APPENDIX O

Appendix/Attachment Title

Example Critical Findings and Repair Recommendations

Appendix/Attachment Revision and Year:

Version 2.0, 2024

Appendix/Attachment Introduction and Discussion

Critical Findings and Repair Recommendations shall be reported by inspectors according to Chapter 8.

Appendix/Attachment Description

Appendix O includes common examples both for Critical Findings and Repair Recommendations (Priority A, Priority B and Priority C) on bridges in South Carolina. The lists are not all-inclusive; final evaluation as to how to determine status of the deficiency is the responsibility of the BITL.

Appendix O also outlines the process to submit repair recommendations. This section will be updated based on upcoming changes to the following software applications:

- Highway Maintenance Management System (HMMS)
- AASHTOWare BrM (BrM)

Critical Finding Examples

Examples of a Critical Finding are listed below. Material specific Critical Findings are included on the following page. Given the severity of a discovered deficiency, all the items listed below warrant bridge closure, bridge restriction, or immediate maintenance work because of a safety related item. *FHWA has set 3 tons as the absolute minimum gross live load capacity (inventory rating) for a bridge and a bridge closure is required for load ratings that result in that capacity. If the inventory rating factor of any vehicle is 3 tons or less, the bridge needs the be closed*, or if there is any situation where the bridge is at risk of collapse or partial collapse (see list below). Any of the situations listed below may result in closure of a bridge. Detailed examples of what may be discovered in the field and what may warrant a Critical Finding are included below.

The list below provides an example of what shall be considered a Critical Finding:

- Bridges which are given a structural condition evaluation rating code of 3 or less; this includes:
  - NBI Item 58 [SNBI Item B.C.01] (Deck Condition Rating)
  - NBI Item 59 [SNBI Item B.C.02] (Superstructure Condition Rating)
  - NBI Item 60 [SNBI Item B.C.03] (Substructure Condition Rating)
  - NBI Item 62 [SNBI Item B.C.04] (Culvert Condition Rating)
  - SBI Item 633 [SNBI Item B.C.14] (NSTM Inspection Condition Rating)
- Bridges which are given any waterway rating of 3 or less; this includes:
  - NBI Item 61 [SNBI Item B.C.09] (Channel Condition Rating)
  - SBI Item 601 [SNBI Item B.C.10] (Channel Protection Condition Rating)
  - SBI Item 631 [SNBI Item B.C.10] (Scour Condition Rating)
- A partial or complete collapse of a bridge,
- Bridges with a recommended *operating* LFR (HS-20 truck) load rating of 6 tons or less (Rating Factor of 0.3 or less) *unless the bridge is already posted for 17 tons or less*,
- Missing or illegible at-bridge posting signs *including deviations in posting sign type on the Posting Form (R-12-6-48 and/or R-12-9-36 for state owned bridges),*
- Incorrect at-bridge posting signs if the posted weight is HIGHER than the value in the signed Posting Form (refer to Load Posting flowchart, Figure O.2),
- Immediate work needed to prevent substantial reduction in safe load capacity,
- Bridge railing is missing, damaged, deteriorated, or no longer can contain and/or redirect vehicles for bridges designed for loads higher than H-15 and bridges designed for H-10 or H-15 loads which are part of the NHS (Note: For some H-10/H-15 bridges off the NHS, a railing may not be required – see Appendix S),
- *Approach guardrail transition is missing on a bridge where it was previously in place or if the approach guardrail transition that is in place is damaged, deteriorated, or otherwise can no longer contain and/or redirect vehicles for bridges designed for loads higher than H-15 and bridges designed for H-10 or H-15 loads which are part of the NHS. See Appendix S, an approach guardrail may not be required for some H-10/H-15 bridges off the NHS.*
- Storage of flammable, explosive, or hazardous materials stored in the right-of-way adjacent to a bridge or under a bridge,
- Any quantity of a non-redundant bridge element (including NSTMs) placed in Condition State 4,
- Loose, deteriorated, or damaged expansion joints which may damage passing vehicles,

- Pedestrian railing is missing or detached, potentially allowing a pedestrian to fall off the structure,
- Sidewalk walking surface with damage or deterioration presenting a hazardous condition to pedestrians,
- Serious mechanical, electrical, or hydraulic problems which have stopped or may stop the operation of a movable span or safety equipment,
- Loose or spalling deck material (such as concrete or timber) in imminent danger of falling onto traffic or pedestrians which could cause extensive damage or injury,
- Hole in the deck (with immediate damage risk to traffic on the bridge or traffic below),
- Navigational lighting systems on the structure with failure (significant threat to structure given boat traffic), or
- Any situation that would pose the risk of partial or complete collapse of a bridge, and may pose imminent danger to public safety, including the following:
    - Severe loss of bearing;
    - Severe scouring of a foundation;
    - Critical damage or a defect to main structural members;
    - Significant scour damage, bank erosion, or slope erosion which endanger the stability of substructure elements;
    - Bridges which are damaged either by collision, natural event, fire, or chemicals;
    - Excessive drift causing excess pressure/scour on bridge substructure;
    - Bridges which are or may be prone to severe scour before, during, or after a scour or hydraulic event;
    - Drastic/excessive movement or vertical/horizontal displacement (e.g. sliding or deflection) in major structural component or to the structure as a whole, including unstable foundations.

