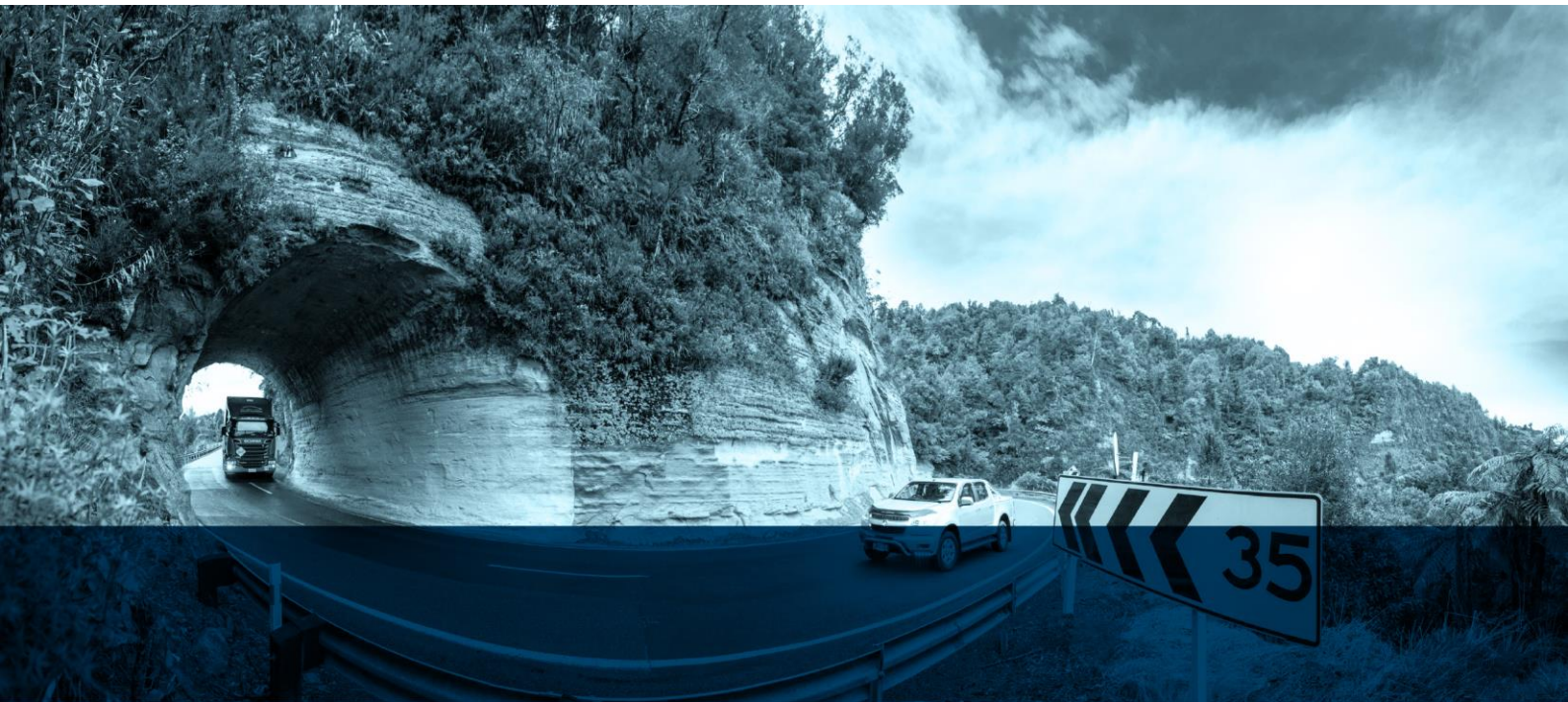


Specific Construction Water Management Plan

Establishing Fill Disposal Site 4

Reference: South Z10. DISPOSAL 4: ESTABLISH_RPT 1100

MMA-DES-E1-RPT-1100



Revision schedule		
Rev. Number	Date	Description
0.	10 May 2018	Draft for Council review
1.	25 May 2018	Updated for Council
2.	17 July 2018	Updated for Council Hearing

Disclaimer

This report has been prepared by the Mt Messenger Alliance for the benefit of the NZ Transport Agency. No liability is accepted by the Alliance Partners or any employee of or sub-consultant to the Alliance Partners companies with respect to its use by any other person. This disclaimer shall apply notwithstanding that the report may be made available to other persons for an application for permission or approval or to fulfil a legal requirement.

Contents

1	SCWMP Overview	3
1.1	Purpose	3
1.2	Scope	3
1.3	Description	3
1.4	Site Conditions	4
1.5	Monitoring	5
2	Construction Method and Erosion and Sediment Control Measures	6
2.1	Overview	6
2.2	Specific control measures	6
2.3	Stabilisation	7
2.4	Risk Analysis and Contingency Measures	8
	Appendix A: Drawings and calculations	10

1 SCWMP Overview

1.1 Purpose

This Specific Construction Water Management Plan (SCWMP) has been prepared in accordance with the guidance in the Construction Water Management Plan (CWMP) to meet resource consent conditions and the SCWMP template appended to the CWMP.

This SCWMP is considered a field document, and is developed in consultation with suitably qualified staff (e.g. construction supervisors and engineers) to guide construction works (refer Section 2).

This SCWMP may be updated over time based on feedback from Taranaki Regional Council (TRC) compliance staff and/or in response to lessons learned as works proceed and/or as part of the CWMP review process.

1.2 Scope

This SCWMP covers the activity of **establishing** Fill Disposal Site 4 to operate as a surplus fill disposal site. The location of this activity is shown on Drawing MMA-ESC-E1-DRG-1101, attached in Appendix A.

This SCWMP addresses earthworks to construct:

- Access;
- Clean water diversion; and
- The sediment retention pond for fill operations.

These Establishment works, and associated construction details are shown on Drawings MMA-ESC-E1-DRG-1102 to 1104, in Appendix A. Supporting design calculations are also attached in Appendix A.

Note: A separate SCWMP will be prepared prior to Main construction works commencing at this location to cover the activity of **operating** Fill Disposal Site 4. This SCWMP will include:

- Confirmation of expected soil being placed for disposal;
- Establishing a flocculation unit, with supporting bench testing of soil being placed; and
- Main works comprising of fill earthworks from soil being disposed.

1.3 Description

The works are located within the Mimi Catchment.

The potential maximum open earthwork area associated with this SCWMP is approximately 0.3 ha.

All activities within this SCWMP will be progressively stabilised, and it is unlikely that this whole area will be open at once.

Table 1.1 – Activity and duration

Works type	√	Description	Duration	Area	Earthworks volume
Establishment works	√	Earthworks required to form access, establish perimeter diversion bunds, and construction the SRP	Up to 1 month	Approximately 0.3 ha	Approximately 5,000 m ³
Stream works	×	NA			
Main earthworks	×	NA			

1.4 Site Conditions

Current site conditions comprise a gently sloping grassed paddock, with a stream running along the western side.

The underlying soil at Fill Disposal Site 4 is consistent with the valley floor for the Project alignment, comprising:

- Materials eroded from the surrounding hillsides which have been re-deposited as soft soils (predominately silt); and
- A high groundwater table throughout the year.

