

Annexure MRTS03.1 (January 2019)

Drainage, Retaining Structures and Protective Treatments



Specific Contract Requirements

Contract Number

XXXXXXXXXX

Note: Clause references within brackets in this Annexure refer to Clauses in the parent Technical Specification MRTS03 unless otherwise noted.

1 Testing Frequencies (Clause 5.4)

The following minimum testing frequencies and minimum number of tests shall apply to the construction of work covered by this Technical Specification.

Construction Activity	Normal Testing level		Reduced testing level	
	Minimum testing frequency	Minimum number of tests	Minimum testing frequency	Minimum number of tests
Installation of anchors for the flexible barriers	Refer GE-TD-03			

2 Components to be salvaged

2.1 Culvert and culvert end structures (Clause 8.2)

The following culverts and/or culvert end structures shall be salvaged.

N/A

2.2 Salvage storage location (Clause 8.2)

The location of the storage site for salvaged materials is as follows.

N/A

3 Supply of Precast and Preformed Culvert

3.1 Helical lock-seam corrugated aluminium pipe culvert components (Clause 11.2)

The following requirements shall apply to the supply of helical lock-seam corrugated aluminium pipe culvert components.

N/A

3.2 Details of precast and preformed culvert components (supply only) (Clause 11.2)

Details of any precast and preformed culvert components supplied only under the Contract are as follows.

Item number	Description	Section size (mm)	Length (metres)	Class or gauge	Design height of fill (metres)†
N/A					

† For reinforced concrete box culverts only.

4 Fabric-encased concrete batter protection (Clause 44.3.3)

The average thickness of the concrete mat shall be

N/A

5 Interlocking blocks – Approved Products (Clause 48.2)

The following products are approved for use as interlocking block protection.

N/A

6 Supplementary Requirements (Clause 58)

The following supplementary requirements shall apply.

Demolition of flexible barriers:

Where existing flexible barriers shall be demolished (refer drawings GE-DP-01, GE-DP-02, GE-DP-03), all components shall be removed and disposed offsite, with exception to:

- Below ground portion of drilled anchors may remain unless otherwise noted on the General Arrangement Drawings. Above ground portions of anchors or casing must be broken back at surface level and removed, then covered so they do not present a trip hazard.
- Existing concrete post footings may remain.

Sacrificial testing of anchors

Sacrificial anchors as detailed on GE-TD-03 shall be installed prior to the installation of the production anchors to allow sacrificial anchor testing. The sacrificial anchors shall be installed using the same materials and methods as the production anchors.

The purpose of the sacrificial testing is to:

- Verify to the designer the anchor resistance in relation to the ground conditions
- Determine the bond capacity of an anchor by inducing a failure at the grout/ground interface.
- Allow the designer to determine criteria for anchor acceptance;
- Prove the competence of the Contractor and their construction methods

Sacrificial anchor testing load increments are shown in below table. Note T_u = ultimate tensile capacity of the bar/strands.

Load Increments (% of T_u)							Minimum Period of Observation (Minutes)
1 st Cycle	2 nd Cycle	3 rd Cycle	4 th Cycle	5 th Cycle	6 th Cycle	7 th & 8 th Cycles	
5	5	5	5	5	5	5	1
10	20	30	40	50	60	70 (65*)	1
15	25	35	45	55	65	75 (70*)	1
20	30	40	50	60	70	80 (75*)	5
15	20	30	40	40	50	50	1
10	10	15	20	20	30	30	1
5	5	5	5	5	5	5	1
* For bars							

The Contractor shall record the deformation every minute of the test as well as at the completion of the test and submit to the Designer for review within 5 days of undertaking each test.

Once the Sacrificial tests are completed, the anchors shall be either:

- Extracted entirely from the ground with photos taken of the isolated grouted zone, or

- The anchor shall be cut off below surface level, covered with soil and left in place.

The Sacrificial anchors shall not be used as production anchors

Crack treatment repair of existing mortared stone wall

Crack repairs to the existing mortared stone wall as detailed on GE-TD-04 shall be performed using a low-shrinkage proprietary epoxy, according to the requirements outlined on GE-DI-04.

Item 90505 Connect new pipe to existing pipe using concrete bandage joint

The work operations incorporated in the below items include the following as indicated:-

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Standard Specifications, and* Supplementary requirements listed in MRTS01.1
- b) Supply of all materials, including all necessary road pavement materials;
- c) Carrying out localised excavations, including all necessary road pavement materials;
- d) Removing and/or demolishing existing components, including saw cutting;
- e) Sealing all exposed reinforcing on existing pipe
- f) Removing/demolishing concrete;
- g) Utilising or disposing of existing components and excavated or demolished materials; and
- h) Connecting and aligning existing pipe to new pipe;
- i) Placing and finishing cement mortar
- j) fabricating and placing steel reinforcement
- k) placing and compacting concrete
- l) finishing and curing concrete
- m) Placing and compacting backfill material.

Construction requirements:

The cut location shall be marked out neatly, and that portion of the existing drainage pipe shall be demolished to facilitate the joining of the new drainage pipe to the existing drainage pipe. Demolition shall be such that no damage is caused to the existing drainage pipe. Any damage to the remainder of the pipe shall be made good at no cost to the Principal.

The new pipe shall be placed and kept in place with packers and/or wedges.

The void between the new pipe and the existing drainage structure/pipe shall be made good with concrete infill and all packages/wedges shall be removed.

The contractor shall break out the existing benching (if necessary) and construct new benching with concrete infill to suit the invert and shape of the new pipe. Concrete benching shall have smooth, even surfaces and neat edges.

The internal surface of all concrete infill shall be mortared and bagged (if necessary) to provide a surface finish consistent or better than surface finish to the existing drainage structure. The mortar shall be used with one hour of mixing and shall not be retempered. Bagging (if necessary) shall comply with the requirements of Clause 25.1 (e) of MRTS70.

All quality system requirements such as Hold Points, Witness Points and Milestones specified with MRTS70 apply for the pouring of concrete for all cast insitu items (i.e. approval of concrete mixture, approval of falsework, approval to place concrete etc.)

The joints between the existing drainage structure/pipe and the pipe shall be made watertight and be finished to provide smooth surfaces, uniform with the inner surfaces of the drainage structure/pipe.

Annexure MRTS04.1 (November 2020) General Earthworks



Specific Contract Requirements

Contract Number

XXXXXXXXXX

Note: Clause references within brackets in this Annexure refer to Clauses in the parent Technical Specification MRTS04 unless otherwise noted.

1 Clearing and grubbing

1.1 Additional width for clearing and grubbing (Clause 7.2.1)

The maximum additional width for clearing and grubbing is

N/A

1.2 Areas to be cleared and grubbed (Clause 7.2.1)

The following areas are to be cleared and grubbed in addition to those specified.

N/A

1.3 Trees required by the Administrator (Clause 7.2.3)

The following trees are required by the Administrator for use as marketable timber.

N/A

1.4 Additional requirements for clearing and grubbing (Clause 7.2.8)

The following requirements apply to clearing and grubbing operations additional to those specified in Clause 7.

Additional requirement for clearing of mature trees to be undertaken for the areas shown on GE-EW-01 & GE-EW-02

2 Stripping of topsoil (Clause 8.2)**2.1 Areas to be stripped (Clause 8.2)**

The following areas are to be stripped of topsoil to the depth stated.

Location	Average depth (mm)
N/A	

Refer to the Soil Management Plan – Planning in the environmental documents and/or the Schedule of Rates for estimated topsoil volumes and areas and depths for topsoil stripping required.

Payment Note: Payment for the stripping and stockpiling of topsoil can be nominated in the schedule of rates of Work Item 32003P.

2.2 Topsoil stockpile locations (Clause 8.4.1)

The following areas on the Site are available for the stockpiling of topsoil.

N/A

3 Embankment foundations (Clause 9.2)

The following minimum allowable bearing pressures or minimum California Bearing Ratios (CBRs) shall apply to foundations for embankments.

Location	Minimum allowable bearing pressure (kPa)	Minimum CBR
N/A		

4 Acid sulphate soils

4.1 Initial assessment of acid sulphate soils on the Site (Clause 10.2)

Acid sulphate soils have been identified on the Site.

Yes

No

4.2 Location of acid sulphate soils (Clause 10.2)

The locations of any acid sulphate soils on the Site are stated below.

N/A

4.3 Likely deposits of acid sulphate soils (Clause 10.2)

Likely deposits of acid sulphate soils exist on the Site

Yes

No

No assessment

 N/A

4.4 Location of likely deposits of acid sulphate soils (Clause 10.2)

The locations of any likely deposits of acid sulphate soils on the Site are stated below.

N/A

4.5 Site-specific requirements (Clause 10.3)

The following site-specific requirements apply to the assessment and treatment of acid sulphate soils.

N/A

4.6 Water treatment (Clause 10.7)

The standard to be attained prior to discharge of contaminated water is as follows.

N/A

5 Areas available for the disposal of excess and Unsuitable Material on the Site (Clauses 7.2.7 and 11.2)

The following areas on the Site are available for the disposal of excess and Unsuitable Material. If no areas are indicated, all such material shall be removed from the Site.

Excess material shall be minimised and disbursed over the site where possible to do so safely.

6 Ground surface treatment

6.1 Additional areas for standard ground surface treatment (Clause 12.2.1.1)

Standard ground surface treatment shall be carried out on the following areas additional to those specified in Clause 12.2.1.

N/A

6.2 Ground surface treatment, special, measured in square metres (Clause 12.2.2)

The following are the Contract-specific requirements for special ground surface treatment.

Area	Requirements
N/A	

7 Areas to be tyned (Clause 13.3.1)

The following areas shall be lightly tyned.

N/A

8 Excavation – pre-splitting of batters (Clause 13.3.2.3)

Batters in the following areas are required to be pre-split.

N/A

9 Embankments

9.1 Earth fill material – additional properties (Clause 14.2.2, Clause 14.3.1, Clause 18.2.1 and Clause 18.3.4.2)

Earth fill material shall have the following properties. Where information is not specified below, earth fill material shall have the properties specified in Clause 14.2.2.

Material description	Depth below Subgrade Level (if applicable)	Property requirements				
		Minimum CBR (%)	CBR soaked condition	CBR target density %	CBR target moisture content	Other
N/A						

10 Rainfall zone (Clause 15.3)

The rainfall zone which applies to the Contract is:

High (> 1000)	<input checked="" type="checkbox"/>
Medium (500 – 1000)	<input type="checkbox"/>
Low (< 500)	<input type="checkbox"/>

11 Borrow on the Site**11.1 Areas for borrow on the Site (Clause 17.2)**

The following areas on the Site are available for borrow of additional material. If no areas are indicated, no material shall be borrowed from areas on the Site.

N/A

11.2 Requirements for borrow on the Site (Clause 17.2)

The following additional requirements shall apply to borrowing operations on the Site.

N/A

12 Subgrade

12.1 Unbound granular material (Clause 18.2.2)

Unbound pavement material shall be of the following subtype.

For use in unbound treatments N/A

For use in insitu stabilised treatments N/A

For use in plant-mixed stabilised treatments N/A

12.2 Insitu stabilising agent (Clause 18.2.5.1)

The stabilising agent and its rate of application for insitu stabilisation shall be as follows.

N/A

When filling in this Clause, refer to the guide notes in Clause 18.2.5.1 of MRTS04 for further information.

12.3 Subgrade treatment(s) (Clauses 18.3.3.1 to 18.3.3.13 and Table 18.3.3.2)

The following subgrade treatment(s) shall be applied where stated.

Location	Treatment type	Depth of treatment (mm)
N/A		

12.4 Subgrade treatment Type K (Clause 18.3.3.13)

Subgrade treatment Type K shall be in accordance with the following provisions.

N/A

12.5 Existing subgrade testing (Clauses 18.3.4.2 and 18.4)

Testing of existing subgrade is required by the Contractor

Yes

No

As directed by the Administrator

For Design and Construction Contracts, testing of existing subgrades is typically required in all circumstances unless specifically nominated by the Principal.

For Construct-Only Contracts, testing of existing subgrades is often not required as the subgrade has been tested and its strength taken into account during the design process; however, where only limited subgrade testing has been undertaken, the Principal may elect for the Contractor to undertake additional verification testing during construction.

