



ROUTINE MAINTENANCE BRIDGE & CULVERT INSPECTIONS - LEVEL 1

POLICY

ROUTINE MAINTENANCE BRIDGE & MAJOR CULVERT INSPECTIONS – LEVEL 1

November 2014
Version 1.0

Owner: Department of Transport

Manager: Transport Infrastructure Planning Division

GENERAL

1.1 TYPES OF INSPECTION

To enable asset condition to be monitored and maintenance works to be programmed, there is a requirement for a systematic program of bridge and major culvert inspections based on three levels of inspection.

The three levels of inspection are:-

(a) Routine Maintenance Inspections (Level 1)

Managed by the regional personnel of the Department of Infrastructure (DOI), Civil Services and usually carried out in conjunction with routine pavement inspections to check the general serviceability of the structure for road users.

(b) Condition Inspections (Level 2)

Managed by Department of Transport (DOT), Transport infrastructure Planning Division (with technical input/guidance from DOI, Structural Section) on a territory basis to assess the condition of each structure and its components.

(c) Detailed Engineering Inspections (Level 3)

Managed by Department of Transport (DOT), Transport infrastructure Planning Division (with technical input/guidance from DOI, Structural Section) on a needs basis to assess the structural condition and capacity of structures which have been identified as potential candidates for rehabilitation, strengthening, widening or replacement.

1.2 SAFETY

All inspection procedures shall comply with the relevant, current, rules and regulations of the Northern Territory of Australia Work Health Act and all associated Northern Territory Department of Infrastructure Codes of Practice.

Where inspections are to be carried out on bridges located over or under the assets of other Authorities, the relevant regulations and Codes of Practice relating to work on or close to their assets must be adhered to, and where necessary, referred to in the procedures developed for the inspection.

REQUIREMENTS

2.1 PURPOSE

Routine maintenance inspections are carried out to check the general serviceability of the structure, particularly for the safety of road users, and identify any emerging problems.

Level 1 inspections will normally be carried out in conjunction with routine pavement inspections.

2.2 SCOPE

The scope of a Routine Maintenance Inspection will include:

- Inspection of approaches, waterway, deck/footpath, substructure, superstructure and attached services to assess and report any significant visible signs of distress or unusual behaviour, including active scours or deck joint movements.
 - Recommendation of a Condition Inspection (Level 2) if warranted by observed distress or unusual behaviour of structure.
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- Identify maintenance work requirements that fall outside the expertise and/or available material and equipment resources at hand.

2.3 FREQUENCY OF INSPECTIONS

Routine Maintenance Inspections shall be carried out on a twice yearly frequency. They shall be carried out before the wet season (around November) and after the wet season (around June).

Routine Maintenance Inspections shall also be carried out after flooding and other natural disasters (e.g. cyclone, fire, earthquake or landslide), vehicular accident and overload.

2.4 EXTENT OF INSPECTIONS

The Routine Maintenance Inspection is a visual and sounding inspection of the structure and adjacent pavement and shall cover components above ground and water level as described in Section 2.6.2 below.

Components that need not be inspected for level 1 inspection are:-

- (i) Inside Box Girders.
- (ii) Areas behind Abutments that is inaccessible.
- (iii) Piles and Foundations below ground or water level.
- (iv) Piers and Pile Caps/Crossheads located in permanent water.
- (v) Concrete or steel beams located in spans over permanent water.

These components will also be inspected as part of a level 2 or level 3 inspections.

2.5 INSPECTION ACCREDITATION

Inspections shall be conducted by personnel who have extensive practical experience in road and bridge routine maintenance. They shall be competent to judge the visual condition of structures and the road approaches for visual defects. The inspectors should have attended an ARRB Transport Research seminar on level 1 Bridge Inspection procedures.

2.6 INSPECTION PROCEDURE

2.6.1 Preparation for Site Inspection

Prior to commencing site inspections, the inspector shall ensure that he/she has all the relevant documentation, inspection equipment and safety equipment to carry out the inspection.

Documentation should include a copy of the Department of Infrastructure Bridge and Major Culvert Inspection Manual and previously completed "Bridge Routine Maintenance Inspection Report" form and or "Major Culvert Routine Maintenance Inspection Report" form.