When establishing the Fill disposal site, excavation of the existing soft ground will be minimised where possible. Instead, the existing ground will be prepared for earthworks by placing geotextile (if required) on the existing surface, with no stripping or undercutting of the topsoil.

The exception to this will be localised excavation to achieve required Sediment Retention Pond (SRP) invert level. This will be no deeper than the observed groundwater table. Excavated material may be blended into the structural fill, or temporarily stockpiled as a geotextile covered windrow until the disposal site is operational.

Soil material for establishing Fill Disposal Site 4 will be sourced from cut areas within the wider Project alignment (**i.e. from outside the extent of Fill Disposal Site 4**). This will comprise soft siltstone and sandstone rock of the Mount Messenger Formation.

A flocculated treatment pond is not required for Establishment works because this comprises a small footprint of works which are progressively stabilised.

SRPs and DEBs used for treatment of cut areas, or fills constructed from soil material sourced from on site, are expected to require chemical flocculation. As such, a flocculation unit will be installed prior to Main construction works with details set out in a separate SCWMP.

It is not expected earthworks will encounter soil conditions, such as acid based soils, that would compromise the effectiveness of the erosion and sediment control measures or methodology proposed.

If any unexpected geological conditions are encountered, discussions will be held with the TRC monitoring officer to determine appropriate contingency measures.

1.5 Monitoring

This SCWMP will be monitored in accordance with the Monitoring Programme as per resource consent conditions and the CWMP.



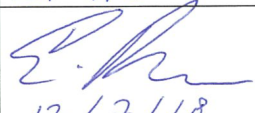

An important focus of site monitoring will be to ensure that when large or high intensity rainfall events are forecast, appropriate monitoring and or maintenance is implemented in response. This monitoring will include a 'feedback loop' to ensure that all personnel are aware of any changing requirements and or any improvements to management practices.

This feed-back loop will include procedures for adapting erosion and sediment controls in response to the monitoring outcomes.

2 Construction Method and Erosion and Sediment Control Measures

2.1 Overview

This SCWMP has been prepared and reviewed by the following suitably qualified persons:

	As per SCWMP template	
SCWMP prepared by:		Sharon Parackal E&SC Engineer
Construction method(s) reviewed by:	 13/7/16	Stu Haynes Construction Manager
SCWMP reviewed by:	 13/7/18	Ed Breese Environmental Manager
Approved for Release:		Hugh Milliken Alliance Manager

All erosion and sediment control measures have been designed by a suitability qualified staff who meet the following requirements:

Plan Preparation Requirements (as per SCWMP template)	✓
Is familiar with the requirements of the Transport Agency Guidelines, conditions of consent (under draft), the CWMP and any supporting plans (e.g. Chemical Treatment Plans).	✓
Is familiar with expected site conditions and proposed construction methodologies relevant to this SCWMP.	✓
Is familiar with topographical lay of the surrounding land relevant to this SCWMP.	✓
Has completed a site visit relevant to this SCWMP.	✓

2.2 Specific control measures

Table 2.1 summarises the sequence of works and the specific application of erosion and sediment control measures from the CWMP. Refer to Appendix A for further details: Drawings MMA-ESC-E1-DRG-1102 to 1104; Design calculations for SRP-FD4; and the clean water diversions.

Table 2.1 – Work sequence and erosion and sediment control (ESC) measures

Work Sequence		ESC measure	Comments
1.	Construct a stabilised construction entrance.	Clean water diversions to separate the upslope clean water runoff from working area (Detail 5).	Low fines material (e.g. AP65) will be used to create the stabilised entrance as per Detail 1.
2a.	Set out SRP perimeter, and toe of access road/perimeter bunds. Install silt fence at toe.	Not required.	Silt fences installed as per Detail 2.
2b.	Set out 10 m stream buffer zone, install perimeter silt fence along the edge of this buffer.		
3.	Earthworks to extend access and construct SRP-FD4. Access track culvert is installed. SRP-FD4 is sized for a 1.5 ha catchment (full disposal extent).	Silt fence for the access & SRP earthworks (Detail 2). SRP outlet pipe discharging to stabilised outlet (Detail 4).	SRP installed as per Detail 6. SRP outer batter face stabilised with pinned geotextile. Access track culvert installed as per SCWMP for Temporary Crossings. Install flocculation system. (UNDER DEVELOPMENT).
4.	Earthworks to progressively extend the perimeter bunds and install clean water diversions.	Silt fence for the access and bund earthworks (Detail 2). Clean water diversions to separate the upslope clean water runoff from working area (Detail 3, Detail 5). Drains/diversions discharging to stabilised outlet points (Detail 4).	No more than 50 m length of unlined drain and/or outside batter face at the end of each working day.

2.3 Stabilisation

The CWMP sets out the definition of **Stabilised Area** and **Actively Worked**. Areas not subject to works for more than a 14-day period will be identified and stabilised as works proceed (referred as “Stabilisation Trigger”).

As per SCWMP template	
Stabilisation Trigger:	14 days not Actively Worked
Is the Stabilisation Trigger likely to occur	Yes or No
Stabilisation techniques	Access & perimeter bunds: Pinned geotextile on outside fill batters.
	SRP-FD4: Pinned geotextile on the outside face.
	Clean water diversions: Pinned geotextile on the base and inside batter face.
Frequency of check on Activity Worked area	Weekly checks by the Construction Supervisor. Records of these checks will be maintained by the ESC Supervisor.

2.4 Risk Analysis and Contingency Measures

The potential risk of increased sediment discharges from activities of this SCWMP is assessed in Table 2.2, along with specific measures (both structural and/or non-structural) to address this risk.

Table 2.2 – Risk assessment

Risk activity	Specific measures	Residual risk after controls
Untreated sediment laden discharges to stream.	Silt fences between working area and stream, installed prior to any earthworks commencing.	Low
	A “no-go” buffer of 10 m between the stream and working area.	
	Earthworks timed to a suitable weather forecast.	

In accordance with the CWMP, this SCWMP includes a risk assessment process to assess works in the winter period (1 May to 30 September inclusive).

As per SCWMP template	
Date prepared	13 July 2018
Is Winter Works required	Yes or No
Next review date	1 April 2019

Appendices

Appendix A: Drawings and calculations

10

Appendix A: Drawings and calculations

- Drawings MMA-DES-ESC-E1_DRG-1101 to 1104
- Calculation: SRP-FD4
- Calculation: Clean water diversions for FD4

Calculation sheet: CWD for FD4

Table 1: Design flow	Rational method				Comments
	Catchment 1	Catchment 2	Catchment 3	Catchment 4	
Area (ha)	0.3	1.1	3	0.7	Silt loam, steep vegetated
C	0.7	0.7	0.7	0.7	
i	42.6	42.6	42.6	42.6	5% AEP event
Q - 20 m³/s	0.025	0.091	0.249	0.058	Design flow for 5% AEP

