

**ROCK SIZES FOR RIPRAP PROTECTION**

Riprap Class	Velocity V m/s	Rock Sizes						Protection thickness T in m	Geotextile with cushioning layer
		D <sub>10</sub> minimum		D <sub>50</sub>		Maximum			
		Size in m	Mass in kg	Size in m	Mass in kg	Size in m	Mass in kg		
Facing	2.0 – 2.6	0.15	2.5	0.3	35	0.4	100	0.50	Geotextile with Filtration Class II, Strength Class E, to MRTS27 and minimum 150 thick cushioning layer with material D85 < 75mm
Light	2.6 – 2.9	0.2	10	0.4	100	0.55	250	0.75	
1/4 tonne	2.9 – 3.9	0.3	35	0.55	250	0.75	500	1.00	Heavy duty non-woven geotextile with the following properties: Grab Strength ≥ 2500N, Tear Strength ≥ 900N, CBR Burst Strength ≥ 8000N, G Rating ≥ 8500, Flow rate ≥ 20 l/m <sup>2</sup> /s, EOS ≤ 0.1mm, with minimum 150 thick cushioning layer with material D85 < 75mm. <i>Note: Currently MRTS27 does not cover geotextile to this requirement. MRTS27 will be amended in the future to include this requirement.</i>
1/2 tonne	3.9 – 4.5	0.4	100	0.7	450	0.9	1000	1.25	
1 tonne	4.5 – 5.1	0.55	250	0.9	1000	1.15	2000	1.60	

- † Velocity V = 1.33 x Average Velocity (V<sub>avg</sub>), at bridge cross section. Project specific design shall be undertaken for V > 5.1m/s
- \* D<sub>a</sub> = a% of sample is finer than this size.
- ◆ Rock classes are in accordance with Austroads: Guide to Bridge Technology Part 8 – Hydraulic Design of Waterway Structures, 2018, Chapter 5 Bridge Scour, Tables 5.11 and 5.12

