Concrete Elements
Prestressed Concrete Girders
Prestressed Concrete Girders

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPOG</td>
<td>Concrete - Post-tensioned, Cast-in-place or Precast-Box Girder/Girder/Slab</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This element defines only those box girders/girders/slabs constructed of cast-in-place or precast, post-tensioned concrete.</td>
<td></td>
</tr>
<tr>
<td>CPRG</td>
<td>Trough Girder/Broad Flange Girder</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This element defines only those planks/units/ I girders/trough girders/broad flange girders constructed of precast, pre-tensioned concrete.</td>
<td></td>
</tr>
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For each of condition states, report the estimated surface area in square metres.

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<td>1</td>
<td>The element shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking.</td>
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<td>2</td>
<td>Minor cracks and spalls may be present but there is no evidence of corrosion of the non-prestressed reinforcement or deterioration of the prestress system.</td>
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<td>3</td>
<td>Some delaminations, significant cracks or spalls may be present. There is no evidence of deterioration of the prestress system. Corrosion of non-prestressed reinforcement may be present but loss of section is minor. There is not sufficient concern to warrant an analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.</td>
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<td>4</td>
<td>Delaminations or spalls or cracks or corrosion of non-prestressed reinforcement are prevalent. There may also be exposure and deterioration of the prestress system (manifested by loss of bond, broken strands or wire, corrosion or failed anchorages, etc). There is sufficient concern to warrant an analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.</td>
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Key Areas to inspect for any crack, spall, leaching, signs of corrosion etc:

1. Anchorage Zone
2. Shear zones near supports (likely diagonal cracks)
3. Midspan of girders (likely vertical cracks)
4. Longitudinal cracks along member

Rating Guidance Notes:
For Level 2 inspection of these elements, all diagonal cracks near supports shall be considered as significant distress that could affect the strength or serviceability of the element. The cracked area shall be rated as condition 4 even if there are no signs of corrosion or loss of section. These cracks must be brought to the attention of Bridge Maintenance Planner for further review.
Prestressed Concrete Girders

Condition State 1
The element shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking.

Prestressed girders in good condition
Prestressed Concrete Girders

**Condition State 2**
Minor cracks and spalls may be present but there is no evidence of corrosion of the non-prestressed reinforcement or deterioration of the prestress system.

Minor spall in the prestressed girder bottom flange. No exposed reinforcement or prestressing strand.

Short cracks and leaching on the soffit of prestressed trough girder.
Prestressed Concrete Girders

Condition State 3
Some delaminations, significant cracks or spalls may be present. There is no evidence of deterioration of the prestress system. Corrosion of non-prestressed reinforcement may be present but loss of section is minor. There is not sufficient concern to warrant an analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.

Diagonal cracking near pier 1, crack extending to the soffit.

Longitudinal crack along the bottom flange corner near support.
### Prestressed Concrete Girders

#### Condition State 3
Some delaminations, significant cracks or spalls may be present. There is no evidence of deterioration of the prestress system. Corrosion of non-prestressed reinforcement may be present but loss of section is minor. There is not sufficient concern to warrant an analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.

Prestressing anchorage exposed.

Longitudinal cracks along the middle of planks. Minor leaching at one end.
Prestressed Concrete Girders  CPOG, CPRG

**Condition State 4**

Delaminations or spalls or cracks or corrosion of non-prestressed reinforcement are prevalent. There may also be exposure and deterioration of the prestress system (manifested by loss of bond, broken strands or wire, corrosion or failed anchorages, etc). There is sufficient concern to warrant an analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.

Spalling of a small area of plank soffit with exposed and corroding prestressing strands.

Badly deteriorated end of a prestressed plank girder at an abutment end.
Prestressed Concrete Girders

Condition State 4
Delaminations or spalls or cracks or corrosion of non-prestressed reinforcement are prevalent. There may also be exposure and deterioration of the prestress system (manifested by loss of bond, broken strands or wire, corrosion or failed anchorages, etc). There is sufficient concern to warrant an analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.

Cracked and spalled end of a 13.7m span pre-tensioned girder with exposed tendon.

