

Contract Documents - 10018821

Supplementary: Specification and Technical Standard

Landslide mitigation treatments and demolition

SS01 – JAN20

1 General

This Supplementary Specification and Technical Standard applies to construction of the landslide mitigation treatments (debris flow barriers and draped meshes) and demolition of the existing flexible barriers as detailed on the design drawings.

2 Work Items

The work items covered in this Supplementary Specification and Technical Standard are listed below:

Table 1: Permanent Geotechnical Treatments

Item No.	Description	Unit of Measurement
90101	Supply and installation of proprietary Boat Club debris flow barrier superstructure [5m height, 8600kJ capacity]	Lump
90102	Supply and installation of proprietary Marine 2 debris flow barrier superstructure [4m height, 5000kJ capacity]	Lump
90103	Supply and installation of proprietary Marine 1 debris flow barrier superstructure [5m height, 5000kJ capacity]	Lump
90104	Supply and installation of proprietary Christmas Island Club debris flow barrier superstructure [4m height, 8600kJ capacity]	Lump
90106	Provision of as built red line markup and survey data	Lump
90501	Supply and installation of anchor head compatible with 40/16 anchor	each
90502	Supply and installation of anchor head compatible with 52/26 anchor	each
90503	supply and installation of draped mesh steel anchor plates and nuts [5mm, 100mm x 100mm]	each
91001	Supply and installation of draped mesh anchor bar [32mm high strength fully threaded 900/1100]	m
91002	Supply and installation of debris flow barrier anchor bar, including grout [52/26 self drilling anchor]	m
91003	Supply and installation of debris flow barrier anchor bar, including grout [40/16 self drilling anchor]	m
91004	Supply only - draped mesh anchor bar [32mm high strength fully threaded 900/1100]	m
91005	Supply only - debris flow barrier anchor bar [40/16 self drilling anchor]	m
91006	Supply only - debris flow barrier anchor bar [52/26 self drilling anchor]	m
91007	Supply and installation of PVC drilled anchor casing [3mm, 100mm diameter, unplasticised, drain waste & vent, solid wall joint]	m
91008	Supply and installation of PVC anchor casing [3mm, 125mm diameter, unplasticised, drain waste & vent, solid wall joint]	m
91009	Supply and installation of crab apron	m
91010	Supply and storage of draped mesh longitudinal cable [22mm diameter, 1690MPa steel grade]	m
91011	Supply and storage of proprietary Boat Club debris flow barrier superstructure [5m height, 8600kJ capacity]	m
91012	Supply and storage of proprietary Marine 2 debris flow barrier superstructure [4m height, 5000kJ capacity]	m
91013	Supply and storage of proprietary Marine 1 debris flow barrier superstructure [5m height, 5000kJ capacity]	m
91014	Supply and storage of proprietary Christmas Island Club debris flow barrier superstructure [4m height, 8600kJ capacity]	m
92001	Supply and installation of proprietary draped mesh type 1	m ²

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92002	Supply and installation of proprietary draped mesh type 2	m2
92501	Manual scaling of loose blocks on rock faces	m3
94001P	Supply and installation of grout for drilled anchor bars (draped mesh and debris flow barrier) beyond drawing requirements. Provisional item, if ordered. [32MPa]	Litre

2.1 Work Operations

The work operations incorporated in the above item include the following as indicated:-

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Standard Specifications*; and additional work operations for each item as specified:-

Item 90101 Supply and installation of proprietary Boat Club debris flow barrier superstructure:

The following work operations apply to the above item, as required:-

- b) Supply and installation of all materials required to construct proprietary debris flow barrier system superstructure including posts, base plates, ringnets, cables, shackles, energy dissipation devices etc. as specified on design drawings.
- c) Isolated removal of vegetation and boulders (if required) to allow machine access to anchor location
- d) All testing requirements as specified on the design drawings.
- e) Preparation and submission of drilling records to the Superintendent. The records shall describe the subsoil properties and confirm the design required rock embedment length has been achieved.
- f) Preparation and submission of grouting records to the Superintendent. The records shall confirm the grout batch info, properties, testing and volume to confirm the design requirements are achieved.