Figure 1: Catchment boundaries

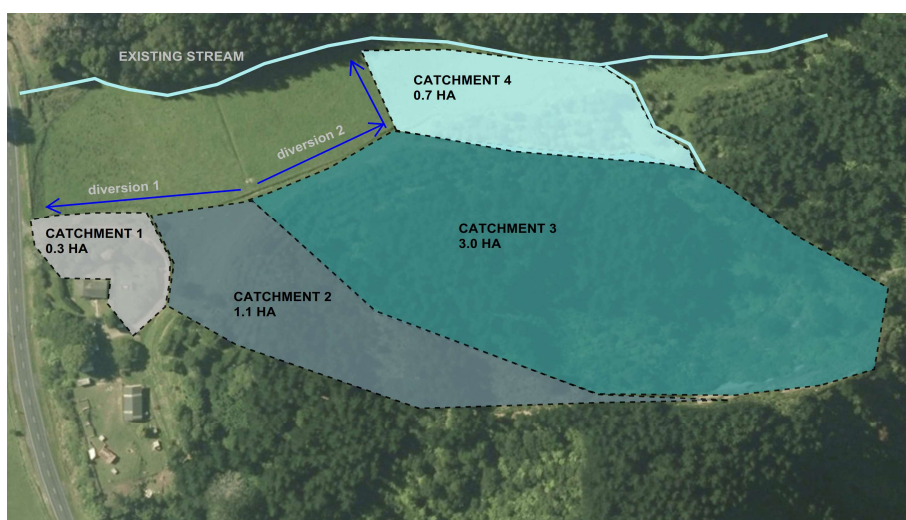


Table 2: Diversion sizing	Diversion 1	Diversion 2	Comments
Channel parameters	Diversion 1	Diversion 2	
Design Catchment	Catchment 1 +2	Catchment 3 +4	Refer Figure 1
Design flow (m ³ /s)	0.12	0.31	Refer Q-20 flows in Table 1
Description	Diversion bund, constructed channel, culvert	Diversion bund, constructed channel	Nominal shape of trapezoidal with 1:2 side slopes assumed for constructed channels. Diversion bund assumed with with 1:3 side slope
Grade	1-3.5%	1-3.5%	Varies.
Roughness coefficient n	0.03	0.03	assumed for geotextile lined channel (0.02-0.03)
Flow depth (m)	0.08-0.2	0.1-0.3	Will vary with rainfall. Design rainfall of 1 in 20 year, 1hr storm assumed
Stabilised depth	0.6	0.6	Max flow depth + 300 mm freeboard
Base width			Nominal width assumed. Min width of stabilised ground for diversion bund
Culvert pipe	0.5 DN450 mm	0.5 Not required	Sized for the Q-20 flow . Smooth wall PE pipe (n=0.015), installed at 1% grade, no heading of water above pipe

Calculation sheet: SRP-FD4

Required Volume		
Pond ID	SRP-FD4	Assumptions
Catchment area (m2)	15000	Full disposal extent
Slope (%)	<20	During filling
Runoff coefficient	0.4	Bare earth smooth, silt loam slope 10-20%
I (20 yr-1hr)	42.6	from HIRDS for 1hr storm
Storage volume (20 yr - 1 hr storm)	256	NZTA method used
Required forebay volume (10% of main) (m3)	26	
Total volume (m3)	281	Storage+forebay

		Available volume			
side slope 1v in	Water Depth (WD)	pond width at WD	Bund width (at top)	bund width at toe	pond width at toe
2	1.5	10.1	0.5	6.5	4.1
Pond Width (Top)	Pond Depth	pond length at WD	Bund width with access (at top)		pond length at toe
12.5	2.1	32.6	3		26.6
Side bund top width	Pond Length (Top)				
0.3	35	Ratio 1 to 3.2			



Vol1	29.3	$W \times H \times D$	$W = 2 \times (C3 \times D3) + F3 = G3$
Vol2	14.6	$0.5 \times W \times H \times D$	
Vol3 (Aof)	4.5	$0.333 \times W \times H \times D$	$1/3 \times w0 \times D3 \times w0$
Bund End Vol (Vend)	5.6	$Vol1 - Vol2 - (Vol3 \times 2)$	$w0 = D3 \times C3$

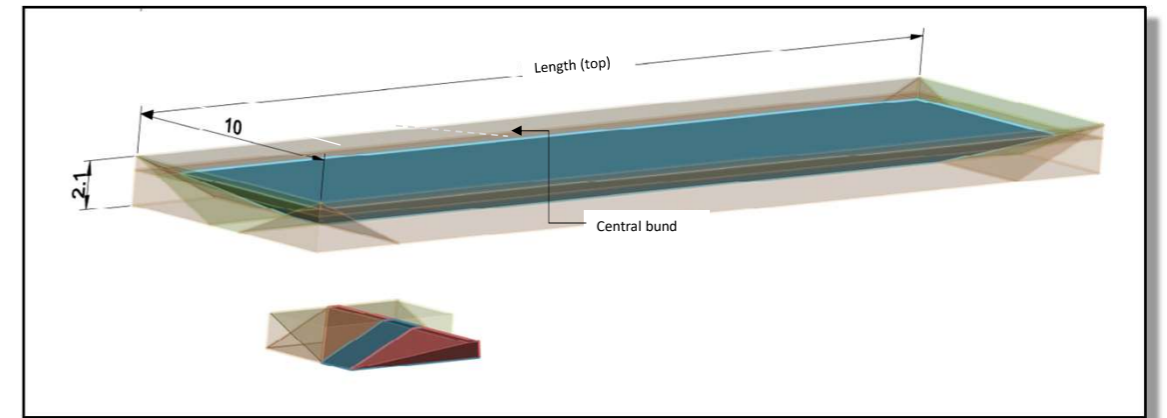
Bund Central Vol -	21.5	$(w1 + w2)/2 \times WD \times D + 2 \times Vend$	$(G3 + F3)/2 \times D3 \times H3 \times 2 \times G14$
Bund Total	32.8		

