MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

Office of Structures
Guidelines and Procedures Memorandums

STRUCTURE INSPECTION SECTION

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	General Definitions	Approval:

The following are general definitions and abbreviations for the structure inspection program within the State of Maryland:

OOS	Office of Structures (OOS), Maryland Department of Transportation, State Highway Administration
LA	Local Agency which includes all non-federal and non-SHA bridge owners in Maryland.
Bridge	A structure meeting the definition of a NBIS bridge. This includes all structures carrying vehicular traffic with an opening measured along the centerline of the roadway > 20 feet. This includes extreme ends of multiple boxes and multiple pipes where the clear distance between openings is less than half of the smaller contiguous opening.
Small Structure	Bridges and Culverts having an opening measured along the centerline of the roadway ≥ 5 feet but ≤ 20 feet. Bridges and culverts ≥ 3 feet and < 5 feet where the depth of fill over it measures less than the size of the opening. Retaining walls ≥ 6 feet. Also retaining walls ≥ 3 feet but < 6 where the distance to the edge of road is less than the height of the exposed wall.
NBIS	Code of Federal Regulations (CFR), Title 23 (Highways) Part 650 (Bridges, Structures and Hydraulics), Subpart C-National Bridge Inspection Standards (NBIS).
MBE	American Association of State Highway and Transportation Officials (AASHTO), Manual for Bridge Evaluation (MBE)
SIRE	Structures Inspection and Remedial Engineering (SIRE), Office of Structures, Maryland Department of Transportation, State Highway Administration
SIA	Structure Inventory and Appraisal (SIA)
MDTA	Maryland Transportation Authority (MDTA)
SAM	Structure Asset Management (SAM) program
SIA Guide	MDOT SHA's Guide for Completing Structure Inventory and Appraisal Input Forms

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Inspection Organizational Roles and Responsibilities		Approval:

The Maryland Department of Transportation State Highway Administration (MDOT SHA), Office of Structures (OOS), Structures Inspection and Remedial Engineering (SIRE) shall be the governing organization ensuring all non-federally owned bridges located on public roads in the State of Maryland are inspected in accordance with the National Bridge Inspection Standards (NBIS). This includes ensuring all bridges owned by Local Agencies (LA) are inspected in accordance with the NBIS.

Organizational Roles and Responsibilities

Deputy Director, SIRE – Oversees the statewide National Bridge Inspection Program and serves as the Program Manager as defined in the NBIS. This position shall be the sole liaison with the Federal Highway Administration in regard to Maryland's Bridge Inspection Program.

Division Chief, SIRE – Structures Inspection and Preservation: Manages the daily operations of the MDOT SHA and LA Bridge inspection program and is responsible for ensuring all inspections are performed in accordance with the NBIS regulations and SHA's policies and procedures. This includes performing compliance reviews of the LA bridge inspection programs.

Division Chief, SIRE – Structures Remedial Engineering: Responsible for the designs included in the MDOT SHA minor bridge rehabilitation program.

Inspection Program Manager: First level of management and is involved in the daily field operations regarding scheduling and managing resources for MDOT SHA inspections. Directly supervises all field inspection personnel involved in MDOT SHA structure inspections.

Inventory Program Manager: Responsible for the load rating program for MDOT SHA bridges. LA bridges are required to have all ratings checked by a registered professional engineer in accordance with the Structural Load Ratings, GPM D-97-47(4). Also oversees the inspection program for LA owned bridges. This involves providing consultant inspection resources to those LA's that request assistance and ensuring the inspections meet the NBIS requirements. Assists the Information Systems Manager in maintaining and managing the Structural Inventory and Appraisal database.

Information Systems Manager – Manages the National Bridge Inventory (NBI) and bridge information database for the State of Maryland. Manages and maintains the MDOT SHA Structural Inventory and Appraisal database.

Inspection Organizational Roles and Responsibilities

Inspection Team Leader – Inspector who meets NBIS Team Leader requirements and is responsible for managing an inspection team. This includes setting overall schedules to ensure structures are spread out throughout the year and inspected at appropriate times, scheduling individual inspections, ensuring MOT permits are required, obtaining necessary equipment, supervising inspection team members, etc.

Bridge Inspector – Member of the structure inspection team and works under the direct supervision of the Inspection Team Leader.

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	Qualifications of Personnel	Approval:

The following MDOT SHA personnel involved in the Maryland structure inspection program shall have the following minimum requirements:

Deputy Director, SIRE (NBIS Program Manager for the State of Maryland)
Division Chief, SIRE – Structures Inspection
Division Chief, SIRE – Structures Remedial Engineering
Inventory Program Manager

- Be a registered professional engineer in the state of Maryland
- Successfully complete FHWA-NHI-130055 Safety Inspection of In-Service Bridges course or equivalent
- Successfully complete FHWA-NHI-130078 Fracture Critical Inspection Techniques for Steel Bridges course or equivalent
- Successfully complete FHWA-NHI-130053 Bridge Inspection Refresher Training at least every five years. First refresher course shall be taken five years after completion of the Safety Inspection of In-Service Bridges course.

Inspection Program Manager
Inspection Team Leader

- Successfully complete FHWA-NHI-130055 Safety Inspection of In-Service Bridges course or equivalent
- Successfully complete FHWA-NHI-130078 Fracture Critical Inspection Techniques for Steel Bridges course or equivalent prior to inspecting any fracture critical bridges
- Successfully complete FHWA-NHI-130053 Bridge Inspection Refresher Training at least every five years. First refresher course shall be taken within five years of completion of the Safety Inspection of In-Service Bridges course.
- Must also have one of the following:
    - Be a registered Professional Engineer in the State of Maryland
    - Five years of bridge inspection experience
    - Be certified as NICET Level III or IV Bridge Safety Inspector
    - Have a BS in Civil Engineering, and passed the Fundamentals of Engineering exam, and have two years of bridge inspection experience.
- Inspection Program Manager is additionally required to have at least 5 years of experience as Inspection Team Leader.

Bridge Inspector

- Successfully complete FHWA-NHI-130055 Safety Inspection of In-Service Bridges course or equivalent within one year of performing bridge inspections
- Successfully complete FHWA-NHI-130078 Fracture Critical Inspection Techniques for Steel Bridges course or equivalent within one year of performing bridge inspections
- Successfully complete FHWA-NHI-130053 Bridge Inspection Refresher Training at least every five years. First refresher course shall be taken within five years of completion of the Safety Inspection of In-Service Bridges course.

The following are the minimum requirements for Local Agencies (LA) and anyone performing structure inspections for the LA as well as consultants performing inspections of MDOT SHA bridges:

LA Bridge Program Manager

- Successfully complete FHWA-NHI-130055 Safety Inspection of In-Service Bridges course or equivalent
- Successfully complete FHWA-NHI-130078 Fracture Critical Inspection Techniques for Steel Bridges course or equivalent if the LA owns any fracture critical bridges
- Successfully complete FHWA-NHI-130053 Bridge Inspection Refresher Training at least every five years. First refresher course shall be taken within five years of completion of the Safety Inspection of In-Service Bridges course.
- Must also have one of the following:
  - Be a registered Professional Engineer in the State of Maryland
  - Ten years of bridge inspection experience

Lead Inspector/Team Leader

- Successfully complete FHWA-NHI-130055 Safety Inspection of In-Service Bridges course or equivalent
- Successfully complete FHWA-NHI-130078 Fracture Critical Inspection Techniques for Steel Bridges course or equivalent prior to inspecting any fracture critical bridges.

- Successfully complete FHWA-NHI-130053 Bridge Inspection Refresher Training at least every five years. First refresher course shall be taken within five years of completion of the Safety Inspection of In-Service Bridges course.
- Must also have one of the following:
  - Be a registered Professional Engineer in the State of Maryland
  - Five years of bridge inspection experience
  - Be certified as NICET Level III or IV Bridge Safety Inspector
  - Have a BS in Civil Engineering, and passed the Fundamentals of Engineering exam, and have two years of bridge inspection experience.

Bridge Inspector

- Successfully complete FHWA-NHI-130055 Safety Inspection of In-Service Bridges course or equivalent. A one year allowance is allowed only for inspectors who are graduate engineers.
- Successfully complete FHWA-NHI-130078 Fracture Critical Inspection Techniques for Steel Bridges course or equivalent prior to inspecting any fracture critical bridges. A one year allowance is allowed only for inspectors who are graduate engineers.
- Successfully complete FHWA-NHI-130053 Bridge Inspection Refresher Training at least every five years. First refresher course shall be taken within five years of completion of the Safety Inspection of In-Service Bridges course.

For the qualifications required for underwater bridge inspections, refer to Underwater Bridge Inspection Program, GPM- SI-12-16 (4).

For the qualifications required for complex bridge inspections, refer to Complex Bridge Inspection Program, GPM-SI-12-08 (4).

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-04(4) Date: 01-07-2019
Hands-On Inspection (HOI) and Modified Hands-On Inspection (MHOI)		Approval:

A hands-on inspection (HOI) shall be performed on all structures during routine inspections except for those approved for a Modified Hands-on Inspection (MHOI). A HOI is defined as an inspection within arm's length on the element. The inspection uses visual techniques that may be supplemented by nondestructive testing. This is consistent with an NBIS In-depth inspection. Since Maryland performs HOI, no in-depth inspections are required.

