

Grade Separation Inspection and Rating

Grade Separation Form

- Applies to structures which have traffic going over **and** under
- Applies to Wildlife/Cattlepass or Pedestrian Underpass structures
- Replaces channel section
- Has items specific to under/overpass rather than channels
- Generated automatically
- Can be requested for blank forms
- Refer to Chapter 10 in BIM Manual for Bridges
- Refer to Chapter 13 – section 13.8 for Culverts

Grade Separation Form


- Generated for following usage types:
 - **GS** - vehicle grade separation
 - **PS** - pedestrian grade separation
 - **SP** - stockpass or cattlepass
 - **RO** - railway overpass
 - **RU** - railway underpass
- All types above can be either bridge or culvert Grade Separation

Traffic Grade Separation – Bridge (CI.A)



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**Traffic Grade Separation – Culvert
(Class B)**



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**Bridge Grade Separation – Pedestrian
(depending on girder type can be std. or major)**



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Culvert Grade Separation - Pedestrian



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Grade Separation – Animal Underpass




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Grade Separation – Railroad Overpass







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Grade Separation – Culvert RXR Underpass – Cl. B





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Bridge Grade Separation Form

Bridge Section – Chapter 10

| | Structure Usage | | Explanation of Condition |
|-------------------------------------------------|-----------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------|
| | Last | Now | |
| Grade Separation | | | |
| Road Alignment | 7 | 7 | |
| Traffic Safety Features | 4 | 4 | 1 damaged post at W.B median and wrong lap at NW. |
| Type | GUARDRAIL | | |
| Slope Protection (Type - CONCRETE, CONCRETE) | 4 | 4 | Broken around pier columns-200mm at North & 120 mm at South. Settled 100mm at North top sections. Sealed, in some areas, open gaps in others. |
| Bank Stability | 5 | 5 | |
| Drainage | 5 | 4 | Ponding water at west toe of headslope - not affecting driving lanes. |
| Grade Separation General Rating | 4 | 4 | |



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Culvert Grade Separation Form

Culvert Section—Chapter 13 Section 13.8

| | Structure Usage | | Explanation of Condition |
|----------------------------------|-----------------|-----|--------------------------------------|
| | Last | Now | |
| Grade Separation | | | |
| Road Alignment | X | X | |
| Roadway Surface (Type : SOIL) | 6 | 6 | |
| long (Y/N) | No | | |
| Traffic Safety Features | X | X | |
| Type | None | | |
| Lighting | X | X | |
| Barrel Leakage (Y/N) | No | | |
| Drainage | 4 | 4 | Average 150mm water and ice in pipe. |
| Structure In Use (Y/N) | No | | |
| Grade Separation General Rating | 4 | 4 | Fencing is down. |



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Road Alignment

- Refers to alignment up to and through the Bridge/Culvert including surface condition
- Look for:
 - Cracks, heaves & roughness
 - Super elevation & orientation
 - Accessibility for stock
 - Collision potential
- If alignment can be safely driven at legal or posted speed limit, rate 5 or more.
- For Railway, Pedestrian and Animal underpasses rate alignment "X".



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Roadway Surface

- Refers to Culvert Grade Separations and Animal/Pedestrian Underpasses
- Purpose is to provide a surface for traffic usage
 - Smooth surface
 - No holes, depressions or projections
 - Not slippery
- Record type of surface
 - Asphalt
 - Concrete
 - Gravel
 - Soil
- Look for defects that might affect high load vehicles
- Defects that create hazards to traffic or pedestrians
- Record the presence of icing on the roadway Y/N – comment if Yes. May affect Drainage rating.
 - If defects a problem for stock/traffic, rate 4 or less
 - If hazardous, rate 2 or less (holes, projections, icing on traffic or pedestrian surfaces)



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Traffic Safety Features

- Refers to curbs, medians, guardrails, advance warning signs, crash protection, etc.
- Not applicable for stock underpasses
- Indicate type and rate condition and functionality
- If not present record type as "None" and rate "X"



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Slope Protection

- Refers to protection system on headslopes
- Look for:
 - evidence of settlement
 - cracked, broken or bulging concrete protection
 - Deck drainage away from system
 - voids under concrete slabs
- Note graffiti
- Rate 4 or less for:
 - Significant settlement or moving downwards
 - Significant heaving or cracking of concrete slope protection
 - Voids under concrete slope protection



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Bank Stability


- Refers to stability of bridge headslopes
- Look for:
 - damage or displacement
 - settlement at abutment and piers
 - bulging at toe of slope
 - loss of material at toe of slope

Rate 4 or less if:

- Settled and exposing underside of abutment seat
- Instability that affects the Substructure or Superstructure
- Instability requiring monitoring