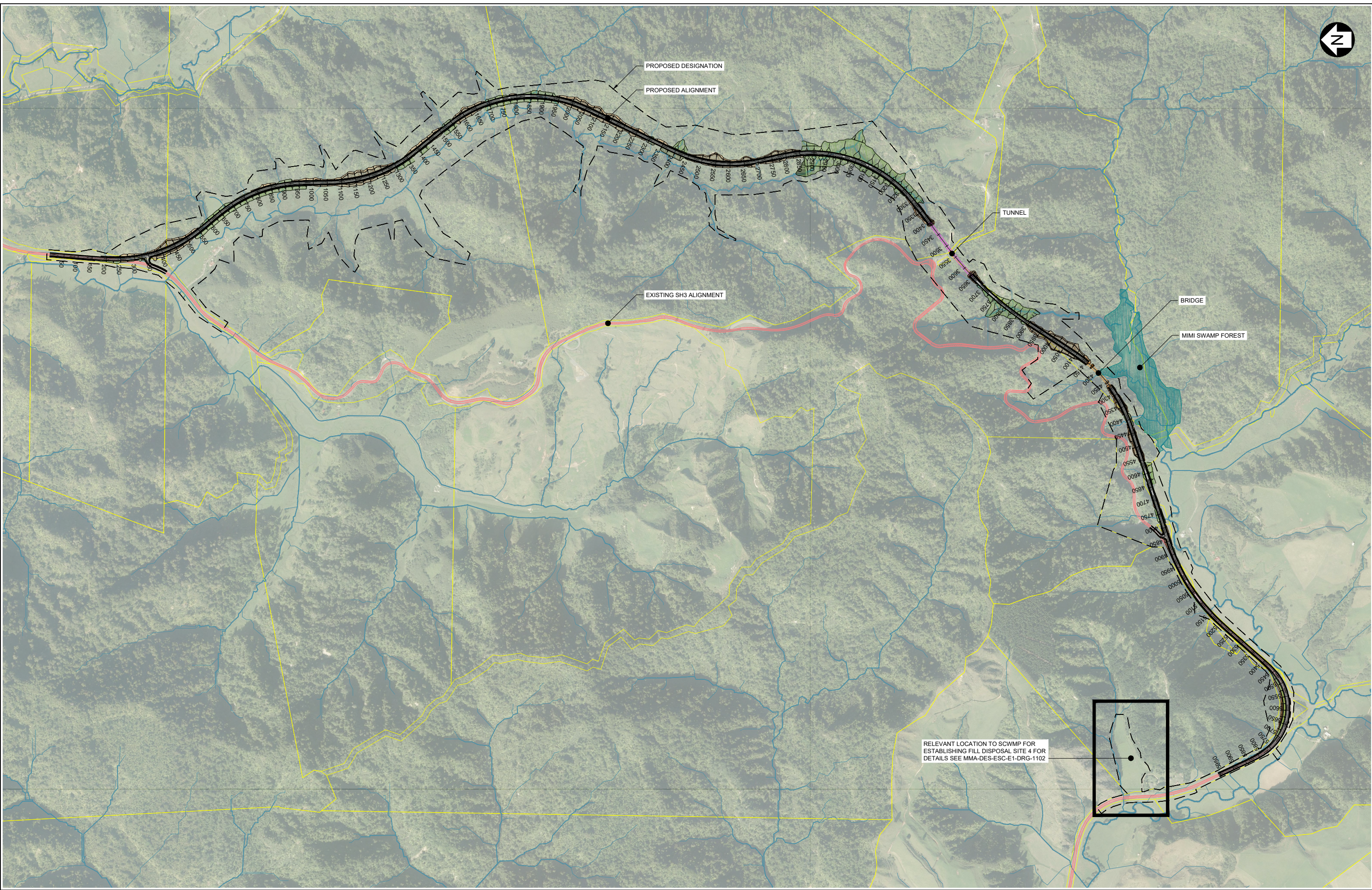
VolB1	493.9	$W \times H \times D$	$E3 \times E5 \times D3$
VolB2	146.7	$W \times H \times D$	$(C3 \times D3) \times D3 \times E5$
VolB3 (Aof)	4.5	$0.333 \times W \times H \times D$	$1/3 \times w0 \times D3 \times w0$
Basin Vol	329.2	$VolB1 - VolB2 - (VolB3 \times 4)$	$w0 = D3 \times C3$

Basin Storage Vol (less central bund), V_t	296.4	<i>incl. forebay volume</i>
----------------------------------------------------------------	--------------	-----------------------------

Main pond length	30.0	At WD
L:W ratio at WD	Ratio 1 to 3	
VolB1	454.5	see above
VolB2	135.0	see above
VolB3 (Aof)	4.5	see above

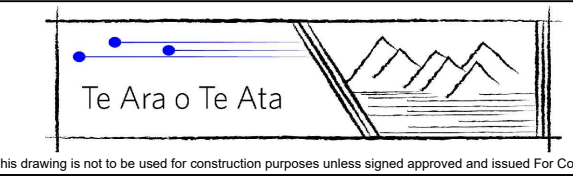
Main pond basin Vol, less central bund V_m	268.7	
Forebay basin Vol V_f	27.7	$V_t - V_m$
forebay Length at WD	2.7	assuming 1m depth
Check if Available> Required	ok	





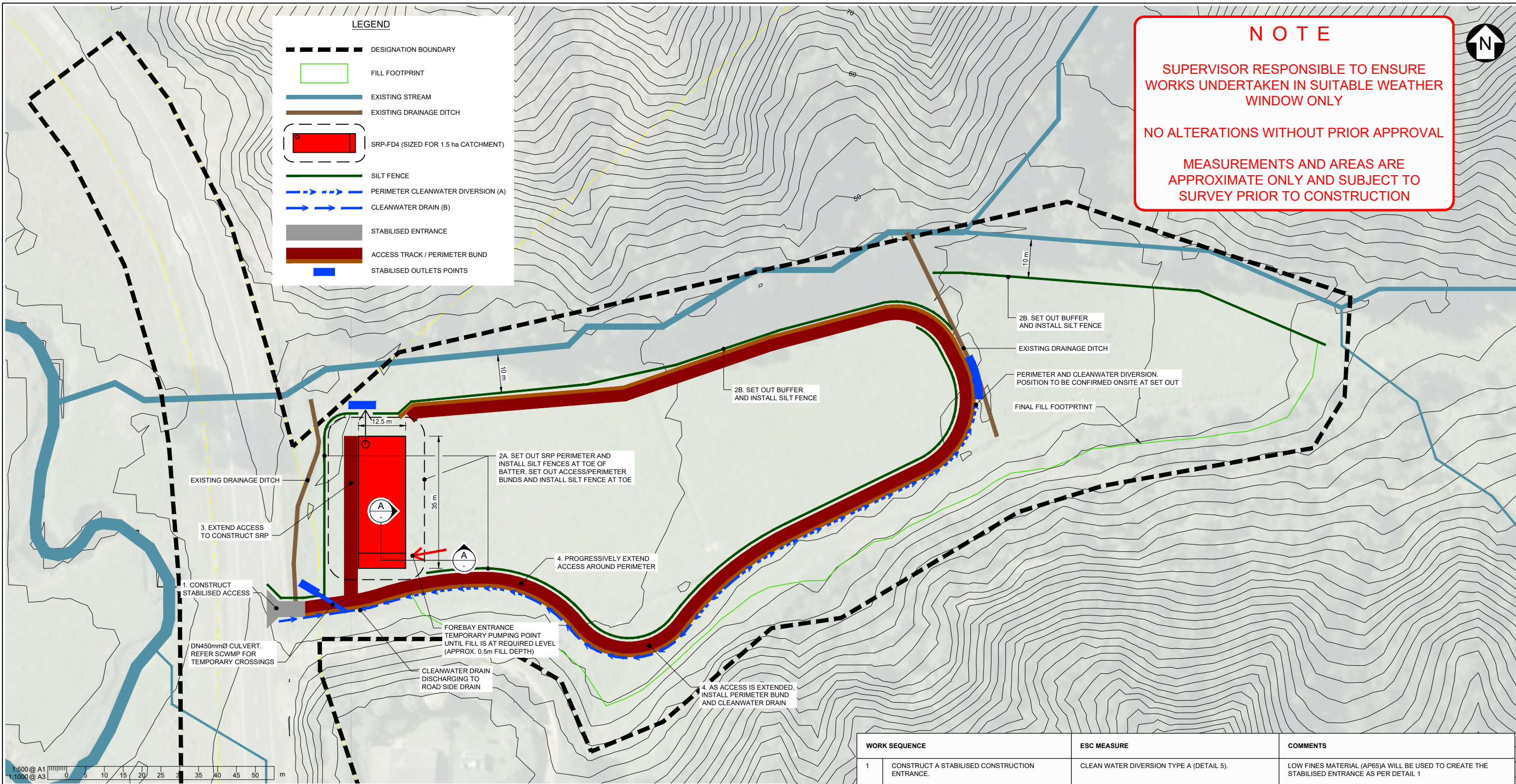
Rev	Revision Description	Drawn	Checked	Designed	Design Checked	Approved	Date
B	CHANGES TO SHEET 1103 ONLY	QDO'S	GGC*	SPP	SH	LJG	13/07/2018
A	FOR INFORMATION	QDO'S	GGC*	SPP	HM	LJG	09/05/2018