Equipment requirements shall be restricted to that which would be carried on a standard road patrol maintenance vehicle for standard routine pavement and bridge maintenance activities. Equipment typically required for routine inspections includes:-

- Safety vest
- Safety shoes
- Overalls (preferably orange)
- Rubber boots
- Note book (A5 size spirally bound) and pen
- Bridge and Major Culvert Routine Maintenance and Inspection Report form
- Torch, both flood light and spot light
- Hand mirror (to shine into culverts)

- Geological or heavy hammer
- Tape measure (5m and 30m)
- Camera
- First aid kit
- signage for traffic management purposes
- other safety equipment relevant to routine maintenance practices.

2.6.2 Site Inspection

At the site, following the installation of traffic control signs, the inspector shall carry out the inspection in a systematic manner to check the bridge, major culverts and road approaches for:-

- Road approach running surfaces for settlement, depressions, cracking and other deterioration.
- Bridge bituminous surface for cracking and other deterioration.
- Footpath (if any) for unevenness.
- Signs and delineation for completeness, damage, cleanliness, orientation, visibility to road user, and loose and missing bolts.
- Barriers for correct alignment and damaged posts and rails.
- Barriers for loose and missing bolts and clamps, missing and damaged spacer blocks, corrosion, correct rail height and alignment. The approach barrier and bridge barrier should preferably be interconnected.
- Deck joints for leakage and loose, missing and damaged bolts, and other components; dirt or objects which may impede free movement and proper functioning.
- Bridge drainage for accumulations of debris on the deck, in gutters, scuppers and drains which may obstruct free drainage and cause ponding.
- Road drainage for accumulations of debris and growth in side drains, channels, inlet and outlet pits and sumps which may obstruct free drainage and cause ponding.
- Weepholes in abutments and retaining walls for free drainage.
- Ventholes in superstructures which prevent flotation for structures which are subject to inundation by floodwater.
- Road and bridge drainage for scour, especially at outlets to culverts and off deck drainage channels.
- Embankments for erosion and scour.
- Clear vegetation from within 2.0m of abutments and wingwalls.
- Slope protection for damage and undermining by scour or embankment movement.

2.7 DATA RECORDING

All data obtained from the Routine Maintenance Inspection shall be recorded on either the "Bridge Routine Maintenance Inspection Report" form or the "Major Culvert Routine Maintenance Inspection Report" form. Data to be entered shall include but not be limited to:-

- * "Checked" Column
Will provide a means for the Inspector to systematically confirm that the key task requirements have been inspected.
- * "Needs Repair" Column
Provides a means to notify the Supervisor that there are works required on the bridge, major culvert or approaches which fall outside the expertise or resources available on the patrol vehicle.

- * "Level 2 Inspection Required" Column
This is only used if the Inspector has doubts or concerns about visually observed conditions at the bridge and believes a higher level of inspection is required. This column will notify the Supervisor that additional inspection services are required and may initiate a level 2 or level 3 inspections.
- * "Brief Notes" Section
Available for the Inspector to expand on matters raised in any of the two columns "ticked" under "Needs Repair" or "Level 2 Inspection Required" for the assistance of the Supervisor.

2.7.1 BLANK INSPECTION FORM

The procedure to be followed to get a blank copy of the "Bridge Routine Maintenance Inspection Report" form (also see Appendix A) or the "Major Culvert Routine Maintenance Inspection Report" form (also see Appendix B) is outlined below.

For bridges, the procedure is:-

1. Go to Desktop.
2. Open the folder "Asset Management on Highway House Palmerston (Twphwy)".
3. Open the folder "Bridges".
4. Open the folder "_Common data".
5. Open the file "Bridge Routine Maintenance Inspection Report form.doc". Press "Enable Macros". **N.B. The file may take up to 1 minute to open.**
6. Select the "Search Bridges" button on the toolbar.

The screen opens with a macro box asking "What do you wish to search by:". The options are:-

❖ Road Name

7. Select "Road Name" with mouse. The drop down menu next to the blank "Road Name" window will turn black. Select the required road name from the list.