Critical Finding Examples – Steel

- Significant damage, failure, unmitigated cracks, or significant section loss of an NSTM such as severe corrosion in girder flanges, webs, truss members, gusset plates, and connections or a fatigue-prone detail such as certain welds,
- Members with deteriorated areas that have failed in buckling, crippling, etc., or make failure likely in the near future,
- Rocker bearings that are excessively tilted or bearing on the outer 1/4 width of the rocker.
- Primary structural member with completely fractured tension element due to fatigue, or
- Bottom flange cover plates with cracked welds at the end of a partial length welded cover plate for a steel girder or steel floorbeam.

Critical Finding Examples – Concrete

- Prestressed girder with broken strands at high tension areas or 100 percent section loss at high tension area,
- Severely sheared or spalled concrete tee-beam ends where there is a risk of bridge or partial bridge collapse,

- Non-composite prestressed adjacent box beams with cracking and rust-staining, strand loss, loss of camber, or torsional cracking,
- Severe loss of girder bearing area, where remaining area may no longer have capacity to support the girder under legal load,
- Reinforced concrete girder with damaged or deteriorated primary rebar with 100 percent section loss, with more bars affected at the same location,
- Reinforced concrete bent cap with broken primary rebar or 100 percent section loss, with more bars affected at the same location, or
- Concrete column or cap with significant structural cracking that is supporting a span with a fracture critical member.

Critical Finding Examples - Timber Bridge Piles

- Critical Findings related to decay on a timber pile are included in Figures O.3 and O.4.
- If any defect may cause bridge collapse or partial collapse of a bridge, it shall be reported as a Critical Finding.

Critical Finding Examples – Timber (Non-Piles)

- Through-loss in deck planks or broken planks in danger of breaking through,
- Primary structural member with multiple open cracks (splits) in high stress region, or crushing/decay leading to superstructure settlement, or
- Bents which have a loss of bearing capacity or soil retention with crushing, decay, or insect damage which may lead to failure.

General Bridge – Repair Recommendation Examples

The following are examples of Priority Flags. Flag categorization is up to the discretion of the BITL and will be based on the severity and need for repair. See Table O1 for the summary of Critical Finding priority classification. Note that Priority A – "A Flags" must be corrected within 30 days so they are considered urgent. Some items on the Priority A – "A Flags" may be considered Critical Findings if there is an immediate safety concern. Some Critical Findings and repair recommendations may overlap, Critical Findings must be reported in accordance with Chapter 8; simply reporting via HMMS is not sufficient.

Table O1 – HMMS Work Activity Codes

Flag Type	Timeline for Work Completion
Priority A	30 Calendar Days (1 Month)
Priority B	90 Calendar Days (3 Months)
Priority C	365 Calendar Days (12 Months)

Repair Recommendation – Priority A – "A Flags"

- Incorrect at-bridge posting signs if the posted weight is LOWER than the value in the signed Posting Form,
- Missing, illegible, or incorrect vertical clearance signs when the field measured vertical clearance is 17'-0" or under (includes instances if the measured height is less than the sign or if measured height is greater than the sign),
- Missing or illegible approach posting signs *including deviations in posting sign type on the Posting Form (R-12-6-48 and/or R-12-9-36 for state owned bridges),*
- Missing or illegible narrow bridge or one lane bridge signs,
- Severe loss of bearing (generally greater than 50% of bearing area with no risk of bridge or partial bridge collapse),
- Scouring of a foundation (generally greater than 30% of bearing area with no risk of bridge or partial bridge collapse),
- Channel maintenance urgently required before significant scour may occur,
- Lighting fixtures, signs, traffic signals, or utility poles with damaged, split, or buckled sections, missing connections, cracked welds at connections, or base plate connections with loose nuts,
- Significant scour damage, bank erosion, or slope erosion which do not endanger the stability of substructure elements, or
- Hole in the deck (no immediate damage risk to traffic on the bridge or traffic below).

Repair Recommendation – Priority B – "B Flags"

- Incorrect vertical clearance signs when the field measured vertical clearance is greater than 17'-0" and the measured distance is less than the sign (repair recommendation is to take the sign down),
- Loss of bearing (Between 0% and 50% of bearing area with no risk of bridge or partial bridge collapse),

- Scouring of a foundation (generally less than 30% of bearing area with no risk of bridge or partial bridge collapse),
- Channel maintenance required before significant scour may occur,
- Large spalls with exposed rebar,
- Frozen or rusted bearings,
- Leaking or damaged expansion joints,
- Heavy dirt and debris around bridge bearings,
- Clogged deck drains,
- Extensive dirt and debris on bridge deck,
- Excess vegetation around bridge area limiting bridge inspection access,
- Heavy debris on caps, bridge seats, or bents,
- Drift causing excess substructure pressure/scour,
- Wearing surface failures which cannot wait for general maintenance, i.e. large pot holes,
- Settlement of approach slabs or approach roadway resulting in potential safety implications to driver,
- Mechanical, electrical, or hydraulic problems which will affect the operation of a movable span or safety equipment if allowed to continue to deteriorate,
- Regulatory or warning signs which are missing or worn, including end markers.

Repair Recommendation – Priority C – "C Flags"

- Missing, incorrect, incorrectly placed, or illegible Asset ID placards,
- Other missing or worn signs (which are not regulatory or warning) such as informational signs,
- Damage to handrail, guardrail, attenuators, or parapets,
- Slight substructure settlement,
- Exposed coarse aggregate and/or exposed rebar due to abrasion in concrete deck,
- Navigational lighting systems on the structure with failure (no threat to structure given boat traffic),
- Highway lighting systems on the structure with lighting outages,
- Primary masonry members out of alignment, or
- Primary masonry members with unsound patching.

Timber Bridge Piles

Below are potential repair recommendations for timber bridge piles. See also Figures O.3 and O.4.