Tab	MMA-DES-ESC-E1-DRG-1101
Scales	NOT TO SCALE
Original Size	A1



MT MESSENGER BYPASS
EROSION AND SEDIMENT CONTROL
SCWMP FOR ESTABLISHING FILL DISPOSAL
SITE 4 - LOCATION PLAN

Approved	NOT FOR CONSTRUCTION
Status	FOR INFORMATION
Drawing Number	MMA-DES-ESC-E1-DRG-1101
Revision	B



NOTE

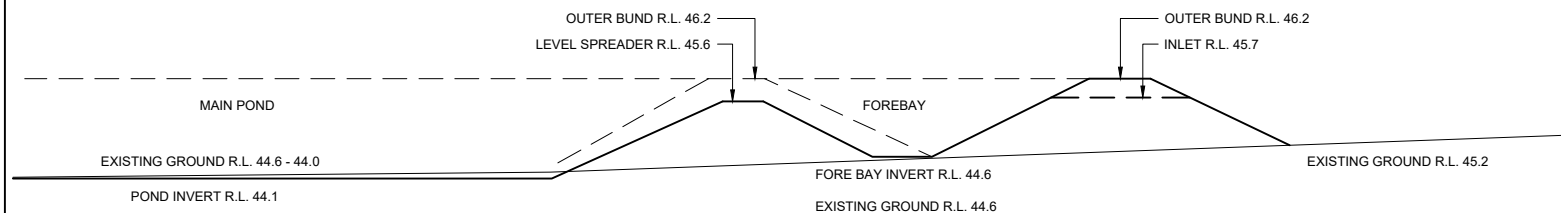
SUPERVISOR RESPONSIBLE TO ENSURE WORKS UNDERTAKEN IN SUITABLE WEATHER WINDOW ONLY

NO ALTERATIONS WITHOUT PRIOR APPROVAL

MEASUREMENTS AND AREAS ARE APPROXIMATE ONLY AND SUBJECT TO SURVEY PRIOR TO CONSTRUCTION



NOTE: EXISTING R.L.'S ARE BASED ON LIDAR SURVEY. R.L.'S TO BE CONFIRMED WITH SPOT SURVEY PRIOR TO CONSTRUCTION.

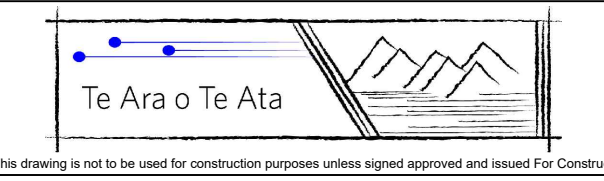


A SEDIMENT RETENTION POND LEVELS
N.T.S.

WORK SEQUENCE	ESC MEASURE	COMMENTS
1 CONSTRUCT A STABILISED CONSTRUCTION ENTRANCE.	CLEAN WATER DIVERSION TYPE A (DETAIL 5).	LOW FINES MATERIAL (AP65)A WILL BE USED TO CREATE THE STABILISED ENTRANCE AS PER DETAIL 1
2 SET OUT SRP PERIMETER AND TOE OF ACCESS ROAD/PERIMETER BUNDS. INSTALL SILT FENCE AT TOE.	NOT REQUIRED	SILT FENCES INSTALLED AS PER DETAIL 2
3 EARTHWORKS TO EXTEND ACCESS TO CONSTRUCT SRP-FD4 AND INSTALL ACCESS TRACK CULVERT. SRP-FD4 IS SIZED FOR A 1.5ha CATCHMENT (FULL DISPOSAL EXTENT)	SILT FENCE FOR THE ACCESS & SRP EARTHWORKS (DETAIL 2). SRP OUTLET PIPE DISCHARGING TO STABILISED OUTLET (DETAIL 4).	SRP INSTALLED AS PER DETAIL 6. SRP OUTER BATTER FACE STABILISED WITH PINNED GEOTEXTILE. ACCESS TRACK CULVERT AS PER DETAIL (UNDER DEVELOPMENT) INSTALL FLOCCULATION SYSTEM. (UNDER DEVELOPMENT).
4 EARTHWORKS TO PROGRESSIVELY EXTEND PERIMETER BUNDS AND INSTALL CLEANWATER DIVERSIONS WHERE SHOWN.	SILT FENCE FOR THE ACCESS EARTHWORKS (DETAIL 2). CLEAN WATER DIVERSIONS AS PER DETAIL 3 AND 5 DRAINS/DIVERSIONS DISCHARGING TO STABILISED OUTLET POINT (DETAIL 4) WHERE SHOWN.	NO MORE THAN 50m LENGTH OF UNLINED DRAIN AND/OR OUTSIDE BATTER FACE AT THE END OF EACH WORKING DAY.

Rev	Revision Description	Drawn	Checked	Designed	Design Checked	Approved	Date
B	CHANGES TO SHEET 1103 ONLY	QDO'S	GGC*	SPP	SH	LJG	13/07/2018
A	FOR INFORMATION	QDO'S	GGC*	SPP	HM	LJG	09/05/2018