Where existing subgrade testing is nominated 'as directed by the Administrator', it is intended this activity would be called up for specific activities such as determining subgrade treatment types and so on.

This Clause is not applicable to testing of subgrade fill material. The requirements for testing subgrade fill material are specified in Appendix A of MRTS04.

12.6 Transitions from cut to fill (Clause 18.3.4.2)

Existing foundation material beneath near grade embankments is to be tested by the Contractor

Yes No

Transition treatments shall continue for a distance of 10 metres into the cuttings.

Yes No

13 Supplementary requirements (Clause 22)

The following supplementary requirements shall apply.

Clearing and grubbing works to include the removal of mature trees within the specified locations shown on GE-EW-01 & GE-EW-02

Annexure MRTS05.1 (March 2022)

Unbound Pavements

Specific Contract Requirements

Contract Number



Note: Clause references within brackets in this Annexure refer to Clauses in the parent Technical Specification MRTS05 unless otherwise noted.

1 Material compliance testing locations (Clause 9.2)

For the following locations and/or material subtypes, material compliance testing shall be undertaken on samples taken from the pavement.

If no locations or material subtypes are given, all samples shall be taken from the stockpile.

--

2 Material requirements

2.1 Pavement material locations (Clauses 7.1.1, 7.2.1, 7.3.1 and 8.1)

The following pavement material subtypes shall be used in the locations stated.

Location	Material Subtype

2.2 Design Traffic (Clause 7.2.1)

Location	Average Daily Traffic in the Design Lane in Year of Opening – Equivalent Standard Axles (ESA)

If no indication is given for a particular location, the Administrator shall confirm the average daily traffic in the design lane in year of opening based on advice from the project's pavement designer.

2.3 Type 4 material requirements**2.3.1 Additional requirements for Type 4 material (Clause 7.4)**

The following additional requirements shall apply to Type 4 materials.

--

2.3.2 CBR moisture content for Type 4 material (Clauses 4.1.2 and 7.4)

The relative moisture content for reporting CBR test results for Type 4 material is given below.

Material Subtype	Relative Moisture Content

If no indication is given for a particular material subtype, the CBR shall be reported at the Optimum Moisture Content (OMC).

2.4 Material stockpiles (Clause 7.7)

Stockpiles of pavement material shall be located as stated below.

If no indication is given, material stockpiles shall be located as stated in Clause 7.7.

3 Construction requirements**3.1 Construction equipment****3.1.1 Paving equipment – Type 2, 3 or 4 materials (Clause 8.3.1.1.3)**

For pavement constructed using Type 2, 3 and 4 materials, the following paving equipment shall be used.

If no indication is given, the paving equipment to be used shall be nominated by the Contractor in their Unbound Pavement Construction Procedure.

The above requirements are not applicable to Type 1 (HSG) materials.

3.1.2 Intelligent Construction Rollers (Clause 8.3.1.3)

Intelligent Construction (IC) rollers shall be used to compact unbound pavement material

Yes No

If no indication is given, the rollers to be used shall be nominated by the Contractor in their Unbound Pavement Construction Procedure.

Where IC equipped rollers are not available locally, existing roller may need to be retrofitted with IC equipment.

3.2 Geometrics

3.2.1 Vertical tolerances – Types 2, 3, and 4 materials only (Clause 8.4.4.3)

The vertical tolerance on any layer shall be alternative

A		B	
(10/15 mm)		(25 mm)	

If no indication is given, the vertical tolerance shall be Alternative A.

3.2.2 Deviation from a straight-edge – Types 2, 3 and 4 materials only (Clause 8.4.5)

The maximum deviation from a straight-edge shall be alternative

C		D	
(5 mm)		(8 mm)	

If no indication is given, the maximum deviation from a straight-edge shall be Alternative C.

3.2.3 Crossfall and straight-edge tolerances applicable on layers other than the final layer (Clauses 8.4.4.4 and 8.4.5)

In addition to the final layer of unbound pavement, the specified requirement for crossfall and deviation from a straight-edge shall also apply to the following layers.

If no indication is given, the requirements for crossfall and deviation from a straight-edge shall apply to the final (uppermost) layer of unbound pavement only.

3.2.4 Road roughness (Clause 8.4.6)

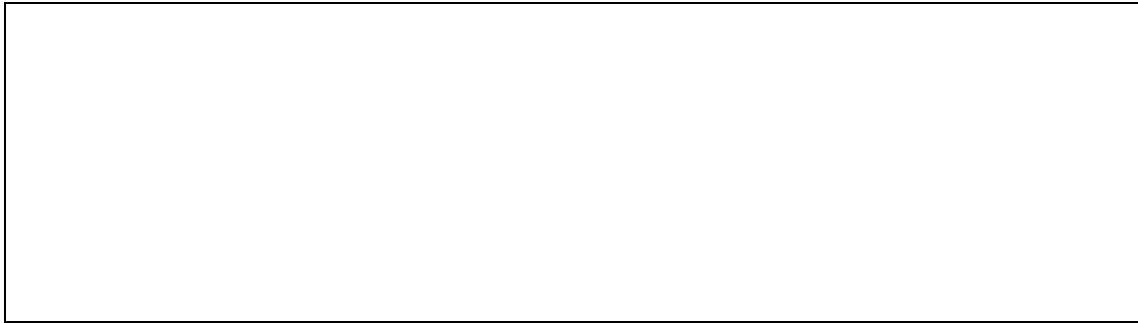
The maximum road roughness shall be (R_s)

	m/km
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If no indication is given, the requirement shall be 2.31.

4 Supplementary requirements (Clauses 8.4.6 and 10)

The following supplementary requirements shall apply.



Annexure MRTS16.1

Landscape and Revegetation Works



Specific Contract Requirements

Contract Number

Note: Clause references within brackets in this Annexure refer to Clauses in the parent Technical Specification MRTS16 unless otherwise noted.

1 Quality System Requirements

1.1 *Quality System Supplementary Requirements (Clause 5.4)*

2 General Requirements

2.1 *General Requirements Supplementary Requirements (Clause 6.3)*

3 Materials and Construction

3.1 Weed Control

3.1.1 Target Herbicides (Clause 7.3.2)

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3.1.2 Manual Removal of Weeds (Clause 8.3)

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3.2 Seeding

3.2.1 Seed Treatment (Clause 7.4.9)

Seed Species / Mix	Pre treatment

3.2.2 Grass Seed Mix Table (Clause 7.4.9.1)

Mix Name					
Botanical Name	Rate kg / ha	Contractor to Complete - <i>include Table in Seed Supply Proposal</i>			
		Purity %	Viability / Germination %	Adjusted Rate kg / ha	
Couch grass and a mix of a minimum three additional perennial turf / pasture grass species					
Cynodon dactylon (Green Couch) - Hulled					
Cynodon dactylon (Green Couch) – Un-Hulled					
Cover Crop Grass Seed Species					
Apr – Aug	50% Annual Rye and 50% Annual Millet				
Sep – Mar	100% Annual Millet				

3.2.3 Native Woodland / Forest Seed Table (Clause 7.4.9.2)

Mix Name						
Botanical Name	Mature Height	Mature Width	Rate kg / ha	Contractor to Complete – <i>include in Table Seed Supply Proposal</i>		
				Purity %	Viability / Germination %	Adjusted Rate kg / ha
Mix of a minimum three Acacia species						
Mix of a minimum three tree species						
Mix of a minimum three shrub species						
Couch Grass and a mix of a minimum three additional perennial turf / pasture grass species						
Cynodon dactylon (Green Couch) – Hulled						
Cynodon dactylon (Green Couch) – Un-Hulled						
Cover Crop Grass Seed Species						
Apr - Aug	50% Annual Rye and 50% Annual Millet					
Sep - Mar	100% Annual Millet					

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3.2.4 Organic Mesh (Clause 7.4.8.1)

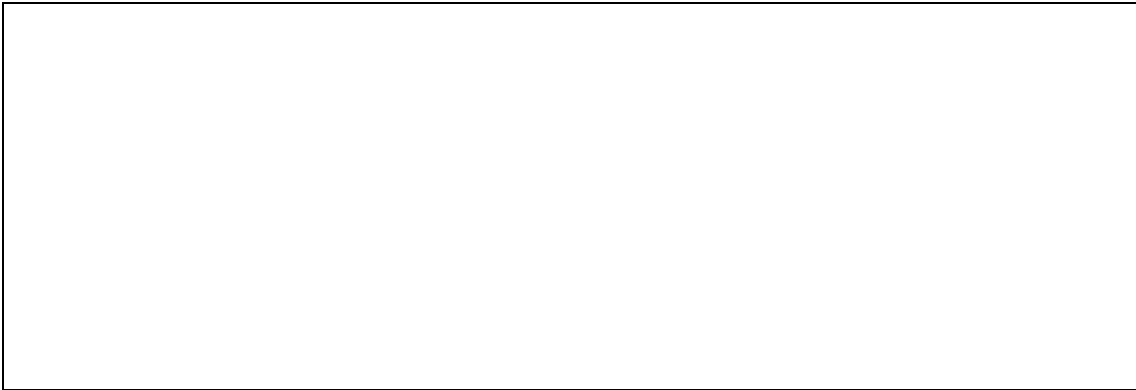
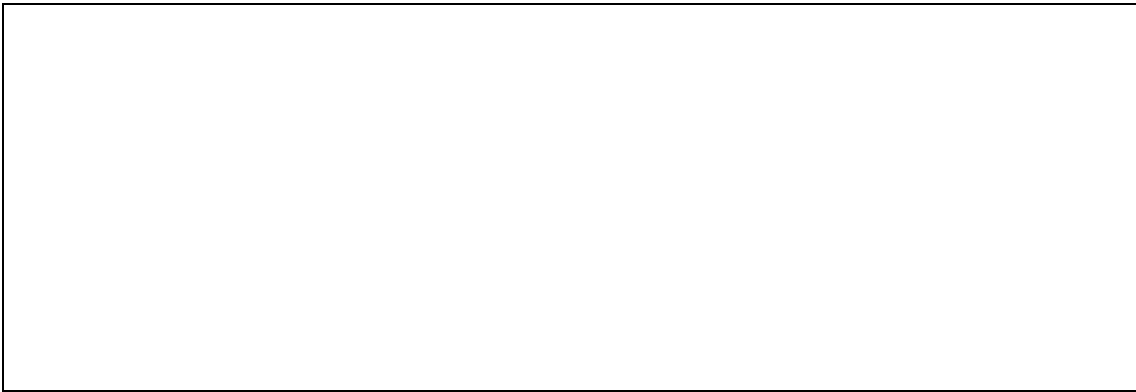
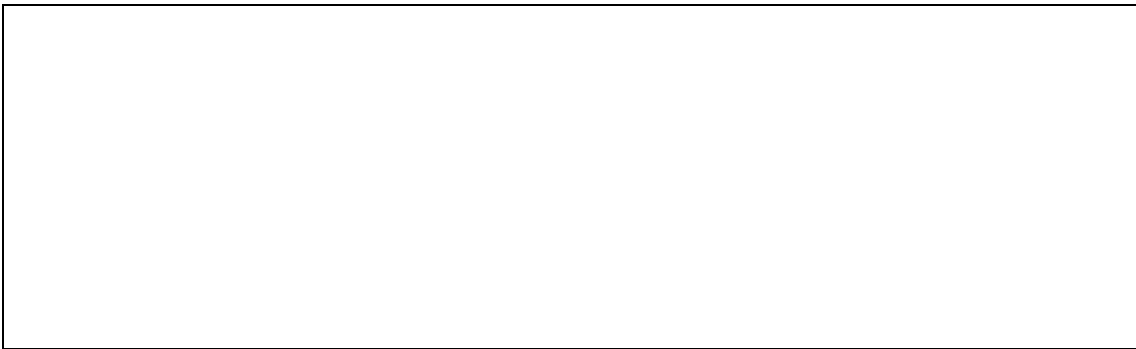
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3.3 Turf**3.3.1 Turf (Clause 7.5.2)**

Species	Grade	Roll Width

3.4 Planting**3.4.1 Container and Ex-ground Stock Schedule (Clause 7.6.2)**

Schedule Name						
Botanical Name	Container Size	Planting Density		Mature Size (m)		Quantity
		Spacing (m) or	Plants per / m ²	H	W	

3.4.2 Imported Mulch (Clause 7.6.3.2)**3.4.3 Organic Matting (Clause 7.6.4)****3.5 Irrigation System (Clause 7.9)**

3.6 Materials and Construction Supplementary Requirements (Clause 7.10 and Clause 8.7)

4 Establishment and Monitoring

4.1 Watering (Clause 9.1.1.1 and Clause 9.2.1.1)

4.2 Monitoring Period Duration (Clause 9.2)

Monitoring period duration shall be	days	OR
Monitoring period shall finish on the following date		OR

4.3 Establishment and Monitoring Supplementary Requirements (Clause 9.3)

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Appendix – Forms A-I

**Transport and Main Roads Specifications
MRTS16 Landscape and Revegetation Works**

July 2017

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Form A – Soil Management Plan - Construction

The Contractor shall prepare a Soil Management Plan – Construction using this form.