To satisfy the HOI requirement, it will often be necessary to make use of special inspection equipment such as an underbridge inspection vehicle (snooper truck), bucket truck, scaffolding or rigging. Free climbing may also be necessary on some unique structures, but this will only be performed by inspection personnel trained for this activity.

When a HOI of any portion of an element cannot be completed for any reason on a bridge that is not approved for a MHOI, the inspector shall report this in the inspection report and provide a description of the inaccessible area. For SHA structures, an FYI report shall be submitted to the Senior Project Team Leader, SIRE, in accordance with an FYI (See GPM SI-12-18 (4)).

A MHOI is performed on those bridges that have difficult access issues, have a low risk of having a significant defect, and has been approved for a MHOI by the Division Chief, SIRE- Structures Inspection or the LA Program Manager. A MHOI is a HOI performed to the best of the ability of the inspector using the available access equipment provided. Only those areas listed in the SIA for MHOI shall not have a HOI. If the inspector suspects a significant defect exists within a MHOI area, he will contact the Senior Project Team Leader or LA Program Manager for assistance in obtaining additional access equipment. All suspected defects not fully hands on inspected must be inspected to the satisfaction of the inspector. When a MHOI inspection is performed on any portion of an element, the inspector shall report this in the inspection report and provide a description of the inaccessible area.

The following types of bridges are those that may be approved for MHOI by the Division Chief, SIRE- Structures Inspection or the LA Program Manager if there are not significant defects that warrant a HOI:

- Bridges with spans over electrified railroads. Only those spans over the electrified rail may have a MHOI. All other areas shall have a HOI. A HOI shall be performed on those areas approved for MHOI every 6 years.

- Bridges over roadways with more than 4 lanes underneath. Typically double right and left lane closures are to be used to access as much of the bridge as possible without severely impacting traffic.

- Bridges over water where the overall superstructure width does not enable the underbridge inspection vehicle to reach all interior elements.

- Bridges where the Inspection Division Chief, SIRE – Structures Inspection or LA Program Manager has approved a MHOI due to particular access or MOT issues.

A Modified Hands on inspection is not allowed on fracture critical elements of structures. Refer to Fracture Critical Member Inspection, GPM SI-12-07 (4).

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-05(4) Date: 01-07-2019
Increased Inspection Frequency		Approval:

Increased inspection frequency is whenever a portion or the entire structure has an inspection frequency less than standard required frequency. The standard frequency for a NBIS bridge is 24 months. A structure can be placed on an increased inspection frequency based upon the load rating, condition rating, or engineering judgment. This GPM applies to all types of inspections: routine, underwater, fracture critical and special inspections.

Load Rating: The below table details the requirements of increased inspection frequency based on load rating. Increased inspection frequency is typically defined as 12 months.

Load Rating Results	Increased inspection frequency?
Operating Rating Factor for any Legal Vehicle < 1.0	**Required**
Inventory Rating Factor for all Legal Vehicles ≥ 1.0	**Not Required**
Inventory Rating Factor for any Legal Vehicle < 1.0	*Determined below*
↳ Bridge Weight Posted consistent with Inventory Ratings	**Not Required ***
↳ Controlling element in satisfactory condition ('6') or better	**Not Required**
↳ Controlling element in poor condition ('4') or less	**Required**
↳ Controlling element in fair condition ('5')	*Determined below*
• ADT < 15,000	**Not Required ***
• ADT ≥ 15,000	**Required ****
• Fracture Critical	**Required**

* If the controlling element is in fair condition ('5') or less and the Inventory Rating is due to section losses, then increased inspection frequency is recommended.

** For bridges in this category, the engineer may use engineering judgment to waive the increased inspection frequency requirement. Reasons for this decision must be documented in SAM (Cover 2) and approved by the Structures Inspection Division Chief or LA Program Manager. Examples of potential reasons may include any combination of the following:

- The degree to which the rating extends into the operating stress range
- The level of load path redundancy
- Inspection access difficulties and/or significant impact to traffic
- ADT/ADTT

The increased inspection frequency can be applied to the entire bridge, or only to the structural members of concern based on the load rating. Typically, a shorter structure consisting of one or two spans would be placed on an increased inspection cycle for the entire structure. For larger or more complicated structures, the increased inspection may only apply to the specific members which rate within operating. This determination must be approved by the Structures Inspection Division Chief.

Condition Rating: If Item 58 (Deck), Item 59 (Superstructure), Item 60 (Substructure), or Item 62 (Culvert) is rated a 3 or less, the inspection frequency shall not be more than 12 months. This requirement also applies to underwater inspections. The Division Chief, SIRE – Structures Remedial Design or the LA Program Manager may place either a portion or the entire structure on an increased inspection frequency.

Engineering Judgment: As a result of specific defects, overall condition, scour changes, monitoring of specific elements, etc., the Division Chief, SIRE- Structures Remedial Design or the LA Program Manager may place either a portion or the entire structure on an increased inspection frequency. This can include changing the frequency for underwater, fracture critical, non-destructive evaluation, or any other types of inspections. The following are several examples that may warrant an increased frequency:

- New fatigue cracks with an unknown history of possible progression
- Severe deterioration of concrete or steel that warrants more frequent inspection until repairs are performed
- Timber piles with deterioration that warrants more frequent underwater inspections
- Changes in stream profile, scour or flood concerns

For MDOT SHA owned bridges, upon receiving approval from the Division Chief, SIRE – Structures Remedial Design, the engineer will place a note in the respective bridge inspection folder, notify the inspection team of the areas and reason for more frequent inspection and provide the information to the

Information Systems Manager. For LA bridges, the Program Manager shall place a note in the inspection file with the same information.

If the entire structure is on an increased inspection frequency, then SIA Item 91 and any appropriate category of SIA Item 92 shall indicate the increased frequency. Reporting procedures shall be the same as those used for a normal inspection for the particular structure type. If only a portion of a structure (bearings, beams, etc.) is to be inspected on an increased inspection frequency, then only the appropriate category of SIA Item 92 shall be changed and a Monitor Inspection report, GPM- SI-12-09 (4), shall be prepared when a full inspection is not required.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-06(4) Date: 01-07-2019
	Routine Inspection	Approval:

A routine inspection is a regularly scheduled inspection with intervals not to exceed 24 months consisting of observations and/or measurements needed to determine the condition of a bridge. This includes rating the bridge elements, checking the accuracy of the bridge inventory data and indentifying any changes all to ensure the bridge continues to satisfy present service requirements.

All routine inspections shall be performed with the following requirements:

- Using either HOI or MHOI in accordance with Hands-On Inspection (HOI) and Modified Hands-On Inspection (MHOI), GPM SI-04-02(4).
- Performed in accordance with the MBE
- Coded in accordance with the SIA Guide
- Element level inspection shall be performed and coded in accordance with MDOT SHA's Element Level Inspection Guide except for MDTA which requires coding in accordance with their guide.
- All data must be inputted into the SAM program. MDTA is only required to code the SIA portion and not the element level data.
- All inspections of all types must be performed in the month they are due based on their designated frequency. For any delinquencies, the nature and circumstances of the delay must be documented in the Structure Asset Management System, under Inspection Report Information, field entitled "Reason for Delinquency".

All routine inspections shall be performed by qualified Lead Inspectors and Bridge Inspectors. A Lead Inspector must be present during the full inspection.

All defects shall be clearly identified and considered for additional reporting requirements as identified in Defects, GPM SI-12-18 (4) and Critical Findings, GPM SI-12-17 (4).

For bridges which are undergoing rehabilitation or replacement, the routine inspections shall still be performed as long as any part of the existing bridge is carrying traffic. Coordination with the District Construction office shall be carried out as necessary for any special access requirements.

For SHA or LA owned structures inspected by their own Bridge Inspectors, the final report shall list the names of all Bridge Inspectors that participated, signed off as complete by the Lead Inspector and submitted to the Senior Project Team Leader, SIRE or the LA Program Manager

For SHA or LA owned structures inspected by consultant firms, the final report shall list the names of all Bridge Inspectors that participated, signed off as complete by the Lead Inspector, signed and sealed by a registered Professional Engineer in the State of Maryland, and submitted to the Division Chief, SIRE – Structures Inspection or the LA Program Manager.

For LA owned structures, in addition to the requirements of reporting condition and defects of all elements, recommendations for repair, maintenance or monitoring shall be included in the report. These recommendations shall include cost estimates and be categorized with the following priorities: Immediate, Priority, Routine and Monitor.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-07(4) Date: 01-07-2019
	Fracture Critical Member (FCM) Inspection	Approval:

A Fracture Critical Member (FCM) is a steel member in tension, or with a tension element, whose failure would probably cause a portion of or the entire bridge to collapse. The primary causes of FCM failure involve fatigue related issues due to live loading, temperature changes and wind loading. In addition, material and construction defects, damage due to transportation and erection, in-service flaws and general overall deterioration due to corrosion may also seriously affect a fracture critical member. Therefore, FCM inspections should focus on tension zones and fatigue sensitive details most susceptible to cracking.

FCM's are trusses, two and three girder systems, pin and hanger assemblies, and floorbeams that are spaced fourteen (14) feet or more. Bridges with FCMs are identified by the appropriate category of SIA Item 92. For MDOT SHA owned bridges with FCMs, the inspection reports are maintained in blue folders.