Tab	MMA-DES-ESC-E1-DRG-1102
Scales	1:1000 (A3) 1:500 (A1)
Original Size	A1

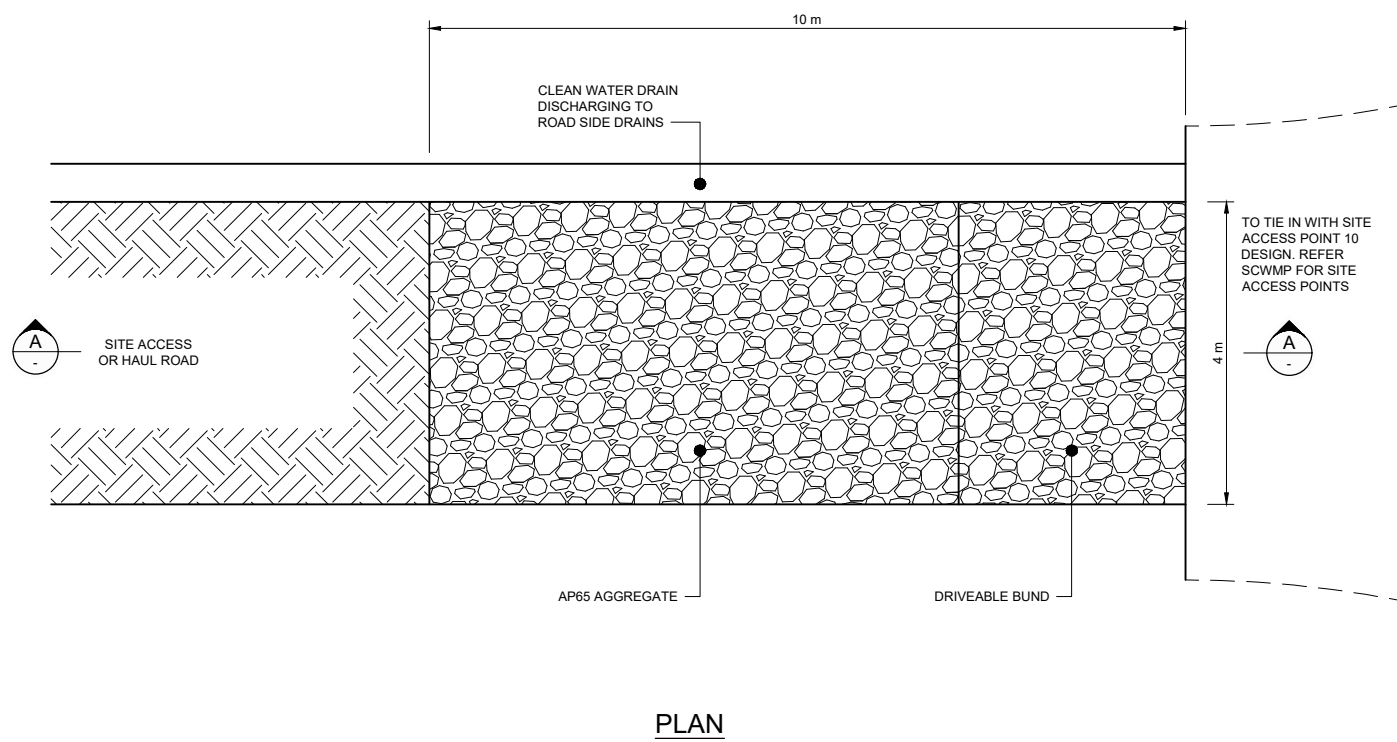


MT MESSENGER BYPASS

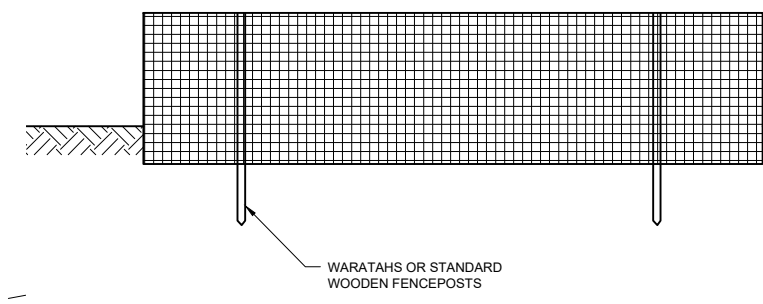
**EROSION AND SEDIMENT CONTROL
SCWMP FOR ESTABLISHING FILL DISPOSAL
SITE 4 - LAYOUT PLAN**

Approved	NOT FOR CONSTRUCTION
Status	FOR INFORMATION
Drawing Number	MMA-DES-ESC-E1-DRG-1102
Revision	B

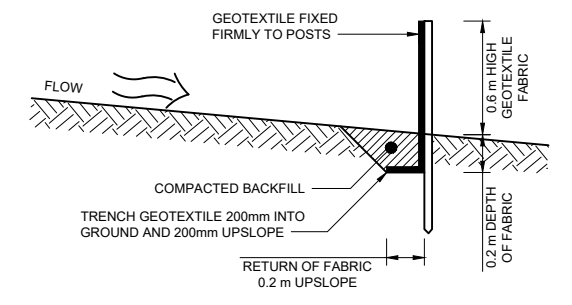
NOTES
 1. ALL LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO CONSTRUCTION.