Project Name			
Contract No.		Date	
Site Description			
Prepared by			

1 Topsoil volumes assessment		m ³
Total scheduled volume of topsoil.		m ³
Estimated total volume of potentially ¹ suitable site topsoil, as per Clause 8.2 <i>Topsoil Stripping Dimensions</i> , of MRTS04 <i>General Earthworks</i> .		m ³
If shortfall in site topsoil, estimated volume of topsoil to be imported.		m ³
If surplus of site topsoil, estimated volume of topsoil to be disposed.		
If shortfall in suitable site topsoil ¹ , the Contractor may provide a proposal to adjust the areas and / or depths to be stripped; or where this is not practicable, propose to import topsoil –		
If surplus in site topsoil, the Contractor shall treat material in accordance with Clause 8.4.2 Surplus Material of MRTS04 <i>General Earthworks</i> , or provide a proposal to avoid surplus volumes by reducing areas to be stripped and / or depths of stripping –		

2 Integrated soil management activities
The Contractor shall describe how topsoil and subsoil operations will be integrated with the requirements and associated operations of each of the following documents:
Road Construction Program - <i>including stripping depths and locations, topsoil stockpile locations, amelioration, road embankment construction, ground work operations, and placement of soil –</i>
Environmental Management Plan (Construction) – <i>in particular acid sulphate soils, contaminated soils, red imported fire ants, water quality and erosion and sediment control operations –</i>
Other documents –

3 Amelioration program and operations
The Contractor shall refer to the Soil Assessment Report(s) and provide a soil amelioration program and describe the amelioration operations for each of the following materials:
Stripped topsoil stockpiles –
Subsoil (broadacre area subsoils in areas to be vegetated) –
Subsoil (cut and fill batters to be vegetated):

4 Appendix A – Soil Management Plan – Construction Site Plans

The Contractor shall include in Appendix A site plan/s (drawing/s) showing:

Topsoil

- areas specified not to be stripped of topsoil / not to be disturbed
- stockpile locations and stockpile identification numbers
- stockpiles to be disposed of on / off site
- if disposing of topsoil on site, location and footprint of disposal site
- amelioration agents and application rates per stockpile as per Soil Assessment Report

Subsoil

- batters not specified to be treated with a vegetation treatment
- cut and fill batter identification number
- location of each subsoil sampling location
- amelioration agents and application rates for subsoil areas as per Soil Assessment Report

5 Appendix B – Soil Assessment Report(s)

The Contractor shall include a Form B – Soil Assessment Report and the associated test form per sample as follows:

Form / Set of Tests	Material to be Tested / Managed
Form C – Topsoil Testing	<ul style="list-style-type: none"> • stockpiled site topsoil • imported topsoil
Form D – Manufactured Site Topsoil Compliance Testing	<ul style="list-style-type: none"> • compliance testing of stockpiled site topsoil after amelioration
Form E – Subsoil Testing	<ul style="list-style-type: none"> • subsoil
Form F – Drainage Basin Soil Testing	<ul style="list-style-type: none"> • soil used in basins
Where organic soil conditioner is to be used as a soil ameliorant and / or where an organics blanket is specified, the Contractor shall include:	
Form G – Organic Soil Conditioner Testing	<ul style="list-style-type: none"> • organic soil conditioner and organics blankets
Where non-potable water is proposed, the Contractor shall include:	
Form H – Non-potable Water Management Plan	<ul style="list-style-type: none"> • dam • bore • creek / river • lake water
Form I – Non-potable Water Testing and Assessment Report	

6 Soil Test Results Summary

The Contractor shall summarise the soil test results for each topsoil and subsoil sample using the following tables (for accurate interpretation show the relevant 'a - d' sub-parameter with the test result and non-complying results in red text):

TOPSOIL Test Results Summary										
Parameter	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
Bulk density										
Organic matter										
Wettability										
pH a) General b) Acid soils c) Alkaline soils d) Strongly alkaline										
Electrical conduct										
Ext. phosphorus a) Very sensitive b) Mod. Sensitive c) Non-sensitive										
Permeability										
Texture										
Particle size a) Site soil b) Imported topsoil										
Plant propagules (imported topsoil)										
Water repellence										
Soil texture range: a) / b) / c)										
Exch. Calcium										
Exch. Magnesium										
Ca:Mg										
ESP										
Exch. Potassium										
Exch. Aluminium										
ECEC										
Sol. Chloride										
Ext. sulfur										

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SUBSOIL Test Results Summary										
Parameter	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
Wettability										
pH a) General b) Acid soils c) Alkaline soils d) Strongly alkaline										
Electrical conduct.										
Texture										
Water repellence										
Emerson class no.										
Soil texture range: a) / b) / c)										
Exch. Calcium a) / b) / c)										
Exch. Magnesium a) / b) / c)										
Ca:Mg a) / b) / c)										
ESP a) / b) / c)										
Exch. Potassium a) / b) / c)										
Exch. Aluminium a) / b) / c)										
ECEC a) / b) / c)										
Sol. Chloride a) / b) / c)										
Ext. sulfur a) / b) / c)										
Slaking class no.										
Clouiding class no.										

7 Appendix C – Additional Information

The Contractor may include an Appendix C and provide additional information to support the Soil Management Plan – Construction – for example, delivery dockets for imported materials.

NOTE – ¹ Suitable topsoil refers to stockpiled site topsoil, identified by a qualified Soil Scientist as being a soil that can be used with or without amelioration; and any required amelioration is considered to be practicable.

Form B – Soil Assessment Report

The Soil Scientist is to complete this form and attach the relevant soil testing forms (C, D, E or F) for each soil sample.

NOTE – A Soil Assessment Report is not required for certified complying, imported topsoil.		
Site Sample Identification		Sample Date:
Project Name:	Sample Location:	
Job / Contract No:	Site / Stockpile / Batter No:	
Form attached: C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F <input type="checkbox"/>		
Testing Laboratory Sample Identification		
Laboratory:	Sample No:	Date Tested:
Soil scientist name (person who prepared report)		
Compliance:		
Complies: <input type="checkbox"/> Non-compliant – ameliorate <input type="checkbox"/> Non-compliant – impracticable to ameliorate <input type="checkbox"/>		

1 Interpretation of test parameter result		
The Soil Scientist is to indicate (x) the non-compliant soil parameters and provide an interpretation for each parameter relevant to the soil test parameter requirement.		
Soil Test Parameter	Non-compliant	Interpretation
Bulk density (BD)	<input type="checkbox"/>	
Organic matter (OM)	<input type="checkbox"/>	
Wettability	<input type="checkbox"/>	
pH (H ₂ O, 1:5)	<input type="checkbox"/>	
Electrical conductivity (H ₂ O, 1:5)	<input type="checkbox"/>	
Extractable phosphorus content (Extr. P)	<input type="checkbox"/>	
Permeability	<input type="checkbox"/>	
Texture	<input type="checkbox"/>	
Particle size	<input type="checkbox"/>	
Plant propagule (imported topsoil)	<input type="checkbox"/>	
Water repellence class number	<input type="checkbox"/>	
Dispersion – Emerson class number (subsoil)	<input type="checkbox"/>	
Exchangeable calcium (Ca)	<input type="checkbox"/>	
Exchangeable magnesium (Mg)	<input type="checkbox"/>	
Calcium magnesium ratio (Ca:Mg)	<input type="checkbox"/>	
Exchangeable sodium percentage (ESP)	<input type="checkbox"/>	
Exchangeable potassium (K)	<input type="checkbox"/>	
Exchangeable aluminium (Al) percentage	<input type="checkbox"/>	
Effective cation exchange capacity (ECEC)	<input type="checkbox"/>	

Soluble chloride (Cl ⁻)	<input type="checkbox"/>	
Extractable sulfur (S)	<input type="checkbox"/>	
Slaking class number (subsoil)	<input type="checkbox"/>	
Clouding (dispersion) class number (subsoil)	<input type="checkbox"/>	

2 Assessment of test results of site TOPSOIL

The Soil Scientist is to provide an assessment per sample relevant to:

Suitability and practicability of the topsoil to comply with Form C – *in particular describe how the parameters as a whole affect the suitability of the soil –*

Erodibility and / or dispersion risk of topsoil:

Best use of the topsoil relevant to vegetation treatment and installation location (batters, basins, drains and so on):

3 Amelioration treatment of TOPSOIL – initial and compliance testing

The Soil Scientist is to provide an amelioration treatment in the schedule below, addressing the non-compliant topsoil parameters in Form C and Form D, as per sample and *in particular –*

- | | |
|--|---|
| <ul style="list-style-type: none"> • organic matter content (OM) • acidity and / or alkalinity (pH) • water repellence (hydrophobicity) class number • calcium magnesium ratio (Ca:Mg) | <ul style="list-style-type: none"> • concentration of calcium (Ca) • concentration of magnesium (Mg) • exchangeable sodium percentage (ESP) • fertiliser type(s) and application is rate(s) |
|--|---|

TOPSOIL Amelioration Schedule

Ameliorant	Rate ^{1, 2}	Workings
Agricultural lime	kg/m ³	–
(Agricultural) dolomite	kg/m ³	–
Agricultural gypsum	kg/m ³	–
Organic soil conditioner	kg/m ³	% by volume
	kg/m ³	–
Vegetation treatment type (e.g. turfed areas)	kg/ha	
Fertiliser type and analysis (N:P:K:S)		
Vegetation treatment type (e.g. seeded areas)	kg/ha	
Fertiliser type and analysis (N:P:K:S)		
Vegetation treatment type (e.g. planted areas)	kg/ha	
Fertiliser type and analysis (N:P:K:S)		

4 Assessment of test result of SUBSOIL

The Soil Scientist is to provide an assessment per subsoil sample relevant to:

Suitability and practicability of the subsoil to comply with Form E –

Erodibility and / or dispersion risk of subsoil –

5 Amelioration treatment of SUBSOIL

NOTE – Compliance testing of ameliorated subsoil is not required.

The Soil Scientist is to provide amelioration treatment addressing the non-compliant subsoil parameters and *in particular* –

- wettability
- acidity and / or alkalinity (pH)
- calcium magnesium ratio (Ca:Mg)
- concentration of calcium (Ca)
- concentration of magnesium (Mg)
- exchangeable sodium percentage (ESP)
- aluminium toxicity (Al)
- slaking and / or clouding class number

SUBSOIL Amelioration Schedule

Ameliorant	Rate ^{1, 2}	Workings
Agricultural lime	kg/m ²	kg/m ³ x 0.2 m = kg/m ²
(Agricultural) dolomite	kg/m ²	kg/m ³ x 0.2 m = kg/m ²
Agricultural gypsum	kg/m ²	kg/m ³ x 0.2 m = kg/m ²
	kg/m ²	kg/m ³ x 0.2 m = kg/m ²

6 Justification for exceeding ameliorants maximum amelioration rates

The Soil Scientist shall provide justification for recommending an application rate for a single or combination of agents that exceeds the maximum rate specified below:

NOTE –**¹Amelioration rate units and calculation standards**

Chemical ameliorant application rate of topsoil – shall be stated as dry weight (kg) of ameliorant to volume (m³) of stockpiled soil – (kg/m³).

Chemical ameliorant application rate of subsoil – shall be stated as dry weight (kg) of ameliorant to area (m²) of subsoil – (kg/m²). The volume of subsoil to be treated is the top 200 mm depth. The rate for amelioration of subsoil is not based on the depth of incorporation (depth of ground preparation operations). For example, a batter that is to be ameliorated with 5 kg / m³ of lime and roughened to the standard depth of 50 mm will receive 1 kg/m² of lime (and not 0.25 kg/m²).