Timber Pile Repair Recommendation – Priority A – "A Flags"

- Pile defects in CS 4 including severe splits, scour, checking/shaking, misalignment, settlement, damage, or cracking but there is no risk of bridge collapse or partial collapse of a bridge.

Timber Pile Repair Recommendation – Priority B – "B Flags"

- Pile defects in CS 3 including significant splits, scour, checking/shaking, misalignment,

settlement, damage, or cracking, or

- Replacement of timber pile cross-bracing.

Timber Pile Repair Recommendation – Priority C – "C Flags"

- Pile defects in CS 3 including slight splits, scour, checking/shaking, misalignment, settlement, damage, or cracking.

Timber Bridge Components (Non-Piles)

Below are potential repair recommendations for bridge components which are timber but are not piles.

Timber Repair Recommendation – Priority A – "A Flags"

- Bearing loss/undermining due to scour on timber mud-sill footing (>30% loss of footing bearing area),
- Deck boards with hole completely through, broken deck boards in traffic areas (no immediate damage to traffic below),
- Cracked or broken timber stringers,
- Extensively decayed and crushed caps, crown strips or sills, or
- Broken or severely decayed timber joists.

Timber Repair Recommendation – Priority B – "B Flags"

- Bearing loss/undermining due to scour on timber mud-sill footing (<30% loss of footing bearing area),
- Failed deck plank boards,
- Decayed or missing bulkhead boards with loss of fill,
- Excessive drift causing excess pressure/scour on bridge substructure (if there is no risk to bridge collapse or partial bridge collapse),
- Missing/broken/damaged/loose/badly decayed rail posts, rail boards, and blockouts, or
- Loose deck boards.

Timber Repair Recommendation – Priority C – "C Flags"

- Split/decayed nailers,
- Decayed or unusual/excessive splits in timber joists,
- Decayed or unusual/excessive splits in caps and sills, but still intact and not subject to extensive crushing,
- Decayed timber wingwall system, or
- Bearing loss/undermining due to scour on timber mud-sill footing (<30% loss of footing bearing area).

Concrete Bridge Components

Below are potential repair recommendations for bridge components which are concrete.

Concrete Repair Recommendation – Priority A – "A Flags"

- Deep and wide cracks (greater than ½" wide) in areas which compromise the structural integrity of the member but there is currently no risk of bridge or partial bridge collapse,

- Severely deteriorated concrete sections, especially spalled concrete caps at girder bearing area but there is currently no risk of bridge or partial bridge collapse,
- Severely sheared (cracked) or spalled concrete tee-beam ends which may be compromising the structural integrity of the beam where there is no risk of bridge or partial bridge collapse,
- Severely deteriorated concrete sections which may be compromising the structural integrity but there is currently no risk of bridge or partial bridge collapse, or
- Deck spalls below the top mat of reinforcing steel, which do not pose a hazard to traffic, or in danger of punching through.

Concrete Repair Recommendation – Priority B – "B Flags"

- Deep and wide cracks (up to ½" wide) in areas which may lead to a condition that could compromise the structural integrity of the member but there is currently no risk of bridge or partial bridge collapse,
- Severely deteriorated concrete sections, especially spalled concrete caps at girder bearing area which do not present an imminent safety concern,
- Severely sheared (cracked) or spalled concrete tee-beam ends which are not applicable to the condition listed under the Priority A – "A Flags" section,
- Spalled prestressed girder with exposed/deteriorating strands which may lead to a condition that could compromise the structural integrity of the member but there is currently no risk of bridge or partial bridge collapse,
- Spalled reinforced concrete girder with exposed/deteriorating main rebar with section loss and more than one bar affected at same location on girder, or
- Spalled/cracked columns with extensive spalls and areas of exposed rebar.

Concrete Repair Recommendation – Priority C – "C Flags"

- Deep and wide cracks (greater than ½" wide) in areas which are not applicable to the condition listed under the Priority B – "B Flags" section,
- Unsound patches with rust staining in prestressed concrete members,
- Previous unsatisfactory repairs (i.e. mortar or patches) of delaminated, spalled, or cracked concrete to prevent additional deterioration especially in the bearing areas,
- Slightly sheared tee-beam ends, or
- Bearing loss/undermining due to scour on concrete spread footing (<30% bearing area).

Steel Bridge Components

Below are potential repair recommendations for bridge components which are steel.

Steel Repair Recommendation – Priority A – "A Flags"

- Beams, girders, or piles with deteriorated areas which are likely to cause localized failure, or have localized failure in buckling, crippling, etc. (redundant structures only with no safety risk),
- Impact damage to steel members which are likely to cause failure, or have failed in buckling, crippling, etc. (redundant structures only with no safety risk),
- Active measurable section loss in the tension zone on NSTMs, or

- Primary structural members (beams/girders/steel piles) with active corrosion and over 75% section loss (redundant structures only with no safety risk; generally localized defects (i.e. beam ends)).

Steel Repair Recommendation – Priority B – "B Flags"

- Secondary members (diaphragms, bracing, etc.) with 25% section loss to a widespread amount of members,
- Bolted Field Splice: Missing bolts, active corrosion and with 25% section loss to a widespread amount of splices,
- Primary structural members (beams/girders/steel piles) with active corrosion and between 25% to 75% section loss (redundant structures only with no safety risk), or
- Active minor (non-measurable or negligent) section loss (redundant structures only with no safety risk).

Steel Repair Recommendation – Priority C – "C Flags"

- Cracks or deterioration in secondary steel members,
- Need for spot painting primary structural steel members,
- Primary structural members (beams/girders/steel piles) with active corrosion and under 25% section loss,
- Dormant measurable section loss in the tension zone on NSTMs,
- Unmitigated crack in a secondary steel member, or
- Cracked welds on steel grid deck.