Item 90102 Supply and installation of proprietary Marine 2 debris flow barrier superstructure:

The following work operations apply to the above item, as required:-

- b) Supply and installation of all materials required to construct proprietary debris flow barrier system superstructure including posts, base plates, ringnets, cables, shackles, energy dissipation devices etc. as specified on design drawings.
- c) Isolated removal of vegetation and boulders (if required) to allow machine access to anchor location
- d) All testing requirements as specified on the design drawings.
- e) Preparation and submission of drilling records to the Superintendent. The records shall describe the subsoil properties and confirm the design required rock embedment length has been achieved.
- f) Preparation and submission of grouting records to the Superintendent. The records shall confirm the grout batch info, properties, testing and volume to confirm the design requirements are achieved.

Item 90103 Supply and installation of proprietary Marine 1 debris flow barrier superstructure:

The following work operations apply to the above item, as required:-

- b) Supply and installation of all materials required to construct proprietary debris flow barrier system superstructure including posts, base plates, ringnets, cables, shackles, energy dissipation devices etc. as specified on design drawings.
- c) Isolated removal of vegetation and boulders (if required) to allow machine access to anchor location
- d) All testing requirements as specified on the design drawings.
- e) Preparation and submission of drilling records to the Superintendent. The records shall describe the subsoil properties and confirm the design required rock embedment length has been achieved.
- f) Preparation and submission of grouting records to the Superintendent. The records shall confirm the grout batch info, properties, testing and volume to confirm the design requirements are achieved.

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Landslide mitigation treatments and demolition**SS01 – JAN20****Item 90104 Supply and installation of proprietary Christmas Island Club debris flow barrier superstructure:**

The following work operations apply to the above item, as required:-

- b) Supply and installation of all materials required to construct proprietary debris flow barrier system superstructure including posts, base plates, ringnets, cables, shackles, energy dissipation devices etc. as specified on design drawings.
- c) Isolated removal of vegetation and boulders (if required) to allow machine access to anchor location
- d) All testing requirements as specified on the design drawings.
- e) Preparation and submission of drilling records to the Superintendent. The records shall describe the subsoil properties and confirm the design required rock embedment length has been achieved.
- f) Preparation and submission of grouting records to the Superintendent. The records shall confirm the grout batch info, properties, testing and volume to confirm the design requirements are achieved.

Item 90105 Demolition of existing debris flow barriers

The following work operations apply to the above item, as required:-

- b) Supply and installation of all materials and equipment required to demolish existing debris flow barriers, cut back above ground portion of anchors, and remove select clashing anchors - as detailed in the design drawings.
- c) Undertaking barrier and anchor demolition/removal as detailed in the design drawings
- d) Backfilling any removed anchors with minimum 1Mpa strength grout
- e) Salvaging ringnets for installation on the draped mesh (refer item 92001 and 92002)
- f) Safe disposal offsite of all material, excluding ringnets (refer MRTS03 annexure)

Item 90501 Supply and installation of anchor head [40/16 compatible]

The following work operations apply to the above item, as required:-

- b) Supply and installation of anchor head compatible with 40/16 self drilling anchoring bars, and any required connections to the bar. Excludes any concrete/grout surround

Item 90502 Supply and installation of anchor head [52/26 compatible]

The following work operations apply to the above item, as required:-

- b) Supply and installation of anchor head compatible with 52/26 self drilling anchoring bars, and any required connections to the bar. Excludes any concrete/grout surround

Item 90503 Supply and installation of draped mesh steel anchor plates [5mm, 100mmx100mm]

The following work operations apply to the above item, as required:-

- b) Supply and installation of draped mesh steel anchor plates and nuts

Item 91001 Supply and installation of draped mesh anchor bar [32mm high strength fully threaded 900/1100]

The following work operations apply to the above item, as required:-

- b) Supply and installation of all draped mesh anchoring bars, grout, tremmies etc
- c) All testing requirements as specified on the design drawings.
- d) Preparation and submission of drilling records to the Superintendent. The records shall describe the subsoil properties and confirm the design required rock embedment length has been achieved.
- e) Preparation and submission of grouting records to the Superintendent. The records shall confirm the grout batch info, properties, testing and volume to confirm the design requirements are achieved.

Item 91002 Supply and installation of debris flow barrier anchor bar [52/26 self drilling anchor]

The following work operations apply to the above item, as required:-

- b) Supply and installation of all debris flow barrier 52/26 self drilling anchoring bars, including spacers, grout etc as detailed on the design drawings
- c) All testing requirements as specified on the design drawings.
- d) Preparation and submission of drilling records to the Superintendent. The records shall describe the subsoil properties and confirm the design required rock embedment length has been achieved.
- e) Preparation and submission of grouting records to the Superintendent. The records shall confirm the grout batch info, properties, testing and volume to confirm the design requirements are achieved.