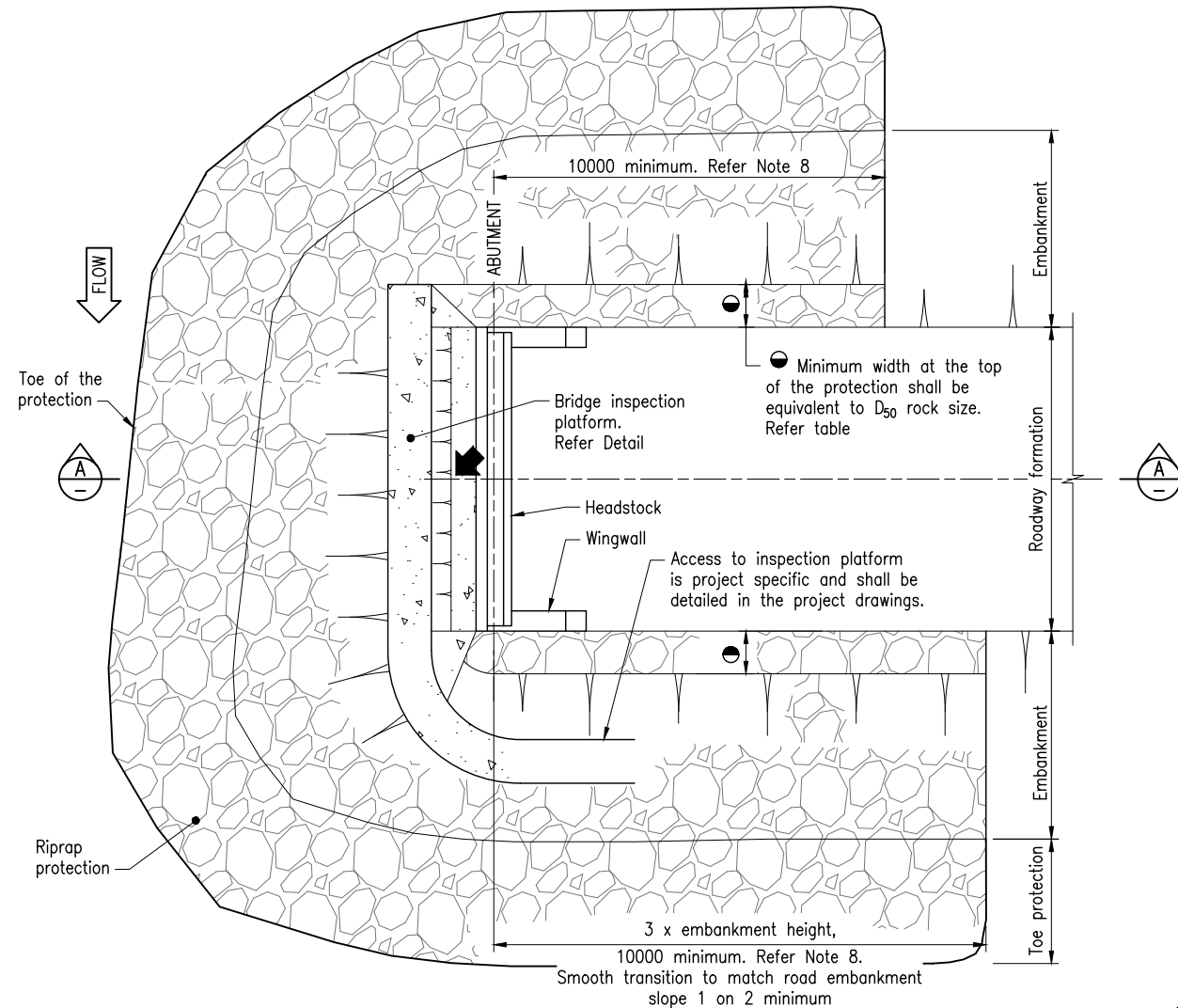
**NOTES:**

- Bridge abutment protections shall be designed in accordance with Design Criteria for Bridges and Other Structures and Bridge Scour Manual.
- The purpose of this drawing is to provide standard details for protection height up to 6.0m and fitness for purpose shall be determined and RPEQ certified by the bridge design engineer to suit the specific bridge site. Project specific protection design and supplementary specification shall be developed and included in the project design documentation. In accordance with Workplace Health and Safety requirements, abutment headstocks must be easily accessible to allow them to be inspected and maintained. Where the clearance is no greater than 1700 high, this can be done by walking around the base of the protection. If the clearance is greater than 1700, a platform shall be provided 1700 from the underside of the bridge. A risk assessment shall determine the best method of accessing the inspection platform and shall be detailed in the project drawings.
- Rocks used for riprap protection shall comply with Rock fill section of MRTS04 except for rock sizes, shall be in accordance with this Standard Drawing.
- Concrete platform shall be S32/20 in accordance with MRTS70.
- Geotextile filter material shall be in accordance with MRTS27.
- Design of spillthrough batter stability including Geotechnical Factor of Safety for batter stability shall be in accordance with Geotechnical Design Standard – Minimum Requirements. Riprap protection shall not be considered for stability of the abutment / embankment fill. When designing abutment protection, consideration shall be given to the strength of the subsoil material.
- Width of the toe protection shall be modified to suit project specific scour situation in accordance with the project scour assessment. Alternative toe protections can be considered as required by the project specific scour assessment.
- Abutment protection on the upstream side of the road embankment shall extend along the embankment past the abutment for a distance of not less than 10m, and on the downstream side of the same for a distance of three times the height of the road embankment, but not less than 10m, as shown. If the protection along the embankment is less than 10m, due to meeting existing ground surface, terminate the protection to engage 1m minimum into the ground. Actual extent of the riprap protection along the embankment shall be determined to suit project specific requirements.
- Rocks for riprap protection shall be placed in a manner which ensures that the larger rocks are uniformly distributed throughout the protection work, and that the smaller rocks effectively fill the spaces between the large rocks without leaving any large voids. The layers of placed rock shall be of even thickness and of even grading.
- Bridge construction sequence shall be taken into consideration when constructing the scour protection. The riprap protection shall be placed before the bridge beams are erected on the end span. Consideration shall be given to avoid potential damage to bridge foundation and substructure with regard to falling rocks while the rocks are being placed.
- The rock placing operation shall minimise the chances of rock running loose and damaging adjacent areas. Rock deposited in areas outside the riprap protection zone shall be recovered.
- Rock shall be placed in a manner so as to not damage the geotextile. Maximum rock drop height shall be confirmed with geotextile manufacturer prior to placing of rocks.
- Dimensions are in millimetres unless shown otherwise.
- SETTING OUT POINTS shown thus

**ASSOCIATED DEPARTMENTAL DOCUMENTS:**

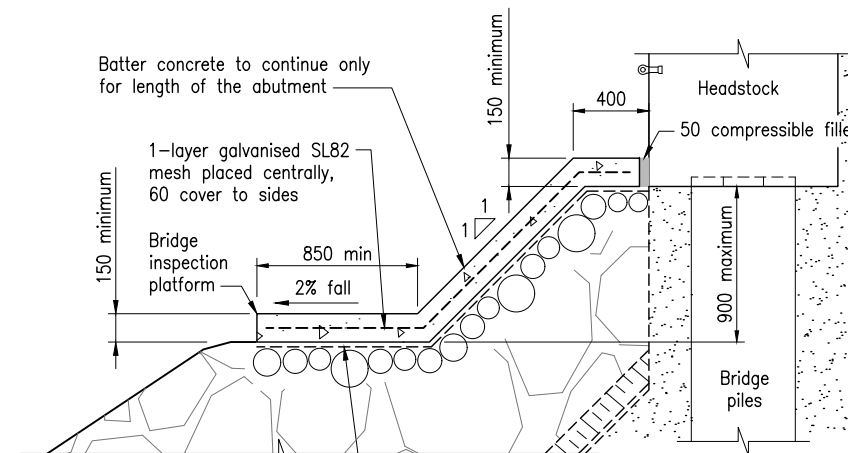
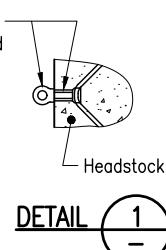
- Bridge Scour Manual
- Design Criteria for Bridges and Other Structures
- Geotechnical Design Standard – Minimum Requirements
- MRTS04 General Earthworks
- MRTS27 Geotextiles (Separation and Filtration)
- MRTS70 Concrete