Overheight vehicle impact damage to bottom of prestress girder
Reinforced Concrete Girders
Reinforced Concrete Beam/Girder/Arch CRBM

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<tr>
<td>CRBM</td>
<td>Concrete-Reinforced, Cast-in-Place-Beam/Girder/Arch</td>
<td>$m^2$ of exposed surface area of element</td>
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This element defines only those beams/girders/arches constructed of cast-in-place reinforced concrete.

For each of condition states, report the estimated surface area in square metres.

**Condition state descriptions**

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<td>Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.</td>
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**Key Areas to inspect** for any crack, spall, leaching, signs of corrosion etc:

1. Shear zones near supports (likely diagonal cracks)
2. Midspan of beams (likely vertical cracks)

**Rating Guidance Notes:**
For level 2 inspections, all diagonal cracks > 0.5mm near the supports in the element shall be considered as significant distress that could affect the strength or serviceability of the element. The cracked area shall be rated as condition 4 even if there are no signs of corrosion or loss of section. These cracks must be brought to the attention of Bridge Maintenance Planner for further review.
Reinforced Concrete Beam/Girder/Arch

Condition State 1
The element shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking.

Concrete girders in good condition

Superficial crack.
Reinforced Concrete Beam/Girder/Arch

**Condition State 2**
Minor cracks and spalls may be present but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.

Minor spall.

Reinforced beam with vertical crack.
Reinforced Concrete Beam/Girder/Arch

Condition State 2

Minor cracks and spalls may be present but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.

Cracks (previously repaired).
Reinforced Concrete Beam/Girder/Arch  

**Condition State 3**

Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.

**Spall on external girder. Exposed reinforcement with corrosion setting in.**

**Bottom edge spalled. Exposed and corroding reinforcement with no significant loss of section.**
Reinforced Concrete Beam/Girder/Arch

Condition State 3
Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.

Diagonal shear cracks near support

Typical flexural cracks 0.5 to 1.0mm wide at midspan with leaching through the cracks.
Reinforced Concrete Beam/Girder/Arch  

**Condition State 3**

Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.

Diagonal crack near the support and construction joint.

Severe spalling and delamination. Exposed and corroding reinforcement.
Reinforced Concrete Beam/Girder/Arch

Condition State 4
Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.
Concrete Cross Girder/Diaphragm
Concrete Cross Girder/Diaphragm

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<tr>
<td>CCGD</td>
<td>Concrete – Reinforced/Prestressed - Cross Girder/Diaphragm</td>
<td>m² of exposed surface area of element</td>
</tr>
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This element defines only those cross girders/diaphragms constructed of reinforced or prestressed concrete.

For each of condition states, report the estimated surface area in square metres.

**Reinforced Concrete - Condition state descriptions**

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**Key Areas to inspect** for any crack, spall, leaching, signs of corrosion etc:

1. Anchorage Zone (for prestressed members)
2. Near the connections with main girders (likely diagonal cracks, if load transferring)
3. Midspan (likely vertical cracks, if load transferring)

**Rating Guidance Notes:**
Concrete Cross Girder/Diaphragm  

**Condition State 1**
The element shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking.

Cross girder in good condition.
Concrete Cross Girder/Diaphragm  

**Condition State 2 (Reinforced Concrete)**

Minor cracks and spalls may be present but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.

*(Prestressed Elements: Please refer to the element sheet for condition definitions.)*

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Significant crack ready to delaminate.

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Significant moisture ingress and leaching at the construction joint of the cross girder. No evidence of corrosion.
Concrete Cross Girder/Diaphragm

**Condition State 2 (Reinforced Concrete)**

Minor cracks and spalls may be present but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.

*(Prestressed Elements: Please refer to the element sheet for condition definitions.)*

Cracked cross girder.

Cracked diaphragm with access hole.
Concrete Cross Girder/Diaphragm

**Condition State 3 (Reinforced Concrete)**
Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. *(Prestressed Elements: Please refer to the element sheet for condition definitions.)*

Minor spall with exposed reinforcement in the cross girder

Spalled concrete with exposed reinforcement.
Concrete Cross Girder/Diaphragm  

**Condition State 3 (Reinforced Concrete)**  
Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.  
(Prestressed Elements: Please refer to the element sheet for condition definitions.)