Barrier Rail or Guardrail

Note: Below are potential repair recommendations for barrier rail or guardrail components which are located within 75 feet of a bridge.

Barrier Rail or Guardrail Repair Recommendation – Priority A – "A Flags"

- Bridge railing is missing, damaged, deteriorated or no longer can contain and/or redirect vehicles for bridges (not part of the NHS) designed for H-10 or H-15 loads and a barrier is or was in place,
- Serious damage to guardrail which may lead to issues with future public safety (no current risk), or
- Guardrail connections to bridge railing, concrete barrier rebar, or guardrail that is detached but there is no current risk to the traveling public.

Barrier Rail or Guardrail Repair Recommendation – Priority B – "B Flags"

- Impacted approach guardrail or end terminal/treatment.

Barrier Rail or Guardrail Repair Recommendation – Priority C – "C Flags"

- Minor damage to guardrail,
- Failed paint system,
- Decayed or damaged wheel guard not presenting danger to vehicles, or
- Loose or missing connection shoe.

End Marker Guidance

End markers, also known as delineators, bridge end markers, or pier markers (OM-3.5L-24 & OM-3.5R-24), are identified by the Manual on Uniform Traffic Control Devices (MUTCD) as Type 3 Object Markers. The signs are utilized to mark obstructions within or adjacent to the roadway. Typically, object markers (either bridge end markers or pier markers) have been used to delineate the blunt end of barrier wall, curb, wing wall, or similar obstruction adjacent to the roadway.

Missing or worn regulatory signs (including object makers) shall be considered Priority B – "B Flags".

Required Use of Object Markers

For instances where bridges have no guard railing, (or the railing does not include the characteristics noted below in the "Object Markers Not Required" section) the presence of curbs, walls, or other obstructions within the clear zone should be delineated with object markers.

In addition, for instances where bridges have narrow shoulders object markers should be placed in accordance with the MUTCD. Narrow shoulders are typically defined as a clear roadway on the bridge that is less than that of the approach roadway.

Object Markers Not Required

For instances where bridges have appropriate guard rail systems around the bridge, object markers are not required. The physical obstruction is not considered adjacent to the roadway, but it is considered to be set back from the roadway by the presence of the roadside restraint system (guardrail, barrier wall, etc.). When considering if the obstruction is physically protected, the inspector should consider/evaluate if the roadside restraint system incorporates features that would appropriately transition stiffness should it be impact by a vehicle. Common conditions would be as follows:

- "Type T" end treatments
- W-beam which transitions to thrie-beam
- Presence of bridge end connectors
- Reduced post spacing in close proximity to the bridge end

If any of the four conditions above are not present and required, consideration should be given to have an object marker installed.

Similarly, if bent columns or bents are set back from the roadway by the presence of the roadside restraint system, then pier markers are not required.

Examples

Longitudinal "Kink" in the Guardrail

Object Markers Required

Discussion: Although the approach guardrail does have transition stiffness, object markers are needed. The shoulders narrow significantly at the bridge approach and the longitudinal "kink" in the guardrail requires the use of object markers.

Example 1 – Longitudinal "Kink" in the Guardrail

Guardrail without Transitions

Object Markers Required

Discussion: Although bridge rail (in the form of guardrail) is present, it does not protect impact to the blunt end of the curb, thus object markers are required.

Example 2 – Guardrail without Transitions

Bridge Rail without Transitions

Object Markers Required

Discussion: Although bridge rail (in the form of a concrete barrier with steel railing) is present, it does not protect impact to the blunt end of the bridge rail, thus object markers are required.

Example 3 – Bridge Rail without Transitions

No Bridge Rail (Curb Only)

Object Markers Required

Discussion: No roadside barrier exists (only curb exists). To protect the blunt face of the curb, object markers are required.

Example 4 – No Bridge Rail (Curb Only)

Bridge End Markers Present (Not Required)

Object Markers Not Required (No Flags)

Discussion: While object markers are installed, they are not required. The approach guardrail protects all blunt ends of the barrier wall and includes details that transitions stiffness in the event of impact.

Example 5 – Bridge End Marks Present (Not Required) (No Flags)

Bridge End Markers Not Present (Not Required)