E.g. If you wanted all the bridges on the Barkly Highway, select "Barkly Highway", then click Ok. You can then use the Maroon buttons on the toolbar to see the location data for each of the four bridges on the Barkly Highway. If you only want to print the form for the particular bridge that is currently visible, select the normal "Print" function. If you want to print forms for all four bridges, select the "Merge to Printer" button on the toolbar. If you wish to select another road name, select the "Search Bridges" button on the toolbar and continue as previously described above.

❖ Region

8. Select "Region" with mouse. The drop down menu next to the blank "Region" window will turn black. Select the required region name from the list.

E.g. If you want all the bridges in the Katherine region, select "Katherine", then click Ok. You can then use the Maroon buttons on the toolbar to see the location data for each of the 85 bridges in the Katherine Region. If you only want to print the form for the particular bridge that is currently visible, select the normal "Print" function. If you want to print forms for all 85 bridges, select the "Merge to Printer" button on the toolbar. If you wish to select another

region, select the “Search Bridges” button on the toolbar and continue as previously described above.

❖ Both

9. Select “Both” with mouse. The drop down menu next to the blank “Road Name” window and the blank “Region” window will turn black. Select the required road name and region from the respective lists. **N.B. This function is only required for roads that are in multiple regions.**

E.g. If you want all the bridges on the Stuart Highway in the Alice Springs region, select “Stuart Highway” and “Alice Springs”, then click Ok. You can then use the Maroon buttons on the toolbar to see the location data for each of the 10 bridges on the Stuart Highway in the Alice Springs region. If you only want to print the form for the particular bridge that is currently visible, select the normal “Print” function. If you want to print forms for all 10 bridges, select the “Merge to Printer” button on the toolbar. If you wish to select another region, select the “Search Bridges” button on the toolbar and continue as previously described above.

If you have finished using the file:-

- 10 Close the file. **Note: You will be asked twice if you wish to save changes. Select “No” twice.**

For major culverts, the procedure is:-

1. Go to Desktop.
2. Open the folder “Asset Management on Highway House Palmerston (Twphwy)”.
3. Open the folder “Culverts”.
4. Open the folder “_Common data”.
5. Open the file “Major Culvert Routine Maintenance Inspection Report form.doc”. Press “Enable Macros”. **Note: The file may take up to 1 minute to open.**
6. Select the “Search Culverts” button on the toolbar.

The screen opens with a macro box asking “What do you wish to search by”. The options are:-

❖ Road Name

7. Select “Road Name” with mouse. The drop down menu next to the blank “Road Name” window will turn black. Select the required road name from the list.

e.g. If you wanted all the major culverts on the Barkly Highway, select “Barkly Highway”, then click Ok. You can then use the Maroon buttons on the toolbar to see the location data for each of the 11 major culverts on the Barkly Highway. If you only want to print the form for the particular major culvert that is currently visible, select the normal “Print” function. If you want to print forms for all 11 major culverts, select the “Merge to Printer” button on the toolbar. If you wish to select another road name, select the “Search Culverts” button on the toolbar and continue as previously described above.

❖ Region

8. Select “Region” with mouse. The drop down menu next to the blank “Region” window will turn black. Select the required road name from the list.
e.g. If you want all the major culverts in the Katherine region, select “Katherine”, then click Ok. You can then use the Maroon buttons on the

toolbar to see the location data for each of the 146 major culverts in the Katherine Region. If you only want to print the form for the particular major culvert that is currently visible, select the normal "Print" function. If you want to print forms for all 146 major culverts, select the "Merge to Printer" button on the toolbar. If you wish to select another region, select the "Search Culverts" button on the toolbar and continue as previously described above

❖ Both

9. Select "Both" with mouse. The drop down menu next to the blank "Road Name" window and the blank "Region" window will turn black. Select the required road name and region from the respective lists. **Note: This function is only required for roads that are in multiple regions.**

E.g. If you want all the major culverts on the Stuart Highway in the Alice Springs region, select "Stuart Highway" and "Alice Springs", then click Ok. You can then use the Maroon buttons on the toolbar to see the location data for each of the 16 major culverts on the Stuart Highway in the Alice Springs region. If you only want to print the form for the particular major culvert that is currently visible, select the normal "Print" function. If you want to print forms for all 16 major culverts, select the "Merge to Printer" button on the toolbar. If you wish to select another region, select the "Search Culverts" button on the toolbar and continue as previously described above.