LEGISLATION: Work Health and Safety Act 2011; Work Health and Safety Regulations 2011



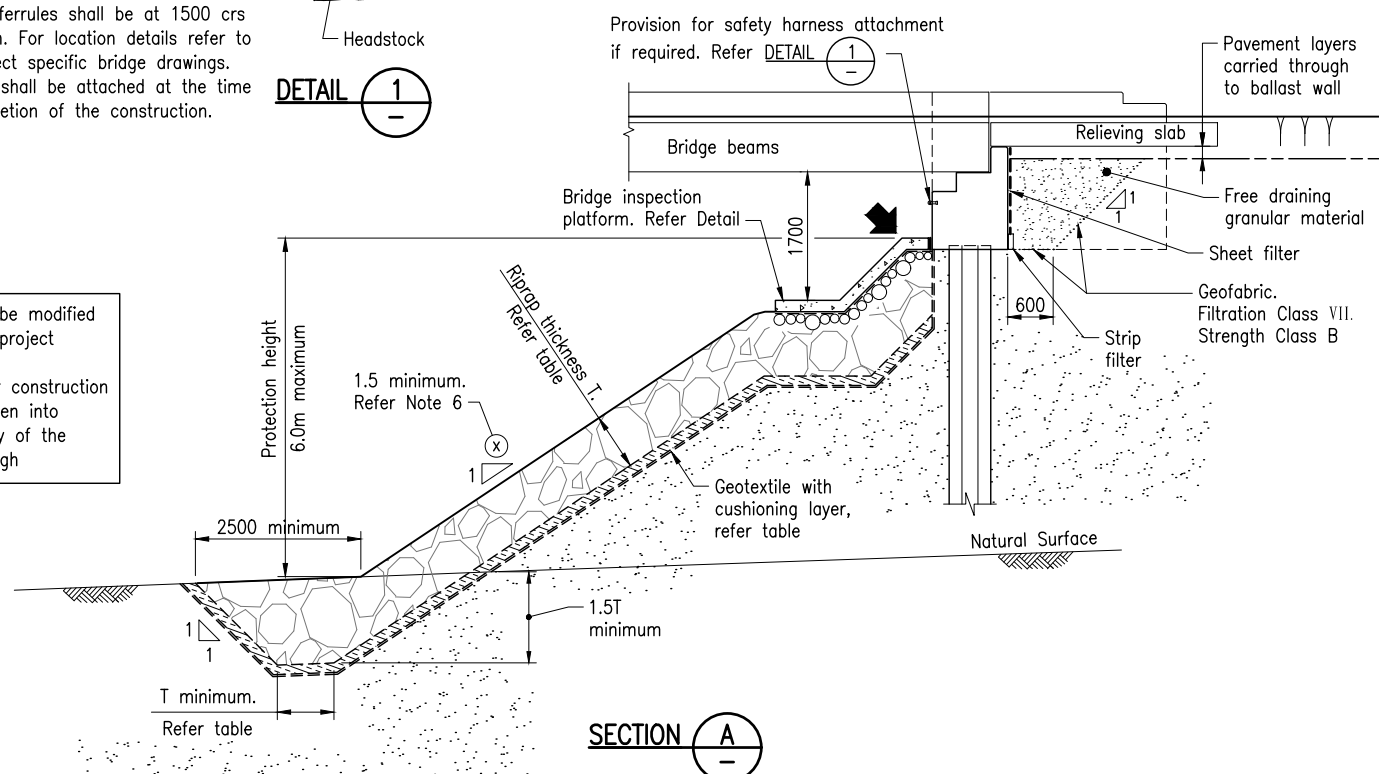
**ABUTMENT PROTECTION – PLAN VIEW**

Grade 316 Stainless Steel M20 eyebolts and cast-in ferrules with minimum load rating of 21 kN shall be attached to support a safety harness for inspection and maintenance. Cast-in ferrules shall be at 1500 crs maximum. For location details refer to the project specific bridge drawings. Eyebolts shall be attached at the time of completion of the construction.



**BRIDGE INSPECTION PLATFORM DETAILS**

Toe arrangement shall be modified if required to suit the project specific requirements. Depth of excavation for construction of the toe shall be taken into account for the stability of the abutment and spillthrough



Department of Transport and Main Roads			
ABUTMENT PROTECTION			
TYPE 8 – RIPRAP PROTECTION – HEIGHT UP TO 6 METRES		A3	Standard Drawing No
		Not to Scale	2242
			Date 7/2021
A	B		