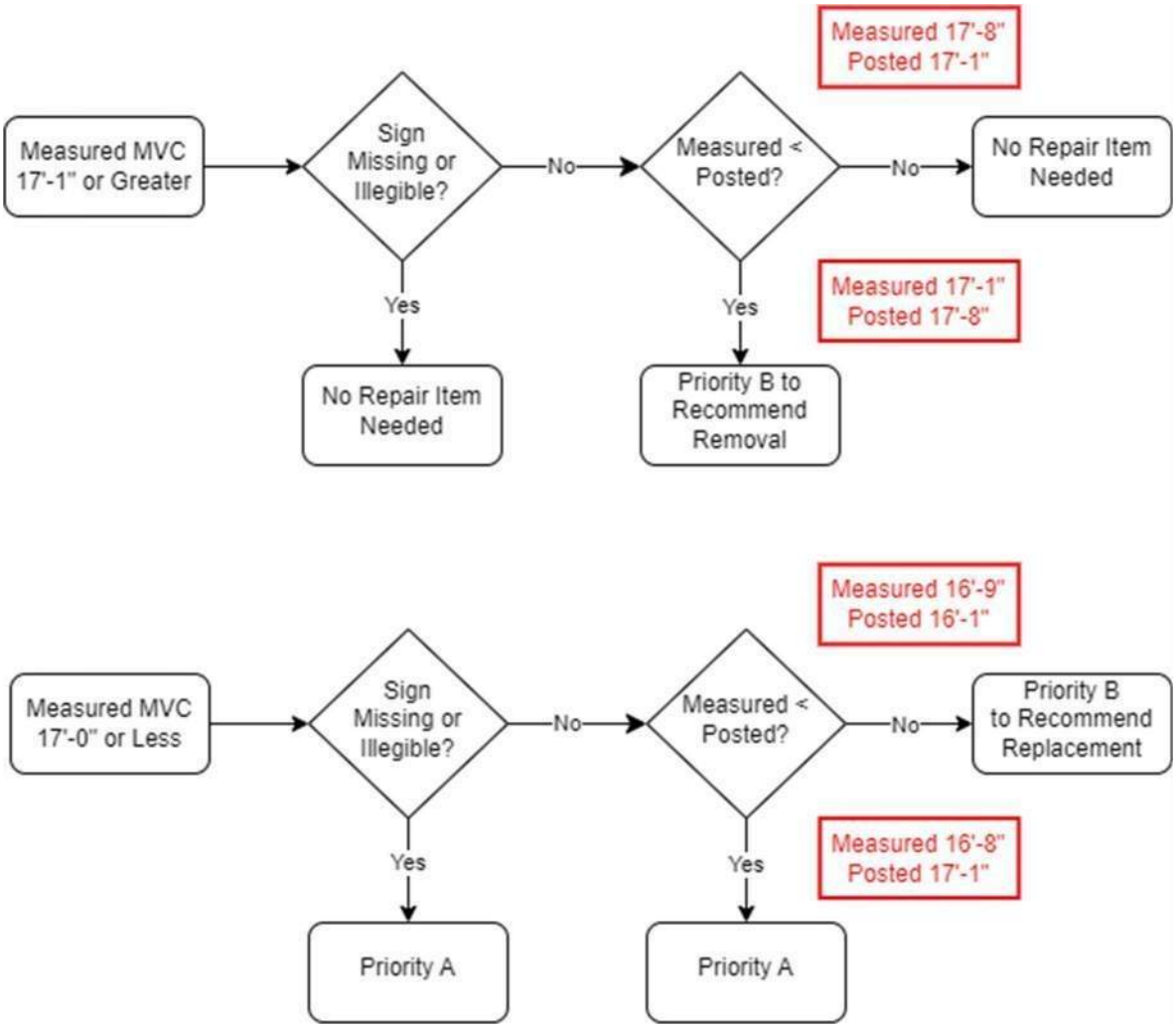
Object Markers Not Required (No Flags)

Discussion: Object markers are not installed and should not be recommended for installation by inspectors. The approach guardrail protects all blunt ends of the barrier wall and includes details that transitions stiffness in the event of impact.

Example 6 – Bridge End Marks Present (Not Required) (No Flags)