If you have finished using the file:-

10. Close the file. **Note: You will be asked twice if you wish to save changes. Select "No" twice.**

2.7.2 COMPLETED INSPECTION FORM

The procedure to be followed once the inspection of the structure has been undertaken is outlined below.

For bridges, for example, an inspection was performed on the Elizabeth River Inbound Bridge (AIS asset number BD071) on the Stuart Highway at chainage 38.72km on 15 November 2002; the procedure is:-

1. Scan the hand completed "Bridge Routine Maintenance Inspection Report" form and save to the "TRANSFER" drive. **Use this filename format – "0038 720 Elizabeth River Inbound BD071 151102.pdf"**.
2. Open Windows Explorer.
3. Click on "Desktop".
4. Open the folder "Asset Management on Highway House Palmerston (Twphwy)".
5. Open the folder "Bridges".
6. Open the folder "Stuart Highway".
7. Open the folder "0000 000 to 0225 810 Darwin region".
8. Open the folder "0038 720 Elizabeth River Inbound BD071".
9. Open the folder "Inspections".
10. Click on "TRANSFER" drive.
11. Copy the file "0038 720 Elizabeth River Inbound BD071 151102.pdf".
12. Click on folder "Inspections".
13. Paste the file "0038 720 Elizabeth River Inbound BD071 151102.pdf".

For any photos, videos etc. of the bridge for that inspection:-

14. Press the "Back" button once. Open the folder "Photos".
15. Create new folder and name "20021115 ??????????????". Insert a general description for the question marks, e.g. rails and CP cabinet.

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16. Save any photos, videos etc. of the bridge for that inspection to the folder "20021115 ??????????????".

For the hard copy of the completed form:-

17. Forward the hand completed "Bridge Routine Maintenance Inspection Report" form to the Supervisor within 7 days of the bridges inspection.
18. The Inspector shall bring to the Supervisors attention any of the structures components that may require further investigation. If deemed necessary, the Supervisor shall notify the Road Projects Division Structural Section that additional higher level inspections have been identified. The Road Project Division Structural Section will then determine whether a higher level inspection is required.
- 19 Any items that have been ticked "Need Repair" should be raised either as a routine maintenance or specific maintenance activity (depending on the activity) and the work undertaken as necessary in accordance with DIPE procedures.

For major culverts, for example, an inspection was performed on the Victoria Highway at chainage 4.55km on 15 November 2002; the procedure is:-

1. Scan the hand completed "Major Culvert Routine Maintenance Inspection Report" form and save. **Use this filename format – "0004 550 Culvert 151102.pdf"**.
2. Open Windows Explorer.
3. Click on "Desktop".
4. Open the folder "Asset Management on Highway House Palmerston (Twphwy)".
5. Open the folder "Culverts".
6. Open the folder "Major Culverts".
7. Open the folder "Victoria Highway".
8. Open the folder "0004 550".
9. Open the folder "Inspections".
10. Click on "TRANSFER" drive.
11. Copy the file "0004 550 Culvert 151102.pdf".
12. Click on folder "Inspections".
13. Paste the file "0004 550 Culvert 151102.pdf".

For any photos, videos etc. of the major culvert for that inspection:-

14. Press the "Back" button once. Open the folder "Photos".
15. Create new folder and name "20021115 ??????????????". Insert a general description for the question marks, e.g. culvert cracks.
16. Save any photos, videos etc. of the culvert for that inspection to the same "20021115 ??????????????".

For the hard copy of the completed form:-

17. Forward the hand completed "Major Culvert Routine Maintenance Inspection Report" form to the Supervisor within 7 days of the culverts inspection.
18. The Inspector shall bring to the Supervisors attention any of the structures components that may require further investigation. If deemed necessary, the Supervisor shall notify the Road Projects Division Structural Section that

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additional higher level inspections have been identified. The Road Project Division Structural Section will then determine whether a higher level inspection is required.

Any items that have been ticked "Need Repair" should be raised either as a routine maintenance or specific maintenance activity (depending on the activity) and the work undertaken as necessary in accordance with DIPE procedures.