![Photograph of concrete cross girder/diaphragm]

Extensive delamination and exposed reinforcement.

![Photograph of concrete cross girder/diaphragm]

Significant spalling at the bottom of diaphragm. Exposed reinforcement.
Concrete Cross Girder/Diaphragm  

**Condition State 4 (Reinforced Concrete)**  
Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.  
*(Prestressed Elements: Please refer to the element sheet for condition definitions.)*

Crushed concrete diaphragm with exposed reo.
Concrete Pier Headstock
### Concrete Pier Headstock

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<tbody>
<tr>
<td>CPHS</td>
<td><strong>Concrete - Reinforced/Prestressed - Pier Headstock</strong> (non-integral with superstructure) This element defines only those pier headstocks (non-integral with the superstructure) constructed of reinforced or prestressed concrete.</td>
<td>m$^2$ of exposed surface area of element</td>
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For each of condition states, report the estimated surface area in square metres.

#### Reinforced Concrete - Condition state descriptions

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#### Prestressed Concrete - Condition state descriptions

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<td>Delaminations or spalls or cracks or corrosion of non-prestressed reinforcement are prevalent. There may also be exposure and deterioration of the prestress system (manifested by loss of bond, broken strands or wire, corrosion or failed anchorages, etc). There is sufficient concern to warrant an analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.</td>
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**Key Areas to inspect** for any crack, spall, leaching, signs of corrosion etc:
1. Anchorage Zone (for prestressed members)
2. Near the bearings and connections with columns/piles (likely diagonal cracks)
3. Near the support of cantilevered parts.

**Rating Guidance Notes:**
Concrete Pier Headstock

**Condition State 1**
The element shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking.

Concrete Headstock in good condition
Concrete Pier Headstock

**Condition State 2 (Reinforced Concrete)**
Minor cracks and spalls may be present but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.

*(Prestressed Elements: Please refer to the element sheet for condition definitions.)*

Vertical crack under the bearing

Crack with leaching on the end of headstock
Concrete Pier Headstock

**Condition State 3 (Reinforced Concrete)**
Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. *(Prestressed Elements: Please refer to the element sheet for condition definitions.)*

Severe AAR cracking on a headstock

Significant crack with hollow sounding concrete behind the affected area.
Concrete Pier Headstock

Condition State 3 (Reinforced Concrete)
Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. (Prestressed Elements: Please refer to the element sheet for condition definitions.)

![Concrete Pier Headstock - Condition State 3](image1)

Spalling of the concrete with exposed reinforcement. Some previously repaired area cracking again.

![Concrete Pier Headstock - Condition State 3](image2)

Significant spall under the beam on the headstock.
Concrete Pier Headstock  
CPHS  

**Condition State 4 (Reinforced Concrete)**  
Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.  
(Prestressed Elements: Please refer to the element sheet for condition definitions.)

Significant spall under the bearing on the headstock. No exposed reinforcement in the headstock.

Significant cracking of the headstock in all faces. Pattern is typical of AAR.
Concrete Pier Headstock

**Condition State 4 (Reinforced Concrete)**

Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. (Prestressed Elements: Please refer to the element sheet for condition definitions.)

Wide crack splitting the headstock under the bearing

Local failure of the headstock under the bearing threatening support of the beam. Reinforcement and holding bolt exposed
Concrete Pier
Concrete Pier

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<tbody>
<tr>
<td>CPIR</td>
<td>Concrete - Reinforced/Prestressed - Pier (excluding any headstock or piles)</td>
<td>$m^2$ of exposed surface area of element</td>
</tr>
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</table>

This element defines only those piers constructed of reinforced or prestressed concrete but excluding any headstocks or piles. Where the top of a wall pier projects in the transverse or longitudinal directions, this is to be considered as a pier headstock (element CPHS).

For each of condition states, report the estimated surface area in square metres.

