Railings
Metal Railing
### Metal Bridge Railing

**Element** | **Description** | **Units**
--- | --- | ---
RMET | Metal Bridge Railing  
This element defines all types and shapes of metal bridge railing. Steel or aluminium hollow sections, rolled shapes, etc may all be part of this element. All components of the railing must be metal. It may or may not be painted or galvanised. Any concrete end posts are rated under RCON. | m of railing

For each of the condition states, report the estimated quantity in linear metres.

#### Condition state descriptions

<table>
<thead>
<tr>
<th>Condition State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>There is little or no corrosion.</td>
</tr>
<tr>
<td>2</td>
<td>There may be minor surface corrosion or deformation of rail/posts or nicks.</td>
</tr>
<tr>
<td>3</td>
<td>Any section loss is minor and does not affect the strength or serviceability of the element. There may be accident damage such as tearing or moderate deformation or the rail/posts. There may be minor cracking of the welds. Bolts may be loose.</td>
</tr>
<tr>
<td>4</td>
<td>Section loss is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of the element. There may be significant impact damage with sections missing, heavily deformed or torn from supports. There may be significant cracking of the welds. Bolts may be missing.</td>
</tr>
</tbody>
</table>

#### Key Areas to inspect:

1. Joining pins
2. Post bases.
3. Welds

#### Rating Guidance Notes:
Metal Bridge Railing

Condition State 1
There is little or no corrosion.

Metal railing in good condition.

Protective coating showing signs of distress but is still reasonably effective.
Metal Bridge Railing

Condition State 2
There may be minor surface corrosion or deformation of rail/posts or nicks.

Minor corrosion and nicks.

Corrosion of nuts at the base plate.
**Metal Bridge Railing**

**Condition State 3**
Any section loss is minor and does not affect the strength or serviceability of the element. There may be accident damage such as tearing or moderate deformation or the rail/posts. There may be minor cracking of the welds. Bolts may be loose.

![Significant rust and minor pitting.](image1)

Impact damage.
Metal Bridge Railing

**Condition State 3**
Any section loss is minor and does not affect the strength or serviceability of the element. There may be accident damage such as tearing or moderate deformation or the rail/posts. There may be minor cracking of the welds. Bolts may be loose.

Loose nuts in the thrie beam connection

Loose and missing nuts in the connection.

Damaged hold-down bolts and mortar pads.
Metal Bridge Railing

**Condition State 3**
Any section loss is minor and does not affect the strength or serviceability of the element. There may be accident damage such as tearing or moderate deformation or the rail/posts. There may be minor cracking of the welds. Bolts may be loose.

Loose nut.

Weld crack at the base and corrosion of nut.
Metal Bridge Railing

**Condition State 4**
Section loss is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of the element. There may be significant impact damage with sections missing, heavily deformed or torn from supports. There may be significant cracking of the welds. Bolts may be missing.

Accident damage with unsupported railing over a short length.

Badly damaged metal railing with missing post and torn guard fence rail.
Metal Bridge Railing

**Condition State 4**
Section loss is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of the element. There may be significant impact damage with sections missing, heavily deformed or torn from supports. There may be significant cracking of the welds. Bolts may be missing.

All the nuts and parts of bolts completely corroded off.

Rail connector missing
Concrete Railing
## Concrete Bridge Railing/End Posts

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCON</td>
<td>Concrete Bridge Railing/End Posts</td>
<td>m of railing and/or end posts</td>
</tr>
</tbody>
</table>

This element defines all types and shapes of reinforced concrete bridge railing and/or end posts. All elements of the railing must be concrete.

For each of the condition states, report the estimated quantity in lineal metres.

### 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 but without effect on strength and/or serviceability. There may be minor vehicle marks or scores.</td>
</tr>
<tr>
<td>2</td>
<td>Minor cracks, gouges or 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 and/or spalls and/or deformations may be present and some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and does not significantly affect the strength and/or serviceability of the element. There is no rotation of the end posts.</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 the element. Rail or posts may be impacted from their original position. End posts may show signs of significant impact or rotation.</td>
</tr>
</tbody>
</table>

### Key Areas to inspect:
1. Alignment and level of end posts and/or rail and posts
2. 

### Rating Guidance Notes:
Concrete Bridge Railing/End Posts

**Condition State 1**

The element shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking but without effect on strength and/or serviceability. There may be minor vehicle marks or scores.