All FCM's shall have regularly scheduled inspections with intervals not to exceed 24 months unless deemed to require a more frequent inspection as specified in Increased Inspection Frequency, GPM. SI-12-05(4). A hands-on inspection (HOI) of all FCMs is required by the NBIS and shall be performed in accordance with Hands-On Inspection, GPM SI-04-02(4). If these areas cannot be reached through the use of the available access equipment, the Lead Inspector must bring this to the attention of the Senior Project Team Leader, SIRE or the LA Program Manager so that efforts can be made to provide rigging or free climbing by trained personnel. A modified hands-on inspection (MHOI) may not be used for FCMs. However, a MHOI is acceptable for other non-FCMs on the bridge as approved per the requirements of GPM SI-04-02(4).

For fracture critical members over railroads, advance preparation is required to ensure there is adequate time to complete the necessary coordination and permitting with Amtrak, Norfolk Southern, CSX, etc. These preparations shall be made as early as necessary to ensure the designated FCM inspection frequency is met.

The locations of all fracture critical members shall be clearly shown and identified on sketches within the inspection file. It is the responsibility of the Lead Inspector to understand the FCM details and arrange for the necessary access equipment prior to the inspection. Reference to previous inspection reports will aid the inspection team in determining the condition of the FCMs.

In addition to the requirements in Routine Inspection, GPM SI-12-06(4), the inspection team shall use the FHWA's Fracture Critical Inspection Techniques for Steel Bridges manual when inspecting fracture critical members.

All cracks found on a FCM shall be immediately phoned in to the respective MDOT SHA engineer or LA Program Manager, followed by the procedures specified for documenting an Engineer's Request in Defects, GPM SI-12-18 (4). If the defect has previously been identified, the inspector will follow the procedure determined by the MDOT SHA engineer or LA Program Manager found within the inspection file. If there is any confusion as to the direction needed to be taken by the inspection team, the defect must be immediately phoned in to the MDOT SHA engineer or LA Program Manager.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-08(4) Date: 01-07-2019
Complex Bridge Inspection Program		Approval:

Definition: A Complex Bridge Inspection is an inspection of Movable, Suspension, Cable Stayed and other bridges with unusual characteristics. In Maryland, these include all Movable and Suspension Bridges. Inspections of these bridges require specialized training and/or experience and generally include specific inspection procedures.

The inspection of Suspension Bridges owned by MDTA shall be performed in accordance with all MDTA requirements and procedures.

Frequency: All Complex Bridges shall have regularly scheduled inspections with intervals not to exceed 24 months unless deemed to require a more frequent inspection as specified in Increased Inspection Frequency, GPM-SI-12-05(4). Both SIA Item 91 and the appropriate category of Item 92 shall be coded.

Qualifications of Inspection Personnel:
The Inspection Team Leader who will oversee and coordinate the Complex Bridge Inspection shall meet FHWA's qualifications for an individual in charge of a bridge inspection team as outlined in 23 CFR Part 650, Subpart C, NBIS, Section 650.309(b). The Inspection Team Leader shall also be a Professional Engineer registered in the State of Maryland and possess a minimum of five (5) years acceptable experience in this type of inspection. Inspection Team Leaders are subject to approval by the Division Chief, SIRE – Structures Inspection or the Local Area Program Manager.

The Complex Bridge Inspection Team responsible for inspecting the movable span's machinery systems shall include two (2) individuals who are Professional Engineers registered in the State of Maryland with experience in performing condition inspections, evaluations and designs of repairs / rehabilitations to the machinery systems with one (1) who has expertise in mechanical engineering and one (1) who has expertise in electrical engineering. These individuals are subject to approval by the Division Chief, SIRE – Structures Inspection or the Local Area Program Manager.

Inspection Requirements: In addition to the requirements specified in Routine Inspection, GPM-SI-12-06(4), all movable bridges shall have the machinery systems hands-on inspected and properly documented:

<u>Mechanical Inspection</u>
An inspection of the following typical components shall be performed to include a visual inspection, sampling, operational testing and the use of hand tools such as feeler gages, gear tooth calipers, dial calipers, etc., to record measurements including clearances:

- Trunnion Bearings, Pinion Bearings
- Racks and Pinions, Open Gearing
- Speed Reducers, Differential Reducers
- Live Load Bearings
- Span Lock Assemblies
- Machinery Supports
- Housings, Shafts, Couplings, Seals

Electrical Inspection

An inspection of the following typical components shall be performed to include a visual inspection, operational testing and the use of instrumentation such as data logging multimeters, megohmeters, current clamps, etc., to record voltage, current and insulation resistance.

- Drive Motors, Lock Motors, Gate Motors
- Motor Brakes, Machinery Brakes, Emergency Brakes
- Control Consoles
- Motor Control Cabinets
- Panel Boards
- Traffic Warning, Control & Gate Assemblies
- Traffic, Navigation & Access Lighting Systems
- Incoming Service, Meters
- Limit Switches, Safety Interlocks
- Conduit, Wire, Cable, Boxes, Switches, Receptacles
- Submarine Cables

Report Requirements: In addition to the requirements of reporting condition and defects, all movable bridge inspection reports shall include any recommendations for repair or maintenance of the structural, mechanical, or electrical systems. These recommendations shall include cost estimates and be categorized by the following priorities: Immediate, Priority, Routine and Monitor. All specialized personnel shall be identified in the report, with the responsible Professional Engineer licensed in the State of Maryland for each specialty area (mechanical, electrical) providing his signature and seal on the report.

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	Monitor Inspection	Approval:

A Monitor Inspection (Special Inspection in the NBIS) is an inspection scheduled at the discretion of the Division Chief, SIRE- Structures Remedial Design or the LA Program Manager and used to monitor a particular known or suspected deficiency more frequently than the routine inspection. The specific elements requiring the special inspection shall be indicated in the file and the frequency shall be coded in the appropriate category of SIA Item 92.

Monitor inspections shall be performed on the required elements only and in accordance with Routine Inspection, GPM-SI-12-06(4). Some typical deficiencies that may require monitor inspection include the following:

- Steel/weld/fatigue cracks
- Specific Concrete deterioration
- Scour
- Rocker bearing tilt
- Fatigue cracks
- Steel deterioration
- Bearing gaps
- Roadway joints

The frequency of the Monitor Inspections shall consider the past history of the defects, changes to condition, severity, ADT, etc. and be determined by the Division Chief, SIRE- Structures Remedial Design or the LA Program Manager. No specific criteria can be established to set each frequency as there could be an unlimited number of circumstances.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-10(4) Date: 01-07-2019
	Damage Inspection	Approval:

A Damage Inspection is an unscheduled inspection to assess structural damage resulting from an accident or unforeseen event other than flooding (i.e. over height vehicle striking a bridge).

LA Damage Inspections

Upon notification of a bridge with potential damage, The LA Program Manager shall contact the consultant assigned to them to have a damage inspection performed by a qualified Lead Inspector. The Lead Inspector shall keep the LA Program Manager informed of status, defects, issues, etc. It shall be the responsibility of the LA Program Manager to take appropriate actions based upon the information. This may involve total or partial closure of the road, posting, etc. Unless the incident resulted in a Critical Finding, GPM- SI-12-17 (4), the LA Program Manager shall contact the SIRE, Division Chief – Structures Inspection the next business day with a status report.

SHA Damage Inspections

Initially the Statewide Operations Center (SOC) will contact SIRE per the call out list included in the Emergency Response Directory. This list identifies in order the Senior Project Team Leader-Inspection, Division Chief, SIRE-Structures Inspection, Deputy Director SIRE, Division Chief, SIRE-Structures Remedial Design, Division Chief, SIRE - Construction, Senior Project Team Leader-Construction. The contacted person will be responsible for the following steps:

1. Depending on the severity of issue, determine if a condition inspection team, an engineer, or both should respond to the incident.

2. Contact the Inspection Team Leader and/or Design Team Leader responsible for the structure. If either is not available, then another team or engineer must be contacted.

3. The Inspection Team Leader and his inspection team will travel to the site of the emergency. The engineers, if required, will also travel to the site.

4. Based on the Inspection Team's knowledge of the bridge or information obtained from the office, the contacted person may ask that access equipment be provided and dispatched to the site. It is not necessary to travel to the site before requesting support.

5. Immediately after arriving at the site, the Inspection Team shall determine who is the individual in-charge, representing SHA, and report to that individual.

6. As soon as the location is safe for conducting a complete inspection, the inspection will be performed.

7. Following the inspection, the Inspection Team shall phone the individual who initially contacted them to report the findings and recommendations concerning any follow-up action. At this time, it may be necessary to call for an engineer if one is not already present.

8. Subsequent to this communication, the Team Leader will provide his assessment and pending actions to the on-site individual in-charge.

9. An inspection report including only those items affected shall be prepared and forwarded to the office as an Engineer's Request. The date of the inspection shall be reported in the appropriate SIA Item 93.

10. Photos must be sent in with the inspection report clearly marked as accident damage photos. If available, the police accident report or officer responsible for the report shall also be reported.

11. During a damage inspection, if any condition has changed from the previous inspection, regardless of whether or not it resulted from the accident, it shall be documented in the report. The inspector shall clearly state whether the defect is related to the accident.