Organic soil conditioner amelioration rate shall be stated as volume (m³) of ameliorant to volume (m³) of stockpiled topsoil – (m³/m³).

²Ameliorants maximum application rates

The following ameliorant application rates are not to be exceeded unless justification has been provided and deemed suitable:

Ameliorant	Topsoil – Max. Rate	Subsoil – Max. Rate
Agricultural lime – CaCO ₃	10 kg/m ³	15 kg/m ³ (3 kg/m ²)
(Agricultural) dolomite – CaMg(CO ₃) ₂	10 kg/m ³	15 kg/m ³ (3 kg/m ²)
Agricultural gypsum – CaSO ₄ .2H ₂ O	10 kg/m ³	15 kg/m ³ (3 kg/m ²)
Organic soil conditioner – by volume of topsoil	0.2 m ³ /m ³	–

Form C – Topsoil Testing

Site Sample Identification		Sample Date:
Project Name:	Sample Location:	
Job / Contract No:	Site / Stockpile No:	
NOTE – sample shall be taken from topsoil layer and be a composite, representative sample per topsoil type <input type="checkbox"/>		
Testing Laboratory Sample Identification		
Laboratory:	Sample No:	Date Tested:
Complies <input type="checkbox"/> Non-compliant – ameliorate <input type="checkbox"/> Non-compliant – impracticable to ameliorate <input type="checkbox"/>		
Imported Topsoil Only		
Date of Manufacture:	Name of the Manufacturer:	
Manufacture Batch Number:	Complies <input type="checkbox"/>	Non-compliant <input type="checkbox"/>

Soil Test Parameter	Test Method	Soil Test Parameter Requirement	Soil Test Result
Refer AS 4419 – Soils for landscaping and garden use – NOTE MODIFIED REQUIREMENTS			
Bulk density (BD)	Clause 5.2	> 0.7 kg/L	
Organic matter (OM) (relevant to the organic carbon concentration)	Clause 5.3	3 to 10%	
Wettability	Clause 5.4	> 5 mm/min. – < 150 mm/min.	
pH (H ₂ O, 1:5): a) General range b) Naturally occurring acid soils c) Naturally occurring alkaline soils d) Naturally occurring strongly alkaline soils	Clause 5.5	> 5.5 and < 7.5 > 5.5 and < 6.5 > 7.0 and < 8.5 ≥ 8.5 and < 9.5	
Electrical conductivity (EC H ₂ O, 1:5)	Clause 5.6	< 1.2 dS/m	
Extractable phosphorus content (Extr. P) a) Very P sensitive plants b) Moderately P sensitive plants c) Non-sensitive P plants	Clause 5.8	< 5 mg/kg < 20 mg/kg < 100 mg/kg	
Permeability	Clause 5.12	2 to 35 cm/hr	
Texture	Clause 5.13	Texture Classification	
Particle size: a) Site soil b) Imported topsoil	–	100% by weight to pass a 40 mm sieve 100% by weight to pass a 20 mm sieve	
Imported topsoil only – plant propagule content	Clause 5.15	Free from any living parts of plants generally considered to be weeds	
Refer TMR Materials Testing Manual – Test Method Q160: Water repellency of soil			
Water repellence (hydrophobicity) class number	Table 1	Class 0 or 1	

Refer Soil Chemical Methods: Australasia – Rayment & Lyons, CSIRO 2011			
NOTE – Select soil texture range: a) <input type="checkbox"/> b) <input type="checkbox"/> c) <input type="checkbox"/>			
Exchangeable calcium (Ca) a) Sands and loamy sands b) Sandy loams to silty clay loams c) Sandy clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	≥ 2 meq/100 g ≥ 5 meq/100 g ≥ 5 meq/100 g	
Exchangeable magnesium (Mg) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	> 0.6 meq/100 g > 1.0 meq/100 g > 1.0 meq/100 g	
Calcium magnesium ratio (Ca:Mg) Exchangeable form for a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	2 to10	
Exchangeable sodium percentage (ESP) (Na base saturation % = % Na of total cations) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	< 6 < 15 < 15	
Exchangeable potassium (K) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	> 0.2 meq/100 g > 0.4 meq/100 g > 0.4 meq/100 g	
Exchangeable aluminium (Al) percentage (Al base saturation % = % Al of total cations) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH < 6.0 Method 15G1	< 25 < 40 < 40	
Effective cation exchange capacity (ECEC) (ECEC = sum of exchangeable cations) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	Method 15J1	> 5 meq/100 g > 10 meq/100 g > 10 meq/100 g	
When EC > 1.2 dS/m – Soluble chloride (Cl ⁻) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	Method 5A	< 900 mg/kg	
When EC > 1.2 dS/m – Extractable sulfur (S) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	Method 10B	< 100 mg/kg	

Form D – Manufactured Site Topsoil Compliance Testing

Site Sample Identification		Sample Date:
Project Name:	Sample Location:	
Job / Contract No:	Site / Stockpile No:	
NOTE – sample shall be a composite, representative sample taken from soil 500 mm below the stockpile surface <input type="checkbox"/>		
Testing Laboratory Sample Identification		
Laboratory:	Sample No:	Date Tested:
Complies <input type="checkbox"/>		Non-compliant – ameliorate <input type="checkbox"/>

Soil Test Parameter	Test Method	Soil Test Parameter Requirement	Soil Test Result
Refer AS 4419 – Soils for landscaping and garden use – NOTE MODIFIED REQUIREMENTS			
Organic matter (OM) (relevant to the organic carbon concentration)	Clause 5.3	3 to 10%	
pH (H ₂ O, 1:5): a) General pH range soils b) Naturally occurring acid soils c) Naturally occurring alkaline soils d) Naturally occurring strongly alkaline soils	Clause 5.5	> 5.5 and < 7.5 > 5.5 and < 6.5 > 7.0 and < 8.5 ≥ 8.5 and < 9.5	
Electrical conductivity (EC H ₂ O, 1:5)	Clause 5.6	< 2.4 dS/m when agricultural lime, gypsum or dolomite added: otherwise < 1.2 dS/m	
Texture	Clause 5.13	Texture Classification	
Refer TMR Materials Testing Manual – Test Method Q160: Water repellency of soil			
Water repellence (hydrophobicity) class number	Table 1	Class 0 or 1	
Refer AS 1289.3.8.1 – Methods of testing soils for engineering purposes			
Dispersion – Emerson class number	Method 3.8.1	Class 3 to 8	
Refer Soil Chemical Methods : Australasia – Rayment & Lyons, CSIRO 2011			
NOTE – Select soil texture range: a) <input type="checkbox"/> b) <input type="checkbox"/> c) <input type="checkbox"/>			
Exchangeable calcium (Ca) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	≥ 2 meq/100 g ≥ 5 meq/100 g ≥ 5 meq/100 g	
Exchangeable magnesium (Mg) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	> 0.6 meq/100 g > 1.0 meq/100 g > 1.0 meq/100 g	
Calcium magnesium ratio (Ca:Mg) Exchangeable form for – a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	2 to 10	

Exchangeable sodium percentage (ESP) (Na base saturation % = % Na of total cations) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	< 6 < 15 < 15	
Exchangeable potassium (K) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	> 0.2 meq/100 g > 0.4 meq/100 g > 0.4 meq/100 g	
Exchangeable aluminium (Al) percentage (Al base saturation % = % Al of total cations) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH < 6.0 Method 15G1	< 25 < 40 < 40	
Effective cation exchange capacity (ECEC) (ECEC = sum of exchangeable cations) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	Method 15J1	> 5 meq/100 g > 10 meq/100 g > 10 meq/100 g	

Form E – Subsoil Testing

Site Sample Identification		Sample Date:
Project Name:	Sample Location:	
Job / Contract No:	Site / Stockpile / Batter No:	
NOTE – sampling of batters to be taken from surface to 200 mm depth <input type="checkbox"/>		
Testing Laboratory Sample Identification		
Laboratory:	Sample No:	Date Tested:
Complies <input type="checkbox"/>		Non-compliant – ameliorate <input type="checkbox"/>

Soil Test Parameter	Test Method	Soil Test Parameter Requirement	Soil Test Result
Refer AS 4419 – Soils for landscaping and garden use – NOTE MODIFIED REQUIREMENTS			
Wettability	Clause 5.4	> 5 mm/min – < 150 mm/min	
pH (H ₂ O, 1:5): a) General range b) Naturally occurring acid soils c) Naturally occurring alkaline soils d) Naturally occurring strongly to very strongly alkaline soils	Clause 5.5	> 5.5 and < 7.5 > 5.5 and < 6.5 > 7.0 and < 8.5 ≥ 8.5 and < 9.5	
Electrical conductivity (EC H ₂ O, 1:5)	Clause 5.6	< 1.2 dS/m	
Texture	Clause 5.13	Texture Classification	
Refer TMR Materials Testing Manual – Test Method Q160: Water repellency of soil			
Water repellence (hydrophobicity) class number	Table 1	Class 0 or 1	
Refer AS 1289.3.8.1 – Methods of testing soils for engineering purposes			
Dispersion – Emerson class number	Method 3.8.1	Class 3 to 8	
Refer Soil Chemical Methods : Australasia – Rayment & Lyons, CSIRO 2011			
NOTE – Select soil texture range: a) <input type="checkbox"/> b) <input type="checkbox"/> c) <input type="checkbox"/>			
Exchangeable calcium (Ca) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	≥ 2 meq/100 g ≥ 5 meq/100 g ≥ 5 meq/100 g	
Exchangeable magnesium (Mg) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	> 0.6 meq/100 g > 1.0 meq/100 g > 1.0 meq/100 g	
Calcium magnesium ratio (Ca:Mg) Exchangeable form for – a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	2 to 10	

Exchangeable sodium percentage (ESP) (Na base saturation % = % Na of total cations) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	< 6 < 15 < 15	
Exchangeable potassium (K) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	> 0.2 meq/100 g > 0.4 meq/100 g > 0.4 meq/100 g	
Exchangeable aluminium (Al) percentage (Al base saturation % = % Al of total cations) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH < 6.0 Method 15G1	< 25 < 40 < 40	
Effective cation exchange capacity (ECEC) (ECEC = sum of exchangeable cations) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	Method 15J1	> 5 meq/100 g > 10 meq/100 g > 10 meq/100 g	
When EC > 1.2 dS/m – Soluble Chloride (Cl ⁻) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	Method 5A	< 900 mg/kg	
When EC > 1.2 dS/m – Extractable Sulfur (S) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	Method 10B	< 100 mg/kg	
Refer TMR Materials Testing Manual – Test Method Q161 Field dispersion indicator test of soil – slaking			
Slaking class number	Table 1	Class 0 – 2	
Refer TMR Materials Testing Manual – Test Method Q162 Field dispersion indicator test of soil – clouding			
Clouding (dispersion) class number	Table 1	Class 0 – 1	

Form F – Drainage Basin Soil Testing

Site Sample Identification		Sample Date:
Project Name:	Sample Location:	
Job / Contract No:	Site / Stockpile / Batter No:	
NOTE – sampling of batters to be taken from surface to 300 mm depth <input type="checkbox"/>		
Testing Laboratory Sample Identification		
Laboratory:	Sample No:	Date Tested:
Complies <input type="checkbox"/>		Non-compliant – ameliorate <input type="checkbox"/>

Soil Test Parameter	Test Method	Soil Test Parameter Requirement	Soil Test Result
Refer MRTS04 – General Earthworks			
Earth fill material Class A	Tables 14.2.2-A and 14.2.2-B	Requirements as per Tables 14.2.2-A and 14.2.2-B	
Refer AS 1289.3.8.1 – Methods of testing soils for engineering purposes			
Dispersion – Emerson class number	Method 3.8.1	Class 3 to 8	
Refer TMR Material Testing Manual - Test method Q142A: Dry density – moisture relationship of soils and crushed rock - standard			
Construction moisture content	Q142A	± 2% (OMC)	
Refer AS 4419 – Soils for landscaping and garden use – NOTE MODIFIED REQUIREMENTS			
pH (H ₂ O, 1:5): a) General range b) Naturally occurring acid soils c) Naturally occurring alkaline soils d) Naturally occurring strongly alkaline soils	Clause 5.5	> 5.5 and < 7.5 > 5.5 and < 6.5 > 7.0 and < 8.5 ≥ 8.5 and < 9.5	
Electrical conductivity (EC H ₂ O, 1:5)	Clause 5.6 – Method 3A1	< 1.2 dS/m	
Refer Soil Chemical Methods : Australasia – Rayment & Lyons, CSIRO 2011			
NOTE – Select soil texture range: a) <input type="checkbox"/> b) <input type="checkbox"/> c) <input type="checkbox"/>			
Exchangeable sodium percentage (ESP) (Na base saturation % = % Na of total cations) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	When pH ≤ 7.3 Method 15B3 When pH > 7.3 Method 15C1	< 6 < 15 < 15	
When EC > 1.2 dS/m – Soluble chloride (Cl ⁻) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	Method 5A	< 900 mg/kg	
When EC > 1.2 dS/m – Extractable sulfur (S) a) Sands and loamy sands b) Sandy loams to clay loams c) Sandy light clay to heavy clay	Method 10B	< 100 mg/kg	

Refer TMR Materials Testing Manual – Test Method Q161 Field dispersion indicator test of soil – slaking			
Slaking class number	Table 1	Class 0 – 2	
Refer TMR Materials Testing Manual – Test Method Q162 Field dispersion indicator test of soil – clouding			
Clouding (dispersion) class number	Table 1	Class 0 – 1	

Form G – Organic Soil Conditioner Testing

Organic soil conditioner shall comply with:

- a) AS 4454 Clause 3.1.1.1 (d) mature compost and Clause 3.1.1.2 (a) soil conditioner, and
- b) Form G.