APPENDIX A

Bridge Routine Maintenance Inspection (Level 1) Report

Road Name: _____ Road Number: _____
 PRP: Distance from PRP (km): _____ Chainage (km): _____ Region: _____
 Asset Name: _____ Stream Name: _____ AIS Asset Number: _____

Inspected by: Inspection Date:

Reason for inspection: Opportune/Postwet/Prewet/Flood/Earthquake/Vehicleacc/Othe.....

Task	Checked	Needs Repair	Level 2 Inspection Required	Brief notes (detailed notes can be provided on next page)
<u>Signs and delineation</u> Missing/damaged/orientation/cleanlines Loose and missing bolts	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	
<u>Road approach</u> Settlement of approach slab Depressions, rutting, shoving etc. Cracking	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<u>Alignment barriers</u> Loose and missing bolts Missing/damaged spacer blocks or barrier Corrosion Correct rail height and alignment	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<u>Bridge railing</u> Loose and missing bolts Corrosion Paint stripping Missing/damaged railing	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<u>Deck and footpath surface</u> Cracking Uneven surface	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	
<u>Expansion joint</u> Missing, loose or damaged joint Missing, loose or damaged bolts Dirt/debris accumulation	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<u>Bridge drainage</u> Debris accumulation on deck/footpath Debris accumulation in scuppers/gutters/drains	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	
<u>Embankments</u> Erosion/scour/voids Cracked or missing protection works Vegetation growing in protection works	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<u>Abutments</u> Weepholes clean Vegetation clear Accumulation of dirt and debris Cracking Splitting/spalling	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<u>Piers</u> Accumulation of dirt and debris Cracking Splitting/spalling Corrosion/pitting Paint stripping	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<u>Girders/Beams</u> Accumulation of dirt and debris Cracking Splitting/spalling Excessive vibration Dampness and staining Corrosion/pitting Paint stripping	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<u>Bearings</u> Accumulation of dirt and debris Cracking/splitting Excessive vibration Dislocated	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<u>Vandalism/Graffiti</u> Vandalism Graffiti	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	

APPENDIX B

Major Culvert Routine Maintenance Inspection (Level 1) Report

Road Name: _____ Road Number: _____
 PRP: Distance from PRP (km): _____ Chainage (km): _____ Region: _____
 Number of Cells: _____ Cell Width (mm): _____ Cell Depth (mm): _____ Cell Diameter (mm): _____

Inspected by: Inspection Date:

Reason for inspection: Opportune/Post wet/Pre wet/Flood/Earthquake/Vehicle acc/Other:

Task	Checked	Needs Repair ⁽¹⁾	Level 2 Inspection Required ⁽²⁾	Brief notes (detailed notes can be provided on next page)
<u>Signs and delineation</u> Missing/damaged/orientation/cleanlines Loose and missing bolts	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	
<u>Road approach</u> Settlement of approach Depressions, rutting, shoving etc. Cracking in pavement at culvert	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<u>Safety barriers</u> Loose and missing bolts or nuts Missing/damaged spacer blocks or barrier Corrosion Correct rail height and alignment	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<u>Protection works/Wingwalls</u> Erosion/scour/voids Cracked or missing protection works Vegetation growing in protection works Gaps between protection works, pavement and structure Cracking, spalling, or drummy concrete on wingwalls	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<u>Culvert</u> Accumulation of dirt and debris Cracking, spalling, or drummy concrete on culvert legs, base slab, culvert soffits Cracked pipes Spalling of concrete pipes, particularly at joints Dislocated pipe joints Deformed (seriously out of round) pipes Loss of galvanising from surfaces of corrugated metal pipes Corrosion of invert of steel pipes Signs of corrosion perforation of the steel pipe wall due to corrosion against the soil Exposure of the coarse aggregate on concrete surfaces in the inverts and base of culverts legs	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<u>Stream</u> Trees, rocks, structures or natural features and scours that could create erosive eddies and scour during large floods Erosion of the stream channel at the outlet that could threaten to undermine the outlet structure Realignment/meander/blockage of the upstream channel causing the streamflow to be misaligned with the culvert opening	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

1 Observations for Future Reference

(Photos, measurements, diagrams help to track specific issues.)