12. Complete documentation of the events and an accurate time record shall be written in the daily diary.

Reporting Work Hours for Emergency Call-Outs

Personnel who are called-out to perform emergency inspections during their non-routine work hours shall report their hours portal to portal (i.e. no subtraction of travel necessary). A minimum of 4 hours may be charged for each emergency call-out, regardless of the actual time worked.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-11(4) Date: 01-07-2019
Inquiry Inspections		Approval:

An Inquiry Inspection is an unscheduled inspection to assess a specific question or issue other than damage or flood inspection (i.e. public inquiry about aesthetics or condition).

A Lead Inspector is not required to perform an Inquiry Inspection unless it is apparent the condition of the structure has changed since the last inspection performed by a Lead Inspector.

An Inquiry Inspection report documenting only those items assessed shall be prepared. The date of the inspection shall be reported in the appropriate category of SIA Item 93.

Depending on the findings of an Inquiry Inspection, the SHA engineer or LA Program Manager may require another type of inspection be performed by a Lead Inspector.

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Audit Inspection		Approval:

An Audit Inspection is an unscheduled inspection performed by an independent inspection team to verify accuracy, consistency and quality of inspections. All Audit Inspections shall be performed in accordance with the requirements set forth in these Inspection PPMs for the type of structure and inspection.

An Audit Inspection report shall be prepared and forwarded to the Division Chief, SIRE – Structures Inspection or LA Program Manager for evaluation. The date of the inspection shall be reported in the appropriate category of SIA Item 93.

A follow-up report shall be developed by the Division Chief, SIRE – Structures Inspection or LA Program Manager highlighting any issues or discrepancies that may need to be resolved for future inspections to ensure the quality of the Bridge Inspection Program.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-13(4) Date: 01-07-2019
Flood Response Program and Inspection		Approval:

MDOT SHA Structures

When a Flood Warning is issued by the National Weather Service for a particular county or drainage system, the Flood Response Program shall be initiated for these locations. Flash Flood Warnings and Coastal Flood Warnings do not initiate the Flood Response Program unless otherwise directed by the Division Chief, SIRE – Structures Inspection.

The MDOT SHA Flood Response Program requires all bridges with the SIA Item 113 ratings of 3, 4, 6U, 5A, 5B and (in some cases) 7 to be checked for scour damage following each flood event. In addition, any specific bridge Scour Plans of Action (POA) within the affected county shall be implemented.

The primary goal of all flood inspections is to determine that increased flow rates have not affected the stability of the structure. This includes looking for signs of structural movement, roadway settlement, scour countermeasure displacement, undermining, increased foundation exposure or other related issues of concern.

Step 1: Flood Warning is issued. Inspection Teams are not to go out into the active storm. Once the majority of the storm system has passed, Inspection Team Leaders are to contact the District Shops to inquire whether there have been any reports of overtopped roadways or other bridge related issues.

Step 2: For any bridges which were reported to have been overtopped or have any other flood related issues, site visits shall be made as soon as possible after the storm event has passed.

Step 3: Approximately 12 to 24 hours after the storm event has effectively passed, flood inspections shall begin for all bridges on the respective Flood Response Crew Bridge Lists. These lists are organized by county, and consist of bridges with Item 113 coded 3, 4, 6U, 5A, 5B, and sometimes 7 based on a review of past scour history and countermeasure performance. Dive firms will be contacted regarding the inspection of bridges on the Flood Response Dive Bridge Lists.

Step 4: If the inspector cannot safely enter the stream to take soundings and probe the foundation elements, the inspection team must return to perform the in-stream flood inspection as soon as the waters suitably subside. If a diver will be required to perform the in-stream inspection, notify the Structures Inspection Senior Project Team Leader or Division Chief as soon as possible.

Report Process:

- The team that visits the bridge first is to open the report in SAM**, whether it's office staff or the field crews. The report must be opened within 24 hours of site visit.
- Each flood response sheet is to be uploaded into the open report by the team that performed that particular site visit (within 2 days of site visit).
- Once the final in-stream inspection is performed, the team that performed that inspection will scan their flood sheet and submit the report which will include the previously uploaded flood sheets (within 2 days of final site visit, 1 week for diver bridges).

** Except in the case of reports with an ER, it is not necessary to delete all existing elements when creating flood inspection reports. The verbiage and condition states for the existing elements are to remain unchanged, and any findings concerning the flood inspection are to be included in the flood response sheet. For flood inspections with findings which warrant an ER, all elements should be deleted except the element which is being ER'ed. Existing verbiage for this element should remain unchanged, and a new paragraph added which clearly indicates the date of the flood inspection along with the relevant findings.

<u>Local Agency Bridges</u>

Each Local Agency Program Manager shall have either a formal written Flood Response Program or adhere to MDOT SHA's Flood Response Program. Each agency's Flood Response Program shall be documented and kept on file with SIRE. It shall include the following at a minimum:

- The bridges to be included in any necessary flood response
- The conditions needed to initiate a flood response
- The specific scour Plans Of Actions for those bridges that require one
- The required documentation
- The process for required follow-up actions

Flood inspections for LA bridges shall be documented in SAM as indicated above for MDOT SHA bridges.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-14(4) Date: 01-07-2019
	Documentation for Changes to Scour Ratings	Approval:

MDOT SHA Structures

Each MDOT SHA structure shall have a written record of the past soundings and baseline soundings, along with the clearances, in the inspection crew's folders. Anytime during an inspection of a bridge, if there has been a change of more than 2 feet in the scour depth verses the baseline sounding for a bridge with an SIA Item 113 scour rating of 2, 3, 4, 5A, 5B, 8L or U, the scour condition is to be re-evaluated by an interdisciplinary team which will consist of a geotechnical engineer, a hydraulics engineer, and a structural engineer. The Remedial Design Team Leader (RDTL) assigned this bridge shall provide to the interdisciplinary team the prior Phase I & Phase II scour evaluation reports, the most recent soundings and crew's inspection report, and the existing As-Built plans that indicate the foundation type of each substructure unit.

Based on the information provided, the interdisciplinary team will make written recommendations that shall be signed by each member of the team and put into the bridge file. If a scour rating does change as a result of this review, all the information regarding the scour evaluation including the recommendations shall be put into the Plan of Action Scour Critical Database. Included in this database shall be the revised and previous scour ratings, the reasons for the rating change, the date of the rating change, and those who participated in the re-evaluation. This database is to be updated and maintained by the Division Chief, SIRE – Structures Remedial Design.

However, if the additional scour results in the undermining of a substructure footing for a bridge that is known to not be built on piles, a review by the interdisciplinary team will not be required. The SIA Item 113 scour rating shall be changed to 3 and a Plan of Action shall be written. The installation of scour countermeasures to address the scour condition at this bridge shall be given a "P" priority.

LA Bridges

Each LA structure shall have a written record of the past soundings and baseline soundings, along with the clearances, in the bridge file. Anytime during an inspection of a bridge, if there has been a change of more than 2 feet in the scour depth verses the baseline sounding for a bridge with a SIA Item 113 scour rating of 2, 3, 4, 5A, 5B, 8L or U, the scour condition is to be re-evaluated by an interdisciplinary team which will consist of a geotechnical engineer, a hydraulics engineer, and a structural engineer. The interdisciplinary team shall be provided, if available, prior Phase I & Phase II scour evaluation reports, the most recent soundings and inspection report, and the existing As-Built plans that indicate the foundation type of each substructure unit.

Based on the information provided, the interdisciplinary team shall make written recommendations that shall be signed by each team member and placed in the bridge file. The information used to make the decisions regarding the scour rating shall also be documented and placed in the bridge file.

However, if the additional scour found during an inspection results in the undermining of a substructure footing for a bridge that is known to not be built on piles, a review by the interdisciplinary team will not be required. The SIA Item 113 scour rating shall be changed to 3 and a Plan of Action shall be written. The installation of scour countermeasures to address the scour condition at this bridge shall be given the highest priority.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-15(4) Date: 01-07-2019
Non-Destructive Evaluations (NDE) Program		Approval:

Definition
Non-Destructive Evaluations (NDE) are generally used to supplement visual inspections and the more common inspection techniques to evaluate elements that have known or suspected deficiencies and to monitor the performance of elements under service conditions. A Non-Destructive Evaluation permits the inspection of the element without impairing its usefulness.

There are numerous NDE techniques. The appropriate technique to be employed is dependent upon a number of factors including the construction material, the quality of information or data required, inspection access and equipment costs. Some of the more commonly used techniques include hammer soundings, pachometer, dye penetrants, magnetic particle, ultrasonics, X-rays, radiography, ground penetrating radar, impact echo, acoustic emissions, taut cable vibration, strain gauges, instrumentation and load testing.

Qualifications
Non-Destructive Evaluation techniques require expertise in using the equipment and interpreting the results and conducted in accordance with the appropriate requirements of the American Society for Testing and Materials (ASTM) specifications. Therefore, most Non-Destructive Evaluation techniques are to be performed by specially trained and experienced personnel.

The personnel engaged to perform a Non-Destructive Evaluation must possess and can produce upon request documentation showing that they have completed training and obtained experience to a level appropriate for the type of technique being performed. The required qualifications should be reviewed with the Office of Materials Technology.

Frequency
Routine NDE is performed on those bridge elements described in the following different NDE programs at a minimum72 month interval and coded in the appropriate category of SIA Item 92. More frequent inspection or additional element NDE may be necessary as determined by the Division Chief, SIRE – Structures Remedial Design or the LA Program Manager.