PLAN



ELEVATION



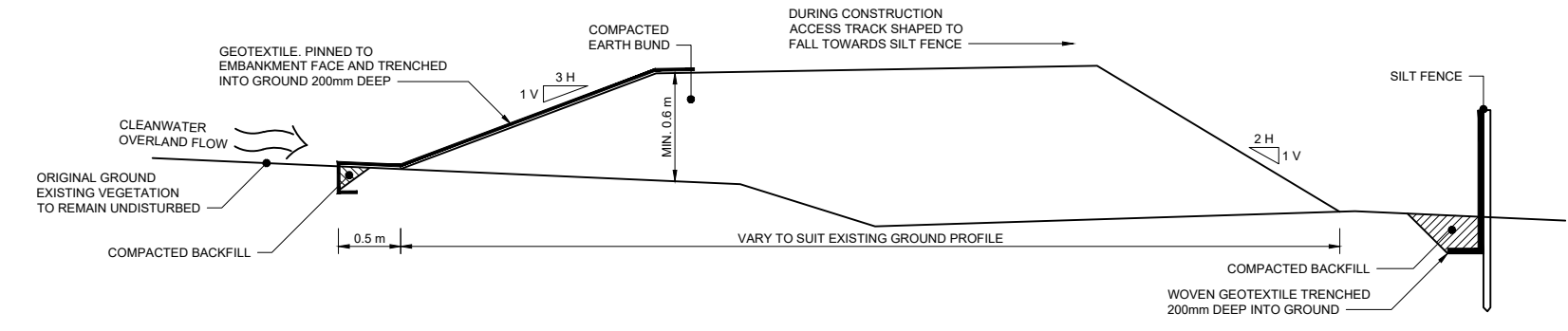
TYPICAL SECTION

NOTE
 SUPERVISOR RESPONSIBLE TO ENSURE
 WORKS UNDERTAKEN IN SUITABLE WEATHER
 WINDOW ONLY

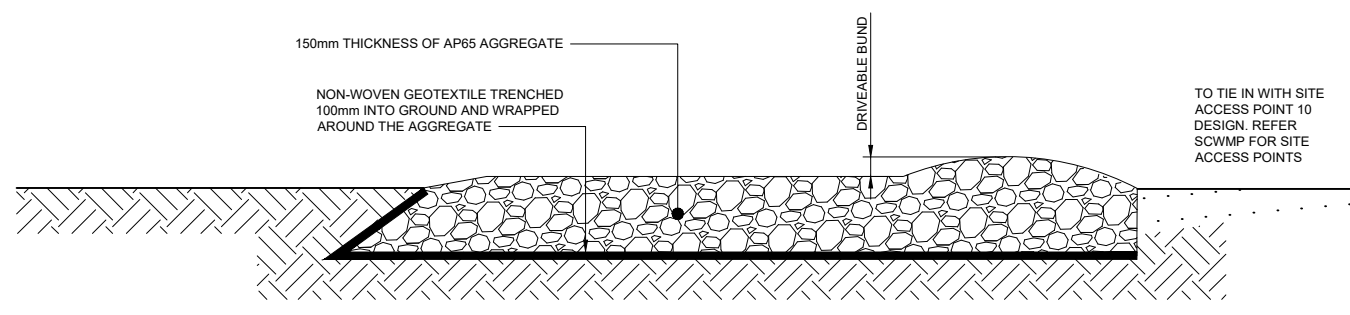
 NO ALTERATIONS WITHOUT PRIOR APPROVAL

 MEASUREMENTS AND AREAS ARE
 APPROXIMATE ONLY AND SUBJECT TO
 SURVEY PRIOR TO CONSTRUCTION

2 SILT FENCE
 N.T.S.

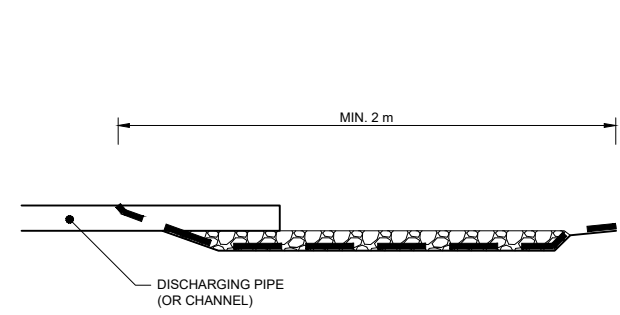


3 CLEANWATER DIVERSION (TYPE A) AND PERIMETER BUND CROSS SECTION
 N.T.S.

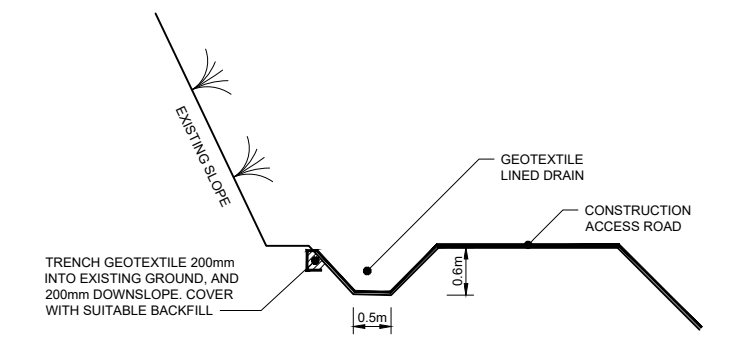


A SECTION

1 STABILISED VEHICLE ENTRANCEWAY
 N.T.S.



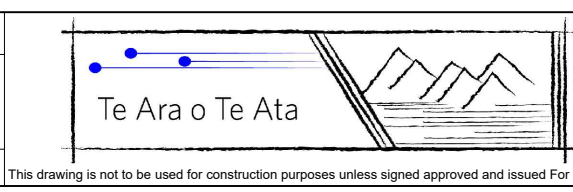
4 STABILISED OUTLET
 N.T.S.



5 CLEAN WATER DRAIN (TYPE B)
 N.T.S.

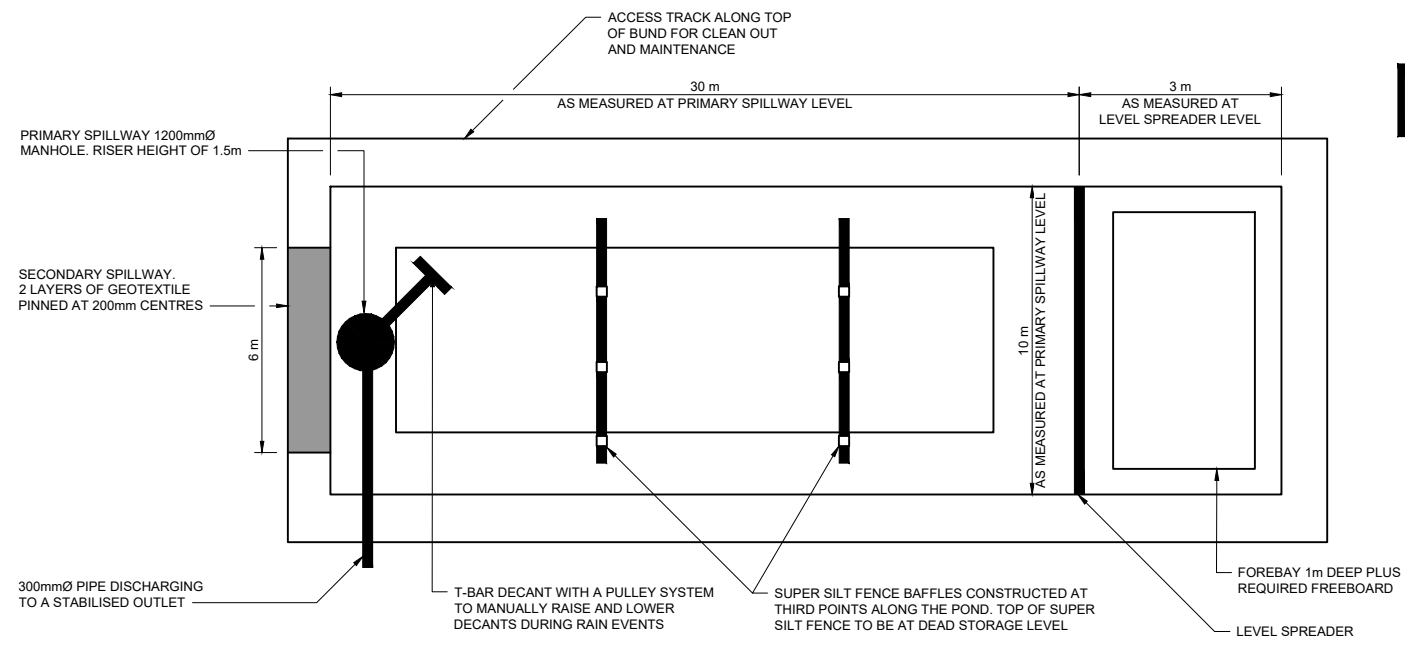
Rev	Revision Description	Drawn	Drawing Checked	Designed	Design Checked	Approved	Date
B	MINOR EDITS TO NOTES	QDO'S	GGC*	SPP	SH	LJG	13/07/2018
A	FOR INFORMATION	QDO'S	GGC*	SPP	GR	LJG	09/05/2018

