. BrM has the NBI checks built in. The results of this validation will give you a good idea of what data needs to be cleaned up before your submittal is ready.

- Generate an NBI and NBE file of your bridge data using the Gateway > Export Page in BrM.

  Note: If the file does not export, check if pop-ups are blocked and allow pop-ups from your BrM site. Then click the 'Export' button again.

- For Tunnel data, the NTI file can be exported using the Gateway > Tunnels > Import/Export page.

- Upload the NBI File exported from BrM to the FHWA NBI file checking site: https://fhwaapps.fhwa.dot.gov/bridgeCheckerp/NBIFileCheck.aspx

- *Note: You will have to change the .nbi file extension to a .txt to run the file check.*
- *Note: Address any errors found. If your error results won't download when you first click on the hyperlinks, you may also have to allow pop-ups from the site to download them.*

- Now upload the NBE File to the FHWA NBE file checking site: https://fhwaapps.fhwa.dot.gov/elementCheckerP/index.aspx and address any errors.
- Upload the NTI file to the FHWA NTI File Check site: https://fhwaapps.fhwa.dot.gov/FullNTICheckerp/
- You can repeat this process as often as necessary.

The remainder of this page is intentionally left blank

9. BIP LEADER DUTIES & REPORT QC

This Section of the Manual contains the QC requirements of a BIP Leader and clarifies other responsibilities. While sections may duplicate data from other sections, this section's purpose is to ensure the understanding of the BIP Leader's role and responsibilities.

9.1. Inspector Qualifications Monitoring

Upon award of consultant inspection contracts, the BIP Lead must request the contractor submit the proof of qualifications for all inspectors. After verifying the course dates and experience, PDFs of the proof need to be forwarded to the Statewide BIP Manager in order to update the Statewide Inspector Registry.

BIP Leads must maintain an up-to-date record of their own inspection certifications to comply with annual Bridge or Tunnel Metric 3.

9.2. Unscheduled Inspections

BIP Leaders are responsible for initiating and timely completing unscheduled inspections such as traffic impacts, fire, flood, or completed construction within your jurisdiction that require inspection.

9.2.1. Structures Discovered to Exist

Existing structures new to BrM must be inspected within 90 days from the day of discovery by the Agency and complete an Initial Inventory Inspection Report with 180 days of the discovery. The BIP Leader must request a new Bridge Number from HDOT Bridge Design Office or brm.help@hawaii.gov before the Team Lead can input data into BrM for new structures and structures not in BrM.

9.2.2. Completed Construction and Temporary Structures

An Initial Inventory Inspection for all tunnels and bridges is required after substantial completion but prior to the date a **partial**, **temporary,** or **permanent** structure is open to the traveling public in accordance with FHWA Questions and Answers on the National Bridge Inspection Standards 23 CFR 650 Subpart C, Q303 and CFR 650.315. The Report must be completed and in the Bridge File within 90 days of the Inspection Date.

- **Newly constructed portions** of an existing bridge must be inspected prior to being open to public traffic. An Initial Inventory Inspection applies to the new construction portion, and Routine Inspection criteria applies to the existing structure.
- Long-term projects where whole or **partially constructed structures** are opened to traffic must be inspected prior to being open to public traffic.
- **Temporary structures** with traffic during construction while the permanent structure is closed must have an Initial Inspection and use a new Temporary Bridge Number. The temporary structure inspection and reporting requirements are same as a new permanent structure which includes SI&A, Load Rating, defect documentation, and photos.
- **Completed Bridge rehabilitation and widenings** must code SNBI Item B.W.02 - Year Work Performed with the year the contract work was permanently open to traffic. See the FHWA Coding Guide for types of eligible work not considered as reconstruction such as: Painting, Rail upgrade,

Repairs, Retrofit without improvement.

Routine Inspections should continue for bridges that are permanently removed from service yet remain in place above pedestrians and/or traffic or have the potential of endangering the public. When they are removed from service, the Assistant Statewide BIP Manger should be notified. SNBI Item B.PS.01 Load Posting Status is coded C for "Closed" and may have up to a 72-month Inspection Frequency assigned.

Design Documents Required for New Structures

The BIP Lead must obtain 3 required documents from the designer for a Team Lead to inspect a new structure. These files should be available in the Bridge File 30 days prior to the Initial Inspection and retained until verified in the Bridge File. New structures require:

- **Contract Plans** with special provisions – As-built plans preferred.
- If the structure is over a waterway**:**
  - **SER** with scour calculations (SCalc) & **POAS**.
  - **Plan Sheet** with hydraulic data.
- **LRS** and **Load Rating calculations.**

  The first sheet of the Bridge Plans should show the hydraulic data which includes, 1) Calculated General & Local scour depths, 2) Scour Elevations relative to the foundations, and 3) Design high water levels. This information may be shown one or more sheets.

9.2.3. Initiating Damage Inspection by BIP Lead

The source of discovery may be from the news, the public, maintenance staff, etc. BIP Leaders need to be proactive to ensure the Owner staff and maintenance informs them when a structure is damaged.

The BIP Lead is responsible for initiating an unscheduled Damage Inspection and should receive a complete Damage Inspection Report within 3 days of notification. Damage Inspections are at the discretion of the BIP Lead's professional judgement. If a Team Leader is not available to the BIP Lead, then contact the Statewide BIP manager. Damage inspections by a Team Leader are recommended when:

- Damage to elements in a primary load path.
- Damage is considered a Condition State 3 or 4 defect.
- Damage would change SNBI Items B.C.01 Deck Condition Rating, B.C.02 Superstructure Condition Rating, B.C.03 Substructure Condition Rating, or B.C.04 Culvert Condition Rating.

Concrete spalling that removed concrete cover and does not damage rebar would not require a Damage Inspection. If the damage meets the definition of a Critical Finding, then the damage must be reported to the Statewide BIP Manager immediately in accordance with Critical Finding Notification.

9.2.4. Initiating Earthquake Reconnaissance by BIP Lead

Earthquakes are monitored by the USGS Earthquake Hazards Program which analyzes earthquake intensity and Hawaii NBI data to provide HDOT notifications for when structures should be checked for signs of earthquake movement. Real-Time Notifications are sent by email to the Statewide BIP Manager and the Hawaii District BIP Leader. If structures in Hawaii County or other islands need reconnaissance, then the Statewide BIP Manager will contact the BIP Lead to look at the structures.

Bridge conditions are not part of the USGS analysis. Therefore, bridges in Fair or Poor condition should be considered for reconnaissance. Reconnaissance items to look for, but not limited to:

- Excessive joint movement or concrete spalls in the bridge rail at expansion joints.
- New signs of movement at bearings.
- Poor bridges with any change in the documented CS3 or CS4 element conditions.

When a structure shows signs of movement, then the BIP Lead must initiate a Post Event Inspection to be completed within 3 days; or within 7 days of a large event, whichever is sooner to minimize the public risk.

Real-Time Earthquake Notifications

The following Real-Time notification shows the information provided when an earthquake exceeds a magnitude 5.0. When structures are ranked with a Low Impact and Green color or greater, they must be checked for signs of movement to identify if POSTE inspections are required.

Name: **(not assigned at this time)**
Magnitude: **5**
ShakeMap ID: **hv72000488-2**
Location: **6 km SSW of PÄ□hala, Hawaii**
Latitude-Longitude: **19.1979, -155.5449**
Local Time: **2022-10-14T09:07:29 HST**

Summary of Potential Impacts: BRIDGE

Total number of facilities analyzed: **5**
Summary by impact rank:

High	0	High impact potential
Medium-High	0	Medium-High impact potential
Medium	0	Medium impact potential
Low	5	Low impact potential
Below Threshold	0	No impact potential

List of Potentially Impacted Facilities: BRIDGE

BRIDGE presented in the table below are sorted in order of impact potential. The list includes the top 200 facilities in the area of shaking. The complete list is available on the web server.

BRIDGE	Facility ID	Owner ID	Latitude ID	Longitude ID	Impact Potential	PSA10
001960001100004 - MAMALAHOA/MOAULA GLH	15_001960001100004	2	19.1857472	-155.4934722	Low	5.872
001000110306805 - PUNALUU STRM	15_001000110306805	1	19.1643917	-155.5014861	Low	6.081
001000110306913 - KANENELU STRM	15_001000110306913	1	19.1759278	-155.4905833	Low	5.775
001000110306986 - MOAULA STRM	15_001000110306986	1	19.183575	-155.4829389	Low	5.324
001000110306996 - HIONOMOA STRM	15_001000110306996	1	19.1846028	-155.4819083	Low	5.324

Prior to inspection, the BIP Lead should ensure safety measures are in place to protect the staff and public. The BIP Lead should follow the Agency protocol for the situation such as: Traffic closure, Calling 911, Debris removal, or Public relations. BIP should notify their Chain of Command and notify the Statewide BIP Manager the same day. The HDOT Statewide BIP Manager will notify FHWA Hawaii Division.

9.3. Inspections Past Due

It is the Team Leaders responsibility to ensure the structures are inspected in a timely manner or to request the inspection be rescheduled. The BIP Lead must verify the structure was inspected timely for compliance and notify the Statewide BIP Manager if the field inspection was late.

9.4. Plan of Action for Scour (POAS & POAC)

The Owner must develop and maintain a Plan of Action (POA) for scour critical structures per the requirements of CFR 650.313(e)(3) and follow Bridge Inspection Reference Documents for scour. It is the BIP Leaders responsibility to complete the activities specified in a Plan Of Action for Scour (POAS) for each structure, see Monitoring Bridges for Flood Events.

All new and modified POAs for scour must be approved by the Statewide Hydraulic Engineer for consistency within the State of Hawaii and should be placed in the Bridge File within 30 days of completion.

Scour Countermeasures constructed on existing structures must be properly reflected in the coding of item B.AP.03, Scour Vulnerability, with a Plan of Action for the Countermeasure (POAC). Any available documentation of the design and/or construction of the scour countermeasure should be stored in the BrM "Bridge" folder under "Scour". This will allow inspectors to monitor the performance of installed countermeasures.

9.4.1. Monitoring Bridges for Flood Events

The Statewide Scour Monitoring process described in this Section applies to all structures with a POA for Scour Critical Bridge that requires monitoring during a flood event in accordance with 23CFR650.313(e).

9.4.1.1. Monitoring the Weather

The BIP Lead is responsible for **monitoring the weather** for flood warnings or appropriate triggers described in the POAS. A secondary owner representative should also be identified to provide coverage as necessary. If the storm meets the trigger criteria, the BIP Lead or appropriate staff must immediately protect the traveling public and begin monitoring the structure, as described in the POA. Monitoring must continue until the storm passes or the peak water level is well established. Each Agency is responsible for staffing resources to provide adequate monitoring of each structure affected by a storm event.

If a gauging station is appropriate for the bridge site, the stream peak flow may be checked remotely with USGS gauging stations. Charts of the current water level (FT), peak, and flow (CFS) may be available for to document the event. The following USGS link allows users to subscribe to alerts based on custom real-time stream flow parameters. This webpage is useful for monitoring

alerts over selected or nearby streams with real-time information: https://dashboard.waterdata.usgs.gov/app/nwd/

If weather conditions at the site are not safe to monitor the structure, the Agency should close the structure and follow the Bridge Closure Plan in the POA and follow the Agency closure protocols.

9.4.1.2. Links to Weather Alerts

The BIP lead or an Owner-designated representative are responsible for obtaining weather related alerts and real-time stream flow conditions using the suggested links below. The following links enable users to opt in to emergency alerts on a cellular phone or e-mail for weather related triggers as required in the Scour POAs such as a "Flash Flood Warning".

- OAHU-CCH - Department of Emergency Management
- MAUI COUNTY - Maui Emergency Management Agency
- KAUAI COUNTY - Kauai Emergency Management Agency
- HAWAII COUNTY - Hawaii County Civil Defense Agency

Additional resources that are available for government use:

- iNWS (NOAA) at https://inws.ncep.noaa.gov/
- Pacific Disaster Center at https://www.pdc.org/

9.4.2. Monitoring the Structures

The BIP Leader or qualified staff, must monitor the scour critical structures during a storm event and downstream of areas with heavy rainfall or known flooding in accordance with CFR 650.313(e). The following is a suggested process for organizing, monitoring, and post event actions.

9.4.2.1. Pre-Response During Potential Triggering Events

Monitor the weather according to section Monitoring the Weather using the suggested links in section Links to Weather Alerts.

When storm monitoring is required, the BIP Lead or an Owner-designated representative are responsible for the following. Long storm events may require updates and additional resources.

- Providing Maps of areas affected by the storm with the bridges identified for storm monitoring. This may change from event to event depending on the locations involved in the triggering event (flash flood warning or other event)
- Planning and organizing the resources to monitor the bridges appropriately.
- Ensuring staff have copies of the scour POAs.
- Assigning resources to monitor structures immediately.
- Assigning resources when Post Event Inspections (POSTE) are required.

- Notifying the Statewide BIP Manager and Statewide Bridge Engineer if repairs are required.
- Submitting copies of the Flood Monitoring Log to the Statewide Hydraulics Engineer.

9.4.2.2. Monitoring During the Event

- Measure the water level continuously during the storm event to determine the highwater level, or peak flow. Measuring consists of actual measurements to the water surface, pictures of posted water markers, or estimated depths relative to posted water marks. If the monitoring protocol is not specified in the POA, structures should be checked every hour until the flood and scour danger passes. Prolonged storms may have more than one peak rainfall.
- If the water level exceeds the water mark specified in a Scour POA, the BIP Lead must initiate a Post Event Inspection for scour to be completed within 3 days; or within 7 days of a large storm event, whichever is sooner to minimize the public risk.
- If water levels exceed the threshold for immediate action, follow the procedures in the scour POA which may restrict or close the bridge immediately to protect the public.
- A threatening or unsafe condition may also be observed while monitoring for scour. This may include settlement of the bridge, overtopping when historically the bridge has not overtopped, or excess debris blocking the bridge opening. When a scour POA threshold is exceeded or other unsafe condition exist, the inspector must immediately contact the Bridge Inspection Team Lead for action such as:
  - Request a bridge partial or full closure per Scour POA requirements.
  - Request for immediate removal of debris blocking a bridge opening and document in the report.

9.4.3. Storm Reporting and Post Event Actions

As part of the Statewide **Plan of Corrective Action (PCA) for Scour**, BIP Leads must report the high-water level to the Statewide Hydraulics Engineer and the Statewide BIP Manager. A Flood Monitoring Log Spreadsheet with the following fields must be used to document and report the findings to the Statewide Hydraulics Engineer:

Flash Flood Warning Time/Date	Bridge ID	Bridge Name	Inspector	Time/Date of Water Level Measurement	Water Level Height	Post Event Inspection Required?

BIP Lead must maintain a Monitoring history and document each storm event for each Scour Critical structure monitored. The Monitoring history contains: Flash Flood Warning Time/Date, Bridge ID, Bridge Name, Measured water levels and time/date. It is useful to note if a Post-Event Inspection is required due to measured Water Level Height.

The updated Flood Monitoring Log spreadsheet or a separate email must be sent to the Statewide Hydraulics Engineer and the Statewide BIP Manager within 24 hours after each storm event.

Perform Post Event Inspection if the water level exceeded the water mark specified in a Scour POA. Initiate a Post Event Inspection for scour to be completed within 3 days; or within 7 days of a large

storm event, whichever is sooner to minimize the public risk.

9.5. Programming BIP Repairs

HDOT BIP Leads must review the Inspector Recommendations for scope, priority, and cost (in the *Inspection > Work > Work Candidates* tab in BrM.

The BIP Lead is responsible for coordinating the completion of repairs that were assigned in BrM as *In-House Maintenance*.

Review of the Inspector recommended repairs should consider:

- Extent and type of damage/deterioration
- Possible planned rehabilitation or replacement
- Estimated rate of damage/deterioration

The BIP Lead must include the date the repair is completed in the BrM *Date Completed* field under the appropriate work candidate (see the TAMP Process section).

9.6. QC Review Procedures

The purpose of the QC review is to assess the quality of the inspection process, as documented in inspection activities and the inspection report. The QC review includes assessing the accuracy and completeness of inspections, inspection data, and data entry; confirming adherence to procedures, training and qualifications of personnel; assessing the consistency and accuracy of condition and load ratings, scour evaluations and element conditions; and evaluating BIP team performance.

QC Bridge Inspection Review Process:

- The Bridge Inspector prepares the documentation and performs a review of the inspection work. The Team Leader prepares and submits the Bridge Inspection Report for Preliminary Approval to the BIP Leader within one month of the completed inspection.
- The BIP Leader performs an independent review of the report documentation. The BIP Leader shall complete the review within one week of receiving the report. If corrections are needed, the report is returned through the Team Leader to the Bridge Inspector for revisions or corrections. If the report is satisfactory, the BIP Leader will sign and approve the inspection report. The BIP Leader will submit the approved inspection report to the BrM Multimedia file.

The following pages are forms for use in QC and QA Review Process.