Vertical Clearance Sign Deficiency Reporting

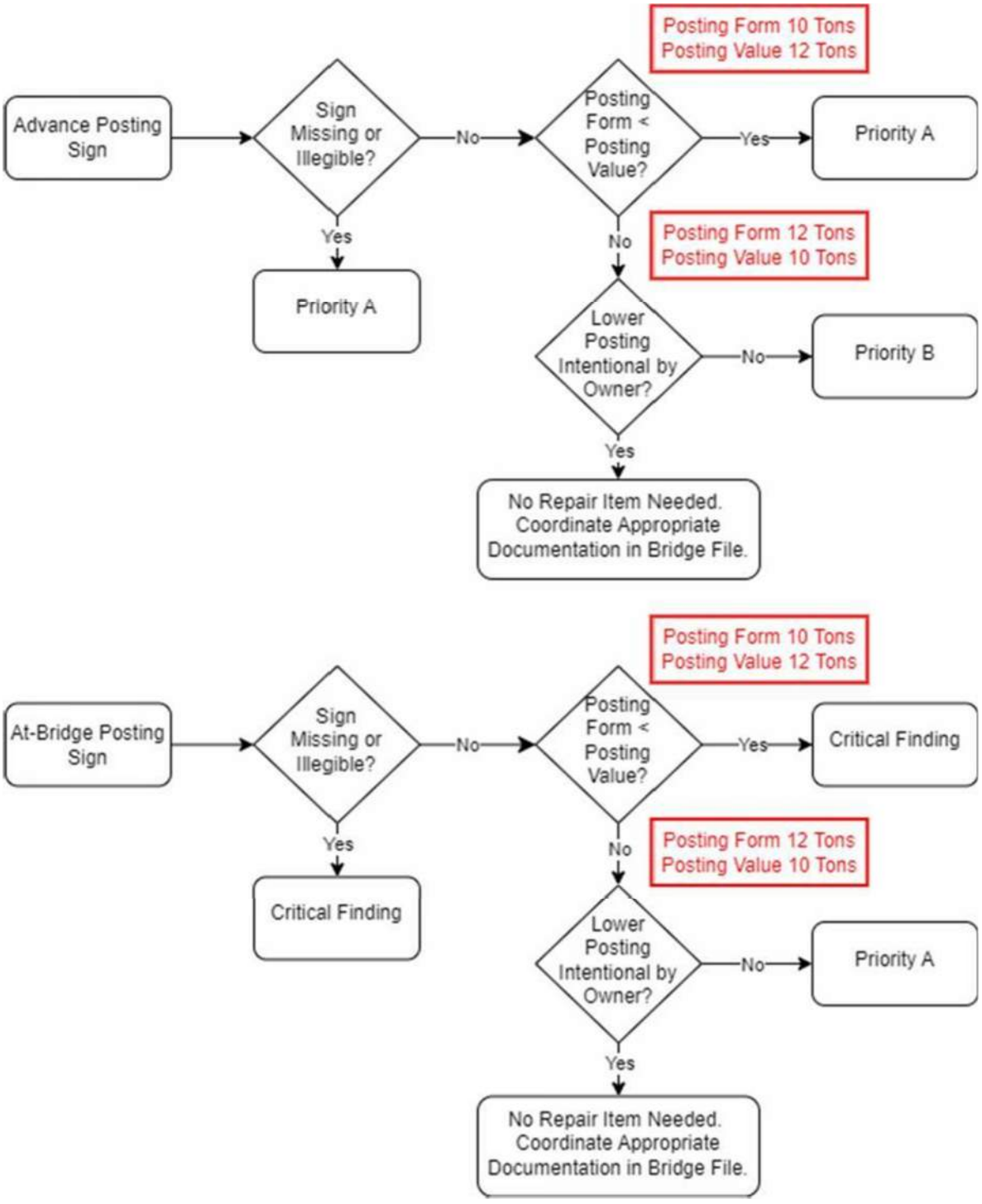
Figure O.1 - Vertical Clearance Signs



Note 1: Red text provided are examples of Minimum Vertical Clearance (MVC) values.

Load Posting Sign Deficiency Reporting

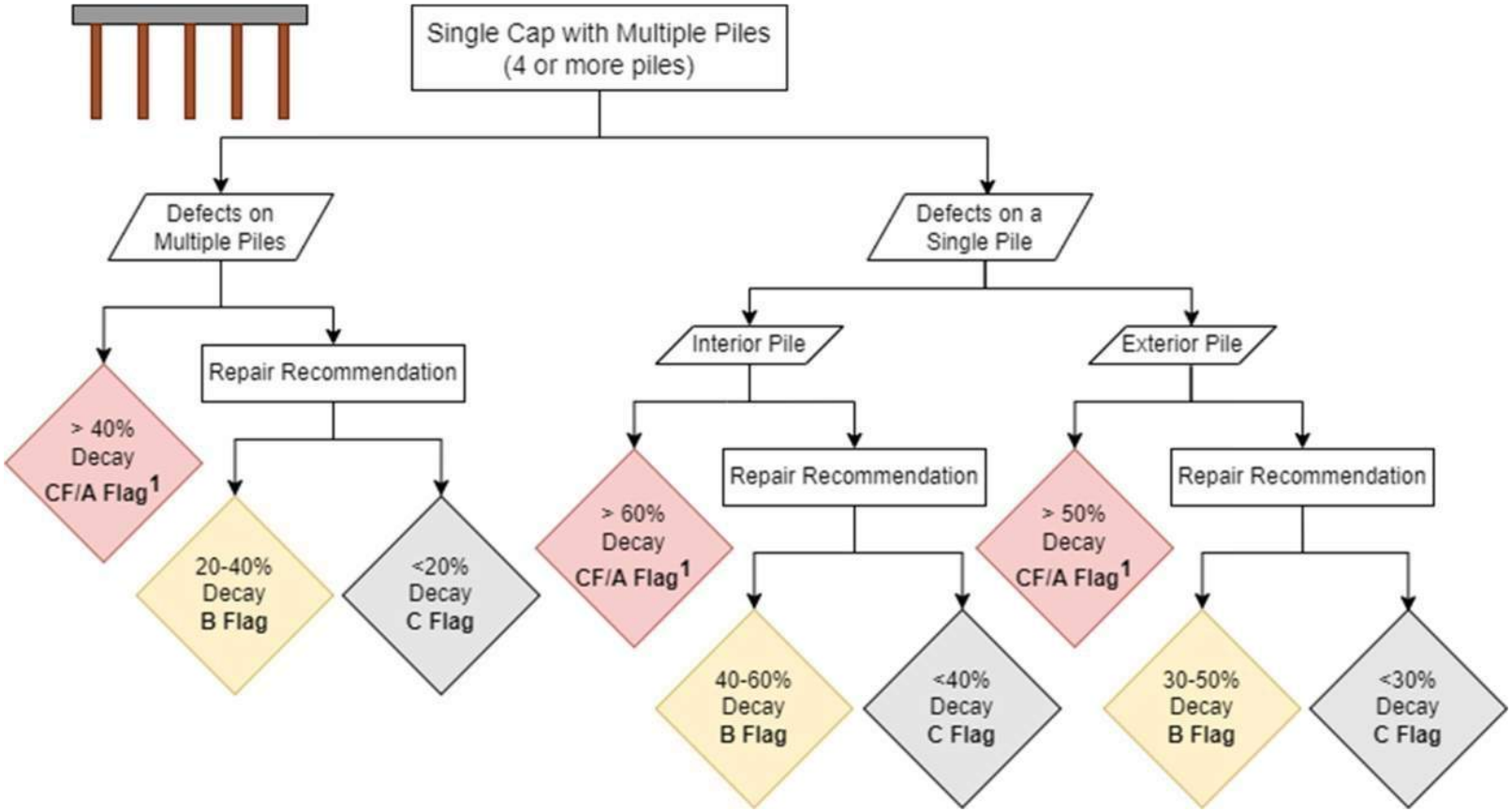
Figure O.2 - Load Posting Signs



Note 1: Red text provided are examples of Load Posting values.