Site Sample Identification		Sample Date:
Project Name:	Sample Location:	
Job / Contract No:	Site / Stockpile No. / Batch:	
NOTE – sampling shall be in accordance with AS 4454 Clause 4.1 <input type="checkbox"/>		
Testing Laboratory Sample Identification		
Laboratory:	Sample No:	Date Tested:
Date of Manufacture:	Name of the Manufacturer:	
Manufacture Batch No.:	Complies with AS 4454, and Form G <input type="checkbox"/>	Non-compliant with AS 4454 and Form G <input type="checkbox"/>

Organic Soil Conditioner Parameter	Test Method	Organic Soil Conditioner Test Parameter Requirements	Organic Soil Conditioner Test Results
Refer AS 4454 – Composts, soil conditioners and mulches – NOTE MODIFIED REQUIREMENTS			
Pathogen indicators: a) E. coli b) Salmonella spp. c) Faecal coliforms	Appendix D – Clause D5.4	< 100 MPN/g absent < 1000 MPN/g	
Nitrogen Drawdown Index (NDI)	Appendix O	> 0.5 NDI	
Refer AS 4276.7 – Water microbiology - Escherichia coli and thermotolerant coliforms - Membrane filtration method			
Thermotolerant coliforms	AS 4276.7	< 100 MPN/g	
Refer AS 3896 – Waters - Examination for Legionella spp. including Legionella pneumophila			
Legionella spp	AS 3896	absent	
Refer AS 5013.24.2 – Microbiology of food and animal feeding stuffs – Horizontal method for the detection and enumeration of Listeria monocytogenes - Enumeration method			
Listeria spp	AS 5013.24.2	absent	
AS 4964 – Method for the qualitative identification of asbestos in bulk samples			
Asbestos containing material (ACM) – a) Bonded (tightly bound) asbestos b) Loosely bound (friable) asbestos	AS 4964	absent	
AS 4419 – Soils for landscaping and garden use			
pH (H2O, 1:5)	Clause 5.5	6.5 – 8.5	
Electrical conductivity (EC H2O, 1:5)	Clause 5.6	< 1.2 dS/m	
Aqueous film forming foams (AFFF) containing PFC compounds			
Perfluorooctane sulfonate (PFOS) and Perfluorooctanoic acid (PFOA)	Method SOC-PFC via LC/MS/MS	< 0.0039 mg/kg	

Form H – Non-potable Water Management Plan

The Contractor shall refer to Form I – Non-potable Water Testing and Assessment Report and prepare a management plan using this form.

<p>1 Integrated non-potable water management activities</p> <p>The Contractor shall describe how watering of vegetation treatments, using water sourced from the sampled water source, will be integrated with the requirements and associated operations of each of the following documents:</p>
<p>Environmental Management Plan (Construction) – <i>in particular water and soil quality operations –</i></p>
<p>Guide to Workplace use of Non-potable Water Including Recycled Waters (DIER 2007) – <i>in particular the management and application of water –</i></p>
<p>The Soil Management Plan – Construction – <i>in particular salt build-up in soils –</i></p>
<p>Other documents –</p>

<p>2 Amelioration program and operations</p> <p>The Contractor shall refer to the Non-potable Water Assessment Report(s) and provide the watering practices and watering program to manage the saline properties of the water – <i>in particular to include –</i></p>			
<p>Salt tolerance of plant species – indicate if a vegetation treatment contains plant species that are salt sensitive, salt tolerant and / or very salt tolerant, as per Department of Agriculture, Fisheries and Forestry.</p>			
Vegetation Treatment	Salt sensitive	Salt tolerant	Very salt tolerant
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Suitable salt tolerant species to be substituted for the salt sensitive species indicated above –</p>			
<p>Water source(s) description –</p>			
<p>Water amelioration –</p>			
<p>Watering program –</p>			
<p>Watering practices –</p>			
<p>Water monitoring program –</p>			
<p>Plant and soil monitoring program –</p>			

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Form I – Non-potable Water Testing and Assessment Report

Non-potable Water Assessment Report		
Site Sample Identification		Sample Date:
Project Name:	Sample Location:	
Job / Contract No:	Site / Water Body:	
Form attached: <input type="checkbox"/>		
Testing Laboratory Sample Identification		
Laboratory:	Sample No:	Date Tested:
Compliance		
Complies: <input type="checkbox"/> Non-compliant – ameliorate <input type="checkbox"/> Non-compliant – impracticable to ameliorate <input type="checkbox"/>		

1 Interpretation of test parameter result		
The Scientist is to indicate (x) the non-compliant water parameters and provide an interpretation for each parameter relevant to the water test parameter requirement.		
Water Test Parameter	Non-compliant	Interpretation
E. coli (median) MPN/100 mL	<input type="checkbox"/>	
Enumeration of Coliform; and E. coli (Petri Film)	<input type="checkbox"/>	
Total coliforms	<input type="checkbox"/>	
Salmonella spp	<input type="checkbox"/>	
pH	<input type="checkbox"/>	
Electrical Conductivity (EC a) Salt sensitive plants b) Salt tolerant plants c) Very salt tolerant plants	<input type="checkbox"/>	
Bicarbonate (HCO_3^{1-})	<input type="checkbox"/>	
Carbonate (CO_3^{2-})	<input type="checkbox"/>	
Chloride (Cl^{1-})	<input type="checkbox"/>	
Sulphate (SO_4^{2-})	<input type="checkbox"/>	
Calcium (Ca^{2+})	<input type="checkbox"/>	
Sodium (Na^{1+})	<input type="checkbox"/>	
Magnesium (Mg^{2+})	<input type="checkbox"/>	
SAR a) Salt tolerant plants b) Salt sensitive plants	<input type="checkbox"/> <input type="checkbox"/>	

<p>2 Assessment of test results of water</p> <p>The Scientist is to provide an assessment per sample relevant to –</p> <p>Suitability and practicability of the water to comply with Form I –</p> <p>NOTE – Water with EC > 5 dS/m is unsuitable for use. Irrigation water as amelioration is not practicable.</p> <p>A use of water relevant to the type and plant / seed species of vegetation treatment –</p>

<p>3 Amelioration and management of water</p> <p>The Scientist is to provide an amelioration treatment and the watering program and best practice addressing the water parameters in Form I, per sample and <i>in particular</i> –</p> <table border="0"> <tr> <td> <ul style="list-style-type: none"> • E. coli • Total coliforms • Salmonella spp </td> <td> <ul style="list-style-type: none"> • pH • EC </td> <td> <ul style="list-style-type: none"> • SAR • Cl¹⁻ </td> </tr> </table>	<ul style="list-style-type: none"> • E. coli • Total coliforms • Salmonella spp 	<ul style="list-style-type: none"> • pH • EC 	<ul style="list-style-type: none"> • SAR • Cl¹⁻
<ul style="list-style-type: none"> • E. coli • Total coliforms • Salmonella spp 	<ul style="list-style-type: none"> • pH • EC 	<ul style="list-style-type: none"> • SAR • Cl¹⁻ 	

Water Amelioration Schedule		
Ameliorant	Rate	Comments
Watering program –		
Watering practices –		

<p>Amelioration program and operations</p> <p>The Contractor shall refer to the Non-potable Water Testing and Assessment Report/s and provide the watering practices and watering program to manage the saline properties of the water <i>in particular</i>:</p> <ul style="list-style-type: none"> • Regular monitoring of water source/s by testing the parameters of concern, using <i>Form I</i>. • Regular monitoring of plants by observation and soil by field testing the pH and EC of the soil using Form C parameter requirements; and inspecting plant foliage for signs of wilting and / or leaf burn. • Watering program to: <ul style="list-style-type: none"> – prioritise night or early morning waterings to lessen evaporation and concentration of salts – avoid windy conditions to lessen leaf burn / death of seedlings. • Watering practices to: <ul style="list-style-type: none"> – apply a volume of water that allows for some leaching to move salts away from plant roots – apply water that allows for deep wetting of the soil and subsequent reduction in the frequency of water to lessen salt build up in upper soil layers – maintain soil moisture to reduce damage to plants when applying salty water to dry soil. • Sourcing an alternate low EC water source for intermittent leaching and removal of salt.
--

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Non-potable Water Testing

Site Sample Identification		Sample Date:
Project Name:		Sample Location:
Job / Contract No:		Site / Water Source No.:
NOTE – sampling of water to be in accordance with Clause 7.10.2.		
Testing Laboratory Sample Identification		
Laboratory:	Sample No:	Date Tested:
Complies: <input type="checkbox"/> Non-compliant – ameliorate <input type="checkbox"/> Non-compliant – impracticable to ameliorate <input type="checkbox"/>		

Water Quality Parameter	Test Method	Water Test Parameter Requirement	Water Test Result
E. coli (median) MPN/100 mL	AOAC Official Method 991.4	< 100 MPN	
Enumeration of Coliform, and E. coli (Petri Film)	AOAC Official Method 991.4	< 100 MPN	
Total coliforms	MPN Method	< 100 MPN	
Salmonella spp	MPN Method	Absent	
Refer Australian Laboratory Handbook of Soil and Water Chemical Methods – Rayment & Higginson, 1992			
pH	Water C	6 – 8.5	
Electrical Conductivity (EC) a) Salt sensitive plants b) Salt tolerant plants c) Very salt tolerant plants	Water B	≤ 1.6 dS/m ≤ 3 dS/m 3 – 5 dS/m	
Bicarbonate (HCO ₃ ¹⁻)	D	< 120 mg/L	
Carbonate (CO ₃ ²⁻)	D	< 350 mg/L	
Chloride (Cl ¹⁻)	E	< 600 mg/L	
Sulphate (SO ₄ ²⁻)	J	< 600 mg/L	
Calcium (Ca ²⁺)	L	> 80 mg/L	
Sodium (Na ¹⁺)	L	< 300 mg/L	
Magnesium (Mg ²⁺)	L	> 35 mg/L	
SAR a) Salt tolerant plants b) Salt sensitive plants	M3a	≤ 9 9 - < 24	

Annexure MRTS28.1 (November 2019) Contractor's Site Facilities and Camp



Specific Contract Requirements

Contract Number

XXXXXXXXXX

Note: Clause references within brackets in this Annexure refer to Clauses in the parent Technical Specification MRTS28 unless otherwise noted.

1 Area Available for Establishment of Site Facilities (Clause 4.2)

The existing paved area south of the Westpac car park at the end of Canberra Place as detailed in the drawings is potentially available for Site Facilities and Laydown. The area shown below which is within the Light Industrial Area along Quarry Road, Flying Fish Cove is also potentially available for the establishment of Site Facilities and Laydown.