**Reinforced Concrete - Condition state descriptions**

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**Key Areas to inspect** for any crack, spall, leaching, signs of corrosion etc:

1. Anchorage Zone (for prestressed members)

**Rating Guidance Notes:**
Concrete Pier

**Condition State 1**
The element shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking.

The pier in good condition with minor leaching
Concrete Pier

**Condition State 2 (Reinforced Concrete)**

Minor cracks and spalls may be present but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.

*(Prestressed Elements: Please refer to the element sheet for condition definitions.)*

Horizontal crack at the bottom part of Pier. No sign of corrosion or exposed reinforcement.

Horizontal crack along the bottom edge. No exposed reinforcement.
Concrete Pier

Condition State 2 (Reinforced Concrete)
Minor cracks and spalls may be present but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.

(Prestressed Elements: Please refer to the element sheet for condition definitions.)

Accident damage - Concrete chipped off the pier column

Patched up crack reopening
Concrete Pier

Condition State 3 (Reinforced Concrete)
Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. (Prestressed Elements: Please refer to the element sheet for condition definitions.)

significant spall with corrosion of exposed reinforcement.

Some spalls and signs of corrosion of reinforcement.
Concrete Pier

Condition State 3 (Reinforced Concrete)
Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. (Prestressed Elements: Please refer to the element sheet for condition definitions.)

Corroding reinforcement and significant vertical crack on the side.
Concrete Pier

Condition State 4 (Reinforced Concrete)
Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. (Prestressed Elements: Please refer to the element sheet for condition definitions.)

Significant loss of section of reinforcement.
Concrete Piles
### Concrete Piles

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<tr>
<td>CPIL</td>
<td><strong>Concrete – Reinforced/Prestressed –Pile</strong>&lt;br&gt;This element defines only those parts of reinforced or prestressed concrete piles that can be inspected, including underwater inspection if appropriate.</td>
<td>M$^2$ of exposed surface area of element</td>
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For each of condition states, report the estimated surface area in square metres.

#### Reinforced Concrete - Condition state descriptions

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<tr>
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<td>The element shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking.</td>
</tr>
<tr>
<td>2</td>
<td>Minor cracks and spalls may be present but there is no evidence of corrosion of the non-prestressed reinforcement or deterioration of the prestress system.</td>
</tr>
<tr>
<td>3</td>
<td>Some delaminations, significant cracks or spalls may be present. There is no evidence of deterioration of the prestress system. Corrosion of non-prestressed reinforcement may be present but loss of section is minor. There is not sufficient concern to warrant an analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.</td>
</tr>
<tr>
<td>4</td>
<td>Delaminations or spalls or cracks or corrosion of non-prestressed reinforcement are prevalent. There may also be exposure and deterioration of the prestress system (manifested by loss of bond, broken strands or wire, corrosion or failed anchorages, etc). There is sufficient concern to warrant an analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.</td>
</tr>
</tbody>
</table>

#### Key Areas to inspect:

1. Splash Zone / Tidal Zone of the piles.
2. 

#### Rating Guidance Notes:

1. Remove skirting and/or marine growth.
2. Inspect at low tide.
Concrete Piles

Condition State 1
The element shows no deterioration. There may be discoloration, efflorescence, and/or superficial cracking.

Concrete piles in good condition.
Concrete Piles

Condition State 2 (Reinforced Concrete)
Minor cracks and spalls may be present but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.
(Prestressed Elements: Please refer to the element sheet for condition definitions.)

Some delamination of a corner of a pile ready to spall.

Fine cracks near the water level.
**Concrete Piles**

**Condition State 3 (Reinforced Concrete)**

Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.  
(Prestressed Elements: Please refer to the element sheet for condition definitions.)

Wide vertical cracks with some signs of corrosion.

Major cracking of corner of a pile with damaged area extending up to 500mm under water.
Concrete Piles

**Condition State 3 (Reinforced Concrete)**
Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. *(Prestressed Elements: Please refer to the element sheet for condition definitions.)*

Significant spall with corroding reinforcement.

Significant spall with exposed reinforcement.
Concrete Piles

Condition State 3 (Reinforced Concrete)
Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. 
(Prestressed Elements: Please refer to the element sheet for condition definitions.)