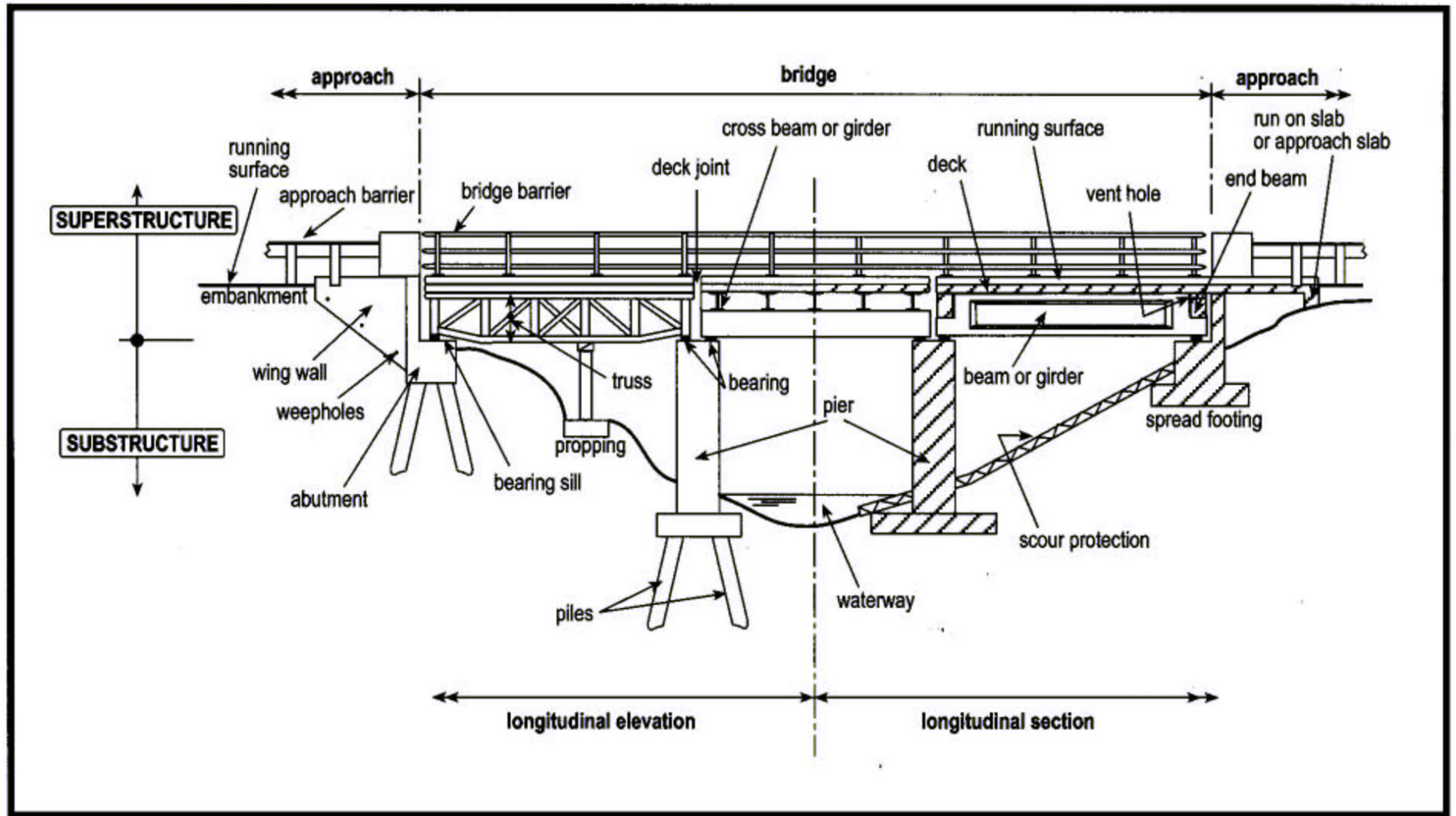
2 Recommended Maintenance

(List the specific requirements as if a scope of works.)

3 ⁽²⁾ Recommended Detailed Inspections

(Explain what needs to be inspected and why)

APPENDIX C



General terminology for bridges (Source Austroads 1991)