FORM: Quality Review

HDOT Bridge Inspection Report Quality Control/Quality Assurance Review Checklist and Comments	
Bridge Number:	
Inspection Type:	
Inspection Date:	
QC Review Date:	

	Name	Initials	Date
Technical Review By:			

	Name	Firm
Inspection Team Leader:		

ID	Item	Status
	HDOT BIP QC Checklist Items	
1	INSPECTION DATE - Bridge is inspected prior to the Due Date.	
2	SCOUR - Channel cross sections provided for bridge over a waterway	
3	SCOUR - Recommended Item 113 Change? State Hydraulic Engineer concurrence requested?	
4	SCOUR - Item 113 Rated 3 or 7? If so, Scour POA insp. requirements followed?	
5	SCOUR - Element Defect 6000 (Scour) Identified and properly encoded?	
6	SCOUR- Sketches quantify and locate scour to detect future changes?	
7	LOAD RATING/POSTING - Change required? New sign call-out w/in 60 days of insp?	
8	BRIDGE ELEMENTS - Load Path Qty in CS4 require NBI Super/Sub Rating not to exceed '4'	
9	CIFs - CIF Identified? If yes - Critical Finding Notification posted to FTP site and brm.help@hawaii.gov notified?	
10	NCRs - NCR for Super/Sub/Culvert changes from 6 and above to 5 and below? If yes, has inspection submitted a new LR?	
11	NCRs - NCR for Super/Sub/Culvert changes from 5 to 4 or below? If yes, has inspection submitted a new Load Rating (LR)?	
12	REPAIRS - Recommended repairs reasonable and coded as new Work Candidates?	
13	REPAIRS - Design improvements not called out as Work Candidates unless existing feature is unsafe (ex. Bridge Rail)	
14	REPAIRS - Existing Work Candidates have status updated or documented as complete?	
15	REPAIRS - Call-out for notification of appropriate personnel for repair programming per BIP Manual.	
16	REPAIRS - New Work Candidates include preliminary design, cost estimate, and repair completion timing.	
17	ADMIN - Bridge Inspection Report (BIR) signed by Team Leader and BIP Lead	
18	ADMIN - BIR uploaded to FTP website BrM within 30 days of inspection?	
	INDEPENDENT TECHNICAL REVIEW (ITR) CHECKLIST ITEMS	
19	REPORT FORMAT - Report cover sheet info, map, page numbering, photo/figure numbering, etc. accurate?	
20	IDENT/INSP - Bridge Identification and Inspection information is accurate, including DONI/DOLI/FREQ	
21	NBI DATA - Remaining NBI data items appear accurate. Item 36 (TSF), 41 (posting) and Clearance data accurate?	
22	NBI DATA 58-62 Congruence - Deck/Super/Sub/Culvert Item ratings appear reasonable considering history & findings?	
23	BRIDGE ELEMENTS - Element quantification is sound and qty distribution reasonable, per findings cited.	
24	BRIDGE ELEMENTS - CS 3/4 quantities exhibit supporting documentation of appropriate detail, incl. photos. Sketches	
25	BRIDGE/INSP NOTES - Adequate level of location, dimensional, and defect description for both CS and NCR ratings	
26	BRIDGE NOTES - Underwater inspection notes incorporated into report, as required (Dive required for >/= 3.5' depth)	
27	BRIDGE NOTES - Include assessment of scour changes evident through cross section sounding or physical detection?	
28	SCOUR - Channel cross sections provided incorporate X lateral distances and appropriate sounding locations	
29	SCOUR - Channel cross sections oriented looking downstream, per BIP Manual	
30	PHOTOS - Included as required per BIP Manual? Photos annotated properly?	
31	DRAWINGS - Plan, elevation, and cross-section views provided per BIP requirements?	
32	OTHER - (Specify)	
33	OTHER - (Specify)	

FORM: Performance Review

Team Leader / Inspection Organization:	
Reviewer:	
Date Reviewed:	

	Exceeds Expectations (4)	Meets Expectations (3)	Needs Improvement (2)	Immediate Action Req (1)
Management and Coordination				
Comments:				
Communication and Responsiveness				
Comments:				
Compliance with Documentation Requirements				
Comments:				
Compliance with BrM Entry and Timeliness				
Comments:				
Compliance with Load Rating Requirements and Criteria				
Comments:				
Compliance with Scour Critical Requirements and Criteria				
Comments:				
Compliance with Nonredundant Steel Tension Member Requirements and Criteria				
Comments:				
Overall Performances				
Comments:				

10. STATEWIDE BRIDGE INSPECTION QUALITY ASSURANCE

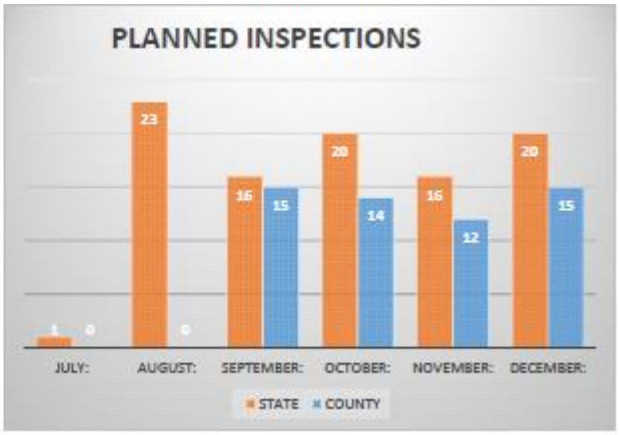
The Statewide Quality Assurance is the responsibility of the Statewide BIP Manager. In this role, the individual is responsible of making sure each of the functions of the Bridge and Tunnel Inspection Program are met and if not are taking appropriate action to remedy the non-compliance.

In this section, the critical compliance functions are outlined as follows:

10.1. Procedures

To be considered compliant, the District/LPA will need to function as stated in the BIP Manual. The Statewide BIP Manager through annual training sessions with LPA/District BIP Leaders will assure that each leader understands his/her role and the extent of their duties.

The Statewide BIP Manager will have regular look ahead forecasts of the bridge and tunnels that are coming up for scheduled inspection in the next 6 months and be provided with a report confirming that the last months inspections were completed and entered the system. Should there be non-compliance, the Statewide BIP Manager will counsel the LPA/District BIP Leaders to retrain them on the procedures and provide assistance in providing the necessary justification of late inspection and reporting to FHWA. Example of a County and District Report prepared by the Statewide BIP Manager is as follows:



The following are terms that are used:

Overdue means the inspection was due prior to the NBI submission date, but a new inspection date was not submitted. This typically occurs either when an inspection was done but not recorded in the inventory data before submission, or that the inspection has not yet been done. An overdue inspection, until resolved, is considered a high-risk safety issue per FHWA.

A ***delinquent*** inspection differs from an overdue inspection in that the inspection was competed but exceeded the required interval.

Bridges adhering to FHWA approved extended frequency criteria are assumed to be lower risk.

10.2. Roles and Responsibilities

Statewide BIP Manager: As indicated in the Statewide BIP Manager Section of this Manual, the Statewide BIP Manager administers and manages QA for statewide bridge and tunnel inspection program. The Statewide BIP Manager or qualified QA consultant (QA Coordinator) shall conduct the independent QA reviews to check compliance of inspection data with the State and Federal requirements.

BIP Leader: As indicated in the BIP Leader (BIP Lead) Section of this Manual, the BIP Leader is responsible for their bridge inspection program in their District or LPA. The BIP Leader establishes and implements the QA procedures and activities in their District or LPA.

Team Lead Inspector (Team Leader): As indicated in the Team Lead Inspector Section of this Manual, the Team Leader oversees the inspection team responsible for planning, preparing, and performing the inspections. The Team Leader also prepares the inspection report for submittal to the BIP Leader. The Team Leader must understand and take responsibility of the QA activities for their bridge inspection team.

Statewide Load Rating Engineer: As indicated in the Statewide Load Rating Engineer Section of this Manual, the Statewide Load Rating Engineer administers and conducts QA for the Statewide Load Rating Program.

Statewide Hydraulic Design Engineer: As indicated in the Statewide Hydraulic Design Engineer Section of this Manual, the Statewide Load Rating Engineer administers and conducts QA for the Statewide Scour Program.

10.3. Monthly Dashboard to all BIP Leaders

The QA Coordinator shall establish and maintain a BIP Dashboard that will provide monthly informational updates to all BIP Leaders and staff. BIP Leaders and staff are required to acknowledge the dashboard content and address any action items. The following are some of the more critical items to be included in the dashboard:

- Results of the Quarterly QA reviews and Data Check for each District and LPA.
- Schedules of the Last Inspection and Planned Inspections.
- Notice of Past Due Inspections.
    - The BIP Leader will check with Team Leader on reasons for the past due inspection and document the expected completion date in the dashboard.
- Frequency of Inspections.
- Certification Listing of Qualified Team Members.
- Listing of Critical Findings and bridges with Nonredundant Steel Tension Members (NSTM) that need immediate action.
- Listing of Underwater Inspections.

10.4. QA Quarterly Review

On a quarterly basis (March, June, September, December), the Statewide BIP Manager (or assigned QA Coordinator) shall conduct a QA review of minimum 2 bridge inspection reports per District/LPA during the year. QA reviews shall be selected for bridges in each District and LPA. The Statewide BIP Manager, Statewide Hydraulics Engineer and Statewide Bridge Design Engineer shall also review 100% of the bridge inspection reports with numerical condition rating of 4 or less for NBI Element Items 58, 59, and 60 for consistency of data. The QA review shall also include a field review of the Inspection Teams and an office review that includes review of the bridge file elements.

Bridge Selection Criteria

The following criteria shall be considered when selecting bridges for audit:

- Structures with documented Critical Findings.
- Bridges with urgent or critical maintenance recommendations.
- Bridges with load restrictions or load posting issues.
- Bridges that have temporary repairs in-place.
- Bridges in need of bridge rehabilitation or replacement.
- New bridges recently opened to traffic to check initial inspection.
- Inspections that are beyond the due date.
- Bridges with Nonredundant Steel Tension Members (NSTM).
- Bridges that contain complex or unusual structural details.
- Selecting repeat structures can be productive by determining whether the bridge inspector amended the last report based on the results of the previous QA review.

10.5. QA Summary Report

The Statewide BIP Manager will prepare a QA Summary Report detailing the quantitative and qualitative findings of the QA reviews and will attach the QA Review Forms as reference. The BIP Manager will submit the report to the BIP Leader responsible for the report inspections. The BIP Manager will review the summary report with the BIP Leader and discuss all relevant findings. Major findings and unresolved problems will be brought to the attention of the BIP Leader for appropriate follow-up action. The BIP Leader will meet Quarterly with the Team Leader and Inspection Team to discuss the QA Summary Report and findings. See Quarterly Meetings section of this guide. At the completion of the review process in all Districts and LPAs, the BIP Manager will issue an Annual Statewide Summary Report to the BIP Team that summarizes the statewide results.

The following are the minimum checks that will be completed quarterly by the Statewide BIP Management team and are required for quality assurance as part of the program:

10.5.1. Metric 10/16: NSTM Inspections

- RTN is being done and NSTM focused inspection is not missed.
- NSTM procedures are completed by the inspection.
- The TL is qualified to do the NSTM inspection.

10.5.2. Metric 11: Frequency

- Inspections with less than the standard frequencies and Monitoring Inspections are completed timely.

10.5.3. Metric 12: Quality Inspections

QA for Poor Condition

- If **CS4** quantity > 0 for a load path element, then SNBI Items B.C.02, B.C.03, or B.C.04 = **4 or less**
- If SNBI Items B.C.02, B.C.03, or B.C.04 = **4 or less**, then CS4 quantities **must be > 0** for at least one load path element.
- Report evaluation of CS4 condition is adequate and has photos to justify the quantities.
- BrM "**NBI Inspection Notes**" references elements to justify SNBI codes of **Poor** condition.

QA for Fair Condition

- If **CS3** quantity > 5%, then SNBI Items B.C.02, B.C.03, or B.C.04 = **5 or 6** or justified otherwise
- Report evaluation of CS3 condition is adequate.
- BrM "**NBI Inspection Notes**" references elements to justify SNBI codes of **Fair** condition.

Other QA

- Bridge Numbers (structures) that have been replaced are removed from the Inventory submittal when Initial Inspection Report for new structure is complete.
- Initial Inspection for rehabilitation or strengthening contract codes Item 106 - Year Reconstructed.
- Elements that have been added or deleted must have explanation.
- **Permitting**: **Minimum Vertical Clearances** has documented location of measurements within ±0.02 ft or 1/4", or verified no change, and SNBI Items B.H.12 (Highway Maximum Usable Vertical Clearance) and B.H.13 (Highway Minimum Vertical Clearance) are coded correctly and rounded down to the nearest inch.
- Item B.H.12 is the biggest box that can fit at the structure and **requires the clearance for each opening shall be measured and documented**.

- Item B.H.13 is the minimum Vertical Clearance (smallest box) in the traveled lanes at the structure.
- **Permitting**: **Minimum Lateral Clearances** has documented location of measurements ±0.5 ft or 6", or verified no change.
- SNBI Items B.H.14 and B.H.15 are coded correctly and rounded down to the nearest foot.
- All elements are identified correctly with no missing elements.
- Annual data upload from Planning for ADT, ADTT, Functional Class, Route Number, etc.
- Reconcile new structures to SNBI in HPMS submittal. Provide new structure data to HPMS.
- Latitude (Item B.L.05) and Longitude (Item B.L.06) is within .01 seconds **or about 1 foot** of the right fog line, looking up station, at the first abutment.
- Make sure the lat/long is at least close to where it is supposed to be.
- Navigation: Items B.N.01, B.N.02, B.N.04, and B.N.05 have documented location and measurements.

10.5.4. Metric 13/14: Load Rating & Posting

- SNBI Items B.LR.05 and B.LR.06 (Inventory Load Rating Factor & Operating Load Rating Factor) can not be the same **or blank**. (MAR Flag).
- If SNBI Items B.C.02, B.C.03, or B.C.04 change from 6 or above to 5 or below then a new Load Rating is required, and each time it is further reduced from 5 or below to a lower value, a new Load Rating is required again. In addition, SNBI Sections 5.2 and 5.3 (items B.PS.01, B.PS.02, B.EP.01, B.EP.02, B.EP.03, and B.EP.04) need to be updated.
- If CS4 quantities increase, a new load rating may be required OR the report justifies why a LR is not required.
- If the LRS sheet indicates SNBI Item B.LR.07, the Controlling Legal Load Rating Factor, is < 1.0, a bridge posting is required within 30 days and the following SNBI Items must be updated:
  - SNBI Item B.PS.01 Load Posting Status
  - SNBI Item B.PS.02 Posting Status Change Date
  - SNBI Item B.EP.03 Posting Type
  - SNBI Item B.EP.04 Posting Value

10.5.5. Metric 15: Bridge File Timeliness and Completeness

- Bridge files are updated timely and contain all inspection files with 90 days of inspection date.
- Check of files in the Bridge Folder, Load Rating Folder, and in the Report Folder.

10.5.6. Metric 17: UW inspections (Level one requirements)

- UW Special Procedures exist documenting the what will be inspected when.
- Report documents features below the waterline
- At least 10% of the substructure piers are inspected
- The Inspection followed the UW Special Procedures

10.5.7. Metric 18: Scour Critical Bridge

- Item B.AP.03 can not be blank.
- Initial Inspections must provide or locate a Scour Evaluation Report (SER) and must be Reviewed by Hydraulics Engineer.

10.6. Quarterly Meetings (BIP Leaders)

On a quarterly basis, the BIP Leader shall meet with the Inspection Team to discuss the QA Summary Report and identify any deficiencies and need for corrective actions, as well as any commendable practices. Examples of deficiencies can include:

- Lack of reporting critical findings.
- Failure to perform quality control activities.
- Poorly rated components with vague comments.
- Inaccurate or incomplete data.

The BIP Leader will resolve any substantial issues that may affect FHWA compliance. The meeting can also obtain feedback from the teams on their experience and perception of the BIP and the QC/QA process. It is very important that the QA process not be viewed to penalize deficient teams, but rather to improve the quality of the overall inspection process. The Statewide BIP Manager may also attend these quarterly meetings.

Inspection Team Status and Update Meetings

The quarterly meetings can help the BIP Leader improve communication between the BIP members. The BIP Leader can update the team on program policies, procedures, review findings and concerns, and overall status and effectiveness of the BIP program. The Inspection Team can provide feedback on and concerns with the BIP process and provide recommendations from the working level to improve the efficiency and quality of the BIP program. The meeting should focus on improving the morale of the Inspection Team.

Inspection Team feedback is a constructive method to improve the BIP process. The Inspection Team can provide lessons learned to help improve the quality of the BIP. The discussion should encourage open communication. Inspection Team feedback can include the following items:

- Knowledge transfer and peer collaboration.
- Timely responses and support.
- Proper inspection equipment including personal protective equipment.
- Adequate Resources.
- Improved inspection forms and efficient reporting.
- Procedure manuals and guidelines.
- Adequate staffing (including additional consultant support).
- Adequate training.
- Other lessons learned during the QC/QA process.

10.7. Annual Data Check for NBI and/or NTI Submission

Each year the FHWA Division Bridge Engineer (DBE) assesses the HDOT Bridge Inspection Program for compliance with the National Bridge Inspection Standards.

Annually, the Statewide BrM Manager submits the NBI and NTI data to the FHWA DBE by March 15th. The BrM Coordination Team shall start preparing the submission documents by the beginning of January to meet the March 15 submission deadline. A general overview of the process to submit inspection and element data is as follows:

- The BrM Coordination team generates the submittal data files and completes a NBI Submittal File Check and NTI Submittal File Check, which validates and analyzes the data for inconsistencies and errors. The BrM includes these file checks that are built into the system.
- The District/LPA BIP Leaders correct all Fatal Errors and address all General (Non-Fatal) Errors. Fatal errors prevent FHWA acceptance of the entire submittal. Non-Fatal Errors should be corrected prior to the next submittal. It is HDOT policy to address all Fatal and Non-Fatal errors.
- The Statewide BrM Manager, or delegated assistant, emails the Data and Element Check spreadsheets to the FHWA DBE for review and possible approval.
- The FHWA DBE will respond to the Statewide BIP Manager within 48 hours with data corrections or approval.
- Upon FHWA approval of the data, the Statewide BIP Manager, or delegated assistant, submits the data to the FHWA UPACS website.