Item 91003 Supply and installation of debris flow barrier anchor bar [40/16 self drilling anchor]

The following work operations apply to the above item, as required:-

- b) Supply and installation of all debris flow barrier 40/16 self drilling anchoring bars, including spacers, grout etc as detailed on the design drawings
- c) All testing requirements as specified on the design drawings.
- d) Preparation and submission of drilling records to the Superintendent. The records shall describe the subsoil properties and confirm the design required rock embedment length has been achieved.
- e) Preparation and submission of grouting records to the Superintendent. The records shall confirm the grout batch info, properties, testing and volume to confirm the design requirements are achieved.

Item 91004 Supply only draped mesh anchor bar [32mm high strength fully threaded 900/1100]

The following work operations apply to the above item, as required:-

- b) Supply only of draped mesh anchor bar

Item 91005 Supply only of debris flow barrier anchor bar [40/16 self drilling anchor]

The following work operations apply to the above item, as required:-

- b) Supply only of debris flow barrier 40/16 self drilling anchoring bars

Item 91006 Supply only of debris flow barrier anchor bar [52/26 self drilling anchor]

The following work operations apply to the above item, as required:-

- b) Supply only of debris flow barrier 52/26 self drilling anchoring bars

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Landslide mitigation treatments and demolition**SS01 – JAN20****Item 91007 Supply and installation of PVC drilled anchor casing [3mm, 100mm diameter, unplasticised, drain waste & vent, solid wall joint]**

The following work operations apply to the above item, as required:-

- b) Supply and installation of all PVC casing required to address hole instability during installation of 40/16 drilled anchors, as detailed on the design drawings (refer 'anticipated soil depth')

Item 91008 Supply and installation of PVC drilled anchor casing [3mm, 125mm diameter, unplasticised, drain waste & vent, solid wall joint]

The following work operations apply to the above item, as required:-

- b) Supply and installation of all PVC casing required to address hole instability during installation of 52/26 drilled anchors, as detailed on the design drawings (refer 'anticipated soil depth')

Item 91009 Supply and installation of crab apron

The following work operations apply to the above item, as required:-

- b) Supply and installation of the crab interception apron as detailed on CI-GD-04 and the general arrangement drawings. Inclusive of all aluminium flashing, FE mesh, modifications, fixings etc

Item 91010 Supply and installation of draped mesh longitudinal anchor cable [22mm diameter, 1690MPa steel grade]

The following work operations apply to the above item, as required:-

- b) Supply and installation of draped mesh longitudinal anchoring cable, including tightening

Item 90111 Supply and storage of supplementary Boat Club debris flow barrier superstructure components:

The following work operations apply to the above item, as required:-

- b) Supply of all materials required to replace damaged proprietary debris flow barrier system superstructure including posts, base plates, ringnets, cables, shackles, energy dissipation devices etc. Assume the portion of barrier to be replaced is positioned centrally along the barrier.
- c) Storage on site in line with proprietor recommendations for the duration of the project
- d) Transportation at the end of the project to the Department nominated permanent storage location

Item 90112 Supply and storage of supplementary Marine 2 debris flow barrier superstructure components:

The following work operations apply to the above item, as required:-

- b) Supply of all materials required to replace damaged proprietary debris flow barrier system superstructure including posts, base plates, ringnets, cables, shackles, energy dissipation devices etc. Assume the portion of barrier to be replaced is positioned centrally along the barrier.
- c) Storage on site in line with proprietor recommendations for the duration of the project
- d) Transportation at the end of the project to the Department nominated permanent storage location

Item 90113 Supply and storage of supplementary Marine 1 debris flow barrier superstructure components:

The following work operations apply to the above item, as required:-

- b) Supply of all materials required to replace damaged proprietary debris flow barrier system superstructure including posts, base plates, ringnets, cables, shackles, energy dissipation devices etc. Assume the portion of barrier to be replaced is positioned centrally along the barrier.
- c) Storage on site in line with proprietor recommendations for the duration of the project
- d) Transportation at the end of the project to the Department nominated permanent storage location