Concrete railing in good condition.
Concrete Bridge Railing/End Posts

**Condition State 2**

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

Concrete railing with minor spall.
Concrete Bridge Railing/End Posts

**Condition State 3**
Some delaminations and/or spalls and/or deformations may be present and some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and does not significantly affect the strength and/or serviceability of the element. There is no rotation of the end posts.

Spalls and exposed reinforcements.

Spalls and exposed reinforcement.
Concrete Bridge Railing/End Posts

**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 the element. Rail or posts may be impacted from their original position. End posts may show signs of significant impact or rotation.

Advanced deterioration.

Badly damaged concrete end post and railing.
Combined Bridge Railing
Combined Bridge Railing

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<thead>
<tr>
<th>Element</th>
<th>Description</th>
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<tbody>
<tr>
<td>RCMB</td>
<td>Combined Bridge Railing: This element defines only specific combined concrete and metal traffic barriers, namely, full or part Type F concrete barriers with one or more metal rails on top. Metal components may or may not be painted or galvanised. This includes any concrete end post transitions to the approach barriers.</td>
<td>m of railing and/or end posts</td>
</tr>
</tbody>
</table>

For each of the condition states, report the estimated quantity in lineal metres.

**Condition state descriptions**

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<thead>
<tr>
<th>Condition State</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>There is little or no corrosion of metal. The concrete shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking but without effect on strength and/or serviceability. There may be minor vehicle marks or scores.</td>
</tr>
<tr>
<td>2</td>
<td>There may be minor surface corrosion or deformation of metal rail/posts or nicks. Minor cracks, gouges or spalls may be present in concrete but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.</td>
</tr>
<tr>
<td>3</td>
<td>Any section loss of metal is minor and does not affect the strength or serviceability of the element. There may be accident damage such as tearing or moderate deformation of the rail/posts. There may be minor cracking of the welds, especially at the bases. Bolts may be loose. Some delaminations and/or spalls and/or deformations may be present in concrete and some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and does not significantly affect the strength and/or serviceability of the element. There is no rotation of the ends due to impact.</td>
</tr>
<tr>
<td>4</td>
<td>Section loss in metal railing is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of the element. There may be significant impact damage with sections missing, heavily deformed or torn from supports. There may be significant cracking of the welds. Bolts may be missing. Advanced deterioration of concrete. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis. Ends may show signs of significant impact or rotation.</td>
</tr>
</tbody>
</table>

**Key Areas to inspect:**

1. Metal welds
2. Post bases for cracked welds or loose/missing bolts
3. Alignment and level of end posts and/or rail and posts

**Rating Guidance Notes:**
Combined Bridge Railing

**Condition State 1**: There is little or no corrosion of metal. The concrete shows no deterioration. There may be discolouration, efflorescence, and/or superficial cracking but without effect on strength and/or serviceability. There may be minor vehicle marks or scores.

Combined railing in good condition.

Railing in good condition.
## Combined Bridge Railing

**Condition State 2:** There may be minor surface corrosion or deformation of metal rail/posts or nicks. Minor cracks, gouges or spalls may be present in concrete but there is no exposed reinforcement or surface evidence of corrosion of reinforcement.
Combined Bridge Railing

**Condition State 3**: Any section loss of metal is minor and does not affect the strength or serviceability of the element. There may be accident damage such as tearing or moderate deformation of the rail/posts. There may be minor cracking of the welds, especially at the bases. Bolts may be loose. Some delaminations and/or spalls and/or deformations may be present in concrete and some reinforcement may be exposed. Corrosion of reinforcement may be present but loss of section is minor and does not significantly affect the strength and/or serviceability of the element. There is no rotation of the ends due to impact.

Damage to concrete support requiring repairs.