For more details, see BIM Section 3.6 NBI & NTI Data Submittal to FHWA, and BIM Section 6.3.2 Annual BrM Data Submittal to FHWA.

10.8. Metric Assessment Report (MAR)

It is imperative that the BIP Leaders and their respective Team Leaders/Inspection teams understand the content of the BrM and the Reporting requirements to minimize the MAR reports and subsequent MAR review meetings that need to take place.

The MAR is generated by FHWA using the NBIP MARGentool that is downloaded from the NBIP Sharepoint site. The MAR is typically based on the most recent and previous April NBI Submissions that are provided by the Statewide BrM Coordinator. The MAR non-compliance results is an indicator of overall non-compliance of the Statewide Bridge and Tunnel Inspection Program; therefore, the monthly goal is to strive for consistent compliance for all inspections and reporting being executed throughout the State.

FHWA will conduct MAR reviews to discuss non-compliance issues with the Statewide BIP Manager, the Statewide Bridge Design Engineer and the Statewide Hydraulics Design Engineer. If necessary, a Plan of Action (POA) is for each Bridge entry issue would be generated.

Following this MAR Review, the Statewide BIP Manager will meet with each BIP Leader to go over all MAR Reports and require POA's for each MAR Report. Typically, issues that are considered safety issues by FHWA must be addressed within 30-days, which includes bridge weight restrictions and overdue inspections.

10.9. FHWA Annual Inspection

The FHWA DBE shall conduct a field inspection in compliance with Metric 12 - Inspection Procedures - QC/QA. The FHWA DBE randomly selects the bridges from the recent NBI submission and it is recommended that the tour covers a variety of structure types and conditions if possible. The QA team for the inspection tour normally consists of the following members:

- FHWA DBE
- Statewide BIP Manager or Assigned Staff
- Statewide Bridge Design/Load Rating Engineer (optional)
- Statewide Hydraulic Design Engineer (optional)
- BIP Leader
- Team Leader

The field inspection consists of the following tasks:

- Check for compliance of the applicable NBIS Metrics.

- Verify the accuracy of the applicable SNBI Element Items, including:
  - Major Element Condition Ratings (Items B.C.01, B.C.02, B.C.03)
  - Channel and Channel Protection (Items B.C.09 and B.C.10)
  - Coding for Approach Roadway Alignment (Item B.AP.01)
- Confirm status of recommended signage and postings
- Compare the observations made at each bridge site against SI&A sheets and inspection reports for consistency and accuracy.

Following the annual tour of inspections, FHWA incorporates the findings into the FHWA Annual Statewide Compliance Review.

10.10. Annual Compliance Review Discussions

The FHWA DBE will meet with the Statewide BIP Manager, the Statewide Bridge Design Engineer and the Statewide Hydraulic Design Engineer to review and assess the MAR compliance/non-compliance issues and the Annual Statewide Compliance Review.

Following the FHWA DBE MAR reviews, the Statewide BIP Manager will meet with each BIP Leader to discuss their respective MAR report and require a POA for any MAR non-compliance reports. The POA shall describe the proposed remedial actions along with a schedule of milestone and completion dates for these actions.

10.11. Corrective Actions

Corrective action is a constructive term that describes activities to improve the quality of bridge inspections, typically in response to the outcome of the QA review. Corrective actions are very important to the QA process because through corrective actions quality can be improved.

Data error, omissions and/or changes can occur during the inspection and inventory process, as well as possibly in the QC process. The identification and resolution of these items shall be done in an expedited manner with proper corrective actions. The QA Coordinator shall immediately notify the Statewide BIP Manager to discuss the matter in-depth. The corrective action such as a revision to the inspection report and a QA documentation report shall be submitted to the State BIP Manager for the files. Once reviewed and accepted by the State BIP Manager the corrected information and the QA documentation report shall be submitted to the appropriate BIP Leader for their files and further action.

10.11.1. Probationary Period

Three examples in which a State/County Team Leader or Inspection Consultant Company may be placed on probation or suspended are listed below. Decertification can result immediately upon knowledge of conduct presented below or if the Team Leader does not meet the terms agreed upon in the Team Leader's improvement plan:

- If a Team Leader or Inspector does not fulfill the requirements for recertification.
- If Team Leader or Inspector is found to be using poor inspection practices or producing inadequate inspection documents as assessed by the QC/QA process.
- If a Team Leader or Inspector is found to be falsifying bridge inspection records or otherwise failing to meet general ethical standards.

10.11.2. First Warning – Notification

Formal Performance Notification Stating Quality Concern: The BIP Leader shall meet with the Team Leader to explain the areas of concern and present the QA documentation report and inspection report or other pertinent documents. The Team Leader or Inspector shall be placed on an initial six month "probationary period" where all bridges inspected during this probationary period shall be reviewed for accuracy and quality. The review shall be conducted by the QA Engineer and another qualified Team Leader. The BIP Leader shall ensure that the Team Leader or Inspector attends the Quarterly BIP/Inspector Meetings.

10.11.3. Second Warning – Documentation Filed

Formal Performance Documentation Filed in Bridge Management Files: If same or similar mistakes are found during reviews conducted in the initial probationary period, the Team Leader or Inspector shall be given written notification that they will be disqualified if these problems are not corrected and prevented in the future. The written notification will be filed in the BIP Leader's Bridge Management Files. The Team Leader or Inspector will be placed on a secondary three-month probation. The Team Leader or Inspector shall submit an improvement plan that will be monitored during the probation. The Team Leader or Inspector shall also attend the required refresher training as directed by the Statewide BIP Manager. During this three-month probation, all bridges inspected shall be reviewed for accuracy and completeness by another independent certified Team Leader.

10.11.4. Third Warning – Disqualification

Disqualification: If the same or similar problems are found during the secondary probation period, the Team Leader or Inspector will be notified that they are hereby disqualified for a minimum of twelve (12) months and will no longer be allowed to perform bridge inspections in the State of Hawaii until they have been re-qualified.

10.12. Reasons for Disqualification

Typical reasons for disqualification can be, but are not limited to, the following:

- Failure to meet minimum standards of qualification.
- Failure to address corrective action from previous performance reviews.
- Consistent sub-standard performance.
- Unethical behavior.

Further details for disqualification are listed below:

- Lack of proper follow-up with the BIP Leader for critical findings, such as broken load carrying members, critical scour at foundations, vehicular impacts which could adversely affect load carrying members, bridges requiring closure, etc.
- Lack of follow-up with the BIP Leader for correcting load posting deficiencies.
- Failure to correct findings from Quality Control or Quality Assurance reviews, including recurring unacceptable scores.
- Recurring miscoded critical inventory items such as SNBI Element B.PS.01 Structure Open, Posted or Closed to Traffic, B.SP.04 Span Material, B.G.06 Bridge Curb-to-Curb, B.H.13 Highway Minimum Vertical Clearance, B.IE.03 Inspection Completion Date for Routine, NSTM, UW, and Special, and B.AP.03 Scour Vulnerability.
- Recurring miscoded critical rating items such as NBI Condition States 58 Deck Condition Rating, 59 Superstructure Condition Ratings, and 60 Substructure Condition Ratings.
- Recurring condition rating deviations of more than 1 above or below an independent condition review.
- Failure to submit completed inspection data and/or corrections in a timely manner.
- Failure to maintain the Bridge File to meet minimum requirements.
- Failure to maintain or update Scour Plan of Actions.
- Failure to inspect the bridges within the required frequency (unless there was justifiable cause).
- Dishonest or unethical behavior that adversely affects the inspection results.

The HDOT reserves the right to disqualify immediately and indefinitely if gross negligence, misconduct, or major omissions are found. These errors may adversely affect the safety of the public or the capacity of the bridge.

10.13. Reinstated as a Team Leader or Inspector

A disqualified Team Leader or Inspector may be requalified and reinstated after a twelve (12) month period with the following documentation:

- Submit a written report to the Statewide BIP Manager explaining how they will correct their deficiencies.
- Repeat the FHWA approved comprehensive bridge inspection training course. Receive a passing score on the exam given at the end of the course.

Upon approval by Statewide BIP Program Manager, the Team Leader or Inspector can be placed back on the qualified list but shall be under probation for twelve (12) months.

11. BRIDGE INSPECTIONS AND ITS ROLE IN THE TAMP

The TAMP is using the BrM information combined with technical processes that will objectively guide investment decisions to operate, maintain, and improve transportation assets, and will justify the HDOT's funding needs. The data collection and technical evaluation will be conducted in an ongoing and iterative process of activities using the TAMP Framework. Refer to the TAMP Plan for details. Transportation Asset Management Plan

The TAMP is a 10-year Mid-Range Plan that assists in determining funding needs for the 4-year planning done in the STIP. The inspection process and resulting information is crucial in providing the necessary data needed to program in informed decision making by the Administration for Bridge Maintenance.

Through the Condition Ratings and Work Candidate entries the Statewide BAMP Manager will evaluate the performance of the Statewide System and forecast funding needs to maintain the TAMP's goals as follows:

Asset	Performance Measure	Current Condition 2017	2-Year Target 2019	4-Year Target 2021	Performance Goal (Desired Condition) 10-year Goal
Bridges	Percentage of NHS bridges classified in good condition	23%	20%	20%	20%
	Percentage of NHS bridges classified in poor condition	2%	2%	2%	2%

1 Reference Page 33 of TAMP

The Statewide BAMP Manager is required to establish 2- and 4-year targets that serve as interim indicators of changes in condition levels. The targets can help the State determine how well they are progressing towards its long-term state of good repair goals.

Per the TAMP, through Life Cycle Strategic Programming the estimated gap of asset performance can be minimized or eliminated if the projected allocation of funds is realized as follows:

NHS BRIDGES	Annual Funding	Good	Fair	Poor
Current Performance (2017)	$30-40 million	23%	75%	2%
2-year Target (2019)		20%		2%
2-year Projection	$30 million	20%		2%
4-year Target (2021)		20%		2%
4-year Projection	$30 million	22.5%		1.9%
10-Year Desired State of Repair (2027)		20%		2%
10-Year Projection	$30 million	18.5%		1.8%
10-Year Projected Gap		1.5%		No gap

2 Reference Page 36 of TAMP

12. SNBI DATA COLLECTION AND CODING

The purpose of this section of the BIP Manual is not to substitute the SNBI Manual, but rather to offer additional information that is pertinent to Hawaii BIP and may not be readily available in the SNBI Guide. Only items that are not a clean transition from the 1995 Coding Guide were added to this chapter. Inspection teams are expected to consult the SNBI Guide for reference.

B.ID.02 Bridge Name
BIP Management will import from BrM data, but Team Leaders and BIP Leaders can coordinated to have additional names included as applicable (separated by | or pipe symbol).

B.L.04 Highway Agency District
BIP Management will import from existing data, trimming one leading zero.

B.L.05 Latitude
BIP Management will convert from BrM data, but inspectors are responsible for field verification (please see 3.4. Latitude and Longitude)

B.L.06 Longitude
BIP Management will convert from BrM data, but inspectors are responsible for field verification.

B.L.09 Border Bridge Inspection Responsibility
Do not report.

B.L.12 Metropolitan Planning Organization
BIP Management will code this item.

B.CL.03 Federal or Tribal Land Access
BIP Management will code this item.

B.CL.04 Historic Significance
See for Historic Significance: https://historichawaii.org/resource-center-2/library/hawaii-state-historic-bridge-inventory-evaluation-2014/

B.CL.06 Emergency Evacuation Designation
BIP Management will code this item.

B.SP.01 Span Configuration Designation
Inspectors are required to code span configuration based on As-builts and field verification.

B.SP.02 Number of Spans
Inspectors are required to report number of spans based on As-builts and field verification.

B.SP.03 Number of Beam Lines
Inspectors are required to report number of principal beam lines based on As-builts and field verification.

B.SP.04 Span Material
Inspectors are required to code principal span material type based on As-builts and field verification.

B.SP.05 Span Continuity
Inspectors are required to code span continuity based on As-builts and field verification.

B.SP.06 Span Type
Inspectors are required to code span type based on As-builts and field verification.

B.SP.07 Span Protective System
Inspectors are required to code span protective system based on As-builts and field verification.

B.SP.08 Deck Interaction
Inspectors are required to code the type of interaction between the superstructure and deck for the span configuration based on as-builts and field verification.

B.SP.09 Deck Material and Type
Inspectors are required to code the deck material and type for the span configuration based on as-builts and field verification.

B.SP.10 Wearing Surface
Inspectors are required to code the predominant wearing surface material type protecting the deck or slab for the span configuration based on As-builts and field verification.

B.SP.11 Deck Protective System
Inspectors are required to code the deck protective system for the span configuration based on as-builts and field verification.

B.SP.12 Deck Reinforcing Protective System
Inspectors are required to code the type of deck reinforcing protective system for the span configuration based on as-builts and field verification.

B.SP.13 Deck Stay-In-Place Forms
Inspectors are required to code the type of deck stay-in-place form for the span configuration based on as-builts and field verification.

B.SB.01 Substructure Configuration Designation
Inspectors are required to code the substructure set designation based on as-builts and verification.

B.SB.02 Number of Substructure Units
Inspectors are required to report number of substructure units based on as-built and field verification.

B.SB.03 Substructure Material
Inspectors are required to code the principal substructure material type based on as-builts and field verification.

B.SB.04 Substructure Type
Inspectors are required to code the abutment, pier, or bent design type based on as-builts and field verification.

B.SB.05 Substructure Protective System
Inspectors are required to code the substructure protective system using based on as-builts and field verification.

B.SB.06 Foundation Type
Inspectors are required to code the foundation type based on as-builts and field verification.

B.SB.07 Foundation Protective System
Inspectors are required to code the foundation protective system based on as-builts and field verification.

B.RH.01 Bridge Railings
Please see Chapter 13

B.RH.02 Transitions
Please see Chapter 13

B.G.01 NBIS Bridge Length
Inspectors are required to report the NBIS bridge length to the nearest tenth of a foot based on as-builts and field verification.

B.G.04 Minimum Span Length
Inspectors are required to report the total length of the bridge to the nearest tenth of a foot based on as-builts and field verification.

B.G.12 Curved Bridge
Inspectors are required to code whether the bridge is horizontally curved based on as-builts and field verification.

B.G.13 Maximum Bridge Height

Inspectors are required to report the maximum height from top of deck to ground line or water surface elevation, whichever yield the largest value, rounded to the nearest foot based on as-builts and field verification.

B.G.14 Sidehill Bridge

Inspectors are required to code whether any portion of the bridge is a sidehill structure based on as-builts and field verification.

B.G.15 Irregular Deck Area

Inspectors are required to report the deck area rounded to the nearest tenth of a square foot based on as-builts and field verification.

B.RT.03 Route Direction

Inspectors are required to code the direction of the route, either according to the direction of traffic for divided bridges (i.e., NB, EB, SB, or WB), or both directions for undivided bridges (EW or NS). Use the most applicable code when a route does not have a designated route direction.

B.H.01 Functional Classification

BIP Management will code this item

B.H.02 Urban Code

BIP Management will code this item.

B.H.04 National Highway Freight Network

BIP Management will code this item

B.H.06 LRS Route ID

BIP Management will code this item

B.H.17 Bypass Detour Length

Inspectors are required to report the detour distance to the nearest mile. All detours that are less than 1 mile should be rounded up and coded 1, except if there is available ground level bypass when it's 0. Example: if detour is 0.1 mile, report 1; if detour is 3.1 miles, report 3.

B.H.18 Crossing Bridge Number

Inspectors are required to report the exact bridge number(s) as assigned in Item B.ID.01 based on As-builts, maps, and field verification.

B.RR.01 Railroad Service Type

Inspectors to code the designated railroad service type for the railroad feature reported in item B.F.01 based on as-builts and field verification.

B.N.01 Navigable Waterway

BIP Management will convert existing data from BrM.

B.N.05 Navigation Channel Minimum Horizontal Clearance
Inspectors are required to report, if applicable, the minimum horizontal clearance for the waterway feature reported in item B.F.01 based on as-builts, maps, and field verification.

B.N.06 Substructure Navigation Protection
Inspectors are required to code, if applicable, the presence and adequacy of the substructure navigation protection for the waterway feature reported in Item B.F.01 based on as-builts, maps, and field verification.

B.LR.02 Design Method
Inspectors are required to code from most recent load rating report for each bridge.

B.LR.03 Load Rating Date
Inspectors are required to report the dated of the most recent load rated based on the most recent load rating report for each bridge.

B.LR.07 Controlling Legal Load Rating Factor
Inspectors are required to report the lowest rating factor for the State's and AASHTO legal loads truncated to the hundredth based on the most recent load rating report for each bridge.

B.LR.08 Routine Permit Loads
BIP Management will code it N as the State of Hawaii does not have routine permits defined at this time.

B.PS.01 Load Posting Status
Inspectors are required to code the load posting status based on Load Rating Report and field verification.

B.PS.02 Posting Status Change Date
Inspectors are required to report the date the bridge entered the status reported in Item B.PS.01 based on most recent Load Rating report and field verification.