Repaired piles cracking again.
Concrete Piles

**Condition State 4 (Reinforced Concrete)**
Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. 
(Prestressed Elements: Please refer to the element sheet for condition definitions.)

Advanced deterioration. Significant loss of section. Significant vertical cracks on all faces where the pile is braced in the steel frame.

Significant loss of section of the pile and heavy corrosion of reinforcement.
Concrete Piles

**Condition State 4 (Reinforced Concrete)**
Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.
(Prestressed Elements: Please refer to the element sheet for condition definitions.)

Advanced deterioration and significant loss of section.

Major vertical cracking and extensive spalling. Cathodic protection mesh exposed. Signs of corrosion.
Concrete Piles

**Condition State 4 (Reinforced Concrete)**

Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. *(Prestressed Elements: Please refer to the element sheet for condition definitions.)*

Significant loss of section and corrosion of reinforcement.
Concrete Deck Slabs
Concrete Deck Slabs

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDSL</td>
<td>Concrete - Reinforced, Deck Slab (Including Concrete Overlay/Kerb/Parapet)</td>
<td>m² of exposed surface area of element</td>
</tr>
<tr>
<td></td>
<td>This element defines only reinforced concrete bridge deck slabs, bare or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with a flush seal or asphaltic concrete wearing surface, and includes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>concrete overlays, kerbs and parapets. (Note: Where there is a wearing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>surface, rate the deck slab from the condition of its underside and of the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>wearing surface.)</td>
<td></td>
</tr>
</tbody>
</table>

For each of condition states, report the estimated surface area in square metres.

Reinforced Concrete - Condition state descriptions

<table>
<thead>
<tr>
<th>Condition state</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The element shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking.</td>
</tr>
<tr>
<td>2</td>
<td>Minor cracks and spalls may be present but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.</td>
</tr>
<tr>
<td>3</td>
<td>Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.</td>
</tr>
<tr>
<td>4</td>
<td>Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.</td>
</tr>
</tbody>
</table>

Key Areas to inspect:

Rating Guidance Notes:
<table>
<thead>
<tr>
<th>Concrete Deck Slabs</th>
<th>CDSL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Condition State 1</strong></td>
<td>The element shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking.</td>
</tr>
</tbody>
</table>
Concrete Deck Slabs

Condition State 2
Minor cracks and spalls may be present but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.

Fine cracks on soffit of deck slab.

Transverse cracking of deck slab with minor leaching.
Concrete Deck Slabs

**Condition State 2**
Minor cracks and spalls may be present but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.

Repaired deck slab functioning well.

Exposed reinforcement of parapet.
Concrete Deck Slabs

Condition State 3
Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.

Cracked deck slab.

Significant fine cracking of deck slab.
Concrete Deck Slabs

**Condition State 3**
Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.

Longitudinal cracks on either side of the road centre line.

Concrete deck soffit with spalling, leaching and corroding reinforcement.
Concrete Deck Slabs

**Condition State 4**
Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.
Concrete Abutment / Wingwalls
Concrete Abutment / Wingwalls

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CABW</td>
<td>Concrete - Reinforced/Prestressed - Abutment and Wingwalls</td>
<td>$m^2$ of exposed surface area of element</td>
</tr>
</tbody>
</table>

This element defines only those abutments and wingwalls constructed of reinforced or prestressed concrete.

For each of condition states, report the estimated surface area in square metres.

Reinforced Concrete - Condition state descriptions

<table>
<thead>
<tr>
<th>Condition state</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>The element shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking.</td>
</tr>
<tr>
<td>2</td>
<td>Minor cracks and spalls may be present but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.</td>
</tr>
<tr>
<td>3</td>
<td>Some delaminations or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and <strong>is not sufficient</strong> to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.</td>
</tr>
<tr>
<td>4</td>
<td>Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section <strong>is sufficient</strong> to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.</td>
</tr>
</tbody>
</table>