Areas are indicative only and shall be agreed with the Shire of Christmas Island at the start up meeting.



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2 Facilities for QA audit and meetings (Clause 4.4.1)

Facilities for QA audit and meetings are required **Yes** **No**

(If project specific requirements for the room is specified below then standard requirements for the room in the Clause 4.4.1 of MRTS28 will be replaced by below requirements)

3 Office accommodation for the Administrator (Clause 4.4.2)

Office accommodation for the Administrator with exclusive access is required **Yes** **No**

(Include any project specific requirements below)

Electrical power point, internet access, desk, office chair, 1x minimum 27" monitor for computer, key board, mouse, access to a colour printer/scanner capable of printing and scanning A3 sized sheets.

4 Documentation for Contractor's Site facilities (Clause 4.5.1)

Documentation of the Contractor's site facilities is required **Yes** **No**

5 Visibility of Site Facilities to the Public (Clause 4.5.2)

The Contractor's site facilities shall be screened from the public **Yes** **No**

6 Dust Suppression (Clause 4.5.4)

All access roads in the Contractor's site facility shall be sealed

Yes

No

7 Area available for Establishment for Camp Facilities (Clause 5.2)

The area stated below is available for the establishment of a camp.

N/A

8 Supplementary Requirements (Clause 6)

The contractor shall contact the Shire of Christmas Island to confirm all bonds, applications, conditions of use, fees and charges associated with the use of the Shire owned portion of the Westpac car park and the use of their LIA laydown area on Quarry Road, including any reinstatement requirements post demobilisation.

The contractor's site facilities shall include a bunded appropriate synthetic lined refuelling area.

The contractor's site facilities shall include allowance for the necessary number of lockable, weatherproof storage containers to remain on site permanently to house the spare parts and left-over components of the landslide barriers. The location for permanent storage shall be agreed at the start up meeting, and if they storage containers are not to be permanently located in either of the identified laydown areas, the contractor shall relocate from their current location to the final proposed location.

Annexure MRTS51.1 (July 2020)

Environmental Management

Specific Contract Requirements

Contract Number

XXXXXXXXXX



Note: Clause references within brackets in this Annexure refer to Clauses in the parent Technical Specification MRTS51 unless otherwise noted.

The Contract requires that contract-specific risk levels be assigned for water quality, noise, vibration, and waste sections within the Annexure.

1 Approvals

1.1 *Approvals that have been obtained by the Principal for the Work under the Contract or are applicable to the Work under the Contract and associated conditions and requirements (Clause 7.11)*

The Principal has submitted a referral under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) and the project was deemed to be 'not a controlled action' on 23 June 2020.

The works are located on Commonwealth Land and in proximity to Commonwealth Heritage Places including:

- *Industrial and Administrative Group (Place ID: 105246);*
- *Malay Kampong Group (Place ID: 105402); and*
- *Malay Kampong Precinct (Place ID: 105433).*

The following Matters of National Environmental Significance (MNES) are present in the vicinity of the works:

- Listed threatened species
- Listed migratory species

Details of the assessment of impacts to threatened species and heritage are provided in the EPBC Act Referral, the Biodiversity Assessment Report (Arup 2020) and the Heritage Impact Assessment (GML Heritage Consultants 2020).

The Principal has applied for Part 9 and Part 13 Permits under the EPBC Act and applied to have the permits extended until 1 October 2025.

All works must comply with the Referral, including the management measures identified in the associated Biodiversity Assessment Report (BAR) and the Heritage Impact Assessment and

the Part 9 and Part 13 Permits. This includes the requirement for works to stay within the limit of works identified on the project drawings.

Notification and management of environmental incidents is outlined in Clause 7.7 of MRTS 51. This includes injury or death of native fauna or clearing outside of clearing limits. In addition to the requirements of Clause 7.7 of MRTS 51, any protected trees damaged or removed as a result of the works will be subject to a \$5,000 penalty for each incident under the contract. Any injury or death to wildlife caused by reckless operations or not following procedures of the Construction Environmental Management Plan (CEMP) shall attract a \$1,000 penalty per incident under the contract.

2 Water quality

2.1 The Contract is categorised as the following risk level for water quality:

Low Medium High

2.2 Contract specific water quality criteria (Clause 8.2.2)

Standard requirements of Clause 8.2.2 apply.

The Contractor shall be responsible for the management of water quality to meet Contractual and legislative requirements, and not cause Environmental Harm or Environmental Nuisance at the site or surrounds.

Water quality management is to be documented as part of an CEMP to be prepared by the Contractor for approval by the Superintendent. This is to include the following:

- A stormwater management plan, including measures for the management of stormwater at the site during construction. Proposed management measures are to include the installation of a High Density Polyethylene (HDPE) lined bunded refuel zone at all proposed construction compounds to capture any spills/ leaks of hydrocarbons and/ or other chemicals. Spill kits are to be provided at the works locations with all staff to be trained in spill management response. All spills are to be reported to the Contractor's Site Environmental Representative. Any spills with the potential for Environmental Harm are to be reported to the Superintendent within 24 hours of the occurrence.

An erosion and sediment control plan, identifying the location of measures such as silt fences or other measures to divert water around the works, capture and trap sediments and prevent erosion. Note that MRTS 52 Erosion and Sediment Control and the associated annexure are applicable to the works.

2.3 Contract specific water quality monitoring requirements (Clause 8.2.3)

Site is positioned on steep side slope therefore water will not remain on site for testing purposes.

Visual monitoring for the accumulation of sediments or other contaminants immediately down slope of work areas and construction compounds is to occur daily and within 2 hours of rainfall (>15mm), and erosion and sediment controls adjusted accordingly. Visual monitoring is to be documented in the form of spreadsheets and photographs of the monitoring locations. The areas of worst erosion and sedimentation are to be photographed and monitored, with control measures to be applied to remedy the erosion and sediment control as needed.

Sediment laden water discharging from site shall not be permitted to enter the ocean.

3 Cultural Heritage

3.1 *Contract specific management requirements (Clause 8.4.1)*

Note that MRTS 51 Section 8.4.3 relates to monitoring by Cultural Heritage personnel (persons nominated by the Indigenous Party) for the works. Monitoring by the Indigenous Party is not applicable to this scope of work. However, monitoring by a qualified historical archaeologist is required in particular locations as outlined below. The qualified historical archaeologist shall be engaged by the Contractor. The Contractor shall provide details of the qualified archaeologist for approval by the Superintendent.

There are Commonwealth Heritage Places at and adjacent to the site as identified in Section 3.2 below.

The Contractor's CEMP is to include measures for the management of the identified heritage places and for unexpected heritage finds. This is to be consistent with the measures in the HIA (GML 2020), including:

- Heritage induction to be provided to all site workers and contractors involved in the works, to identify the presence of heritage assets and their significance
- Prior to commencement of site works the contractor shall engage a qualified historical archaeologist to confirm on site the extent of any heritage sites / items. The location of any heritage sites / items shall be surveyed by a qualified surveyor, provided to the Superintendent and Heritage Exclusion Zones identified with bunting for approval by the Superintendent prior to works commencement (HOLD POINT).
- Plan construction to avoid or minimise impacts to heritage places, including a temporary, highly visible barrier along the Christmas Island Club rubble wall, ruins of the Assistant Manager's House and the gravity chute and associated infrastructure.
- Ensure that works do not alter the form of the railway cutting and that it remains discernible (ie not obscured).
- Utilise existing narrow access along alignment of the existing barriers to enable clearing of vegetation and access for the works.
- A qualified historical archaeologist shall be present for all works to the Marine 1 Barrier in the vicinity of the Malay Cemetery site.
- The Contractor shall prepare an Unanticipated Finds Protocol for the works, including Malay Cemetery and archaeological potential associated with the Island's early settlement. The Unanticipated Finds Protocol shall include a process for managing archaeological remains that may be uncovered during the works

3.2 *The location of Principal identified Indigenous Cultural Heritage within and adjacent to the Site (Clause 8.4.1)*

N/A

3.3 Likelihood of harm category in accordance with the Aboriginal Cultural Heritage Act 2003 and / or the Torres Strait Islander Cultural Heritage Act 2003 (Clause 8.4.1)

N/A

3.4 The Principal has entered into an agreement with the Indigenous Parties (Clause 8.4.1)

Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
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3.5 A copy of the Principal's agreement with the Indigenous Parties is provided (if applicable) (Clause 8.4.1)

N/A

3.6 Location of Principal identified non-indigenous Cultural Heritage located within and adjacent to the Site (Clause 8.4.1)

The following heritage values have been identified at and adjacent to the works, as described in full in the provided Heritage Impact Assessment (GML 2020). There are three Commonwealth Heritage Places in the vicinity of the works:

Industrial and Administrative Group (Place ID: 105246)

The individual elements/places and their heritage values that are close to the proposed works, include:

- The Christmas Island Club
- Old European Cemetery
- Assistant Manager's House
- Gravity-fed Chute
- Railway cutting

Malay Kampong Group (Place ID: 105402)

The Malay Kampong Group is a small mix of buildings and places located in the northern part of Flying Fish Cove. The listing comprises a mix of buildings and places. There is only one individual place of relevance to the proposed site – the Malay Cemetery. The presence and location of this cemetery is not confirmed, however possible location is described and shown in the Heritage Impact Assessment.

Malay Kampong Precinct (Place ID: 105433)

The precinct encompasses the area of the Island's Malay Neighbourhood around Flying Fish Cove. The proposed works do not encroach into the key areas of the Commonwealth Heritage places associated with this precinct.

4 Noise

4.1 The Contract is categorised as the following risk level for noise (Clause 8.5.2)

Low Medium High

* Works are in close proximity to sensitive receptors including residential properties. Note however that the Transport Noise Management Code of Practice: Volume 2 (Queensland) that is referenced in MRTS 51 Specification, is not relevant to these works. Noise management requirements applicable to the contract are outlined in Section 4.4 below.

4.2 Principal has completed a preconstruction noise assessment for the Contract (Clause 8.5.2.2)

Yes No

- 4.3 The Contractor is required to undertake a Noise Assessment Report prior to commencing works in accordance with the Noise Code of Practice – Volume 2 (Clause 8.5.2.2)**

Yes No

- 4.4 Location of Principal identified Noise Sensitive Receptors and assessment requirements (Clause 8.5.2)**

The Contractor's CEMP is to include site specific measures for the management of noise and vibration during the works. This is to include as a minimum:

- Location of sensitive receptors and distance from the works
- Procedure for notifying adjacent landholders of intended work schedule, likely noise generating activities and complaints procedure
- Noise mitigation types and locations (including hoarding/barriers where feasible)

Works are to occur within designated construction hours (7am – 7pm Monday to Friday, 7am – 12pm Saturday)

5 Vibration

- 5.1 The Contract is categorised as the following risk level for vibration (Clause 8.6.2)**

Low Medium High

- 5.2 Principal has completed a preconstruction vibration assessment for the Contract (Clause 8.6.2.3)**

Yes No

- 5.3 Contractor is required to prepare a Vibration Assessment Report prior to commencing Works in accordance with the Noise Code of Practice: Volume 2 (Clause 8.6.2.3)**

Yes No

- 5.4 Location of Principal identified Vibration Sensitive Receptors and assessment requirements (Clause 8.6.2.1)**

N/A

5.5 Condition surveys to be undertaken by Contractor on the following Principal identified premises / structures / buildings / services (Clause 8.6.2.3)

Trafficable areas where construction traffic will frequent for the purpose of completing the project including:

- Residential one way road behind Block 413
- Concrete apron and grassed area of the playing field (only if needed as overflow parking)
- The Canberra Place/Westpac car park area where the construction lay down area is proposed
- The existing track to allow access to in behind the Christmas Island Club (if proposed for use)
- The Marine Building and AFP shed
- Block 413
- The Cold Storage Building
- The Madrasa School
- The heritage listed "Shops" (refer plan)
- The Westpac/Water Corporation building adjacent to the lay down site
- The Light Industrial Zone laydown area.

5.6 Person/s to undertake condition survey (Clause 8.6.2.3)

Proposed person/people and qualifications to be submitted to the Superintendent for approval. As a minimum, the nominated person must have the right experience/qualification to complete the condition survey. For example, Civil Engineer in the case of pavement and kerbing inspections, structural engineer in the case of building, retaining wall or infrastructure structural integrity etc.