B.EP.01 Legal Load Configuration
Inspectors are required to code the configuration of the AASHTO legal load based on most recent Load Rating Report.

B.EP.02 Legal Load Rating Factor
Inspectors are required to report the rating factor for the legal load configuration based on most recent Load Rating Report.

B.EP.03 Posting Type
Inspectors are required to code the type of posting at the bridge restricting the vehicle report in item B.EP.01 based on the Load Rating report.

B.EP.04 Posting Value
Inspectors are required to report the weight limit value on the load posting sign for the vehicle reported in Item B.EP.02 based on Load Rating report and field verification.

B.IR.02 Fatigue Details
Inspectors are required to determine from As-Builts and field verification; Refer to the BIRM or AASHTO LRFD Bridge Design Specifications for fatigue categories.

B.IR.04 Complex Feature
Inspectors are required to determine based on BIRM definition.

B.IE.01 Inspection Type
Inspectors are required to code the inspection type or scour monitoring performed, see BIP Manual Section 5

B.IE.02 Inspection Begin Date
Inspectors are required to report the start date of the inspection type performed, See BIP Manual Section 8.

B.IE.03 Inspection Completion Date
Inspectors are required to report the completion date of the inspection performed.

B.IE.04 Nationally Certified Bridge Inspector
Team Leaders are required to report their unique code ID. Contact HDOT/BIP Management for new individual Inspector number. BIP Management keeps a list of qualified Team Leaders based on a certificate tracking log.

B.IE.05 Inspection Interval
Inspectors are required to code this item. Refer to BIP Manual section 3.3.

B.IE.06 Inspection Due Date
Although BrM autopopulates this field adding the frequency or interval to the last inspection date, it is the inspector's responsibility to ensure the bridge is in its correct cycle, and if necessary to overwrite the calculated value.

B.IE.07 Risk-Based Inspection Interval Method
BIP Management will code this item as follows: Use code Method 1 when Item B.IE.01 (Inspection Type) is 2, 3, or 4; Use code N when Item B.IE.01 (Inspection Type) is 1, 5, 6, 7, 8 or 9.

B.IE.08 Inspection Quality Control Date
BIP Leaders will code this item after Quality Control of the inspection report has been completed.

B.IE.09 Inspection Quality Assurance Date
BIP Management will code this item if/when Quality Assurance of the inspection report has been completed.

B.IE.10 Inspection Data Update Date
Inspectors are required to report the date that the NBI Inspection data were entered or updated from previous inspection or changes from QC review, whichever is latest. BIP Manual is not to replace SNBI, but to offer additional information that is pertinent to Hawaii BIP and is not available in the SNBI.

B.IE.11 Inspection Note
Inspectors are required to report a brief description of the members or features inspected only for non-routine inspection reports or inspection of limited portions of bridge.

B.IE.12 Inspection Equipment
Inspectors are required to code all access and inspection equipment used to perform the inspection based on SNBI Manual (March 2022)

B.C.05 Bridge Railing Condition Rating
Inspectors are required to code bridge railing condition rating based on the Condition Ratings section of this BIP Manual

B.C.06 Bridge Railing Transitions Condition Rating
Inspectors are required to code bridge railing transitions condition rating based on the Condition Ratings section of this BIP Manual

B.C.07 Bridge Bearings Condition Rating
Inspectors are required to code bridge bearing condition based on the Condition Ratings section of this BIP Manual

B.C.08 Bridge Joints Condition Rating
Inspectors are required to code bridge deck joint condition based on the Condition Ratings section of this BIP Manual

B.C.10 Channel Protection Condition Rating
Inspectors are required to code the condition of the channel protection device(s) based on the Condition Ratings section of this BIP Manual

B.C.11 Scour Condition Rating
Inspectors are required to code the scour condition that represents the observed or measured scour based on the Condition Ratings section of this BIP Manual

B.C.14 NSTM Inspection Condition
Inspectors are required to code the condition rating of the Non-Redundant Steel Tension Members (NSTM) based on the Condition Ratings section of this BIP Manual

B.C.15 Underwater Inspection Condition

Inspectors are required to code the condition rating of the underwater members of the substructure based on the underwater inspection based on the Condition Ratings section of this BIP Manual

B.AP.02 Overtopping Likelihood

The state of Hawaii does not keep a record of previous overtopping events. Inspectors are required to code this item based on the best available information from County and Districts maintenance personnel and other local neighbors.

B.AP.03 Scour Vulnerability

BIP Management will code this item once Scour Evaluation effort is complete.

B.AP.04 Scour Plan of Action

BIP Management will code this item once Scour Evaluation effort is complete.

B.AP.05 Seismic Vulnerability

BIP Management will code this item based on county and districts information of what has already been evaluated/retrofited.

B.W.03 Work Performed

BIP Management will code this item as follows: As work is performed on bridges, BIP Management is to be notified on what type of work was done, when, and have plans and specifications made available.

The remainder of this page is intentionally left blank

13. RAILINGS AND TRANSITIONS

This chapter is intended to serve as a visual and descriptive guide to help code the most frequently found railings and transitions.

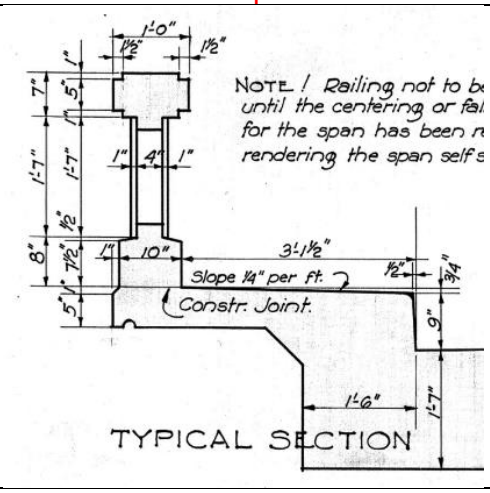
It is still a work in progress and may not contain all bridge rails and transitions found in the field. It therefore relies on feedback from field inspectors.

If during an inspection a rail or transition is found that has no matches in the following table, please document it with description, measurements, photos, and any other applicable information and submit it to bip@hawaii.gov. The BIP Management will reply with the SNBI code for it and add it to the table.

The remainder of this page is intentionally left blank

Name:1930's Bridge Rail - Greek Cross Holes

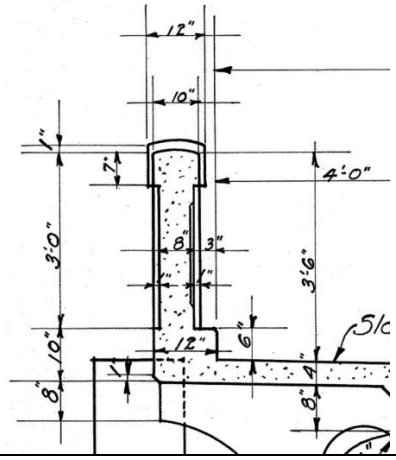
Description: Aesthetic concrete bridge rail with Greek-cross shaped through holes.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: I

Name: 1930's Bridge Rail - Rectangular Panels

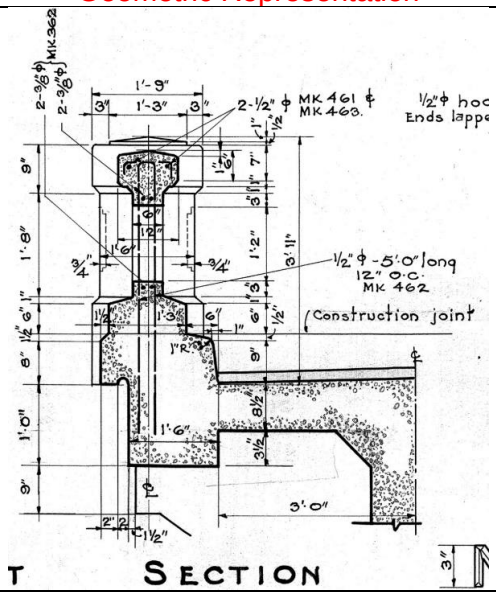
Description: Aesthetic concrete bridge rail with recessed rectangular panels.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: I

Name: 1930's Bridge Rail - Rounded Holes

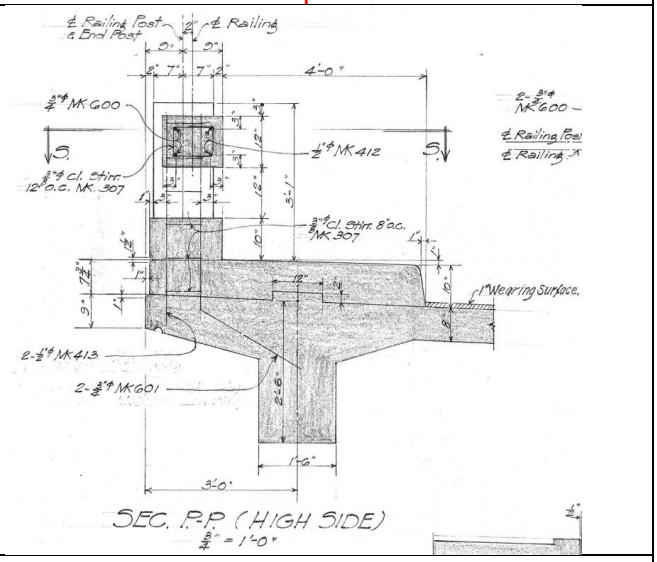
Description: Aesthetic concrete bridge rail with rounded through holes.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: I

Name: 1940's Bridge Rail - Post and Beam with Sidewalk

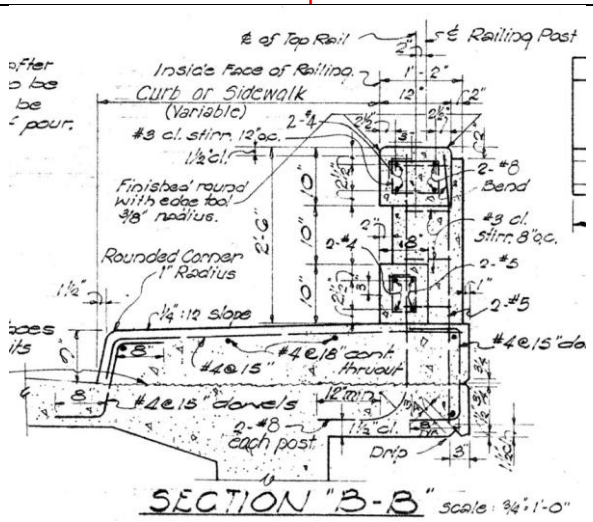
Description: Aesthetic concrete bridge rail made up of horizontal beams and vertical posts.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: I

Name: 1950's Bridge Rail - Post and Beam with Sidewalk

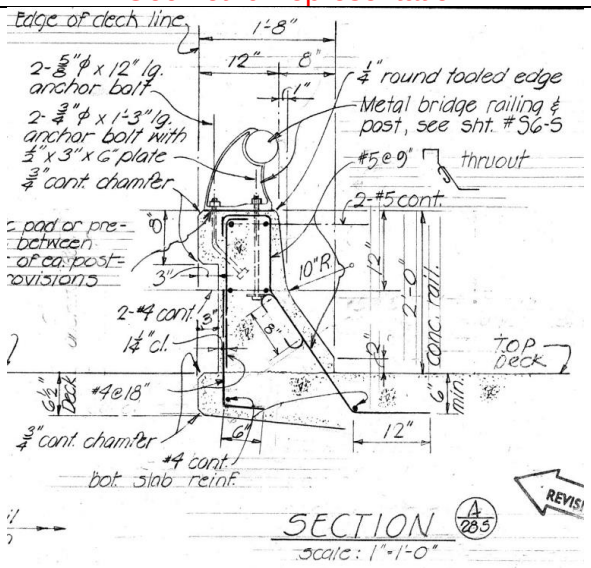
Description: Aesthetic concrete bridge rail made up of horizontal beams and vertical posts.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: I

Name: 1960's Bridge Rail - One Rail Aluminum on Concrete

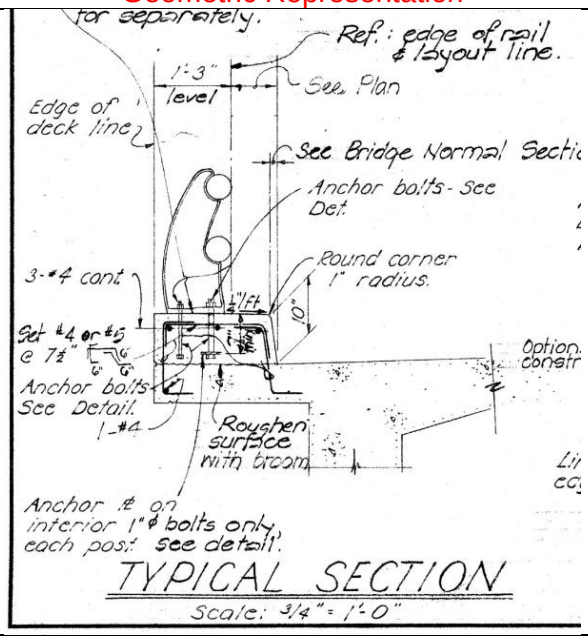
Description: Combination metal and concrete bridge rail made up of 1 horizontal aluminum circular tube mounted on a solid concrete bridge rail.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: I

Name: 1960's Bridge Rail - Two Rail Aluminum on 10 in. Concrete

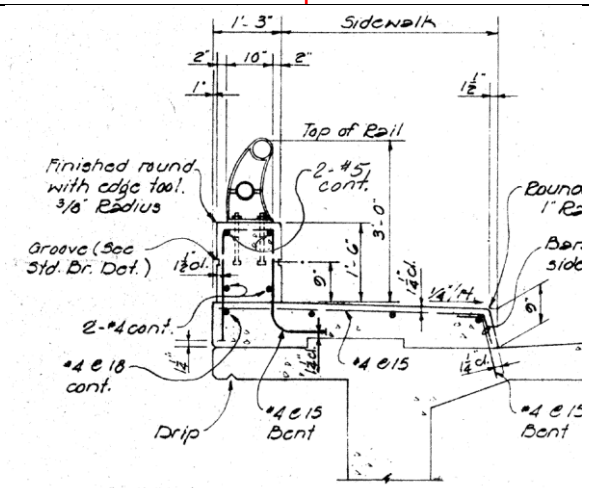
Description: Combination metal and concrete bridge rail made up of 2 horizontal aluminum circular tubes mounted on a concrete curb.

Sample Photo	Geometric Representation
Not currently available	

Suggested SNBI Code: I

Name: 1960's Bridge Rail - Two Rail Aluminum on 18 in. Concrete

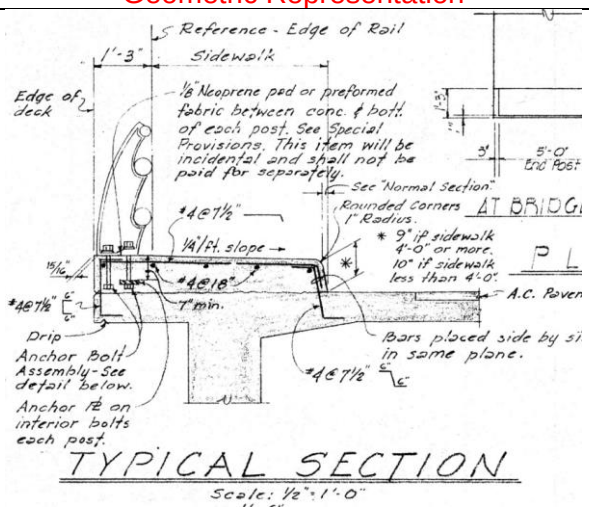
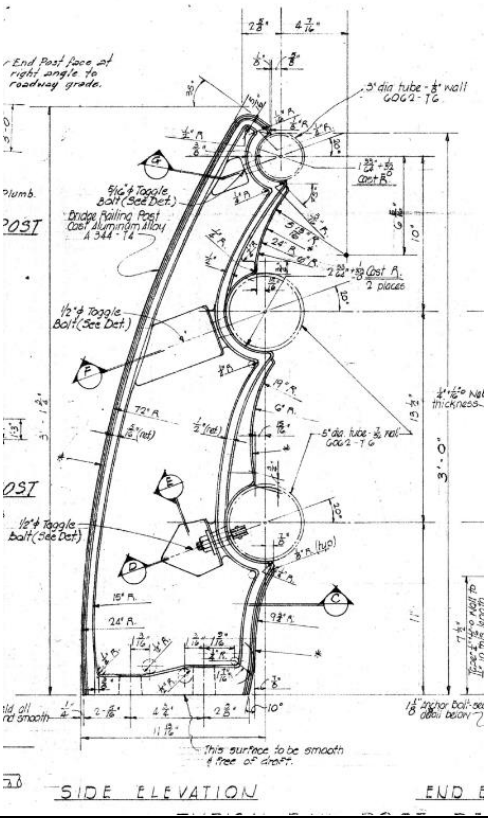
Description: Combination metal and concrete bridge rail made up of 2 horizontal aluminum circular tubes mounted on a concrete rail.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: I

Name: 1960's Bridge Rail - Three Rail Aluminum (36 in.)