Critical Findings for Timber Pile Decay

Figure O.3 – Repair Recommendations for Timber Piles on Multiple Pile Bent

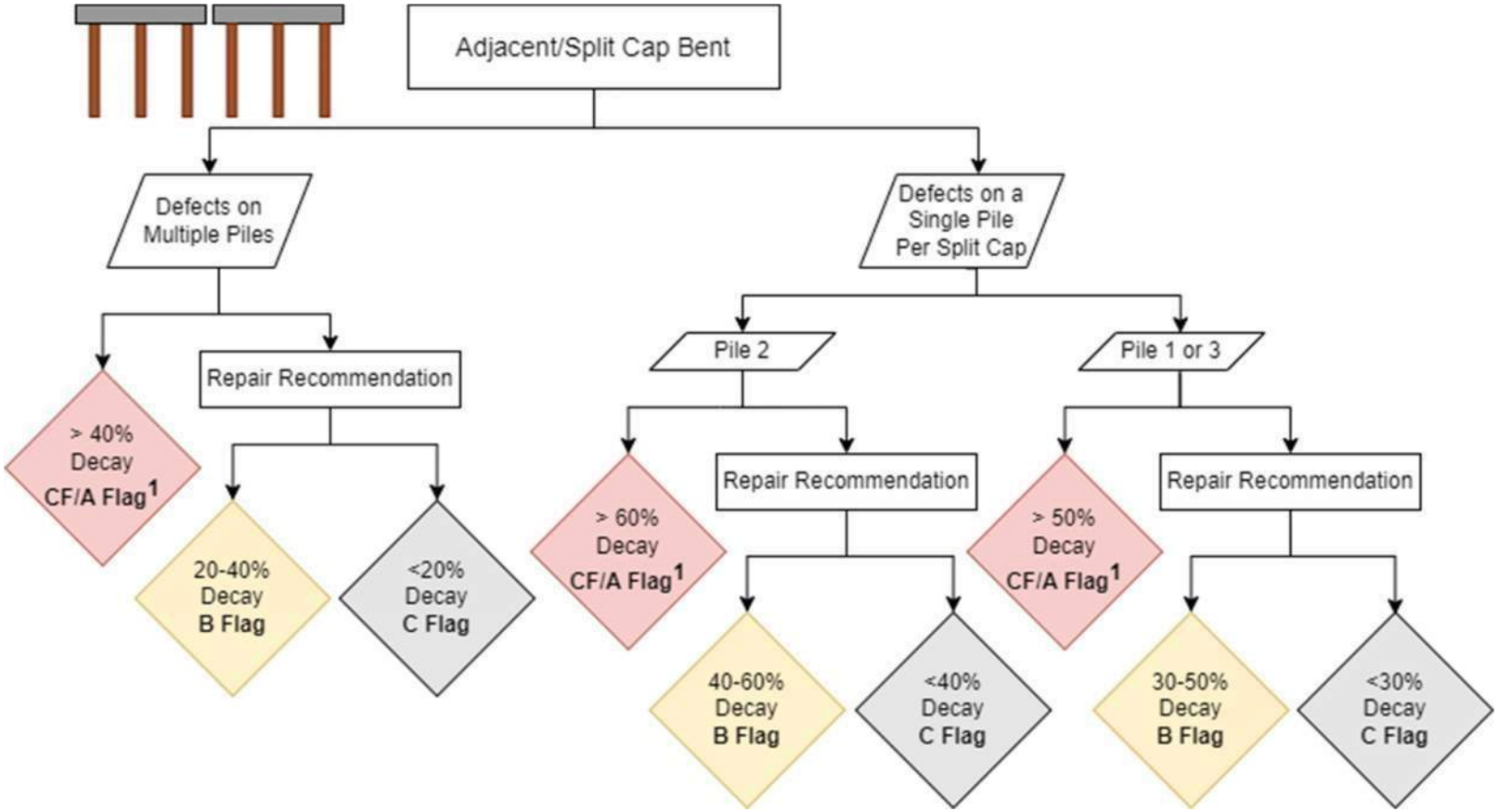


Notes:

- Subscript #1 - The BITL shall determine if a Critical Finding or Priority A "A Flag" is required. If there is a risk of bridge collapse or partial collapse of a bridge, a Critical Finding shall be reported. If bridge closure or lane closure is recommended due to the condition of the pile, a Critical Finding shall be reported.
- 10" piles or smaller lose capacity quickly under the conditions of either section loss or pile decay. The combination of either of these factors could warrant a Critical Finding as determined by the BITL.

Critical Findings for Timber Pile Decay

Figure O.4 – Repair Recommendations for Timber Piles on Adjacent/Split Cap Bent



Notes:

- Subscript #1 - The BITL shall determine if a Critical Finding or Priority A "A Flag" is required. If there is a risk of bridge collapse or partial collapse of a bridge, a Critical Finding shall be reported. If bridge closure or lane closure is recommended due to the condition of the pile, a Critical Finding shall be reported.
- 10" piles or smaller lose capacity quickly under the conditions of either section loss or pile decay. The combination of either of these factors could warrant a Critical Finding as determined by the BITL.

Repair Recommendation Notification and Tracking

HMMS Bridge Deficiency Module

All bridge maintenance items shall be reported via the HMMS Bridge Deficiency Module. This module electronically assigns deficiencies to the appropriate DBE or DME for response. The applicable deficiency code shall be used to initiate the deficiency activity. Bridge deficiencies shall be classified by priority per bridge; see Section 8.6.