NDE Programs
<u>Ultrasonic Testing Program of Steel Pin Assemblies</u>
A routine Ultrasonic Testing Program of Steel Pin Assemblies is established to determine cracks, remaining thickness (loss of section), internal defects and other discontinuities. Steel pin assemblies which could result in the failure of a primary load carrying member are included in the program.

The testing program includes all bridges that contain pin and hanger assemblies, fixed hinge pins, expansion link pins, tie-bar pins, tie-bar bearing pins, arch pins, truss connection pins, truss connection bearing pins, rhomboid connection pins, rhomboid connection bearing pins, Mabey panel connection pins, pier/girder pins and steel column/shoe bearing pins

<u>Ultrasonic Testing Program of Steel Anchor Rod/Bolt Assemblies</u>
A routine Ultrasonic Testing Program of Steel Anchor Rod Assemblies is established to determine cracks, remaining thickness (loss of section), internal defects and other discontinuities. Steel anchor rod/bolt

assemblies which could result in the failure of a bridge railing and impact the safety of the traveling public are included in the program.

The testing program includes all bridges that contain anchor rod/bolt assemblies which are used as the primary attachment of the barrier in lieu of reinforcing steel cast into the bridge deck and generally used for reconstructed barriers for existing bridge decks. The barriers may be precast or cast-in-place concrete along parapets or medians. There may be numerous anchor rod/bolt assemblies present at a bridge requiring testing which may necessitate a risk based sampling percentage to be developed with possible confirmation by random destructive evaluations.

Taut Cable Vibration Measurement Program of Post-Tensioning Bar Assemblies

A routine Taut Cable Vibration Measurement (TCVM) Program of Post-Tensioning Bar Assemblies is established to determine tension forces in the post-tensioning bars. The TCVM method is based on the relationship between tension force and vibration frequency of the bar. A rubber mallet is used to excite the high strength, large diameter post tensioning bar to vibrate between its anchorages. The method employs multiple accelerometers attached to the bars, specialized Wi-Fi data collection instrumentation, software and the fundamental mathematical correlation between vibration frequency and tension to be able to compute the in-situ tension forces. The testing program includes all bridges that contain post-tensioning bars that were retrofitted onto pier caps or onto the steel plate girders at the top of rhomboid trusses directly over the piers.

Documentation

The evaluation report shall be submitted within 60 days of the completion of the test and shall include as a minimum the following sections:

1. Title Page - This sheet shall identify the bridge, the type of Non-Destructive Evaluation performed, the date of testing and the responsible individuals/organizations. This sheet shall be signed by the technician/engineer who performed the field testing and interpreted the results. If the Non-Destructive Evaluation is performed by a consultant, then the report shall be signed/sealed by a Professional Engineer.

2. Description - Provide a brief description and location of the assemblies tested, referencing attached sketches and/or As-Builts for coordinates. Describe fully the testing equipment used (manufacturer, model, power requirements, operational settings, etc.). Note access equipment and maintenance of traffic requirements, testing sequence/scheme, site conditions and any special procedures utilized.

3. Observations and Test Results - Provide a narrative discussion of the observations and test results. Provide a comparison to prior inspection's report. Summarize significant observations and test results in a table.

4. Sketches - Provide sketches as necessary to identify test locations, detail condition accurately, develop repair plans or for future comparisons. All significant defects or discontinuities shall be clearly located and dimensioned.

5. Photographs – Provide representative pictures of typical testing equipment / assembly set-up.

6. Recommendations – Provide any recommended repairs, analyses, additional non-destructive or destructive evaluations, inspection frequency changes, special inspection procedures, monitoring schemes, etc.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-16(4) Date: 01-07-2019
Underwater Bridge Inspection Program		Approval:

Definition
An Underwater Bridge Inspection is an 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. An underwater inspection is required if any portion of a substructure is exposed to water deeper than 3 feet during periods of normal low water. The inspection generally consists of a diver using commercial Self-Contained Underwater Breathing Apparatus (SCUBA) equipment or Surface Supplied Air (SSA) equipment.

Frequency
Routine full inspections of the underwater portion of the bridge substructure and surrounding channel shall be performed at 48 month intervals. These inspections shall be coded in SI&A Item 92B. If a diver is used to supplement a routine inspection for a bridge not on the UWI list, Item 92B shall not be coded, and a remark indicating why the diver was requested shall be indicated in the Remarks area of the SIA.

Frequent full inspections of the underwater portion of the bridge substructure and surrounding channel may be performed at regular intervals less than 48 months as determined by the Engineer considering such factors as construction type, condition rating, foundation materials, scour, environment, known deficiencies, etc. The reason for the frequent full inspection shall be documented. These inspections shall be coded in SIA Item 92B and the reason for frequent full inspection indicated in the Remarks area of the SIA.

Frequent inspections of specific underwater structural elements or surrounding channel may be performed at regular intervals less than 48 months as determined by the Engineer. The frequent special inspections shall be documented. These inspections shall be coded in the appropriate category of SIA Item 92, with the reason for frequent specific inspections, the elements to be inspected and any special inspection procedures indicated in the Remarks area of the SIA.

Qualifications
1. The Inspection Team Leader who will oversee and coordinate the underwater inspection shall meet FHWA's qualifications for an individual in charge of a bridge inspection team as outlined in 23 CFR Part 650, Subpart C, NBIS, Section 650.309(b). The Inspection Team Leader shall also possess a minimum of five (5) years acceptable experience in this type of work. Inspection Team Leaders are subject to approval by the Division Chief, SIRE – Structures Inspection or the Local Area Program Manager.

2. The Diver(s) who will actually perform the underwater inspection shall meet FHWA's qualifications for bridge inspection diver as outlined in 23 CFR Part 650, Subpart C, NBIS, Section 650.309(d) and all applicable OSHA regulations. Each proposed Diver is subject to the approval of the Division Chief, SIRE – Structures Inspection or the Local Area Program Manager. The diver shall also meet the following requirements:

    a. The Diver must possess and can produce upon request documentation showing that they have completed training to a level appropriate for the type of dive being performed. This documentation may be in the form of a certificate from a commercial diving school, a certificate from an ACDE accredited school, documented evidence of training that meets the requirements

of ANSI/ACDE-01-1998, or a valid ADC commercial diver certification card for the appropriate training level.

b. The Diver must be a graduate Engineer (Civil – Structural) from an accredited university and possess at least five (5) years experience in underwater inspections with at least 500 hours of experience in underwater inspection of structures; five (5) years additional experience may be substituted for the required Engineering degree to total ten (10) years of experience in underwater inspections.

3. At least one (1) Professional Engineer registered in the State of Maryland (Inspection Team Leader or Diver may qualify) who is approved by the Division Chief, SIRE – Structures Inspection or the Local Area Program Manager, shall be present at the site during all phases of the inspection.

General Requirements

An underwater bridge inspection shall be a complete visual and tactile inspection of the stream or river bottom, underwater portions of the substructure and foundation elements as well as dolphins and fender systems between the splash zone and the mud line.

All materials between the splash zone and the mud line, including concrete, steel, and timber shall be investigated for any indications of corrosion, erosion, vermin attack, spalling, cracking, scouring, or other deterioration. Any changes in the waterway channel, banks, or bottom profile shall be investigated and documented. Pilings may be cast in place concrete, precast concrete, steel, or timber. Piers and abutments below water shall be examined for any deterioration and/or movement. Dolphins, fenders and bulkheads shall be examined for deterioration, marine attack and damage by vessels. The river bottom around piers and abutments shall be examined for scour holes and unintended exposure of piling.

Due to limited underwater visibility, the inherent access restrictions of the underwater environment, and the presence of marine growth, the required underwater diving inspection precision depends on the level of effort. FHWA defines three underwater diving inspection intensity levels as follows:

Level I - A general visual/tactile inspection using large sweeping motions of the hands where visibility is limited. It must be detailed enough to detect obvious major damage or deterioration. It should confirm the continuity of all underwater elements and detect undermining or exposure of normally buried elements. It may also include limited probing of the substructure and adjacent channel bottom.

Level II - A detailed visual/tactile inspection that requires marine growth to be removed from portions of the structure, i.e., a representative sampling of underwater elements. It is intended to detect and identify damaged and deteriorated areas that may be hidden by marine growth.

For piles, a one foot high band should be cleaned at designated locations, generally near the waterline, at the mud line, and midway between the waterline and the mud line:

- H-piles: clean flanges and web

- rectangular piles: clean at least three sides
- round piles: clean at least three-fourths of the perimeter
- large diameter piles (> 3 ft): clean one foot squares at four equally spaced locations around the perimeter

For solid faced elements such as pier shafts, footings, etc., one-foot squares should be cleaned at four randomly spaced locations, near the waterline, at the mud line, and midway between the waterline and the mud line.

Level III - A detailed inspection typically involving either a non-destructive and/or destructive evaluation conducted to detect hidden or interior damage to include ultrasonics, coring, boring, physical material sampling, etc.

The Division Chief, SIRE – Structures Inspection or the Local Area Program Manager shall maintain in the inspection records for each bridge, the location and description of all underwater elements, and any specific procedures for performing the underwater bridge inspection. As a minimum, all routine underwater bridge inspections in Maryland shall be a Level II intensity. Each inspection report shall indicate the level of inspection which was performed. In addition, the inspections shall conform to the Specific Requirements presented in this GPM.

There may be occasions when it is appropriate for a Level I or Level III intensity interim inspection be performed. It will be requested by either the Engineer, the Division Chief, SIRE – Structures Inspection or the Local Area Program Manager.