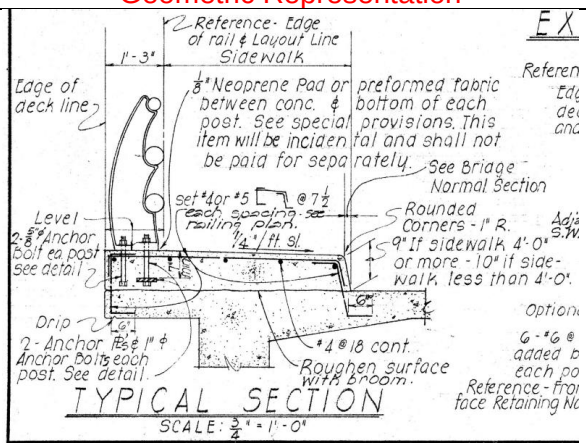
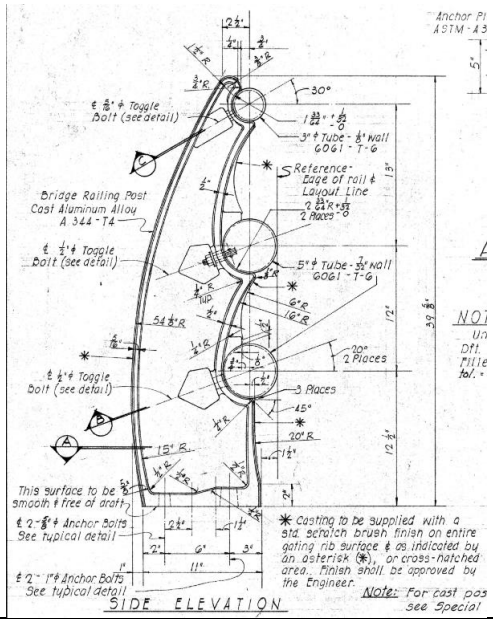
Description: Metal bridge rail measuring 36 in. high made up of 3 horizontal aluminum circular tubes.

Sample Photo	Geometric Representation
Not currently available	 

Suggested SNBI Code: I

Name: 1960's Bridge Rail - Three Rail Aluminum (39 in.)

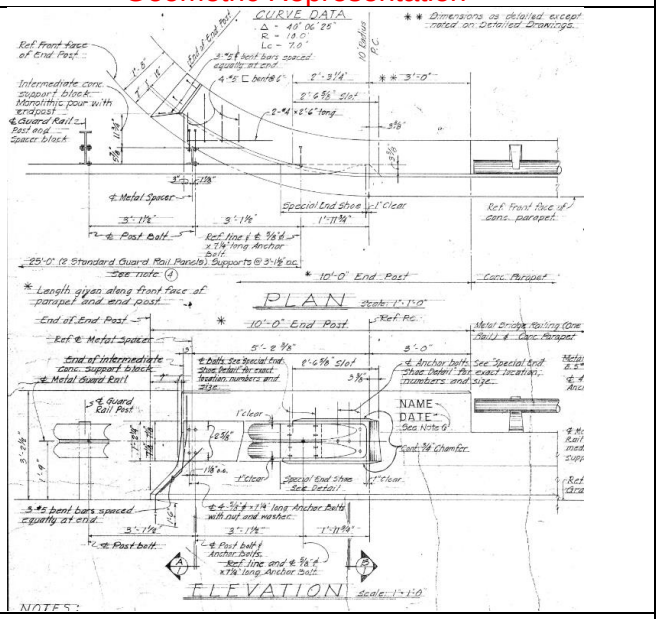
Description: Metal bridge rail measuring 39 in. high made up of 3 horizontal aluminum circular tubes.

Sample Photo	Geometric Representation
	 

Suggested SNBI Code: I

Name: 1970’s Transition - W-beam to One Rail Aluminum on Concrete

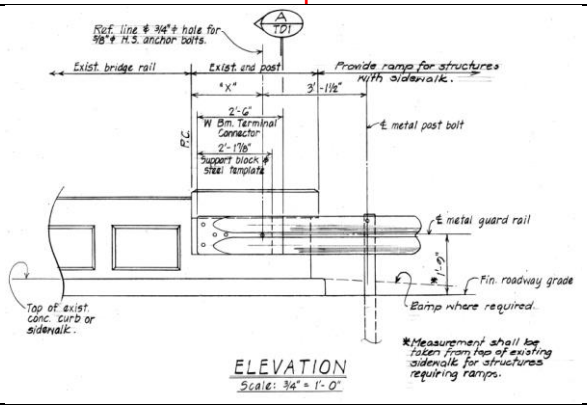
Description: W-beam guardrail attached to curved concrete end post

Sample Photo	Geometric Representation
	

Suggested SNBI Code: I

Name: 1980's Transition - W-beam to Concrete Curved End Post

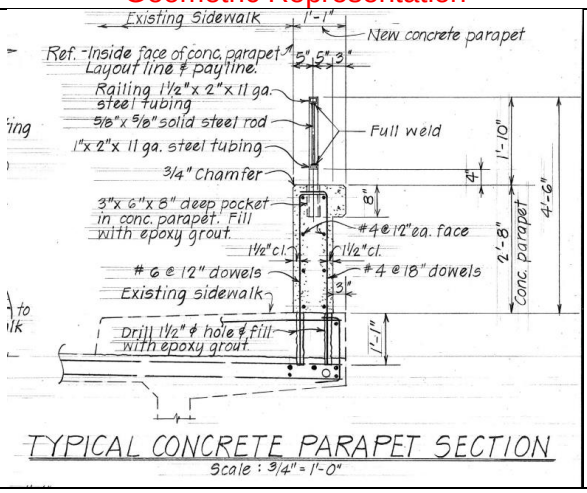
Description: Retrofit

Sample Photo	Geometric Representation
	

Suggested SNBI Code: I

Name: 1970's Bridge Rail - Vertical Concrete (32 in.) with Sidewalk

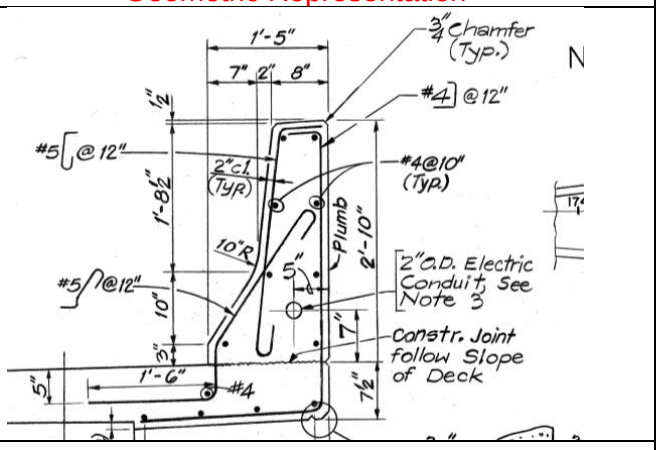
Description: Combination metal and concrete bridge rail made up of steel grated panels mounted on a concrete rail.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: I

Name: 1980’s Bridge Rail - New Jersey (NJ-shape) Barrier

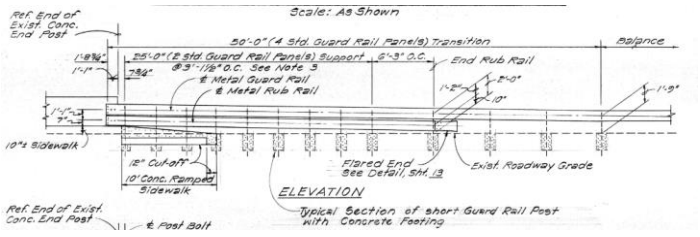
Description: Concrete safety shape

Sample Photo	Geometric Representation
	

Suggested SNBI Code: 3503

Name: 1980's Transition - W-beam with Rub Rail to Concrete End Post with ramped sidewalk

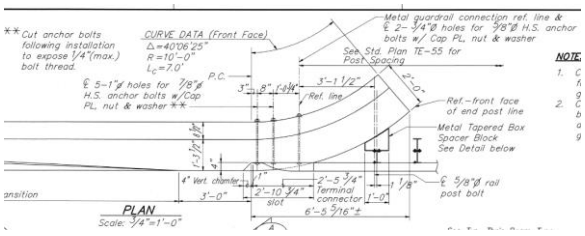
Description: Retrofit

Sample Photo	Geometric Representation
	

Suggested SNBI Code: I

Name: 1990's Transition - Thrie Beam to Curved Concrete End Post

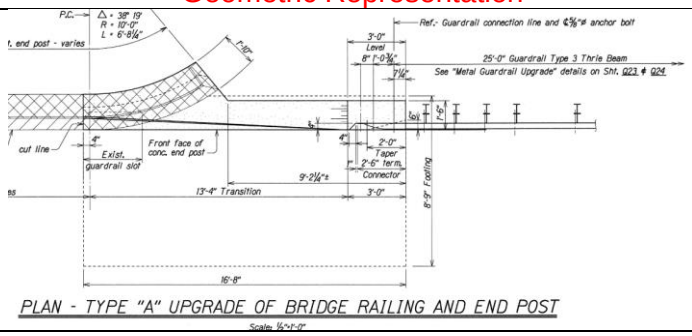
Description: Retrofit

Sample Photo	Geometric Representation
	

Suggested SNBI Code: I

Name: 2000's - Type-A Transition

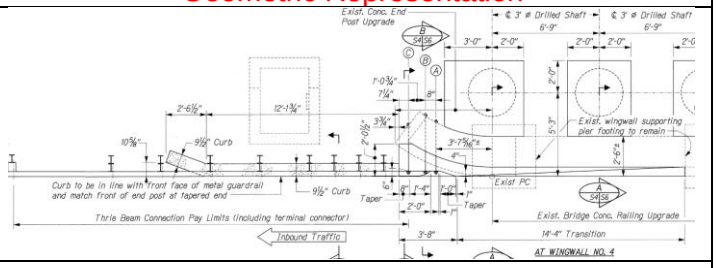
Description: Transition retrofit consisting of new concrete end post attached to existing curved concrete end post.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: 3503

Name: 2000's Type A-1 Transition

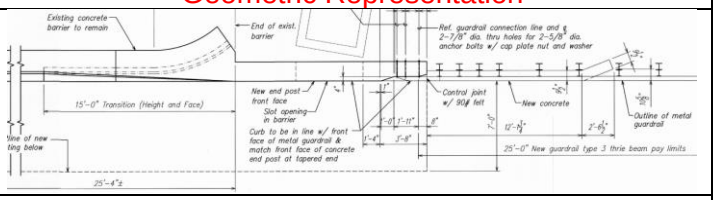
Description: Transition retrofit attached to existing curved concrete end post.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: 3503

Name: 2000's Type A-1 Transition

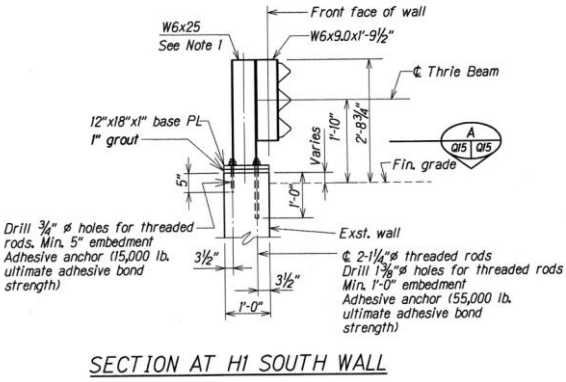
Description: Transition retrofit attached to new concrete end post.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: 3503

Name: 1990's Delaware Railing - Delaware Railing

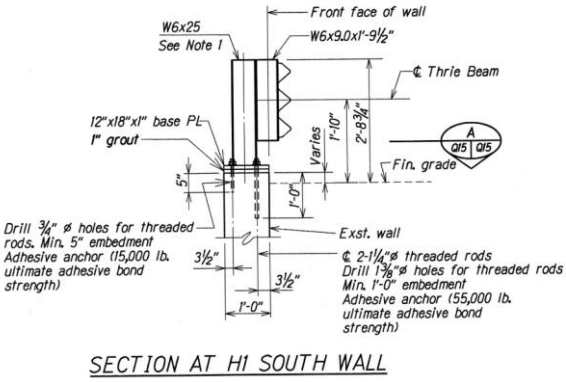
Description: Thrie beam metal guardrail mounted on concrete curb or sidewalk.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: 3504

Name: 1990's Delaware Transition - Delaware Transition

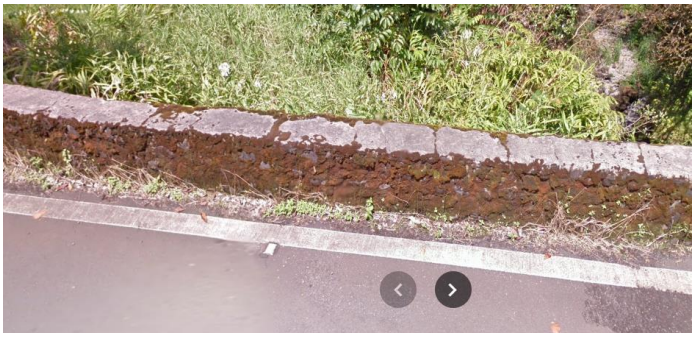
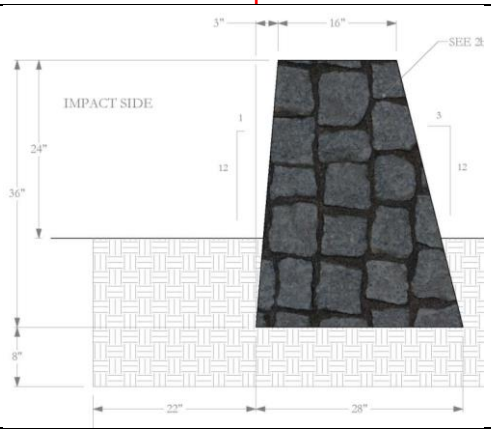
Description: Transition from thrie beam Delaware railing to w-beam guardrail.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: I

Name: Cement Rubble Masonry (CRM) Guardrail Wall

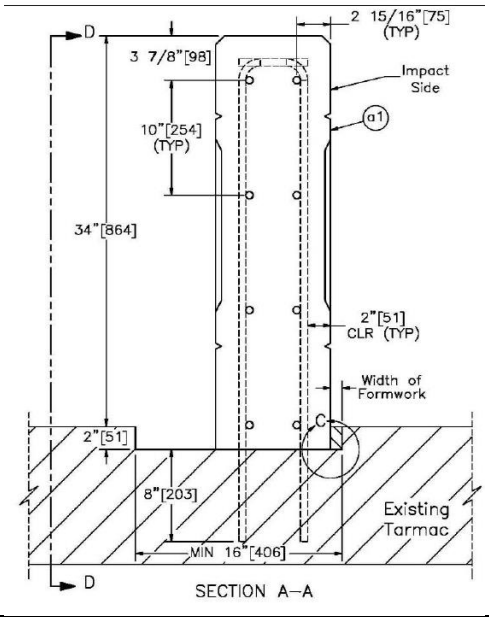
Description: 24-in tall longitudinal barrier made up of various sized stones and mortar.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: M091

Name: MASH 2016 Bridge Rail - Concrete rail with recessed rectangular panels (34 in.)

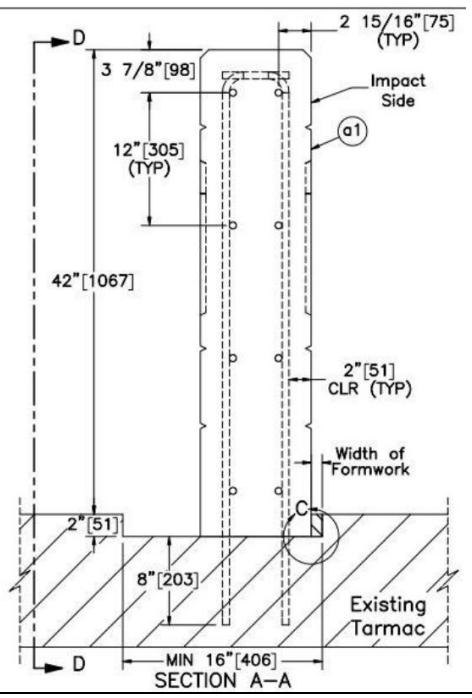
Description: Aesthetic concrete vertical rail with recessed rectangular panels (34 in.).

Sample Photo	Geometric Representation
	

Suggested SNBI Code: M163

Name: MASH 2016 Bridge Rail - Concrete rail with recessed rounded panels (42 in.)

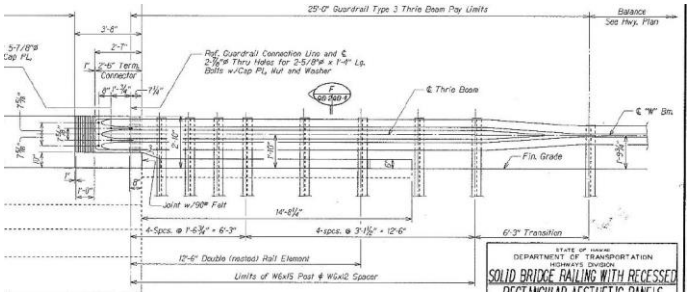
Description: Aesthetic concrete vertical rail with recessed rounded panels (42 in.)

Sample Photo	Geometric Representation
	

Suggested SNBI Code: M163

Name: MASH 2016 Transition - Thrie beam to concrete end post for MASH 2016 34-in railing, 42-in railing, and Modified Natchez Trace railing.