SCDOT Inspections

As the BITL completes the inspection reports, deficiencies shall be entered into HMMS. As deficiencies are entered into HMMS, the BITL shall review summaries of each flag priority category. SCDOT inspectors shall print to PDF the HMMS Bridge Deficiency Report(s) (one for each flag priority category) for the bridge and upload the PDF(s) to the *5 – Maintenance* folder in the Bridge File prior to submitting the report for review.

Consultant Inspections

Consultants performing inspections do not have access to HMMS. The consultants shall complete the Repair Recommendations Form (Attachment 5.6). When the Repair Recommendations Form is electronically transmitted, the DBIS will receive a copy. The Repair Recommendations Form shall be submitted to the DBIS or designee within 7 calendar days of the discovery. The Repair Recommendations Form may be completed before the inspection report is written.

The DBIS or designee from each district shall have the responsibility for logging repair recommendations from consultant inspections into HMMS. Repair recommendations from consultant inspections shall be entered into HMMS within 7 calendar days of receipt of the Repair Recommendations Form. When the DBIS completes the form, the DBIS shall return it to the consultant. The completed Repair Recommendations Form (with DBIS or designee signature) shall be uploaded to the Bridge File by the consultant or the BITL.

When the report is ready for QC, the BITL shall confirm that one of the following file types is uploaded to the *5 – Maintenance* folder in the Bridge File prior to submitting the report for review.

- Attachment A5.6 (Unsigned from DBIS) (no HMMS Bridge Deficiency Report(s) available)
- Attachment A5.6 (Signed from the DBIS) with HMMS Bridge Deficiency Report(s) from the DBIS

If an unsigned copy of A5.6 was uploaded to the Bridge File, the signed A5.6 and the HMMS Bridge Deficiency Report(s) shall be uploaded by the Consultant when they are available from the District.

HMMS Procedures

Step 1 – Immediate Notification for Critical Findings

Maintenance needs related to a Critical Finding shall be reported as Priority A Flags. Some Critical Findings cannot wait to complete the logging of deficiencies in HMMS and the district needs immediately take action to protect the public. The logging of deficiencies in HMMS may occur afterwards.

Step 2 – Logging Repair Recommendations in HMMS

The HMMS Bridge Deficiency Report requires the repair recommendation, inspection date, work activity code, and flag priority type for each deficiency. The text field should use directional notes to aid maintenance in determining correct elements to repair. HMMS work activity codes are included in Table O.

Table O2 – HMMS Work Activity Codes

HMMS Work Activity Code	Type of Deficiency (Suggested)	HMMS Work Activity Code	Type of Deficiency (Suggested)
102	Settlement Repair/Repair Asphalt	801	Any Curb/Sidewalk Repair on Bridge
202	Washout Under the Caps	802	Any Concrete Parapet Repair
203	Washout Around the Four Corners/Repair Flumes	803	Repair Any Beams and Truss Members / Reinforced Concrete Diaphragms
401	Mowing, Hand Trimming & Remove Vegetation from Bridge	805	Clean/Repair Expansion Joints
407	Remove Trash on or around Bridge	806	Clean, Paint or Repair Bearings / Repair Saddles
407	Remove Trash from Channel	807	Repair Headwalls
408	Tree Removal from Bridge or Channel	807	Fender Repair
408	Remove Vegetation from Channel	807	Install Temporary Bridge
409	**STORM USE ONLY**	807	Maintain Temporary Bridge
504	R.C. Medians, Curbs, Sidewalks Not on Bridge	807	Remove Temporary Bridge
603	Signs, Temporary	807	Clean/Clear Scuppers
603	Bridge End Markers/Load Restriction	807	Repair Guardrail/Bridge Rail/Post on Bridge only
603	Any Sign Repair or Replacement	807	Clean and Paint Steel Beams
610	Any Approach Rail Repair/Installation	807	Scour/Build-up at Culvert and Bridge Piles
613	Crash Attenuator Repair/Replacement	809	Repair Spalls in Piles/Caps/Paint Clean Steel H-Pile
801	Any Deck Repair and Clean/Paint Exposed Rebar		

The BITL logging deficiencies in HMMS shall log each item individually. If all deficiencies are combined, it is difficult to track completion. For example, if the clearing of deck drains and a deck spall repair are recommended, they shall not be entered under one maintenance item; they shall be entered into HMMS as two separate repair recommendations using work activity codes 807 (cleaning deck drains) and 801 (deck spall repair).

HMMS only allows one deficiency for each work activity code per flag priority type to be added per day. In the event more than one deficiency for a work activity code with the same flag priority type needs to be entered, the BITL shall input one deficiency per day until all deficiencies are input. If input into HMMS takes longer than 7 days deficiencies can be combined.

When the deficiency is generated, it is routed to the maintenance staff for assignment. The status will be identified as "*Incomplete*" until notified of repairs or other actions.

Step 3 – Actions Taken (for A Flags and B Flags only)

When the deficiency is reported as being complete via the HMMS Bridge Deficiency Module, it is routed back to the district inspection team. The status will be identified as "*Inspection Needed*".

Step 4 – Flagged Bridge Status

Any bridge with addressed items is considered by maintenance to be a "*Flagged Bridge*".

When re-visiting the bridge, the BITL shall perform an unscheduled inspection to check the status of the repair performed. The "*Flagged Bridge*" status shall only be removed by a BITL. Unless there was a Critical Finding, there is a change to the NBI data, or an urgent unscheduled inspection was requested, an immediate

unscheduled inspection is not required. The inspection may take place at the convenience of a BITL or at the next scheduled inspection.

When the deficiency is corrected, inspected, and approved by a BITL, the status shall be changed to *"Deficiency Removed*". If not approved, the status will be changed to "*Inspected, Not Cleared*". This status routes back to the DBE or RME.