Prestressed Concrete - Condition state descriptions

<table>
<thead>
<tr>
<th>Condition state</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The element shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking.</td>
</tr>
<tr>
<td>2</td>
<td>Minor cracks and spalls or significant cracks may be present but there is no evidence of corrosion of the non-prestressed reinforcement or deterioration of the prestress system.</td>
</tr>
<tr>
<td>3</td>
<td>Some delaminations and/or spalls may be present. There is no evidence of deterioration of the prestress system. Corrosion of non-prestressed reinforcement may be present but loss of section is minor. There <strong>is not sufficient</strong> concern to warrant an analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.</td>
</tr>
<tr>
<td>4</td>
<td>Delaminations or spalls or cracks or corrosion of non-prestressed reinforcement are prevalent. There may also be exposure and deterioration of the prestress system (manifested by loss of bond, broken strands or wire, corrosion or failed anchorages, etc.). There <strong>is sufficient</strong> concern to warrant an analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.</td>
</tr>
</tbody>
</table>

Key Areas to inspect:

Rating Guidance Notes:
Concrete Abutment / Wingwalls

**Condition State 1**
The element shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking.

Minor spall
Concrete Abutment / Wingwalls

**Condition State 2 (Reinforced Concrete)**

Minor cracks and spalls may be present but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.

*(Prestressed Elements: Please refer to the element sheet for condition definitions.)*

---

Spalled area at base of abutment.

Diagonal crack at wingwall. Voided slab is bearing against the curtain wall with minor spall.
Concrete Abutment / Wingwalls

Condition State 3 (Reinforced Concrete)
Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge. (Prestressed Elements: Please refer to the element sheet for condition definitions.)

Major delamination - corrosion of reinforcement.

Significant diagonal cracking.
**Concrete Abutment / Wingwalls**

**Condition State 3 (Reinforced Concrete)**

Some delaminations, significant cracks or spalls may be present or some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and is not sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.  

*(Prestressed Elements: Please refer to the element sheet for condition definitions.)*

![Major spall near the bearing with exposed reinforcement.](image-url)
### Concrete Abutment / Wingwalls

<table>
<thead>
<tr>
<th>Condition State 4 (Reinforced Concrete)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced deterioration. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis to ascertain the impact on the strength and/or serviceability of either the element or the bridge.</td>
</tr>
</tbody>
</table>

*(Prestressed Elements: Please refer to the element sheet for condition definitions.)*
Concrete Culverts
Reinforced Concrete Culverts

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CCUL</strong></td>
<td>Concrete - Culvert, Cast-in-Place</td>
<td><strong>m²</strong> of exposed surface area of inside culvert and on wingwalls, headwalls and apron slabs.</td>
</tr>
<tr>
<td></td>
<td>This element defines all cast-in-place reinforced concrete arch and box culverts that have an opening measured along the road centreline of six metres or more, measured between spring lines of arches, or extreme ends of openings for multiple boxes. For each of condition states 1 to 4, report the estimated surface area inside the culvert and on wingwalls, headwalls and apron slabs in square metres.</td>
<td></td>
</tr>
<tr>
<td><strong>CCUP</strong></td>
<td>Concrete - Culvert, Precast</td>
<td><strong>m²</strong> of exposed surface area inside culvert.</td>
</tr>
<tr>
<td></td>
<td>This element defines all precast reinforced concrete arch and box culverts that have an opening measured along the road centreline of six metres or more, measured between spring lines of arches, or extreme ends of openings for multiple boxes.</td>
<td></td>
</tr>
</tbody>
</table>

For each of condition states 1 to 4, report the estimated surface area in square metres.

**Condition state descriptions**

<table>
<thead>
<tr>
<th>Condition state</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Superficial cracks and spalls may be present, but there is no exposed reinforcement or evidence of reinforcement corrosion. There is little or no deterioration or separation of joints. <strong>CCUL</strong> : Minor scour &amp; erosion at wingwalls or cut-off walls may exist.</td>
</tr>
<tr>
<td>2</td>
<td>Deterioration, minor chloride contamination, minor cracking and/or leaching may have begun. There may be deterioration and separation of joints. Minor scour of barrel may have occurred but is not affecting structural integrity.</td>
</tr>
<tr>
<td>3</td>
<td>There may be moderate to major deterioration, extensive cracking and/or leaching and large areas of spalls. Scour may be beginning to affect structural integrity. Minor to moderate distortion, settlement, or misalignment may have occurred. There may be considerable deterioration and separation of joints and/or minor roadway settlement.</td>
</tr>
<tr>
<td>4</td>
<td>Major deterioration, spalling, cracking, major distortion, deflection settlement, or misalignment of the barrel may be in evidence. Major separation of joints may have occurred. Holes may exist in floors and walls. Settlement of roadway may have occurred. Severe scour, if any, will affect structural capacity.</td>
</tr>
</tbody>
</table>