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Drainage

- Refers to the ability to dispose of water at:
 - Toe of headslopes and transitions on bridges
 - Roadway surface from Culvert Grade Separations
 - Ends and barrel of Pedestrian or Animal underpasses
- Typ. water sources are deck and approach road drainage, ditch drainage, and weep holes.
- Some underpasses are also designed for water flow
 - See “Special Comments for Next Inspection”



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Drainage


- On Bridge or Culvert Grade Separations handling vehicle traffic look for:
 - Ponding at toe of headslopes and transitions or inside culverts
 - Blockage of existing drainage systems
 - Damage to embankments
 - Record “Yes” if barrel leakage - comment

Ratings:

- If functioning and no damage to slope protection, embankments and no bank instability rate 5 or more
- If damage or slope instability rate 4 or less
- If drainage causes ponding or icing on travel lanes and potential traffic hazard rate 2 or less



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Drainage


- On Pedestrian/Animal Underpasses look for:
 - Ponding in culvert barrel or at ends
 - Any condition contributing to icing
 - Damage to sideslopes or embankments
- Record “Yes” if barrel leakage and provide comment. Rating is not required but if “Yes” leakage may effect rating of Roadway surface and Drainage

Ratings:

- If functioning and no damage to sideslope or embankment rate 5 or more
- If poor drainage causes icing or ponding around animal underpasses rate 4 or less
- If drainage causes ponding or icing and potential hazard on pedestrian underpass 2 or less




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Animal Underpass – Other Drainage Considerations

- Normally these are not applicable (rate “X”)
 - scour and scour protection at ends
 - fish passage in barrel
 - waterway adequacy in barrel
- If designed to also handle water flow
 - Note in “Special Comments for Next Inspection” (This culvert also handles drainage. 05/06/2016)
 - Inspect and provide ratings for:
 - scour and scour protection at ends
 - fish passage
 - waterway adequacy





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Animal Underpass – Handles Drainage







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Animal Underpass – Handles Drainage






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Lighting

- Refers to lighting in culvert grade separations and pedestrian underpasses
- Not applicable for stock underpasses - rate X
- If lighting does not exist but in opinion of inspector is required rate X and provide comment and recommendation
- Minor damage that does not affect operation or functionality rate 5
- Defects affecting operation and functionality rate 4 or less




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Structure In Use

- Refers to whether the Stock underpass is used for it's intended purpose
- Indicate "In Use" by Yes or No
- Provide comment/explanation if "No"




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General Rating – Grade Separations

- Governing Elements – (refer to 1.10.5 and 10.7 (Bridges), 1.10.10 and 13.8.7 (Culverts)).
 - Road Alignment rating
 - Traffic Safety Features rating
 - Bank Stability rating
 - Drainage rating




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Sample Completed Form - Grade Separation

| Structure Usage | | | |
|----------------------------------------|---------------------------------------------|----------|---------------------------------------------------------------------------------------------------|
| | Last | Now | Explanation of Condition |
| Grade Separation | | | |
| Road Alignment | 7 | 7 | |
| Traffic Safety Features | 4 | 4 | 1 damaged post at W.B median and wrong lap at NW. |
| Type | GUARDRAIL | | |
| Slope Protection | 4 | 4 | Broken around pier columns-200mm at North & 120 mm at South. Settled 100mm at North top sections. |
| (Type - CONCRETE; CONCRETE) | Sealed, in some areas, open gaps in others. | | |
| Bank Stability | 5 | 5 | |
| Drainage | 5 | 4 | Ponding water at west toe of headslope - not affecting driving lanes. |
| Grade Separation General Rating | 4 | 4 | |




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General Rating – Animal or Pedestrian Underpasses

- Governing Elements – (refer to 1.10.10 and 13.8.7)
 - Road Surface rating
 - Drainage rating




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Sample Completed Form - Cattlepass

| Structure Usage | | | |
|----------------------------------------|----------|----------|--------------------------------------|
| | Last | Now | Explanation of Condition |
| Grade Separation | | | |
| Road Alignment | X | X | |
| Roadway Surface (Type - SOIL) | 6 | 6 | |
| long (Y/N) | No | | |
| Traffic Safety Features | X | X | |
| Type | None | | |
| Lighting | | | |
| Lighting | X | X | |
| Barrel Leakage (Y/N) | No | | |
| Drainage | 4 | 4 | Average 150mm water and ice in pipe. |
| Structure In Use (Y/N) | No | | Fencing is down. |
| Grade Separation General Rating | 4 | 4 | |



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https://extranet.infra.gov.ab.ca/infra_login.html



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Questions??



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