Moderate deformation of rails due to vehicular impact.
Combined Bridge Railing

**Condition State 4**: Section loss in metal railing is sufficient to warrant analysis to ascertain the impact on the ultimate strength and/or serviceability of the element. There may be significant impact damage with sections missing, heavily deformed or torn from supports. There may be significant cracking of the welds. Bolts may be missing. Advanced deterioration of concrete. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant analysis. Ends may show signs of significant impact or rotation.

Significant damage to the metal rail base connection and moderate distortion at the end.

Metal railing without suitable end piece with significant risk to the safety of road users.
Timber Railing
Timber Bridge Railing

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Units</th>
</tr>
</thead>
</table>
| RTIM    | Timber Bridge Railing  
This element defines all types and shapes of timber railing and includes timber kerb. All elements of the railing (except connectors) must be timber. | m of railing |

For each of the condition states, report the estimated quantity in lineal metres.

Condition state descriptions

<table>
<thead>
<tr>
<th>Condition State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The timber is in good condition with no evidence of decay. There may be cracks, splits and checks having no effect on strength or serviceability. There may be minor vehicle marks or scores.</td>
</tr>
<tr>
<td>2</td>
<td>Minor decay, insect infestation, splitting, cracking, checking or crushing may exist but none is sufficiently advanced to affect serviceability. There may be vehicle impact damage or scores.</td>
</tr>
<tr>
<td>3</td>
<td>Medium decay, insect infestation, splitting, cracking or crushing has produced loss of strength of the element but not of a sufficient magnitude to affect the serviceability. Rail or posts may be deflected from their original position.</td>
</tr>
<tr>
<td>4</td>
<td>Advanced deterioration. Decay, insect infestation, splits, cracks or crushing has produced loss of strength that may affect the serviceability of the element. Rail or posts may be broken or dislodged or deflected from their original position.</td>
</tr>
</tbody>
</table>

Key Areas to inspect:

Rating Guidance Notes:
Timber Bridge Railing

**Condition State 1**
The timber is in good condition with no evidence of decay. There may be cracks, splits and checks having no effect on strength or serviceability. There may be minor vehicle marks or scores.

Timber railing in good condition.

Timber railing in good condition with failed paint coating.
Timber Bridge Railing

**Condition State 2**
Minor decay, insect infestation, splitting, cracking, checking or crushing may exist but none is sufficiently advanced to affect serviceability. There may be vehicle impact damage or scores.

Split in the kerb.
Timber Bridge Railing

**Condition State 3**

Medium decay, insect infestation, splitting, cracking or crushing has produced loss of strength of the element but not of a sufficient magnitude to affect the serviceability. Rail or posts may be deflected from their original position.

![Timber railing and kerb with significant splits.](image-url)
Timber Bridge Railing

**Condition State 4**
Advanced deterioration. Decay, insect infestation, splits, cracks or crushing has produced loss of strength that may affect the serviceability of the element. Rail or posts may be broken or dislodged or deflected from their original position.

Timber kerbs split and rotten.

Timber railing requiring immediate repair.
Timber Bridge Railing

**Condition State 4**  
Advanced deterioration. Decay, insect infestation, splits, cracks or crushing has produced loss of strength that may affect the serviceability of the element. Rail or posts may be broken or dislodged or deflected from their original position.

Badly deteriorated timber rail post.

Rotten timber post and rails.
Miscellaneous Railing
## Miscellaneous Bridge Railing

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Units</th>
</tr>
</thead>
</table>
| RMIS    | **Miscellaneous Bridge Railing**  
This element defines all types and shapes of railing except those already defined as metal, concrete, or timber. This element will include combinations of timber, concrete and metal, etc. Metal components may or may not be painted or galvanised. Note that concrete end posts are handled under RCON. | m of railing |

For each of the condition states, report the estimated quantity in lineal metres.