Particular attention shall be directed to the dimensions of all substructure units and their conformance to the As-Built plans. Any divergence from these plans shall be accurately reported. Any dimensions not documented on the plans or noted elsewhere shall be field measured and included in the inspection report.

Locations of all existing utilities and submarine cables that may be located on or adjacent to bridges shall be noted. These pipes, conductors, and/or conduits shall be carefully protected and maintained so that no interruption to power or any other utility source occurs due to the underwater bridge inspection team's operations.

For any structure over navigable water, the underwater bridge inspection team's firm shall be responsible for full compliance with all regulations of the United States Coast Guard (USCG) and the Army Corps of Engineers including providing the USCG with at least 30 days advance notification. All inspections shall be conducted so as not to interfere with the waterways. The underwater bridge inspection team shall perform its work so that the structure is capable of passing marine traffic at all times.

The underwater bridge inspection team shall inform the Division Chief, SIRE – Structures Inspection or the Local Area Program Manager if debris needs to be removed in order to perform the inspection. The inspection shall not commence until the debris is removed.

If at any time during the underwater bridge inspection a critical finding is encountered, then the Professional Engineer on site shall immediately notify the Division Chief, SIRE – Structures Inspection or the Local Area Program Manager and comply fully with the requirements of Critical Findings, GPM-SI-12-17 (4).

Specific Requirements

Concrete Piles

Inspect and document the condition of all concrete for:

1. Spalls (measure size – width, length, depth and indicate location).

2. Exposed reinforcing steel.

3. Soundness and visible appearance.

4. Cracks (measure size – length and location)
   a. If a crack is spalling on each edge, record actual crack size which is measured deeper than the spalled surface.
   b. Crack length should be measured from the splash zone to the end of crack underwater. If a crack does not start at the water line, locate the crack with reference to the water line.
   c. A bent number, pile number and face direction is required when recording location of cracks. The direction of numbering bents and piles is from north or west.

5. Scour - inspect for scour at base of piling and record depth.

6. When marine growth covers the piles, a minimum of 25% of the piles shall be thoroughly cleaned from the splash zone to the mud line. The number of areas cleaned will depend on the condition of the concrete. The areas will be determined in the field and identified in the inspection report. Power washing may be necessary. Care shall be taken to insure that no piles are damaged.

Steel H-Piles

1. Inspect and document the condition of the steel for:
   a. Coating
   b. Rust - observe the condition of pile before scraping:
      Light rust – loose rust formation is staining steel or beginning to show through the coating by pitting paint surface

      Moderate rust – a looser rust formation beginning to scale or flake (1/16” and less surface pitting). These areas are discernible with no appreciable loss in steel.

Severe rust – a heavy rust scale or heavy pitting of metal surface (1/8" and greater pits). For piles with severe rust, it is recommended to make a complete pass up and down the pile to determine the worst areas of deterioration. Scrape one or two areas to determine section loss. Section loss of steel should be recorded in this condition.

c. Section Loss - locate areas and record remaining thickness of flange and web. After locating the worst areas, scrape rust flakes off to bare metal and then measure section loss with calipers and a ruler. Record the remaining section and locate the areas so they may be monitored in future inspections.

2. When marine growth covers the piles, a minimum of 25% of the piles shall be thoroughly cleaned from the splash zone to the mud line. The number of areas cleaned will depend on the condition of steel. The areas will be determined in the field and identified in the inspection report. Power washing may be necessary. Care shall be taken to insure that no piles are damaged.

3. Inspect for scour at base of piling and record depth.

4. If steel pile is encased in concrete at water line, inspect closely for loss where pile enters the concrete jacket.

5. If angle cross bracing extends underwater, inspect connections.

6. Inspect for misalignment.

Timber Piles

All timber piles at abutments, piers and bents (including bents not in waterway) shall have their exposed areas of timber piles inspected in accordance with the requirements set forth below. The timber pile bents outside of the water that have been replaced with steel pile bents will not be inspected. The timber piles will be inspected from the mud line or ground line up to the underside of pile cap using small tools.

1. When vegetation or marine growth covers the piles, a minimum of 25% of the piles shall be thoroughly cleaned from the underside of the bent cap to the mud line or ground line. The number of areas cleaned will depend on the condition of the timber. The areas will be determined in the field and identified in the inspection report. Hand tool cleaning or power washing may be necessary. Care shall be taken to insure that no piles are damaged.

2. Minimum pile diameters and maximum ice pick penetration shall be measured and recorded at 2 ft. intervals on each pile from the underside of bent cap to the mud line or ground line. Prepare a table of actual and effective pile diameters to be used for load rating purposes.

3. Inspect all timber piles for infestation, marine borers, vermin, etc., such as shipworms, termites, beetles and caddis worms; check for evidence of fungus decay; check for damage from collisions and/or

overstressing of members; check for evidence of deterioration and excessive weathering such as splits, checks, cracks, shakes, and surface roughness; and check pile batters and locations with the As-Builts.

Use engineering judgment to determine the most representative pile at each support for coring. Any additional piles with evidence of interior deterioration due to fungus decay or damage from vermin shall also be cored. The piling shall be tested by use of an Increment Borer to determine depth of penetration and size of area of decay or damage. A sharp Increment Borer which extracts a core 0.2 inch (nominal) in diameter shall be used, taking care that the Increment Borer is perpendicular to the pile surface, and checks and knots are avoided. Cores extracted by an Increment Borer shall be examined and the findings recorded.

All cored holes shall be immediately plugged with treated, tight-fitting oak plugs. The oak plugs shall be treated with an approved wood preservative. Care shall be used in selecting the proper diameter plugs, and in driving to avoid breaking the plug or splitting the piles. All cored piles shall be identified on the inspection report.

4. All piles shall be sounded with a hammer, and probed with a heavy duty 6" (min.) blade ice pick which is in new condition.

5. The pile diameters, surface condition and texture, soundness, ice pick penetrations, core results, evidence of deterioration, damage and overstressing, pile batter, and any other important observations shall be recorded for use by the engineers.

6. For timber pile bents, Inspect all bolt holes at cross bracing. If there is evidence of deterioration, then the cross bracing may have to be removed to provide access to the hole. Cross bracing shall be reinstalled when inspection is complete.

<u>Pile Footings</u>

1. Inspect for scour at piling and record depth of scour.

2. Inspect and document the condition of the concrete for:
   a. Spalls (measure size – width x length x depth).
   b. Any exposed reinforcing steel.
   c. Soundness and visible appearance.
   d. Cracks (measure size – length and location).
   e. Record any voids or cracks where the pile enters the footing.

3. Inspection of footings which were originally constructed below the mud line will require measurements of each exposed pile from the bottom of footing to the mud line. Take photographs of bottom of footing showing exposed pile when possible.

4. Inspect piles for soundness and section loss and document findings. See pile inspection section.

5. Inspect for drift lodged between piling.

Spread Footings

1. Inspect for scour adjacent to spread footings and document findings. Provide measurements for scour areas in reports (width x length x depth).

2. Inspect for scour or soft material at and under spread footings by surveying along the perimeter of the footing and document findings. Use probing rod and rule during inspection. Inspect and document by the following procedures:
   a. Station footing from upstream end to downstream end at 2' increments.
   b. At these stations measure the following:
      water depth, height from bottom of footing to mud line, and depth of scour from edge of footing to point under footing where bearing is established
   c. Measure from top of footing to water line on upstream and downstream ends.
   d. Measure from top of footing to a known point on the substructure.
3. Inspect condition of concrete and document findings for:
   a. Spalls (measure size – width x length x depth and indicate location).
   b. Any exposed reinforcing steel.
   c. Soundness and visible appearance.
   d. Crack (measure size – length and location).

4. Inspect footings keyed into rock and document findings for:
   a. Separation at base of footing and rock foundation. This condition could indicate foundation or substructure movement.
   b. Voids between footing and rock foundations, which could have been formed by trapped clay, silt, loose rock or mud in concrete.

Scour

Inspect and document the river bottom beneath the bridge and around the piers, abutments and piles for the development of scour holes and unintended exposure of any portion of the substructure.

1. Measure the distance from mud line to the bottom of footing and the length of exposed piles.

2. Locate areas of scour and measure depth of scour.

3. Report condition of existing slope protection, or scour protection.

Soundings and Clearance

Soundings shall be taken on a ten (10) foot grid (10, 20, 30 ft. intervals) on each end of the structure up and down stream and along the face of abutments and piers. The measurements for soundings and cross sections shall be taken at previously established locations whenever possible. The vertical clearance shall be taken at the previously established location, usually the lowest point of the superstructure.

Scour shall be reported when there is a differential of 2 feet, either plus (aggradation) or minus (degradation) in the stream bed when compared to the base soundings or if any undermining of the substructure is present.

Dolphins and Fender Systems
Examine for same deterioration as substructure piles.

Piers and Abutments
Piers and abutments below the water and immediately above the water line shall be inspected for any indications of movement, corrosion, erosion, marine borer attack, spalling, cracking, scouring, or other deterioration. Any conditions of current flow, or change in river bottom profile or any condition of the underwater portion of the structure not shown on the plans shall be investigated and documented.

Submarine Cables
Check for damage to the cables from vessels or floating objects, kinks in the cables, exposure of cables when they should be buried, and determine and plot the existing location of the cables.