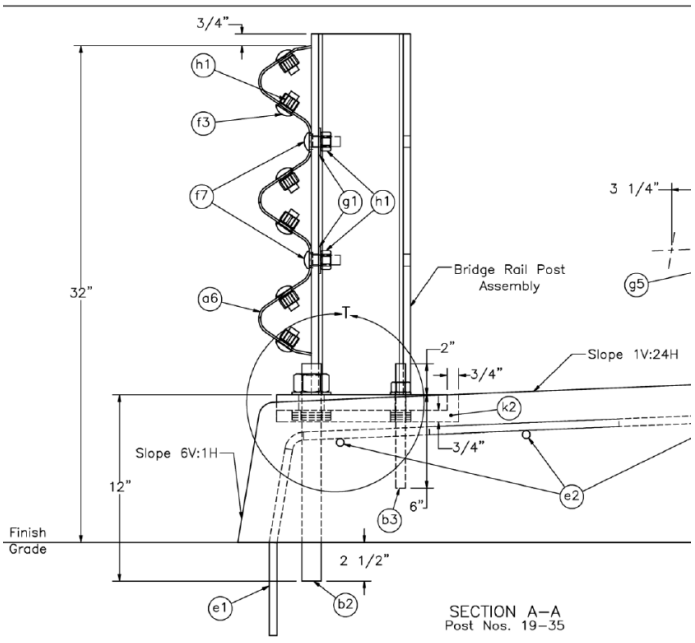
Description: Metal thrie beam guardrail attached to the front face of the concrete end post that transitions to w-beam. The front face of the thrie beam is in line with the front face of the concrete end post. There is a concrete curb under the thrie beam guardrail.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: M163

Name: MASH 2016 Bridge Rail - Modified Delaware Retrofit

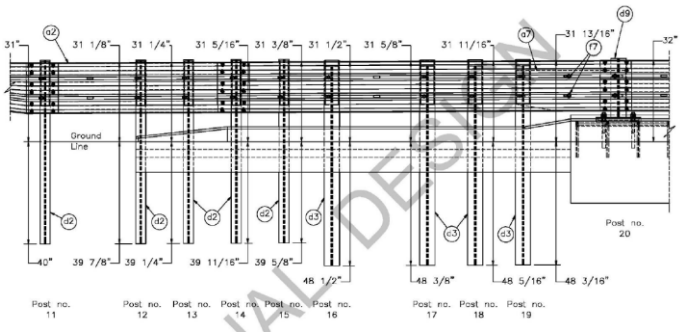
Description: Metal bridge rail made up of thrie beam guardrail mounted on a concrete curb or sidewalk. This railing is sometimes installed in front of an existing bridge rail.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: M163

Name: MASH 2016 Transition - Modified Delaware Retrofit Transition

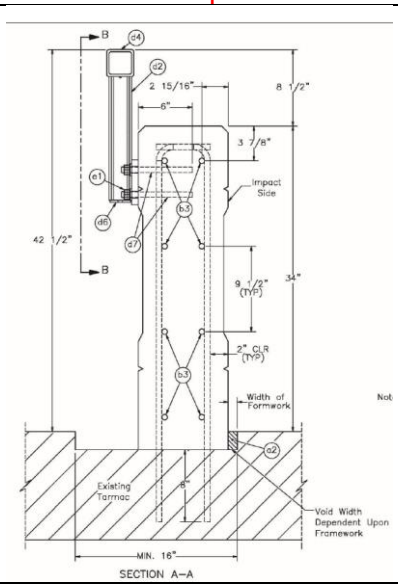
Description: Metal thrie beam guardrail attached to the modified Delaware retrofit bridge rail that transitions to w-beam. Please note the steel plate between posts 19 and 20.

Sample Photo	Geometric Representation
 	

Suggested SNBI Code: M163

Name: MASH 2016 Bridge Rail - Concrete bridge rail (34 in.) with metal pedestrian rail

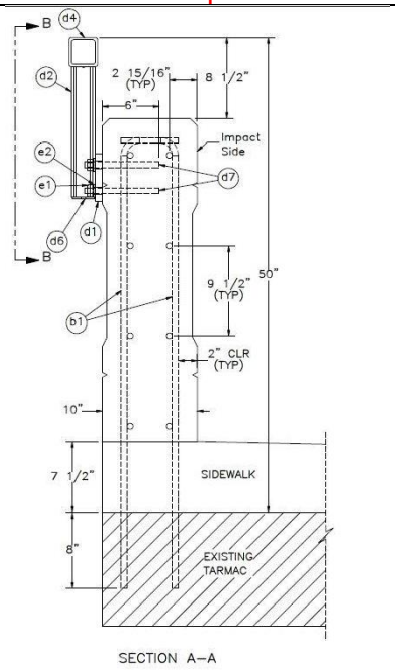
Description: Combination concrete and metal pedestrian railing mounted on the backside of concrete railing

Sample Photo	Geometric Representation
	

Suggested SNBI Code: M163

Name: MASH 2016 Bridge Rail - Concrete bridge rail (34 in.) with metal pedestrian rail and sidewalk.

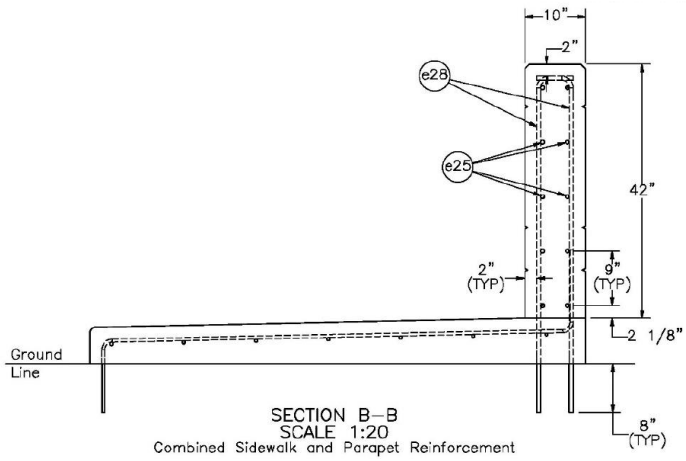
Description: Combination concrete and metal pedestrian railing mounted on the backside of concrete barrier with concrete sidewalk.

Sample Photo	Geometric Representation
	 SECTION A–A

Suggested SNBI Code: M163

Name: MASH 2016 Bridge Rail - Concrete bridge rail (42 in.) with sidewalk

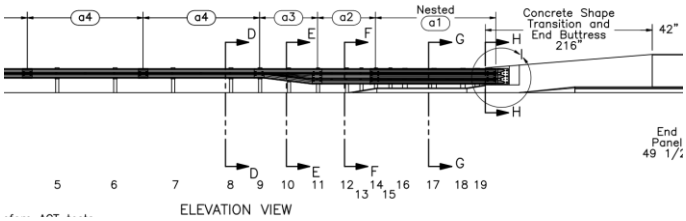
Description: Vertical concrete railing with concrete sidewalk.

Sample Photo	Geometric Representation
	

Suggested SNBI Code: M163

Name: MASH 2016 Transition - Thrie beam to concrete end post for MASH 2016 42 in. railing with sidewalk

Description: Transition

Sample Photo	Geometric Representation
	

Suggested SNBI Code: M163

Name: MASH 2016 Bridge Rail - Concrete modified Natchez Trace Description: Concrete (similar to post and beam railing)	
Sample Photo	Geometric Representation
Not currently available	Not currently available
Suggested SNBI Code: M163	

14. DATA CROSSWALK

The Data Crosswalk is a detailed mapping of the relationship between the 1995 Coding Guide (CG) data items and the data items described in the Specification for the National Bridge Inventory (SNBI).

SNBI ID	SNBI Item Name	1995 Coding Guide ID	Clean Transition
B.ID.01	Bridge Number	8	Yes
B.ID.02	Bridge Name	N/A	No
B.ID.03	Previous Bridge Number	N/A	Yes
B.L.01	State Code	1	Yes
B.L.02	County Code	3	Yes
B.L.03	Place Code	4	Yes
B.L.04	Highway Agency District	2	Yes
B.L.05	Latitude	16	Partial
B.L.06	Longitude	17	Partial
B.L.07	Border Bridge Number	99	Yes
B.L.08	Border Bridge State or Country Code	98A	Yes
B.L.09	Border Bridge Inspection Responsibility	98B	Partial
B.L.10	Border Bridge Designated Lead State	1	Yes
B.L.11	Bridge Location	9	Yes
B.L.12	Metropolitan Planning Organization	N/A	No
B.CL.01	Owner	22	Yes
B.CL.02	Maintenance Responsibility	21	Yes
B.CL.03	Federal or Tribal Land Access	105	Partial
B.CL.04	Historic Significance	37	Partial
B.CL.05	Toll	20	Yes
B.CL.06	Emergency Evacuation Designation	N/A	No
B.SP.01	Span Configuration Designation	43/44	Partial
B.SP.02	Number of Spans	45/46	Partial
B.SP.03	Number of Beam Lines	N/A	No
B.SP.04	Span Material	43A/44A	Partial
B.SP.05	Span Continuity	43/44	Partial
B.SP.06	Span Type	43B/44B	Partial
B.SP.07	Span Protective System	N/A	No
B.SP.08	Deck Interaction	N/A	No
B.SP.09	Deck Material and Type	107	Partial
B.SP.10	Wearing Surface	108A	Partial
B.SP.11	Deck Protective System	108B	Partial
B.SP.12	Deck Reinforcing Protective System	108C	Partial
B.SP.13	Deck Stay-In-Place Forms	N/A	No
B.SB.01	Substructure Configuration Designation	N/A	No
B.SB.02	Number of Substructure Units	N/A	No

B.SB.03	Substructure Material	N/A	No
B.SB.04	Substructure Type	N/A	No
B.SB.05	Substructure Protective System	N/A	No
B.SB.06	Foundation Type	N/A	No
B.SB.07	Foundation Protective System	N/A	No
B.RH.01	Bridge Railings	36A	Partial
B.RH.02	Transitions	36B	Partial
B.G.01	NBIS Bridge Length	49	Partial
B.G.02	Total Bridge Length	49	Yes
B.G.03	Maximum Span Length	48	Yes
B.G.04	Minimum Span Length	48	Partial
B.G.05	Bridge Width Out-to-Out	52	Yes
B.G.06	Bridge Width Curb-to-Curb	51	Yes
B.G.07	Left Curb or Sidewalk Width	50A	Yes
B.G.08	Right Curb or Sidewalk Width	50B	Yes
B.G.09	Approach Roadway Width	32	Yes
B.G.10	Bridge Median	33	Yes
B.G.11	Skew	34	Yes
B.G.12	Curved Bridge	N/A	No
B.G.13	Maximum Bridge Height	N/A	No
B.G.14	Sidehill Bridge	N/A	No
B.G.15	Irregular Deck Area	N/A	No
B.G.16	Calculated Deck Area	N/A	Calculate
B.F.01	Feature Type	42A/42B	Yes
B.F.02	Feature Location	42A/42B	Yes
B.F.03	Feature Name	6A/7	Yes
B.RT.01	Route Designation	N/A	Yes
B.RT.02	Route Number	5D/5E	Yes
B.RT.03	Route Direction	102	Partial
B.RT.04	Route Type	5B	Yes
B.RT.05	Service Type	5C	Yes
B.H.01	Functional Classification	26	Partial
B.H.02	Urban Code	26	Partial
B.H.03	NHS Designation	104	Yes
B.H.04	National Highway Freight Network	110	Partial
B.H.05	STRAHNET Designation	100	Yes
B.H.06	LRS Route ID	13A/13B	Partial
B.H.07	LRS Mile Point	11	Yes
B.H.08	Lanes on Highway	28A	Yes
B.H.09	Annual Average Daily Traffic	29	Yes
B.H.10	Annual Average Daily Truck Traffic	109	Yes
B.H.11	Year of Annual Average Daily Traffic	30	Yes

B.H.12	Highway Maximum Usable Vertical Clearance	10	Yes
B.H.13	Highway Minimum Vertical Clearance	53/54A/54B	Yes
B.H.14	Highway Minimum Horizontal Clearance, Left	55A/56	Yes
B.H.15	Highway Minimum Horizontal Clearance, Right	55A/55B	Yes
B.H.16	Highway Maximum Usable Surface Width	47	Yes
B.H.17	Bypass Detour Length	19	Yes
B.H.18	Crossing Bridge Number	N/A	No
B.RR.01	Railroad Service Type	N/A	No
B.RR.02	Railroad Minimum Vertical Clearance	54A/54B	Yes
B.RR.03	Railroad Minimum Horizontal Offest	55A/55B	Yes
B.N.01	Navigable Waterway	38	Partial
B.N.02	Navigation Minimum Vertical Clearance	39/43B/116	Yes
B.N.03	Movable Bridge Maximum Navigation Vertical Clearance	39/43B	Yes
B.N.04	Navigation Channel Width	40	Yes
B.N.05	Navigation Channel Minimum Horizontal Clearance	N/A	No
B.N.06	Substructure Navigation Protection	111	Partial
B.LR.01	Design Load	31	Yes
B.LR.02	Design Method	N/A	No
B.LR.03	Load Rating Date	N/A	No
B.LR.04	Load Rating Method	63	Yes
B.LR.05	Inventory Load Rating Factor	66	Yes
B.LR.06	Operating Load Rating Factor	64	Yes
B.LR.07	Controlling Legal Load Rating Factor		No
B.LR.08	Routine Permit Loads	N/A	No
B.PS.01	Load Posting Status	41	Partial
B.PS.02	Posting Status Change Date	N/A	No
B.EP.01	Legal Load Configuration	N/A	No
B.EP.02	Legal Load Rating Factor		No
B.EP.03	Posting Type	N/A	No
B.EP.04	Posting Value	N/A	No
B.IR.01	NSTM Inspection Required	92A	Yes
B.IR.02	Fatigue Details	N/A	No
B.IR.03	Underwater Inspection Required	92B	Yes
B.IR.04	Complex Feature	N/A	No
B.IE.01	Inspection Type	90/92/93	Partial
B.IE.02	Inspection Begin Date	90/93	Partial
B.IE.03	Inspection Completion Date	N/A	No
B.IE.04	Nationally Certified Bridge Inspector	N/A	No
B.IE.05	Inspection Interval	91/92	Partial
B.IE.06	Inspection Due Date	N/A	No
B.IE.07	Risk-Based Inspection Interval Method	N/A	No

B.IE.08	Inspection Quality Control Date	N/A	No
B.IE.09	Inspection Quality Assurance Date	N/A	No
B.IE.10	Inspection Data Update Date	N/A	No
B.IE.11	Inspection Note	N/A	No
B.IE.12	Inspection Equipment	N/A	No
B.C.01	Deck Condition Rating	58	Yes
B.C.02	Superstructure Condition Rating	59	Yes
B.C.03	Substructure Condition Rating	60	Yes
B.C.04	Culvert Condition Rating	62	Yes
B.C.05	Bridge Railing Condition Rating	36A	Partial
B.C.06	Bridge Railing Transitions Condition Rating	36B	Partial
B.C.07	Bridge Bearings Condition Rating	N/A	No
B.C.08	Bridge Joints Condition Rating	N/A	No
B.C.09	Channel Condition Rating	61	Yes
B.C.10	Channel Protection Condition Rating	N/A	No
B.C.11	Scour Condition Rating	113	Partial
B.C.12	Bridge Condition Classification	CAT10	Yes
B.C.13	Lowest Condition Rating Code	CAT23	Yes
B.C.14	NSTM Inspection Condition	N/A	No
B.C.15	Underwater Inspection Condition	N/A	No
B.AP.01	Approach Roadway Alignment	72	Yes
B.AP.02	Overtopping Likelihood	71	Partial
B.AP.03	Scour Vulnerability	113	Partial
B.AP.04	Scour Plan of Action	113	Partial
B.AP.05	Seismic Vulnerability	N/A	No
B.W.01	Year Built	27	Yes
B.W.02	Year Work Performed	106	Yes
B.W.03	Work Performed	106	Partial

15. REVISIONS TO THIS DOCUMENT

Rev Date	Section	Change
Published		
10/1/2024	Footer	Removed Division from Highways Division for accuracy.
10/1/2024	1.3	Added HWY is the abbreviation for HDOT Highways.
10/1/2024	1.3	Added National Bridge Inspection Standards (NBIS) are the standards established over the safety inspections of highway bridges on public roads throughout the United States.
10/1/2024	1.3	Added National Bridge Inventory (NBI) is the aggregation of structure inventory and appraisal data collected to fulfill the requirements of the National Bridge Inspection Standards (NBIS). Each State shall prepare and maintain an inventory of all bridges subject to the NBIS. Bridges that are part of the NBI are referred to as NBI Bridges. Similarly, bridges that are not part of the NBI are referred to as Non-NBI Bridges.
10/1/2024	1.3	Added (SNBI Item B.AP.03 Scour Vulnerability coding C or D)
10/1/2024	2.3	Replaced James Fu with Brent Ching
10/1/2024	2.3	Replaced Harry Takiue with Nathan Ortega
10/1/2024	2.3	Replaced Stanley Katsura with Jacob Jinghai Yang
10/1/2024	2.3	Updated Kason's phone number from 961-8926 to 961-8586
10/1/2024	2.3	Replaced Michelle Kwan with Vacant
10/1/2024	2.3	Added BrM Help
10/1/2024	2.3	Added BIP Management
10/1/2024	2.4.1	Replaced NBI Item 21 – Maintenance Responsibility with SNBI Item B.CL.01 - Owner
10/1/2024	2.4.8	Replaced Fracture Critical (NSTM) with Nonredundant Steel Tension Member (NSTM) Replaced Fracture Critical with Nonredundant Steel Tension Member (NSTM)
10/1/2024	2.4.9	Replaced Fracture Critical (NSTM) with Nonredundant Steel Tension Member (NSTM)
10/1/2024	2.4.9	Replaced Fracture Critical with Nonredundant Steel Tension Member (NSTM)
10/1/2024	3.1.	Replaced NBI Item 8 with SNBI Item B.ID.01
10/1/2024	3.1.	Replaced NBI Item 3 with SNBI Item B.L.02
10/1/2024	3.1.	Replaced NBI Item 5 with SNBI Item B.RT.02
10/1/2024	3.1.	Replaced NBI Item 26 with SNBI Item B.H.01 led by 0
10/1/2024	3.1.	Replaced NBI Item 11 with SNBI Item B.H.07