### 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 minor cracking, corrosion and/or other minor deterioration including evidence of vehicle impact having no effect on strength or serviceability.</td>
</tr>
<tr>
<td>2</td>
<td>Minor cracking, gouging, spalls, decay of timber portions or corrosion of metal may be present. Reinforcement may be exposed but with no corrosion. Strength and/or serviceability are not affected.</td>
</tr>
<tr>
<td>3</td>
<td>Cracking, spalls, decay of timber portions or corrosion of metal may be present. There may be member deformation. Reinforcement may be exposed with some corrosion. Defects have produced a loss of strength of the element but not of a sufficient magnitude to affect the serviceability. There may be moderate distortion from vehicle impact.</td>
</tr>
<tr>
<td>4</td>
<td>Advanced deterioration. Corrosion, decay or loss of section is sufficient to warrant analysis to ascertain the impact on the serviceability or strength of the element. Rail or posts may be severely impacted from their original position.</td>
</tr>
</tbody>
</table>

### Key Areas to inspect:

1. Rail alignment and level.

### Rating Guidance Notes:
### Miscellaneous Bridge Railing

**Condition State 1**
The element shows no deterioration. There may be minor cracking, corrosion and/or other minor deterioration including evidence of vehicle impact having no effect on strength or serviceability.

Miscellaneous railing in good condition.
(Note: Removal of graffiti is covered under General Cleaning MGCL element).
Miscellaneous Bridge Railing

Condition State 2
Minor cracking, gouging, spalls, decay of timber portions or corrosion of metal may be present. Reinforcement may be exposed but with no corrosion. Strength and/or serviceability are not affected.

Corrosion of metal components.
Miscellaneous Bridge Railing

Condition State 3
Cracking, spalls, decay of timber portions or corrosion of metal may be present. There may be member deformation. Reinforcement may be exposed with some corrosion. Defects have produced a loss of strength of the element but not of a sufficient magnitude to affect the serviceability. There may be moderate distortion from vehicle impact.

Some damage to the wire fence along the railing but the serviceability is not significantly affected.
Miscellaneous Bridge Railing

**Condition State 4**
Advanced deterioration. Corrosion, decay or loss of section is sufficient to warrant analysis to ascertain the impact on the serviceability or strength of the element. Rail or posts may be severely impacted from their original position.

Miscellaneous railing with broken timber post,

Badly corroded steel tube rail.
Railing Paint work
## Railing – Paint work

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPNT</td>
<td>Railing Paint work</td>
<td>m of railing</td>
</tr>
<tr>
<td></td>
<td>This element defines only the paint work on bridge railings.</td>
<td></td>
</tr>
</tbody>
</table>

For each of condition states 1 to 4, report the estimated lineal metres of railing.

### Condition state descriptions

<table>
<thead>
<tr>
<th>Condition state</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The paint work is sound and functioning as intended to protect the metal or timber and to improve the visibility of bridge railings.</td>
</tr>
<tr>
<td>2</td>
<td>The paint work may be chalking, peeling, checking or showing other early evidence of distress but there is no exposure of timber or metal or concrete.</td>
</tr>
<tr>
<td>3</td>
<td>The paint work is no longer effective on significant areas. There may be exposed timber or metal or concrete.</td>
</tr>
<tr>
<td>4</td>
<td>The paint work has failed.</td>
</tr>
</tbody>
</table>

### Key Areas to inspect:

1. Edges of members
2. Connections
3. Splice Plates
Railing – Paint work

**Condition State 1**
The paint work is sound and functioning as intended to protect the metal or timber and to improve the visibility of bridge railings.

Paint work on metal railing in good condition.

Timber railing with paint work in good condition.
Railing – Paint work

**Condition State 2**
The paint work may be chalking, peeling, checking or showing other early evidence of distress but there is no exposure of timber or metal or concrete.

Protective coating showing signs of distress but is still reasonably effective.
Railing – Paint work

Condition State 3
The paint work is no longer effective on significant areas. There may be exposed timber or metal or concrete.

The paint work is no longer effective on significant areas.

The paint work is no longer effective on significant areas. Some exposed metal
### Railing – Paint work

<table>
<thead>
<tr>
<th>Condition State 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>The paint work is no longer effective on significant areas. There may be exposed timber or metal or concrete.</td>
</tr>
</tbody>
</table>

Paint work is no longer effective in significant areas.
**Railing – Paint work**

**Condition State 4**
The paint work has failed.

Failed paint work on a metal railing.

Failed paintwork on a timber railing.