Documentation
The inspection report shall be submitted within 60 days of the completion of the inspection and shall include as a minimum the following sections:

1. Title Page - This sheet shall identify the bridge, the date of inspection and the firm(s) responsible for the inspection. This sheet shall be signed by the Inspection Team Leader or Dive Team Leader, and signed/sealed by the Professional Engineer responsible for the inspection.

2. Description - Provide a brief description of the bridge's configuration and underwater substructure elements. Names of all underwater inspection team members including the Professional Engineer on site during the inspection shall be provided. Access, equipment, and inspection techniques including any special procedures shall be noted.

3. Findings and Evaluation - Provide a narrative discussion summarizing the inspection findings including evaluations of all underwater structural elements. Discuss condition of stream channel, channel protection, comparison to Base Soundings and scour. For all elements, provide a comparison to prior report's findings.

4. Sketches - Provide detailed elevation sketches of all underwater substructure elements showing appropriate references such as top of footing, waterline, mud line, etc. All defects shall be clearly located and dimensioned. These sketches are necessary for the development of repair plans or for future comparisons.

5. Soundings - Provide current soundings and a comparison of current soundings with the Base Soundings. The Base Soundings must be included in the report.

6. Timber Pile Tables - For all timber pile bents, prepare a table of actual and effective pile diameters by measuring at 2 ft intervals the diameters and corresponding pick penetrations, from mud line or ground line to underside of bent cap. The table shall indicate which piles were cleaned of marine growth (minimum 25% of piles) and which piles were cored with an increment borer (minimum one pile per bent, select the worst).

7. Photographs - Where necessary, include pictures pertinent to the report and appropriately referenced in the Findings and Evaluation discussion.

8. Element Data, Structure Inventory & Appraisal Data (SIA) - Provide updated Pontis elements and any proposed changes to SIA data.

9. Recommendations – Provide any recommended repairs, analyses, non-destructive or destructive evaluations, scour studies, inspection frequency changes, special inspection procedures, monitoring schemes, etc.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-17(4) Date: 01-07-2019
	Critical Findings	Approval:

A critical finding is any defect on a structure that results in a partial or total closure or a requirement of a three (3) ton weight posting of that structure.

When defects are found during the inspection of a structure that could become critical findings, they are to be immediately phoned in to the Remedial Design Team Leader (RDTL) responsible for that structure or the LA Program Manager.

SHA Structures

If the RDTL considers the findings to be critical defects, the Division Chief, SIRE – Structures Remedial Design shall be notified immediately and consulted for concurrence. If available, the Deputy Director, SIRE and Director of OOS shall also be consulted for concurrence.

Any actions required as a result of the critical findings shall be immediately acted upon. The FHWA Division Bridge Engineer shall be notified immediately if possible but no later than the next business day.

Written documentation will follow the procedure for recording and processing Defects, PPM-SI-12-18 (4).

An appropriate schedule for status reports to the FHWA Division Bridge Engineer shall be developed and continued until the critical finding is resolved.

LA Bridges

LA Program Managers shall report all critical findings immediately if possible, but no later than the next business day to the Division Chief- Inspection. The FHWA Division Bridge Engineer shall be notified immediately if possible but no later than the next business day by the Division Chief, SIRE – Structures Inspection.

An appropriate schedule for status reports to SIRE and FHWA shall be developed and continued until the critical finding is resolved.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-18(4) Date: 01-07-2019
	Defects	Approval:

All defects shall have a picture and be clearly identified in the verbiage of each element. If there are a number of similar defects, a representative picture may be used. Also, if the defect has not changed since the last inspection, a new photo is not needed. But, the verbiage must clearly state the defect has not changed since the last inspection.

MDOT SHA Bridges

In addition to including the defects in the report, certain types of defects require further reporting methods. The following types of reporting methods shall be performed for the respective types of defects within each category:

Engineer Request (ER): These types of defects are significant enough to warrant an engineer's evaluation to determine if any future repair, maintenance, load rating, etc. should be performed. Any inspection that uncovers at least one element with defects that warrant an ER, shall be submitted to the Senior Project Team Leader, SIRE within 10 days of the date of the inspection. In addition, certain types of defects require a phone call to the appropriate Remedial Design Team Leader (RDTL) the day of the inspection. The RDTL may have previously evaluated the condition, determined the appropriate action, and issued a note to not ER report the defect again. An ER report does not have to be submitted in this case unless the condition has changed. The following are some examples of typical defects that require an ER along with those noted that require a phone call by the inspector to the RDTL.

- Loss of bearing area of 10% or more.
- Loss of bearing area of 25% or more shall be reported to the District to install temporary blocking (requires a phone call to the RDTL)
- Cracks in weld or steel members (requires a phone call to the RDTL)
- Concrete deterioration whenever reinforcing steel is exposed to a significant extent, potentially affecting the structural integrity of the member
- Severe corrosion or section loss in steel members
- Traffic damage in steel members with deformations or gouges of 1/8" depth or more
- Any elements with quantities in Condition State 3 or less.
- Significant undermining of foundation elements or significant change in scour condition (requires phone call to the RDTL when first discovered)
- Countermeasures intended to remediate undermining have failed or become ineffective due to washing away, becoming significantly undermined, or shifted to an extent which compromises their effectiveness. (Requires phone call to the RDTL)
- Any other issues the inspector believes should be evaluated by an engineer

For Your Information (FYI): These types of reports are not for defects but are for informational purposes. The Lead Inspector should send in an FYI report whenever there is an issue that the RDTL should be aware of but is does not an evaluation. These reports may be included with the submission of the inspection report. The following are some examples of this type of report:

- New bridge has been completed
- Minor or major rehabilitation/repair work has been completed(photos)
- Scour protection installed
- Bridge clearance changes
- Changes to non-condition based SIA items
- HOI is not possible
- Debris in channel

District Maintenance: These types of reports are to notify the District maintenance forces of work to be performed. This work is not repair or rehabilitation but more maintenance in nature. The following are examples of this type of work:

- Debris removal
- Tree removal and trimming
- Silt removal from culverts
- Bridge approach issues such as pavement, traffic barrier treatment, etc.
- Deck patching requirements
- Deck planking installation

LA Bridges

In addition to the requirements of reporting all defects, recommendations for repair, maintenance or monitoring shall be included in the report. These recommendations shall include cost estimates and be categorized into the following priorities: Immediate, Priority, Routine and Monitor.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-19(4) Date: 01-07-2019
Information Retention		Approval:

MDOT SHA Structures

All of the following information shall be stored in the Structure Asset Management (SAM) program:

- Inspection
  - Condition ratings for each applicable element
  - Brief description of general and element conditions supporting the ratings
  - All spans, beams, etc. shall be numbered from North or West (i.e. North span is Span 1)
  - Sketches, if necessary, to indicate typical or deteriorated condition, or to document any monitoring data
  - Inventory data in accordance with the Structure Inventory and Appraisal (SIA) manual
  - Photographs showing top, side and under view of the bridge, posting weight restrictions, subpar underclearance limits, major defects that require an Engineer Request and any other important features of the structure
- Waterway Information
  - Channel sketches, soundings, scour data, etc. as necessary to allow for assessment of waterway stability and any potential risk to the structure
- Significant Correspondence
  - Any correspondence regarding ownership, inspection and maintenance responsibilities, and any additional information affecting the timeliness and thoroughness of inspections
- Special Inspection Procedures
  - Identification of any bridge features which will require special inspection procedures (notably fracture critical members and underwater elements)
  - For these elements, identify their specific location, inspection methods, inspection frequency, special access needs and any applicable special personnel qualifications.
- Load Rating & Load Testing
  - Detailed load rating calculations and interpretation of results
  - Any updates to the rating calculations as a result of changes in bridge condition or live load exposure that could affect the rating results
  - Detailed reports from any load tests conducted on the bridge
- Weight Posting Documentation
  - Posting recommendations with supporting calculations
  - Date of posting and photos or description of signing
- Underclearance
  - Specify location and lowest underclearance

- Critical Findings and Recommendations
  - Narratives, descriptions and photos of all critical findings
  - All maintenance and repair recommendations to address critical findings

- Scour Assessments and Plans of Action
  - Documentation of scour vulnerability assessment
  - Scour Plans of Action for all scour critical bridges

All of the following information shall be stored in OOS Worklist Database:

- Documented history and current status of all completed and active repair projects
- Start and completion dates, and costs for each project

Local Agency (LA) Bridges

For Local Agency bridges, all the above information shall be included in the SAM program with the exception of the following:

- Documented history and current status of all completed and active repair projects
- Start and completion dates, and costs for each project

However, this repair history shall be readily available either electronically or in a file.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-20(4) Date: 01-07-2019
Quality Control / Quality Assurance		Approval:

This document presents the Quality Control and Quality Assurance (QC/QA) procedures & policies related to the National Bridge Inspection Standards. This document is applicable to MDOT SHA, Local Agencies and consultant bridge inspection staff. MDOT SHA has oversight responsibility for the bridge inspection program for the entire state of Maryland except for federally owned bridges.

Quality Control (QC) Procedures:

The required qualifications and training of personnel involved in bridge inspection are documented in Qualifications of Personnel, GPM-SI-12-03 (4).