10/1/2024	3.1.1	Replaced Rehabilitation, Strengthening, or Widening Existing Structures \n Construction projects that rehab, strengthen, or widen the existing structure are not considered new structures and must not change the bridge or tunnel number. \n Structure Replacement projects that remove an existing structure and build a new one must have a new Bridge Number and a new Bridge File because the existing data and history no longer apply. \n Temporary structures used during construction must have a new Bridge Number assigned. Temporary structure bridge numbers use the bridge number of the structure being bypassed with the first digit replaced with a "T", as in T23 4568 9 10 11 12 13 14 15. with New Bridges \n Structure Replacement projects that remove an existing structure and build a new one must have a new Bridge Number and a new Bridge File because the existing data and history no longer apply. The Team Lead must request a Bridge Number from the BIP Lead before data can be entered in BrM. If a Bridge Number has not been provided, Team Leads should request a new Bridge Number prior to inspection. \n To create a new ID for a replacement bridge that will be on the same location as the old replaced bridge, the last digit of the previous code (referring to the second decimal place of milepost) should be added or subtracted one unit. *Symbol \n indicates line break.
10/1/2024	3.1.2.	Added Rehabilitation, Strengthening, or Widening Existing Structures \n Construction projects that rehab, strengthen, or widen the existing structure are not considered new structures and must not change the bridge or tunnel number.
10/1/2024	3.1.3.	Added Temporary Structures \n Temporary structures used during construction must have a new Bridge Number assigned. Temporary structure bridge numbers use the bridge number of the structure being bypassed with the first digit replaced with a "T", as in T23 4568 9 10 11 12 13 14 15.
10/1/2024	3.2	Added With the adoption of SNBI coding, more than one name can be entered separated by the pipe symbol |
10/1/2024	3.3	Removed NBI Item 92B (Critical Feature Inspection) leaving only the reminder of the sentence (The UW frequency shall not exceed **48 months**; and should be the same month as the RTN inspection)
10/1/2024	3.3	Replaced Fracture Critical (FC) with Nonredundant Steel Tension Member (NSTM)
10/1/2024	3.3	Replaced FC with NSTM
10/1/2024	3.3.1	Replaced FC with NSTM
10/1/2024	3.3.2	Replaced FC with NSTM
10/1/2024	3.4	Rewrote the whole item for clarity. Removed Per SNTI, The Tunnel Portal's Latitude and Longitude shall be recorded in decimal degrees at the same location as the LRS Mile Point (SNTI Item 1.12). When the Mile Point is blank, record the latitude and longitude at the tunnel portal on the edge of the right traveled way in the direction of the route mileage to avoid redundancy.
10/1/2024	3.4	Replaced NBI Item 16 with SNBI Item B.L.05
10/1/2024	3.4	Replaced NBI Item 17 with SNBI Item B.L.06
10/1/2024	3.4	Added at the beginning of the bridge or tunnel for clarity.

10/1/2024	3.5	On first paragraph, replaced FHWA Item 31 with SNBI B.LR.01
10/1/2024	3.5	On table, replaced FHWA Item 31 with NBI Item 31 for consistency
10/1/2024	3.6	Replaced title NBI Item 113 – Scour Critical Bridge Coding (Scour Coding) with Scour Vulnerability
10/1/2024	3.6	Replaced Scour Coding NBI Item 113 with Scour Vulnerability (SNBI Item B.AP.03)
10/1/2024	3.6	Replaced The Statewide Hydraulic Engineer concurs with the code recommended by the Team Leader and concurred by the District /LPA BIP Leader with The Team Leader recommends the code for the SNBI Item B.AP.03, the District/LPA BIP Leader must concur, and the code is then submitted to the Statewide Hydraulic Engineer for concurrence
10/1/2024	3.6	Replaced NBI Item 60 Substructure with SNBI Item B.C.03 (Substructure Condition Rating)
10/1/2024	3.6	Replaced Item 62 Culverts with SNBI Item B.C.04 (Culvert Condition Rating)
10/1/2024	3.6	Removed Coding Countermeasures altogether
10/1/2024	3.6	Added subtitle Scour Repairs for clarity
10/1/2024	3.6	Replaced NBI Item 113 scour with SNBI Item B.AP.03 (Scour Vulnerability)
10/1/2024	4.1.4	Replaced FC with NSTM
10/1/2024	4.1.4	Inserted If there is a change in condition ratings, a brief statement directing the reader to the appropriate section should be added here (even if such section is in a different report, e.g., the underwater inspection report). Also, if Deck, Superstructure, Substructure, or Culvert rating is 5 or below, it is recommended to include a narrative statement on the rating, even if it has not changed from last inspection.
10/1/2024	4.1.7	Removed NW corner.
10/1/2024	4.1.7	Added References to cardinal points (N, S, E, W, NE, SW, etc.) should be avoided.
10/1/2024	4.1.7	Added or Condition State
10/1/2024	4.2	Added disclaimer This Section 4.2. only applies to BrM versions prior to BrM version 7 (scheduled to be release in November 2024). It also only applies to collection of 1995 Coding Guide (i.e., it does not apply to SNBI data collection)
10/1/2024	4.2	Added email bip@hawaii.gov
10/1/2024	4.2.2	Added If there is a change in condition ratings, a brief statement directing the reader to the appropriate section should be added here (even if such section is in a different report, e.g., the underwater inspection report). Also, if Deck, Superstructure, Substructure, or Culvert rating is 5 or below, it is recommended to include a narrative statement on the rating, even if it has not changed from last inspection.
10/1/2024	5.1.2	Replaced Fracture Critical with NSTM
10/1/2024	5.1.2	Replaced Fracture Critical with Nonredundant Steel Tension Member (NSTM)
10/1/2024	5.2	Added Coding is done by filling an excel spreadsheet that is provided by the BIP Management under request.
10/1/2024	5.2	Added bip@hawaii.gov
10/1/2024	5.2	Replaced Fracture Critical with Nonredundant Steel Tension Member (NSTM)
10/1/2024	5.2	Replaced NBI Item 22 with SNBI Item B.CL.01

10/1/2024	5.2	Replaced NBI Item 21 with SNBI Item B.CL.02
10/1/2024	5.3.2	Replaced NBI Item 70 Bridge Posting is coded K or Closed with SNBI Item B.PS.01 Load Posting Status is coded C or Closed
10/1/2024	5.3.4	Documenting Element Defects became an item as opposed to being part of Condition Ratings.
10/1/2024	5.3.4	Added If facility carried on bridge has mileposts (MP), orientation is facing the direction of the increasing route station. \n If route doesn't have mileposts, but it connects a major artery with MPs to other smaller roads or it has a dead-end, then orientation is looking away from the major artery. \n If route loops from a major artery with MPs returning to the same artery, orientation is parallel to what would be on major artery. \n If route connects two major arteries with MP, orientation is looking away from artery with highest ADT. \n For any other condition, orientation needs to be described in the Inspection Summary orientation.
10/1/2024	5.3.4	Added In accordance with Hawaii Pavement Management System (HPMS),
10/1/2024	5.3.5	Added List of Abbreviations
10/1/2024	5.3.6	Replaced NBI Items: 60 Substructure, 61 Channel, 62 Culvert, and 113 Scour with SNIB Items B.C.03 Substructure Condition Rating, B.C.09 Channel Condition Rating, B.C.04 Culvert Condition Rating, and B.C.11 Scour Condition Rating
10/1/2024	5.3.7.1	Removed The Team Lead must recommend a scour repair when the scour threatens the structure, see *Process for Programming of Scour Repair Projects*.
10/1/2024	5.3.7.1	Removed In addition, include the narrative above under the substructure element 6000 Scour Defect notes (See Process for Programming Repairs subsection for details).
10/1/2024	5.3.7.1	Replaced NBI Item 113 Scour Code with SNBI Item B.C.11 Scour Condition Rating Code
10/1/2024	5.3.7.3	Replaced NBI Item 113 Scour **not coded "9" or "N"** with SNBI Item B.C.11 Scour Condition Rating **not coded "N"**.
10/1/2024	5.3.7.3	Replaced NBI Item 113 Scour coded 8 with SNBI Item B.C.11 Scour Condition Rating coded "9".
10/1/2024	5.3.7.3	Replaced NBI Item 113 Scour Code with SNBI Item B.C.11 Scour Condition Rating Code.
10/1/2024	5.3.8	Replaced NBI Item 103 with SNBI Item B.PS.01
10/1/2024	5.3.8	Replaced A new Load Rating is required when a Fair structure (NBI 5) is coded Poor (NBI 4), or when the NBI rating of a Poor structure is reduced. A structure in Poor condition has an NBI rating for Item 59 Superstructure, 60 Substructure or 62 Culvert is less than 5 with The need for a new Load Rating is also determined by SNBI Items B.C.02 - Superstructure Condition Rating, B.C.03 - Substructure Condition Rating, and B.C.04 - Culvert Condition Rating. If any of these codes changes from 6 or above to 5 or below a new Load Rating is required, and each time it is further reduced from 5 or below to a lower value, a new Load Rating is required again.
10/1/2024	5.3.8	Added Additionally, a new load rating must be performed if any new CS4 defects are identified which affect bridge capacity or if there are any changes to previously identified SC4 defects.
10/1/2024	5.3.8	Replaced NBI Items with SNBI Items

10/1/2024	5.3.8	Replaced NBI Item 41 – Structure Open, Posted, … Closed to Traffic \n Update NBI Item 70 – Bridge Posting (capacity 5 - 0) with SNBI Sections 5.2 and 5.3 (items B.PS.01, B.PS.02, B.EP.01, B.EP.02, B.EP.03, and B.EP.04)
10/1/2024	5.3.10.2	Replaced Scour repairs do not change the Scour coding of NBI Item #113. Designed scour countermeasures repairs should be coded a 7 with Scour repairs do not change the Scour Vulnerability coding of SNBI Item B.AP.03. Designed scour countermeasures repairs should be coded a B.
10/1/2024	5.4.1	Added The UW inspection report must clearly state the total quantity of underwater elements, and the quantity 10% represents (for example, 80 sqft total and 8 sqft sampled). The location of the 10% sampled area needs to be clearly documented in sketches or drawings and must be at a different location every inspection.
10/1/2024	5.4.2	Added bip@hawaii.gov
10/1/2024	5.4.2	Replaced NBI Item codes with SNBI Item codes
10/1/2024	5.4.3	Replaced NBI Item 60 Substructure, 61 Channel and Channel Protection, 62 Culverts and 113 Scour Critical Bridges with SNBI Item B.C.03 Substructure Condition Rating, B.C.09 Channel Condition Rating, B.C.10 Channel Protection Condition Rating, B.C.04 Culvert Condition Rating, and B.C.11 Scour Condition Rating
10/1/2024	5.4.3	Replaced **DD/MM/YY** with **MM/DD/YY**
10/1/2024	5.5	Replaced Fracture Critical (FC) with Nonredundant Steel Tension Member (NSTM)
10/1/2024	5.5	Replaced Fracture Critical (FC) with Nonredundant Steel Tension Member (NSTM), formerly known as Fracture Critical (FC).
10/1/2024	5.5	Replaced fracture critical member (FCM) with Nonredundant Steel Tension Member (NSTM)
10/1/2024	5.5	Replaced 3 instances of Fracture Critical with Nonredundant Steel Tension Member
10/1/2024	5.5	Replaced FCM with NSTM
10/1/2024	5.5	Replaced FC with NSTM
10/1/2024	5.5.1	Replaced FC Member Procedures (FCP) with Nonredundant Steel Tension Member Procedures (NSTMP)
10/1/2024	5.5.1	Replaced fracture critical procedures with Nonredundant Steel Tension Member Procedures
10/1/2024	5.5.1	Replaced FCM with NSTM
10/1/2024	5.5.1	Replaced FCP with NSTMP
10/1/2024	5.5.2	Replaced FC Reporting with NSTM Reporting
10/1/2024	5.5.2	Replaced FC with NSTM
10/1/2024	5.5.2	Replaced **FC Note DD/MM/YY** with **NSTM Note MM/DD/YY**
10/1/2024	5.6.3	Replaced **DD/MM/YY** with **MM/DD/YY**
10/1/2024	5.6.3	Inserted If the damage is determined to be a Critical Finding, a CF Notification is needed. In addition, the Damage Report also needs to include: to encompass the subitems Immediate actions and Recommended corrective measures
10/1/2024	5.7.1	Replaced **DD/MM/YY** with **MM/DD/YY**
10/1/2024	5.8	Added new item Special Inspections and placed Monitor and Post Event inspection types as subitems.
10/1/2024	5.8.1	Replaced FC with NSTM

10/1/2024	5.8.1	Replaced **DD/MM/YY** with **MM/DD/YY**
10/1/2024	5.8.2	Replaced **DD/MM/YY** with **MM/DD/YY**
10/1/2024	5.8.3	Replaced NBI Item to "3" for Deck (58), Superstructure (59), Substructure (60), Culvert (62) with SNBI Item to "3" for Deck Condition Rating (B.C.01), Superstructure Condition Rating (B.C.02), Substructure Condition Rating (B.C.03), and Culvert Condition Rating (B.C.04).
10/1/2024	5.8.3.1	Replaced the Statewide Bridge Design Engineer and the Statewide BIP Manager with bip@hawaii.gov
10/1/2024	5.8.3.2	Replaced BrM with the BrM inspection folder
10/1/2024	6.1	Replaced brent.k.ching@hawaii.gov with Statewide Load Rating Engineer (see Section 2.3 Statewide Program Directory for contact information)
10/1/2024	6.3.1	Replaced NBI Item 41 a "K" within 90 days with SNBI Item B.PS.01 a "C" within 90 days
10/1/2024	7.1	Replaced NBI 113 with SNBI B.AP.03
10/1/2024	7.1	Replaced NBI Item 113 with SNBI Item B.C.11
10/1/2024	7.1	Replaced NBI Item 113 with SNBI Item B.AP.03
10/1/2024	7.1	Replaced Item 113 = 3 with Item B.AP.03 = D
10/1/2024	7.1	Replaced Scour 113 with Scour B.AP.03
10/1/2024	7.2	Replaced NBI Item 113 Scour Critical Bridges with SNBI Item B.AP.03 Scour Vulnerability
10/1/2024	7.2	Removed Include the following sections.
10/1/2024	7.3	Replaced NBIS Item 113 Scour Critical Bridges rating with SNBI Item B.AP.03 Scour Vulnerability code
10/1/2024	7.3	On Phase 1 QC Form, replaced Has Item 113 been coded? with Has Item B.AP.03 been coded?
10/1/2024	7.3	On Phase 2 QC Form, replaced Item 113 code with Item B.AP.03 code
10/1/2024	7.3	On Phase 4 QC Form, replaced Current Item 113 rating with Current Item B.AP.03 rating
10/1/2024	7.3	On Phase 4 QC Form, replaced Source of Item 113 rating (observed, assessed, calculated, other) with Source of Item B.AP.03 rating (observed, assessed, calculated, other)
10/1/2024	7.3	On Phase 4 QC Form, replaced Item 113 - Scour Critical (current and previous) with Item B.C.11 - Scour Condition Rating (current and previous)
10/1/2024	7.3	On Phase 4 QC Form, replaced Item 60 - Substructure (current and previous) with Item B.C.03 - Substructure Condition Rating (current and previous)
10/1/2024	7.3	On Phase 4 QC Form, replaced Item 61 – Channel & Channel Protection (current and previous) with Item B.C.09 - Channel Condition Rating (current and previous)
10/1/2024	7.3	On Phase 4 QC Form, added Item B.C.10 - Channel Protection Condition Rating (current and previous)
10/1/2024	7.3	On Phase 4 QC Form, replaced Item 71 – Waterway Adequacy (current and previous) with Item B.AP.02 – Overtopping Likelyhood (current and previous)
10/1/2024	8	Added be for clarity
10/1/2024	8	Removed The BRM Multimedia Quick Guide provides instructions to use this Multimedia upload function since there is no uploaded reference
10/1/2024	8.1	Replaced **FC** with **NSTM**
10/1/2024	8.2	Replaced Fracture Critical with Nonredundant Steel Tension Member

10/1/2024	8.2	Replaced FC with NSTM
10/1/2024	8.2	Added Historical Evaluation Summary - HIS - Use Date PDF completed or revised
10/1/2024	8.3.2	Replaced tape with submittal
10/1/2024	9.2	Removed entire QC CheckList
10/1/2024	9.2.2	Replaced The temporary structure **inspection** and reporting requirements are same as a new permanent structure which includes a Load Rating, defect documentation, and photos. Do not code NBI Item 103 as "T" with The temporary structure inspection and reporting requirements are same as a new permanent structure which includes SI&A, Load Rating, defect documentation, and photos
10/1/2024	9.2.2	Removed FHWA Item 103 indicates "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 is not considered temporary."
10/1/2024	9.2.2	Removed The permanent structure under construction must code NBI Item 103 as "T" and update the following SI&A Items based on the temporary structure, as recommended by FHWA Questions and Answers on the National Bridge Inspection Standards 23 CFR 650 Subpart C, A303-7.4. The other SI&A Items and previous element data should remain unchanged until the Initial Inspection after construction changes the data. The Report Inspection Summary should include any Critical Findings on the temporary structure, if they exist. \n 10 - Inventory Route, Minimum Vertical Clearance \n 41 - Structure Open, Posted, or Closed to Traffic \n 47 - Inventory Route, Total Horizontal Clearance \n 53 - Minimum Vertical Clearance Over Bridge Roadway \n 54 - Minimum Vertical Underclearance \n 55 - Minimum Lateral Underclearance on Right \n 56 - Minimum Lateral Underclearance on Left \n 70 - Bridge Posting (Note: Per NBI item 70, the presence of a temporary bridge, bridges shoring, or temporary repairs affects the this coding.) \n 64 – Operating Rating = 000 (See NBI Coding Guide) \n 66 – Inventory Rating = 000 (See NBI Coding Guide)
10/1/2024	9.2.2	Replaced **Item 106 - Year Reconstructed** with SNBI Item B.W.02 - Year Work Performed
10/1/2024	9.2.2	Replaced NBI Item 70 Bridge Posting is coded K for "Closed" with SNBI Item B.PS.01 Load Posting Status is coded C for "Closed"
10/1/2024	9.2.3	Replaced NBI Items 58 Deck, 59 Superstructure, 60 Substructure, or 62 Culverts rating with SNBI Items B.C.01 Deck Condition Rating, B.C.02 Superstructure Condition Rating, B.C.03 Substructure Condition Rating , or B.C.04 Culvert Condition Rating
10/1/2024	9.3	Removed including the attached HDOT HWY-OM Bridge Unit-Scour POA/Standard Operating Procedures (SOP) since there was no attached file (broken link).