Item 90114 Supply and storage of supplementary Christmas Island Club debris flow barrier superstructure components:

The following work operations apply to the above item, as required:-

- b) Supply of all materials required to replace damaged proprietary debris flow barrier system superstructure including posts, base plates, ringnets, cables, shackles, energy dissipation devices etc. Assume the portion of barrier to be replaced is positioned centrally along the barrier.
- c) Storage on site in line with proprietor recommendations for the duration of the project
- d) Transportation at the end of the project to the Department nominated permanent storage location

Item 92001 Supply and installation of proprietary draped mesh type 1

The following work operations apply to the above item, as required:-

- b) Supply and installation of type 1 draped mesh system as specified on design drawings. Excludes plates, longitudinal cables, and anchorage.
- c) Installation of salvaged ringnets (if required, to be determined by the Contractor) from demolished flexible barriers (refer item 90105)

Item 92002 Supply and installation of proprietary draped mesh type 2

The following work operations apply to the above item, as required:-

- b) Supply and installation of type 2 draped mesh system as specified on design drawings. Excludes plates, longitudinal cables, and anchorage.
- c) Installation of salvaged ringnets (if required, to be determined by the Contractor) from demolished flexible barriers (refer item 90105)

Item 92501 Manual scaling of loose blocks on rock faces

The following work operations apply to the above item, as required:-

- b) Supply of all materials and equipment required to undertake manual scaling of loose blocks which pose an unacceptable rockfall risk using pry bars, hydraulic sacs, expanding foam, jackhammers etc.
- c) Undertaking of manual scaling works by qualified site personnel
- d) Removal of scaled blocks from site
- e) Removal of existing detached blocks in the draped mesh clear fall zone

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Landslide mitigation treatments and demolition**SS01 – JAN20****Item 94001P Supply and installation of grout for drilled anchor bars (draped mesh or debris flow barrier) beyond drawing requirements. Provisional item, if ordered. [32MPa]**

The following work operations apply to the above item, as required:-

- b) Supply of all grout for drilled anchors in excess of what is required on the design drawings.
- c) Installation of all grout for drilled anchors in excess of what is required on the design drawings.
- d) All testing requirements as specified on the design drawings.

3 Construction Requirements

Construction procedures for the above work items have been provided on the design drawings. Prior to undertaking any of the above-mentioned work items the Contractor must submit a work method statement a minimum of 3 days prior to planned commence of work for review.

Additional construction requirements as follows:

Item 90105 Demolition of existing debris flow barriers

The following construction requirements apply to the above item, as required:-

- a. Public exclusion zones detailed in the design drawings for the carpark below the Boat Club and Marine 2 barriers shall be established prior to commencing demolition of the corresponding barrier. Maximum duration between establishment of exclusion zones and commencement of demolition works shall be 2 weeks. The Exclusion Zones are not to be used for laydown as they coincide with the landslide debris impact zone when there is no landslide protection operational/in place.
- b. Public Exclusion Zone A shall be in effect if the existing Boat Club landslide barrier is not in a load bearing state and the new barriers are not ready to bear loads either.
- c. Public Exclusion Zone B shall be in effect if the existing Marine 2 landslide barrier is not in a load bearing state and the new barriers are not ready to bear loads either.
- d. Exclusion Zone A or B shall be in effect either one or the other at a time, and shall not be in effect consecutively due to the need to maintain access to the boat ramp and boat parking facilities. If the contractor finds that it is not possible to construct the work in a way that meets with this requirement, the contractor shall advise the Superintendent at the start of the project as well as confirm the timing, duration and likely number of times this scenario is likely to occur. The contractor must provide a minimum of four weeks' notice to the Shire when it is likely that Exclusion Zone A and Exclusion Zone B need to be in effect consecutively.
- e. The Boat Club and Marine exclusion zone shall be reinstated as public car parking within 1 week of completing the corresponding flexible barriers.
- f. The contractor shall prepare a construction sequencing and programming plan to indicate proposed barrier demolition and replacement sequence, with corresponding Parking or Community Exclusion Zones in effect and corresponding temporary traffic management to demonstrate that the safety of the community is being protected by the works staging.

4 Payment

Payment for geotechnical treatments will be measured separately for each work item.

Payment for each item shall be measured per unit (refer to Table 1) for all applicable work operations as described in this Supplementary Specification.