6 Air quality

6.1 Burning of material is permitted on Site (Clause 8.7.2)

Yes

No

X

6.2 The following additional conditions shall apply to burning of material (Clause 8.7.2)

N/A

6.3 Air quality monitoring requirements (Clause 8.7.3)

Contractor's CEMP to include measures for the management of air quality during the works. This is to include:

- Dust suppression
- Emissions reduction (e.g. well-maintained machinery and vehicles)
- Visual monitoring for signs of dust/smoke/nuisance emissions.

6.4 Principal identified Air Quality Sensitive Receivers (Clause 8.7.4)

Flying Fish Cove residences and commercial buildings. Closest sensitive receptors are those downslope of the works, with other residential and commercial buildings upslope from the works.

7 Contaminated Sites**7.1 Location of Principal identified contaminated Sites (including contaminated material, waste dumps or unexploded ordnances) (Clause 8.9.1)**

There is potential asbestos contamination associated with the former phosphate mine gravity chute. No works are proposed in this area and the area is to be fenced off and access not allowed during the works.

7.2 Management and monitoring requirements for Principal identified contaminated Sites (Clause 8.9.1)

All works are excluded from within the known asbestos contaminated site around the gravity chute. Prior to commencement of construction the area of potential asbestos contamination shall be demarcated using temporary fencing.

The CEMP shall include measures for management of unexpected contamination at the site, including notification of the Superintendent within 24 hours, and if necessary, engagement of specialist to review contamination location, extent and mitigation requirements.

7.3 Requirements for Contaminated Site Investigation Plan, Management Plan and Compliance Testing for Principal identified Contaminated Sites (Clause 8.9.2)

Not applicable as works will not be occurring in proximity to the location of known asbestos contamination which is outside the area of works and is to be demarcated to prevent access.

8 Fauna

8.1 *Principal identified Queensland Waterways for Waterway Barrier Works within Site and their category (Clause 8.10.1)*

N/A (No waterways within the site)

8.2 *Locations of Principal identified native fauna habitat, breeding place/s and related management requirements (Clause 8.10.2)*

The Contractor's CEMP shall include measures for the management of fauna, consistent with the requirements of the EPBC Referral and BAR (Arup 2020). This includes the following:

- Site personnel shall attend a site induction prior to the commencement of construction. The induction must inform staff of likely fauna and appropriate management / contingency measures to be implemented where fauna is encountered, injured or killed during the works.
- Contractor to engage a licensed ecology specialist to conduct a pre-clearing inspection of all site areas subject to clearing. Any fauna present are to be relocated to adjacent habitat where necessary. The ecological specialist should remain on site to direct and supervise all clearing activities.
- Active nest trees for Red-footed Booby are located immediately upslope of the construction footprint. Prior to commencement of construction the location of active nest trees for Red-footed Booby are to be surveyed to sub-metre accuracy. The location of the trees must be provided to the Superintendent and be included on relevant site plans including appropriate setbacks to be maintained as exclusion zones.
- Setbacks to nest trees are to be maintained in accordance with AS4970-2009 to make sure the trees can be safely retained. Setbacks are to be maintained as exclusion zones / no-go zones. These are to be flagged on site and shall be inspected weekly and maintained for the duration of construction.
- Where the proposed rock scaling area occurs in proximity to a nest tree, the ecological specialist will determine prior to construction if additional mitigation measures are required, and will submit to the Superintendent for review and approval prior to implementation. Construction activities must avoid existing nest trees for the species through the sensitive siting of barrier anchors and appropriate setback of proposed rock scaling and draped mesh at the Christmas Island Club barrier.
- Construction activities should be minimised within the vicinity of active nest trees where ever possible.
- Works to minimise the use of noise intensive construction activities that involve pitch of metal on metal, concrete cutting, impulse noise versus lower frequency noise and pylon driving. Where these noise intensive works are proposed within 20 m of an occupied nest, monitoring of species behaviour should carried out (by ecology specialist) during construction to ensure eggs/ chicks are not abandoned.
- Christmas Island Red Crab migration occurs through the site. Crab movement measures are to be installed on all replacement barriers to ensure crabs continue to be diverted to existing safe crossing locations. The crab movement measure detail is provided in the drawings.
- Vegetation clearing is to be minimised and the tree canopy layer preserved as much as practicable to minimise the risk of crab exposure when moving along landslide barriers.
- Disturbed areas shall be revegetated in accordance with relevant requirements to mitigate the loss of fauna habitat post-works.

8.3 Requirements for temporary fauna fencing (Clause 8.10.2)

- Habitats immediately upslope of the site are to be identified as no-go zones.
- The ecological specialist is to confirm location of no-go zones based on pre-clearing inspection.
- Exclusion fencing is to be erected at the perimeter of the works site including appropriate signage, prior to the commencement of works.
- Setbacks to active nest trees for Red-footed Booby are to be maintained in accordance with AS4970-2009 to ensure the trees can be safely retained. Setbacks are shall be maintained as exclusion zones / no-go zones. These are to be flagged on site and maintained for the duration of construction.

8.4 Fauna monitoring requirements (Clause 8.10.2.1 and 8.10.3)

- Construction activities shall be minimised within the vicinity of active nest trees where ever possible.
- Works shall minimise the use of noise intensive construction activities that involve pitch of metal on metal, concrete cutting, impulse noise versus lower frequency noise and pylon driving. Where these noise intensive works are proposed within 20m of an occupied nest, monitoring of species behaviour should carried out during construction to ensure eggs/ chicks are not abandoned. The monitoring is to be carried out by a licensed ecological specialist.
- The ecological specialist can recommend a temporary stop work where nesting individuals appear to be subject to high stress levels or there is a perceived risk of nest abandonment.

9 Vegetation**9.1 Principal identified location/s of Significant Vegetation (Individual and communities) and related management requirements (Clause 8.11.1)**

Native vegetation exists at the site offering habitat for fauna including several threatened fauna species.

Prior to works commencing on site, the contractor shall engage a qualified and licensed ecologist to confirm the location of any protected ecological sites (fauna and vegetation). The location of the sites shall be surveyed, provided to the Superintendent, and Environmental Exclusion Zones identified with bunting for approval by the Superintendent.

Heritage and Environmental Exclusion Zones shall be maintained for the duration of site works. Weekly inspections during construction of all Exclusion Zone bunting shall be carried out by the Contractor's Site Environmental Representative and damage repaired immediately.

No disturbance of native vegetation is permitted >10m from the location of the replacement barriers. Vegetation clearing must be minimised as much as practicable and limited only to that required to facilitate construction access and the siting of barriers and anchors. All tree pruning works must be carried out in accordance with AS4373- 2007.

All vegetation cleared from the site must be disposed of at a licenced waste facility.

10 Biosecurity management

10.1 *Principal identified Biosecurity Matters within the Site and / or specific management requirements (Clause 8.12.2)*

The site is currently subject to weed disturbance. The Contractor's CEMP is to include measures to minimise the spread or introduction of weeds to or from the site, including the following:

- Prior to the commencement of works, conduct a weed audit to identify the extent of weeds on site and suitable approaches to control.
- Weed control measures (mechanical or chemical) are to be implemented within all works areas prior to the commencement of works. Weed control shall start in less-disturbed upslope areas within the works boundary and progress towards more disturbed areas downslope.
- Where chemical control is proposed, use of Cavalier is preferred over Glyphosate as this is less likely to impact on establishment of post-works revegetation.
- Following weed control, all bare ground within the works site including access tracks and barrier shelves should be covered with jute matting to minimise the reestablishment of weeds. Revegetation must be carried out in accordance with Section 9.2 of the annexure, to assist with ongoing weed suppression post-works.
- All machinery and vehicles must be clean and free from weed propagules prior to transportation to the Island, in accordance with biosecurity requirements.
- All activities associated with the proposed works must comply with general biosecurity obligations. Any importation of materials to or from the Island must comply with the *Biosecurity (prohibited and conditionally non-prohibited goods-Christmas Island) Determination 2016*.
- Prior to vehicles or machinery leaving the laydown areas or prior to moving between sites, the undercarriage and wheels shall be brushed to remove visible weed material.
- All weed materials cleared from the site must be disposed of at a licensed waste facility.
- Yellow crazy ants are known to occur on Christmas Island. No nests/colonies have been identified at the location of the works, however if the species is identified the Superintendent shall be notified. All materials imported to the site are to be free of yellow crazy ants.

10.2 *Principal identified Biosecurity Management Zone present within or adjacent to the Site (Clause 8.12.2)*

Christmas Island is a unique biosecurity zone and all importation of materials to or from the island must comply with the *Biosecurity (prohibited and conditionally non-prohibited goods-Christmas Island) Determination 2016*.

11 Waste

11.1 *Management requirements for vegetation waste from clearing and grubbing activities (Clause 8.13.2)*

All vegetation cleared from the site must be disposed of at a licenced waste facility.

12 Material sourcing

12.1 *Contract specific requirements for sourcing and supply of materials (Clause 8.15.2)*

N/A

13 Permanent environmental infrastructure operational and maintenance plans

13.1 *Principal identified Permanent Environmental Infrastructure to have operational and maintenance plans developed by Contractor (Clause 9)*

N/A

14 Supplementary requirements

The project is located on Christmas Island on Commonwealth Land. Christmas Island has no state-level of government, which means the Australian Government is responsible for the provision of state-type laws and services to the territory. The territory is administered by the Department of Infrastructure, Transport, Cities & Regional Development, on behalf of the Minister with responsibility for the Territories.

All Australian Government laws and regulations apply to Christmas Island, unless its application is explicitly excluded.

Where Technical Specification MRTS 51 Environmental Management refers to Queensland Legislation, this should be read as reference to corresponding Commonwealth legislation, or Western Australian legislation where applicable. In some cases, relevant legislation is identified in this annexure.

Annexure MRTS52.1 (July 2018) Erosion and Sediment Control



Specific Contract Requirements

Contract Number

XXXXXXXXXX

Note: Clause references within brackets in this Annexure refer to Clauses in the parent Technical Specification MRTS52 unless otherwise noted.

1 Land

1.1 *The Principal has entered into an agreement or commenced negotiation with adjacent landowners (Clause 1.2)*

Yes No

1.2 *Land use agreement and negotiation details*

N/A

2 Project risk level

2.1 *For the purposes of Technical Specification MRTS52 the project shall comply with the requirements of the following erosion risk level (Clause 1.3)*

Low Medium High

2.2 *Different erosion risk levels are required at different times of the year and / or for sites with stark topography and/or soil characteristic differences (Clause 1.3)*

Yes No

2.3 *Details of project duration, timing of year and seasonal rainfall affecting erosion risk levels (Clause 1.3)*

Project duration > 6 months,
Project timing likely to coincide with rainy season
Approximately 1 ha of disturbed surface area

3 Erosion and sediment control

3.1 Project specific issues and requirements for temporary erosion and sediment control (Clause 6.2)

The Contractor shall develop, implement and maintain an Erosion and Sediment Control Plan (ESCP) as outlined in MRTS52. The plan is to contain site specific details for all aspects of works that potentially or actually lead to erosion and sedimentation.

Clearing and grubbing (or the use of the area for stockpiles) shall not start until the ESCP for that section is assessed as suitable by the Administrator (in accordance with Clause 6.1).

Sediment laden water shall not be permitted to leave site and enter the ocean.

4 Inspections and audits

4.1 Inspection and audit additional requirements (Clause 9)

Standard requirements of Clause 9 of MRTS52 apply.

- a) All drainage, erosion and sediment control measures must be inspected:
 - At least daily (when work is occurring on-site)
 - At least weekly (when work is not occurring on-site)
 - Within 24 hours of expected rainfall (inspect prior to rainfall occurring)
 - Within 18 hours of a rainfall event of sufficient intensity and duration to cause runoff on-site.
- b) All temporary erosion and sediment control measures, including drainage control measures, must be fully operational and maintained in proper working order at all times during the maintenance period as specified by the Administrator.

Corrective actions are to be undertaken within 2 days or where there is risk of impact to the ocean, corrective actions shall be implemented immediately upon identifying the non-conformance.