10/1/2024	9.4	Replaced Scour Countermeasure constructed on existing structures must have the NBI Item 113 Scour Critical Bridges coded "7" with a Plan of Action for the Countermeasure (POAC). This is for the Inspectors to monitor the performance of the scour countermeasure. with Scour Countermeasures constructed on existing structures must be properly reflected in the coding of item B.AP.03, Scour Vulnerability, with a Plan of Action for the Countermeasure (POAC). Any available documentation of the design and/or construction of the scour countermeasure should be stored in the BrM "Bridge" folder under "Scour". This will allow inspectors to monitor the performance of installed countermeasures.
10/1/2024	9.4.1.2	Replaced Suggested links for District/LPA BIP Leaders and secondary owner representatives to obtain weather related alerts and real-time stream flow conditions are stated below. with The BIP lead or an Owner-designated representative are responsible for obtaining weather related alerts and real-time stream flow conditions using the suggested links below.
10/1/2024	9.4.2.1	Replaced Secondary Owner Representative with an Owner-designated representative
10/1/2024	9.5	Replaced completing the repairs with the Owners Assigned in BrM as In-House Maintenance, where the HDOT District Engineers and County are considered the Owners with coordinating the completion of repairs that were assigned in BrM as In-House Maintenance for clarity
10/1/2024	9. Form	Updated FORM: Quality Review with our QC CheckList
10/1/2024	9. Form	In FORM: Performance Review, replaced Fracture Critical with Nonredundant Steel Tension Member
10/1/2024	10.2	Replaced BIM Section 2.3.3 Statewide BIP Manager with the Statewide BIP Manager Section of this Manual
10/1/2024	10.2	Replaced BIM Section 2.3.8 BIP Leader (BIP Lead) with the BIP Leader (BIP Lead) Section of this Manual
10/1/2024	10.2	Replaced BIM Section BIM Section 2.3.9 Team Lead Inspector (Team Leader or Team Lead) with the Team Lead Inspector Section of this Manual
10/1/2024	10.2	Replaced BIM Section 2.3.5 Statewide Load Rating Engineer with the Statewide Load Rating Engineer Section of this Manual
10/1/2024	10.2	Replaced BIM Section 2.3.6 Statewide Hydraulic Design Engineer with the Statewide Hydraulic Design Engineer Section of this Manual
10/1/2024	10.3	Replaced Fracture Critical Members (FCM) with Nonredundant Steel Tension Members (NSTM)
10/1/2024	10.4	Replaced non-redundant or fracture critical members with Nonredundant Steel Tension Members (NSTM)
10/1/2024	10.5.1	Replaced FC with NSTM
10/1/2024	10.5.3	Replaced NBI Item 59, 60, or 62 with SNBI Items B.C.02, B.C.03, or B.C.04
10/1/2024	10.5.3	Removed If CS4 quantities change, a new load rating may be required OR the report justifies why a LR is not required.
10/1/2024	10.5.3	Removed If SNBI Item changes from 5 to 4, 4 to 3, or 3 to 2, then a load rating is required and NBI Item 59, 60, or 62 updated.
10/1/2024	10.5.3	Replaced NBI with SNBI
10/1/2024	10.5.3	Replaced NBI Items 10, 53, 54A, and 54B (VC min. for travel lanes) with SNBI Items B.H.12 (Highway Maximum Usable Vertical Clearance) and B.H.13 (Highway Minimum Vertical Clearance).
10/1/2024	10.5.3	Replaced Item 10 with Item B.H.12

10/1/2024	10.5.3	Replaced Item 54B with Item B.H.13
10/1/2024	10.5.3	Replaced NBI Items 55A, 55B, and 56 with SNBI Items B.H.14 and B.H.15
10/1/2024	10.5.3	Replaced Item 16 with Item B.L.05
10/1/2024	10.5.3	Replaced Item 17 with Item B.L.06
10/1/2024	10.5.3	Added first for clarity
10/1/2024	10.5.3	Replaced Items 38, 39 (VC), 40 (HC) with Items B.N.01, B.N.02, B.N.04, and B.N.05
10/1/2024	10.5.3	Removed (Coding for Item 38 coming from the Coast Guard)
10/1/2024	10.5.4	Replaced NBI Item 64 and 66 (Operating Rating & Inventory Rating) with SNBI Items B.LR.05 and B.LR.06 (Inventory Load Rating Factor & Operating Load Rating Factor)
10/1/2024	10.5.4	Added If SNBI Items B.C.02, B.C.03, or B.C.04 change from 6 or above to 5 or below then a new Load Rating is required, and each time it is further reduced from 5 or below to a lower value, a new Load Rating is required again. In addition, SNBI Sections 5.2 and 5.3 (items B.PS.01, B.PS.02, B.EP.01, B.EP.02, B.EP.03, and B.EP.04) need to be updated.
10/1/2024	10.5.4	Added If CS4 quantities increase, a new load rating may be required OR the report justifies why a LR is not required.
10/1/2024	10.5.4	Replaced If LRS sheet indicates the controlling Load Rating Factor is < 1.0, the bridge posting is required within 30 days and NBI Item 70 must be less than 5 AND NBI Item 41 is “P” \n If Item 70 < 5 then bridge posting is required within 30 days and Item 41 should be “P”. \n If Item 41 = “P”, then Item 70 must be < 5. \n If NBI Item 41 = “B”, then structure is non-compliant because the bridge must be posted within 30 days of inspector notification. \n Load Rating calcs and LRS are submitted. \n If NBI Item 59, 60, or 62 < 2 then Item 41 = K with If the LRS sheet indicates SNBI Item B.LR.07, the Controlling Legal Load Rating Factor, is < 1.0, a bridge posting is required within 30 days and the following SNBI Items must be updated: \\n SNBI Item B.PS.01 Load Posting Status \n SNBI Item B.PS.02 Posting Status Change Date \n SNBI Item B.EP.03 Posting Type. \n SNBI Item B.EP.04 Posting Value.
10/1/2024	10.5.7	Replaced 113 with B.AP.03
10/1/2024	10.9	Replaced NBI with SNBI
10/1/2024	10.9	Replaced 58, 59, 60 with B.C.01, B.C.02, B.C.03
10/1/2024	10.9	Replaced Item 61 with Items B.C.09 and B.C.10
10/1/2024	10.9	Replaced 72 with B.AP.01
10/1/2024	10.12	Replaced NBI Element No. 41 Structure Open, Posted or Closed to Traffic, 43 Structure Type, 51 Bridge Roadway Width, 54 Minimum Vertical Underclearance, 90 Inspection Date, 92 Critical Feature Inspection, 93 Critical Feature Inspection Date, and 113A Scour Critical Bridges with SNBI Element B.PS.01 Structure Open, Posted or Closed to Traffic, B.SP.04 Span Material, B.G.06 Bridge Curb-to-Curb, B.H.13 Highway Minimum Vertical Clearance, B.IE.03 Inspection Completion Date for Routine, NSTM, UW, and Special, and B.AP.03 Scour Vulnerability.
10/1/2024	12	Added entire chapter
10/1/2024	13	Added entire chapter
10/1/2024	14	Added entire chapter

Published		
1/1/2024	2.2	Added organizational chart
1/1/2024	2.3	Changed from Donald Fujimoto to Joel Bautista Added Derek Takahashi
1/1/2024	2.4.3	Qualification Requirements, deleted CE and left only SE.
1/1/2024	2.4.5	Qualification Requirements, deleted CE and left only SE.
1/1/2024	2.4.6	Qualification Requirements, added the word “engineer”
1/1/2024	2.4.8	Changed Qualification Requirements, copied CFR for PM
1/1/2024	2.4.9	Changed Qualification Requirements, copied CFR for TL
1/1/2024	3.5	Inserted 3.5. Design Load
1/1/2024	5.3.1	Added entire entry: “Adding New Elements.”
1/1/2024	5.3.3	Changed "Superstructure Examples" to "Examples", and removed next page "Examples"
1/1/2024	5.3.8	Added “and Work Candidates”.
1/1/2024	5.3.8.1	Replaced “may” with “must”.
1/1/2024	5.3.8.1	Replaced “Urgent” with “Critical Findings” twice.
1/1/2024	5.3.8.2	Inserted “and fill out the “Date Completed” field in Work Candidates”
1/1/2024	5.8	Removed the full, separated sentence addressing the need for a POSTE after a CF repair is complete, and added “after any repairs are completed” in the list of events that require a POSTE inspection
1/1/2024	5.8.1	Replaced “The following Routine Inspections may include some, all, or delete the comments” with “The following Routine Inspections may include some, all, or none of the comments”
1/1/2024	5.11	Replaced “Bridge rail failure or field condition that threatens public safety” with “Creating a Plan of Action that describes both immediate actions to address safety issues, and future actions to completely resolve the Critical Finding condition.”
1/1/2024	5.11.1	Added “: if a Critical Finding is observed during a scheduled inspection, then that inspection will contain the finding. Otherwise, a new inspection needs to be created to document the Critical Finding. Under Bridges > New Inspection tab, select Other Special as the type, and then under Inspection > Schedule select the sub-type Critical Findings”
1/1/2024	5.11.1	Added “If the observed Critical Finding changes load capacity or element condition that affects Load Rating, then the Load Rating must be evaluated and updated as required.”
1/1/2024	5.11.2	Added “All Critical Finding repairs must be listed as Priority 1 – Critical Findings in Work Candidates.”
1/1/2024	5.11.2	Added “Repairs that resolve the Critical Finding need to be documented (photos) and the files uploaded to BrM. If repairs change conditions from either previous or ongoing RTN inspection, then either a Post Event inspection must be done or the ongoing RTN inspection must be updated to report the changes. The Work Candidate corresponding to the completed Critical Finding repair(s) must be updated with the Date Completed in BrM.”

1/1/2024	**7.3**	**Added "The following QC checklist for Scour Evaluations will be used by HDOT to ensure the necessary items are included in the Scour Evaluations as well as a guide for those preparing the SER. The Statewide Hydraulic Design Engineer will review the Scour Evaluations for HDOT. Local Public Agencies are responsible for reviewing the SER. They may use this QC checklist as a guide in their review. BIP Leaders may contact the Statewide Hydraulic Design Engineer for any questions on the checklist."**
1/1/2024	8.2	Added Scour > SCO since Scour is a type of inspection/report (under Other Special)
1/1/2024	8.2	Replaced "CFRpt" with "CFR" for consistency, since the next page refers to CF Report as CFR.
1/1/2024	8.2	Rearranged the entire table to keep Doc ID alphabetically sorted
1/1/2024	8.3.1	Replaced "Team Lead completes a report with signature and submits applicable inspection files with Bridge File PDF names to the BIP Lead within 30 days of Inspection." with "Team Lead completes a report with signature, uploads to BrM Multimedia along with all applicable inspection files, and notifies via email both the BIP Leader and BIP@hawaii.gov, within 30 days of Inspection, that the report and bridge files have been uploaded to BrM. The body of the email message must include Bridge File PDF names for all uploaded files."
1/1/2024	8.3.1	Replaced "should" with "must".
1/1/2024	8.3.1	Replaced "**BIP Lead** uploads signed PDF and other related documents in BrM Multimedia Folder within 90 days of Inspection." with "Deadline for all reviews and corrections. Final version of signed report should be in BrM replacing previous versions."
Published		
5/15/2023	4.1.4	Inspection Summary Requirements
5/15/2023	5.3.2.1	Documenting Element Defects
Published		
3/9/2023	2.2	Bridge Inspection Organizational Chart Update
6/15/2022	7.0	Scour Evaluation Requirements Flow chart
2/20/2022	2.3.9 Page 19	Updated Team Leader qualification requirements of licensure.
2/02/2022	2.2 Page 12	Revised Program Directory
2/02/2022	3.3.1 Page 23	Clarified role of BIP leader in reducing inspection intervals
2/02/2022	5.8 Page 54	Added Post Event Inspection for Earthquake event.
2/02/2022	9.3.2 Page 75	Updated requirements for Completed Construction and Temporary Structures
2/02/2022	9.7 Page 82	Updated QC Review Procedures
12/15/2021	5.3.5 Page 45	Updated Re-load Rating to include requirement for load ratings when NBI coding is reduced from fair to poor.
12/15/2021	6 Page 61-63	Revised Load Rating Requirements to use AASTOWare Bridge Rating (BrR) Version 7 and Midas Civil 3.0 Software. Updated field sketch requirements, Gusset Plate Load Rating Reporting and Bridge File Submittal requirements.
11/11/2021	ALL	Added 23 CFR 650 Reference where applicable
11/11/2021	1.1 Page 6	Added statement of intent of the manual
11/11/2021	1.3 Page 8-9	Added definitions for Tunnel terminology

11/11/2021	2.1 Page 11	Added explanation of the BIP role in Asset Management Program
11/11/2021	2.2 Page 12	Revised Program Directory
11/11/2021	2.3.1 Page 13	Added Owner Responsibility in inspections
11/11/2021	2.3.2 Page 14	Updated Qualification Requirements for Tunnels
11/11/2021	2.3.4 Page 15	Updated Qualification Requirements for Tunnels
11/11/2021	2.3.7 Page 17	Updated BrM Manager role and qualifications
11/11/2021	2.3.8 Page 17	Updated BIP Leader responsibilities and duties
11/11/2021	2.3.9 Page 18	Updated Team Leader Role to be onsite
11/11/2021	3.3.2 Page 24	Updated Statewide BIP Leader role in rescheduling inspections
11/11/2021	3.6 Page 25	Revised from Statewide BIP Manager to Statewide BrM Manager to submit annual data to FHWA
11/11/2021	8 Page 68	Updated Bridge and tunnel file locations and procedures
11/11/2021	8.3 Page 71-72	Updated Report Submission requirements
Published		
3/15/2021	2.3.11 Page 21	Added Qualifications for Specialty Contractors for Tunnels
3/15/2021	3.1 Page 22	Added Tunnel ID numbering
3/15/2021	4.1 Page 29	Added Stationing for Long Structures
3/15/2021	5.3.4.3 Page 43	Added figure showing example of Channel Cross Section in BrM
Published		
9/03/2021	4.2.6 Page 33	Added Deck Types
9/03/2021	5.2 Page 36	Added requirement for initial inspections as part of the AE's post design services or contractor's contract.
9/03/2021	5.4.3 Page 50	Revised UW Inspection Notes requirements
9/03/2021	5.10 Page 55-58	Added Tunnel Inspection coding requirements
9/03/2021	5.11.1 Page 59	Updated wording for Critical Finding to clarify Notification requirements
9/03/2021	9.2 Page 74	Minor reference updates to Critical Finding Notification
9/03/2021	10.2 Page 86	Added QA Roles and Responsibilities
9/03/2021	10.3 Page 86	Added Monthly Dashboard to all BIP Leaders to track metric compliance
9/03/2021	10.4 Page 87	Added QA Quarterly Review Procedures
9/03/2021	10.5 Page 87-90	Added QA Summary Reporting
9/03/2021	10.6 Page 90	Added Quarterly Meetings (BIP Leaders)
9/03/2021	10.7 Page 91	Added Annual Data Check for NBI/NTI Submission
9/03/2021	10.9 Page 93	FHWA Annual Inspections
9/03/2021	10.10 Page 93	FHWA Annual Compliance Review
9/03/2021	10.11 Page 93-94	Added Corrective Actions resulting from QA
9/03/2021	10.12 Page 95	Added Reasons for Disqualification
9/03/2021	10.13 Page 95	Added Reinstatement procedures after Disqualification
Published		
9/01/2020	ALL	Published Date