**Key Areas to inspect:**
1. Look for deformation of culvert.
2. Spring and the crown areas of an arch culvert.
3. check scour is not undermining the invert of the culvert.

**Rating Guidance Notes:**
Concrete Culverts

Condition State 1
Superficial cracks and spalls may be present, but there is no exposed reinforcement or evidence of reinforcement corrosion. There is little or no deterioration or separation of joints.
CCUL : Minor scour & erosion at wingwalls or cut-off walls may exist.

Concrete culvert in good condition.

Concrete culvert in good condition.
Concrete Culverts

**Condition State 2**
Deterioration, minor chloride contamination, minor cracking and/or leaching may have begun. There may be deterioration and separation of joints. Minor scour of barrel may have occurred but is not affecting structural integrity.

![Concrete Culverts - Condition State 2](image1)

Vertical cracking on the wingwall culvert cell

![Concrete Culverts - Condition State 2](image2)

Vertical crack near the construction joint on the wall. Noticeable leaching.
Concrete Culverts  

**Condition State 2**  
Deterioration, minor chloride contamination, minor cracking and/or leaching may have begun. There may be deterioration and separation of joints. Minor scour of barrel may have occurred but is not affecting structural integrity.

Cracking, leaching and spalling around an area of poor concrete in the roof.

Spalls on the wall.
Concrete Culverts

**Condition State 3**
There may be moderate to major deterioration, extensive cracking and/or leaching and large areas of spalls. Scour may be beginning to affect structural integrity. Minor to moderate distortion, settlement, or misalignment may have occurred. There may be considerable deterioration and separation of joints and/or minor roadway settlement.

Significant spalls on the roof near the outlet end. Exposed and corroding reinforcement. Signs of leaching and moisture.

Significant spalling and corrosion of exposed reinforcement in the roof of precast units.
Concrete Culverts

**CCULV, CCULP**

**Condition State 3**
There may be moderate to major deterioration, extensive cracking and/or leaching and large areas of spalls. Scour may be beginning to affect structural integrity. Minor to moderate distortion, settlement, or misalignment may have occurred. There may be considerable deterioration and separation of joints and/or minor roadway settlement.

Delamination/spalling around scupper hole in roof. Exposed reinforcement.

Damage to the blade wall.
Concrete Culverts  

**Condition State 4**

Major deterioration, spalling, cracking, major distortion, deflection settlement, or misalignment of the barrel may be in evidence. Major separation of joints may have occurred. Holes may exist in floors and walls. Settlement of roadway may have occurred. Severe scour, if any, will affect structural capacity.

Large delamination of cell wall at inlet end where wingwall is being forced away.

Heavy diagonal cracking of inlet wingwall.
Concrete Culverts  

**CCULV, CCULP**

**Condition State 4**
Major deterioration, spalling, cracking, major distortion, deflection settlement, or misalignment of the barrel may be in evidence. Major separation of joints may have occurred. Holes may exist in floors and walls. Settlement of roadway may have occurred. Severe scour, if any, will affect structural capacity.

Large areas of spalling with exposed corroding reinforcements.

Severe lamination and spalling on all outside precast cell units.
Concrete Culverts

**Condition State 4**

Major deterioration, spalling, cracking, major distortion, deflection settlement, or misalignment of the barrel may be in evidence. Major separation of joints may have occurred. Holes may exist in floors and walls. Settlement of roadway may have occurred. Severe scour, if any, will affect structural capacity.

Extreme delamination and corrosion exposed reinforcement of precast units.

Extreme delamination and with falling off roof reinforcements of precast units.