5 Cost recovery for incidents (Clause 9.2)

Hourly rate used for calculation of cost recovery for serious or material environmental harm incident	\$/hr	N/A
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6 Supplementary requirements (Clause 11)

Implementation of Erosion and Sediment Control measures are not to infringe upon areas that are outside the proposed clearing extents and are not to extend into any of the identified 'no go zones' or impact upon retained trees and/or trees with nests.

Site infrastructure, parking and laydown areas are to be located in previously cleared areas with minimal slope grade where practicable.

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Annexure MRS02.1 (March 2021) Provision for Traffic

Specific Contract Requirements

Contract Number

XXXXXXXXXX



Note: Clause references within brackets in this Annexure refer to Clauses in the parent Specification MRS02 unless otherwise noted.

1 Payment for temporary barriers (Clauses 2.2 and 2.4)

Temporary Barriers which will be paid for under Works Items 20004 and 20005 shall be those in the location and / or for the purpose described below.

Temporary construction fencing to Laydown area boundaries.
Temporary construction fencing to restrict access and to secure the site.

2 Payment for temporary barrier end treatments (Clauses 2.2 and 2.5)

Temporary barrier end treatments which will be paid for under Works Items 20006 and 20007 shall be those in the location and / or for the purpose described below.

N/A

3 Payment for anti-gawking screens (Clauses 2.2 and 2.6)

Anti-gawking screens which will be paid for under Works Items 20008P and 20012P shall be those in the location and / or for the purpose described below.

Applied to all temporary construction fencing for Laydown area boundaries.
Applied to all temporary construction fencing to restrict access and to secure the site.

4 Payment for traffic management inspections (MRTS02 Clause 7.4)

Traffic management inspections which will be paid for under Works Items 20016 shall be those listed below.

N/A

Annexure MRS04.1 (November 2020) General Earthworks



Specific Contract Requirements

Contract Number

XXXXXXXX

Note: Clause references within brackets in this Annexure refer to Clauses in the parent Specification MRS04 unless otherwise noted.

1 Excavation and backfilling operations measured separately (Clause 2.3)

Excavation and/or backfilling for the following trenches and/or structures shall be measured separately.

N/A

2 Non-rippable material

2.1 Determination of Road Excavation (Clause 3.3.2)

Classes of crawler tractor for the determination of non-rippable material.

N/A

2.2 Determination in Confined Excavation (Clause 3.3.3)

Classes of crawler excavator for determination of non-rippable material.

N/A

2.3 Measurement in Road Excavation (Clause 3.4)

Non-rippable material in Road Excavation is to be measured separately.

Yes		No	N/A
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2.4 Measurement in Confined Excavation (Clause 3.4)

Non-rippable material in Confined Excavation is to be measured separately.

Yes		No	N/A
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3 Ground level survey (Clause 4)

The following ground level survey data is provided by the Principal.

TBC

4 Supplementary requirements (Clause 5)

The following supplementary requirements shall apply.

TBC

Annexure MRTS01.1 (March 2021)

Introduction to Technical Specifications

Specific Contract Requirements

Contract Number

XXXXXXXXXX



Note: Clause references within brackets in this Annexure refer to Clauses in the parent Technical Specification MRTS01 unless otherwise noted.

1 Supplementary requirements (Clause 15)

The following supplementary requirements shall apply.

With reference to Clause 14, the term “Administrator” shall be replaced by the term “Superintendent” for all Technical Specifications, Specification (Measurement) and Technical Specification Annexures included in the Contract.

The term “Superintendent” has the same role as the “Project Manager” as defined by Schedule 1 – Contract Particulars and amended in the Special Conditions of Contract.

Refer to Supplementary Specifications for details of work items not included in the Standard Technical Specifications.

All reference to Queensland State Government Legislation, Regulations or Transport and Main Roads Queensland requirements shall be superseded by the Western Australia State Government, Main Roads Western Australia or Christmas Island Ordinance equivalent for all Technical Specifications, Specification (Measurement) and Technical Specification Annexures included in the Contract. In the instance where there is no equivalent legislation, the legislation shall default to the nominated Queensland legislation unless otherwise specified.

Annexure MRTS02.1 (March 2021)

Provision for Traffic



Specific Contract Requirements

Contract Number

XXXXXXXXXX

Note: Clause references within brackets in this Annexure refer to Clauses in the parent Technical Specification MRTS02 unless otherwise noted.

Part A: Traffic Management Solution

1 Nominated Traffic Control Officer or Officers (Clause 5.2)

If required, a Nominated Traffic Officer responsible for complex traffic management schemes which have significant impacts on delays or traffic rerouting, shall have the following additional qualifications and / or experience

All reference to "Transport and Main Roads" and Queensland specific standards and requirements in Table 5.2 shall be replaced by "Main Roads Western Australia (MRWA)" and the Western Australian equivalent standard or requirement respectively unless otherwise stated in this specification.

The nominated Traffic Officer shall have valid Main Roads Western Australia Traffic Management accreditation.

2 Traffic Management Plan (Clause 5.3)

The following specific requirements shall apply to the Traffic Management Plan:

The contractor shall provide the Traffic Management Plan to the Superintendent for review and approval to submit to the Shire of Christmas Island at least 35 days before its proposed commencement of implementation.

The Traffic Management Plan shall be prepared as indicated in Clause 5.4 of MRTS02, item a – j and reference to Queensland's Manual of Uniform Traffic Control Devices (Section 2.2.2) shall be used to define the elements. All signage and road laws applied in the TMP shall meet Western Australian Road Laws and Main Roads Western Australia signage and standards. A Speed Management Plan is not required.

The Contractor shall prepare, submit and pay for all required Shire of Christmas Island permits and associated bonds. Permits may include but are not limited to Container Storage, Road Excavation and Road Closure. More information regarding these permits can be obtained from the Shire of Christmas Island Manager Works & Services on telephone number (08) 9164 8300 ext 230 or mobile number 0439 215 306.

TMP review period (Hold Point 1) – 21 days unless an alternative requirement is specified here

35

days

3 Traffic Management Provisions (Clause 5.7)

3.1 Specific Restrictions on work (Clause 5.7.2)

Days on which work may not occur - major commercial, sporting or cultural event, where the Administrator considers that such closure would cause an unacceptable level of disruption to the traffic operations associated with such events:

TBC

3.2 Traffic lane restrictions – midblock (Clause 5.7.3)

The minimum number of lanes to be maintained on midblock sections of road will be determined as per the method (a), (b) or (c):

a) In accordance with the following minimum requirements **Yes** **No**

Location	Days	Time period	Number of lanes in each direction	Minimum lane width (metres)	Minimum clearance of objects (metres)	Minimum posted speed when site active (kilometres per hour)	Minimum posted speed when site inactive (kilometres per hour)
N/A							
N/A							
N/A							
N/A							

b) In accordance with the requirements of QGTTM Part 3 Table 2.4 Yes No

c) Through an operational assessment as per *Guidelines – Traffic Management at Works on Roads (TMWOR)* Chapter 2 Section 3 Yes No

3.3 Traffic lane restrictions – intersections (Clause 5.7.3)

The minimum number of lanes to be maintained at intersections will be determined as per the method (a), (b) or (c):

a) Maintaining the same number of lanes as the pre-works situation Yes No

b) In accordance with following minimum requirements Yes No

Intersection	Days	Time Period	Number of lanes on each approach	Traffic control method on each approach	Minimum posted speed when site active (kilometres per hour)	Minimum posted speed when site inactive (kilometres per hour)
N/A						
N/A						
N/A						
N/A						

c) Through an operational assessment as per TMWOR Chapter 2 Section 3 Yes No

3.4 Single lane reversible flow (Shuttle Flow) (Clause 5.7.3)

The maximum delay to traffic under single lane, one way traffic arrangement shall be as follows:

Location	Days	Time period	Maximum delay time (minutes)
N/A	N/A	N/A	N/A

3.5 Stopping traffic in both directions (Clause 5.7.3)

Traffic may be stopped in both directions simultaneously only in the situation(s) described below:

Location	Reason	Days	Time period	Maximum delay time (minutes)
N/A	N/A	N/A	N/A	N/A

3.6 Period of no lane closures (Clause 5.7.3)

Days during which lanes shall not be closed and work involving stop / slow arrangements shall not be carried out:

TBC

3.7 Travel time surveys (Clause 5.7.3)

The following minimum requirements shall apply to the provision of traffic control devices and installation of ITS components:

The Contractor shall undertake travel time surveys Yes No

Method and frequency at which travel time surveys will be carried out:

N/A

3.8 Route alterations (Clause 5.7.4)

Traffic may be altered from its existing route via the following means:

Through the road under construction Yes No

The following sections of the work under the Contract may be constructed under traffic:

N/A

Side track Yes No

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Traffic may be redirected around the construction onto a side-track on the following sections of work under the Contract:

N/A

Detours on existing roads

Yes No

Traffic may be redirected around the construction, via existing roads or streets, on the following sections of work under the Contract:

N/A

4 Traffic Guidance Scheme (Clause 6.2)

The following specific approval requirements shall apply to the Traffic Guidance Scheme:

N/A

TGS(s) shall be approved by the Administrator

Yes No

TGS review period (Hold Point 2) – 14 days unless an alternative requirement is specified here

N/A days

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5 Traffic Guidance Provisions (Clause 6.5)

5.1 Portable Traffic Control Devices (PTCD) (Clause 6.5.1.1)

PTCDs shall be used in the following situations:

TBC

5.2 Variable Message Signs (VMS) (Clause 6.5.2.1)

VMS shall be used in the following situations:

N/A

5.3 Use of Police Officers (Clause 6.5.2.2)

Police officers shall be employed to assist in the control of traffic in the following situations:

N/A

5.4 Traffic mounted attenuators (TMA) (Clause 6.5.2.4)

TMA's shall be used to assist in the control of traffic in the following situations:

N/A

5.5 Specific requirements for construction under traffic

The following specific requirements shall apply to construction under traffic:

N/A

5.6 Specific requirements for side track (Clause 6.5.3.3)

The following requirements for side tracks shall apply:

N/A

The paving and sealing requirements for side-tracks shall be as follows:

N/A

The minimum geometry and width requirements for side-tracks shall be as follows:

N/A

Lighting requirements for side-tracks shall be as follows:

N/A

5.7 Preventing end of queue crashes (Clause 6.5.7)

The following additional control measures are required to mitigate end of queue crashes:

Supplementary devices for end of queue protection as per TMWOR Chapter 1 Section 2.

N/A

Vehicle activated speed indicator devices in accordance with TMWOR Chapter 1 Section 1.3.

N/A

Other, as nominated

N/A

N/A

5.8 Delineation of trafficked corridors (Clause 6.5.8)

Additional delineation requirements:

N/A

5.9 Temporary road safety barriers (Clause 6.5.11)

Additional temporary road safety barriers shall be installed in the following situations:

N/A

5.10 Anti-gawking screens (Clause 6.5.12)

Anti-gawking screens shall be installed in the following situations:

TBC

5.11 Temporary road lighting (Clause 6.5.13)

Temporary road lighting shall be installed in the following locations:

N/A

6 Traffic Management Inspection (Clause 7)**6.1 Traffic management inspection requirements (Clause 7.1)**

In addition to the requirements of Clause 7.1, there is a need for an independent review to establish conformance with the approved TMP and TGS, and with the performance requirements of MRTS02 – Provision for traffic:

Yes No

6.2 Officer undertaking Traffic Management Inspection (Clause 7.2)

If required, the officer undertaking the Traffic Management Inspection of complex traffic management schemes which have significant impacts on delays or traffic rerouting, shall have the following additional qualifications and / or experience in addition to the requirements outlined in Table 7.1:

N/A

6.3 Traffic Management Inspection schedule (Clause 7.4)

In addition to the requirements of Clause 7.4, inspections of the traffic management for the works (TMP and TGS) shall be undertaken at the following times / milestones:

N/A

7 Cost for re-inspection (Clause 8.3)

Speed limit signage non-conformance

\$/per re-inspection

N/A

Other Traffic Guidance Scheme non-conformance

\$/per re-inspection

N/A

8 Supplementary requirements (Clause 9)

The following supplementary requirements shall apply:

TBC

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9 Road categorisation

Road categories shall apply to TTM works and are as following:

Road name	Start chainage	End chainage	Posted Speed	AADT	Road Category