These qualifications and training will be tracked as follows:

- All documentation relative to licenses, training certifications, etc. is kept on file by MDOT SHA for all inspection personnel including local agencies and consultants as applicable for all types of inspections.
- The requirements of the Bridge Inspection Refresher Training will be monitored using dates programmed into the SAM program as appropriate. Inspectors will be locked out of SAM 3 months in advance of a training being due.
- MDOT SHA will at least once per year verify all required qualifications and training of all inspection personnel.
- Inspection personnel not meeting the training or experience requirements will be suspended or disqualified from team leader or underwater inspection duties until qualifications are met. This process is applicable for in house or consultant inspection personnel participating in the inspection of a bridge in the state of Maryland. There are two ways that a Bridge Inspection Team Leader or underwater diver inspector can be disqualified: delinquency of training certification or inadequate experience.
    - Training certification:
        - In the event that an inspection team leader is disqualified as a result of unsuccessful completion of the three day refresher course, they will lose their team leader status until they take and successfully pass the refresher training course.
        - If an inspector is disqualified as a result of not taking the course within the five year time frame, then they will lose their team leader status until they take and successfully pass the refresher training course.
        - A consultant team leader that is disqualified due to training requirements will be replaced with another qualified consultant team leader approved by MDOT SHA until the disqualified consultant team leader obtains requalification.

Inspection reports, data and load ratings will be reviewed and validated in accordance with the following procedures:

- Each bridge inspection report written shall be thoroughly reviewed and signed/ by the team leader and an additional inspector who was on site at the time of the inspection. Review should verify that all contents are included in the report as per GPM SI-12-19(4)
- The Senior Project Team Leader or the LA Program Manager will perform detailed reviews of at least 10% of all inspection reports completed. The reports chosen for review are to be randomly selected. For every report that the Senior Project Team Leader does not review, a note is added to the SAM workflow indicating as such. Every report without this note has been given a detailed review.
- Quality Control for load ratings shall follow the procedures detailed in Structural Load Ratings, GPM-D-97-47(4).

Data errors and omissions will be identified in accordance with the following procedures:

- The SAM program has a built-in routine which scans for database errors. The user is automatically notified of potential coding errors while making data additions or modifications. These errors are identified, documented and resolved within the log fields for each individual user.
- At least once per year, all inventory and appraisal data will be scanned for errors and omissions.

Quality Assurance (QA) Procedures:

QA field reviews shall be performed in accordance with the following procedures:

- Sampling Protocol:
    - For Local Agencies, the LA Program Manager shall visit at least 5% of their bridges (minimum of 2 bridges, whichever is greater) per year.
    - For MDOT SHA bridges, the Division Chief, SIRE – Structures Inspection, the Senior Project Team Leader, SIRE, and the Bridge Management Engineer shall visit a minimum of 5 bridges per year for each inspection crew.
    - The bridges selected for review will preferably be in “fair” or worse condition for superstructure and/or substructure. For example, a bridge with Items 59 and/or 60 all coded a ‘5’ would be an ideal candidate.
- During the field reviews the inspection reports and SIA data shall be reviewed in full, noting the accuracy, clarity and completeness of the PONTIS and SIA data relative to the existing bridge conditions. Condition ratings shall be verified and considered acceptable if within ±1 of the rating determined during the review. Field review results are communicated to the inspectors and/or engineers as necessary.
- If the bridge is posted, the posting shall be compared against the relevant SIA fields for consistency.
- The reports shall be checked to ensure the noted Team Leader and Inspector is qualified as indicated in the QC section of this GPM.
- Any comments, questions or errors found during the field reviews shall be communicated to the appropriate inspection personnel. Based upon the nature of the issue, the LA Program Manager or

the Division Chief, SIRE – Structures Inspection will determine the timeline for any required responses and any appropriate actions.

Staff Meetings:

In an effort to communicate with inspection personnel, bridge inspection staff meetings will be held at least every 6 months. The meetings will include the Senior Project Team Leader, Bridge Management Engineer, Division Chief -Structures Inspection, Information Systems Manager - Bridge and all in-house inspection staff. The meeting will be chaired by Senior Project Team Leader. The meetings may cover topics such as the interpretation of Pontis elements and SIA data, proper inspection techniques and procedures, standards of documentation, use of access equipment, safety concerns, and relevant administrative matters. A memorandum summarizing issues that were discussed during the meeting will be distributed to all inspection personnel within and engineers within SIRE. Communication with consultant inspection staff is typically accomplished through memorandums.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION	Office of Structures ***Guidelines and Procedures Memorandum***	INSPECTION Number: SI-12-21(4) Date: 01-07-2019
Posting of Highway Structures for Weight Restrictions		Approval:

For any highway bridge in Maryland, when the load rating analysis, as performed in accordance with Structural Load Ratings, D-97-47(4), indicates that the Operating Rating of any of the Maryland legal load vehicles is less than the vehicle weight, a weight restriction must be implemented accordingly. The Maryland legal load vehicles are the H-15, Type 3, Type 4 (Single Unit Vehicles), HS-20 and 3S2 (Combination Vehicles). In addition, if a bridge has been evaluated as being incapable of carrying any of today's legal vehicles, i.e., Operating Rating is less than or equal to three (3) tons, then it shall be closed.

The bridge owner has the option of posting at the Inventory level. Refer to Increased Inspection Frequency, GPM SI-12-05 (4) for any impacts to inspection frequency.

When considering the need to revise an existing posting:

- If the existing posting is based on an Inventory level rating, consider only revising the posting signs if the change is greater than 2 tons.
- If the existing posting is based on an Operating level rating, the posting shall be revised if the posting would be more restrictive. If the new posting would be less restrictive, then the posting need not be revised but is up to the owner and should be dependent on the impacts of the current posting.

The required posting signs must be installed within 60 days of the date on which the posting is determined to be necessary. Posting may be delayed if, within 60 days of the date on which the posting is determined to be necessary, remedial design and construction efforts will eliminate the need for the weight restriction.

The following procedures must be followed when placing a posting on an unrestricted structure or rescinding, raising or lowering an existing posting.

MDOT SHA Bridges

1. The Project Engineer (PE) prepares the **Bridge Posting Impacts Memorandum** from the Director, Office of Structures to the appropriate District Engineer. The District is requested to provide written responses to a series of questions concerning potential impacts to the community, school transportation, emergency services, etc. within 10 calendar days.

2. Upon receipt of District's responses, the PE shall discuss with the Director, Office of Structures, and prepare with the assistance of the Senior Program Manager – Structure Inventory the following documents : (templates are attached to this GPM):

   Posting Memorandum for State Bridges (Standard Memorandum for Bridge Posting Recommendation – Bridges on State Highway System)

State Structure Posting Summary which contains the information received from the District including detour route and length

3. The PE shall prepare a cover letter from the Director, Office of Structures to the Deputy Administrator/Chief Engineer for Planning, Engineering, Real Estate and Environment. The Posting Memorandum, the State Structure Posting Summary, and a copy of the previous Posting Memorandum, if existing, shall be attached.

4. Upon approval of the Posting Memorandum by the Deputy Administrator/Chief Engineer, the PE shall provide the BME with the original signed Posting Memorandum. The BME will make copies for distribution to the District and all concerned parties, and place the original Posting Memorandum in the State Bridge Posting Book.

5. After all posting and if applicable detour signs are erected, the Assistant District Engineer – Traffic should return a signed copy of the Posting Memorandum to the BME. This copy along with the original signed Posting Memorandum is kept on file in the State Bridge Posting book. A copy of the Posting Memorandum along with the supporting documentation is placed in the Structure Asset Management (SAM) program. Any prior Posting Memorandum is removed from the State Bridge Posting book and placed into the SAM program.

Local Agency Bridges

1. In accordance with the State of Maryland's Vehicle Law, the following local jurisdictions have the authority to post their bridges without MDOT SHA approval. A copy of the Posting Memorandum shall be sent to the BME to be kept on file in the LA Bridge Posting Book:

    - Allegany County
    - Anne Arundel County
    - Baltimore County
    - Carroll County
    - Frederick County
    - Harford County
    - Howard County
    - Montgomery County
    - Prince George's County
    - St. Mary's County
    - Washington County

    For all other local jurisdictions and State Agencies, the LA Program Manager shall prepare the appropriate Posting Memorandum (templates are attached to this GPM):

Posting Memorandum for County Bridges (Standard Memorandum for Bridge Posting Recommendation – Bridges on County Road System)

Posting Memorandum for Agency Bridges (Standard Memorandum for Bridge Posting Recommendation – Bridges owned by State Agency)

2. The LA Program Manager shall submit to the BME the completed Posting Memorandum along with a letter providing the reasons for the posting including any actions planned for repairs, rehabilitation or replacement of the structure.

3. The BME will prepare a cover letter from the Director, Office of Structures to the Deputy Administrator/Chief Engineer for Planning, Engineering, Real Estate and Environment. The Posting Memorandum, the LA Program Manager's letter and a copy of the previous Posting Memorandum, if existing, shall be attached.

4. Upon approval of the Posting Memorandum by the Deputy Administrator/Chief Engineer, the BME will make copies for distribution to the Local Agency and all concerned parties, and place the original Posting Memorandum in the LA Bridge Posting Book (located with BME).

5. After all posting and detour signs, if applicable, are erected, the LA Program Manager shall return a signed copy of the Posting Memorandum to the BME. This copy along with the original signed Posting Memorandum is kept on file in the LA Bridge Posting Book. A copy of the signed Posting Memorandum along with supporting documentation must be kept in the LA's Structure Asset Management (SAM) program.