Tab	MMA-DES-ESC-E1-DRG-1103
Scales	NOT TO SCALE
Original Size	A1



MT MESSENGER BYPASS
EROSION AND SEDIMENT CONTROL
SCWMP FOR ESTABLISHING FILL DISPOSAL
SITE 4 - DETAILS SHEET 1

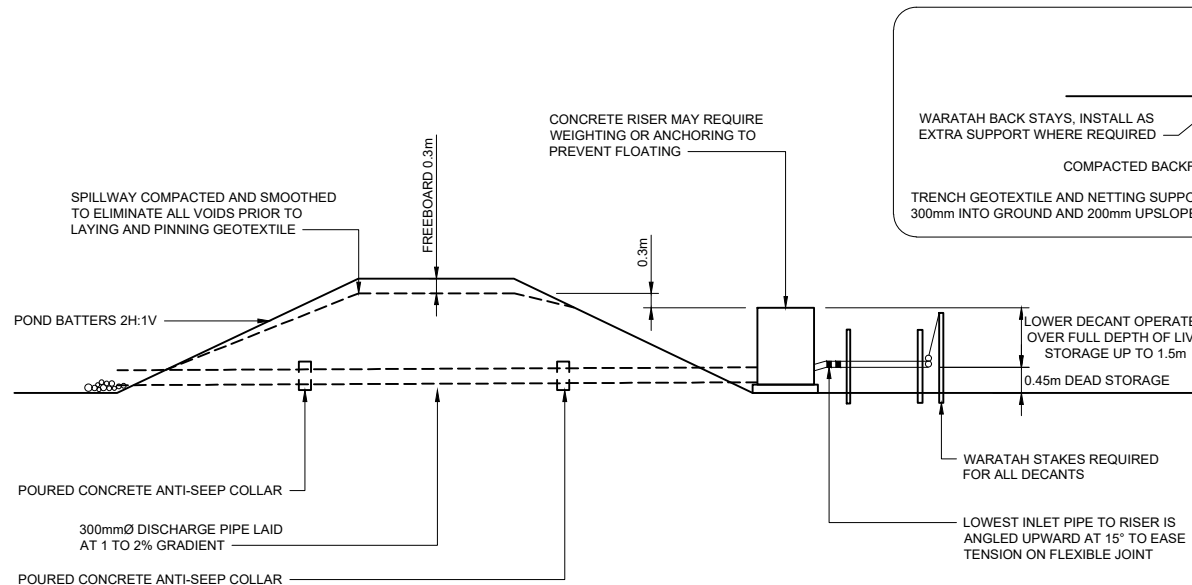
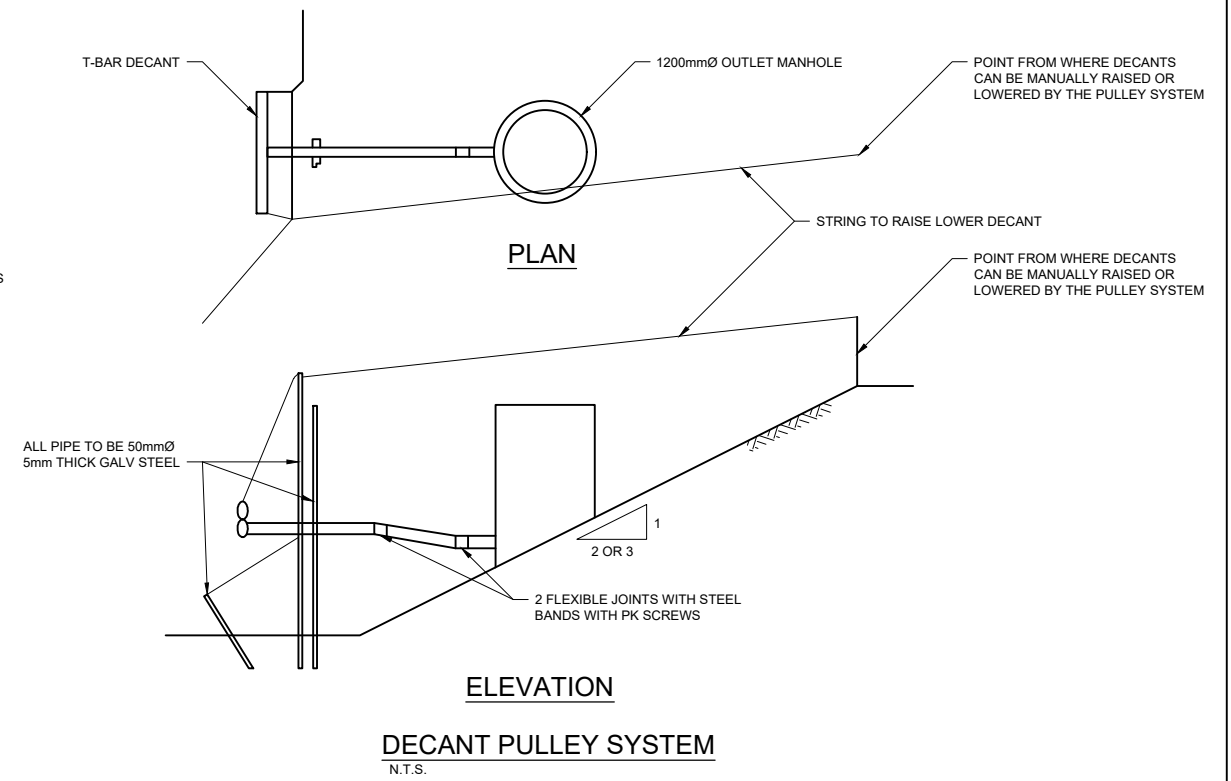
Approved	NOT FOR CONSTRUCTION
Status	FOR INFORMATION
Drawing Number	MMA-DES-ESC-E1-DRG-1103
Revision	B



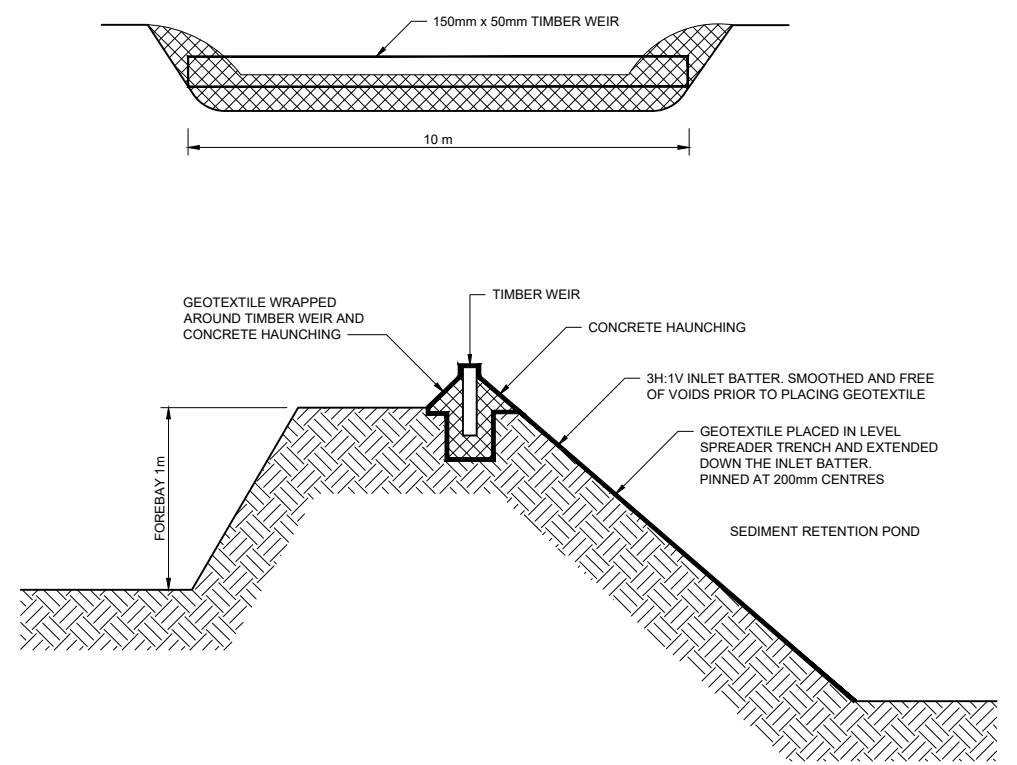
PLAN



FLOCCULATION SYSTEM LOCATION TO BE DETERMINED ON SITE SO FLOCCULATION DISCHARGES INTO THE MAIN FLOW PATH AT LEAST 5m BEFORE THE WATER ENTERS THE FOREBAY



SECTION



LEVEL SPREADER

N.T.S.

NOTE

SUPERVISOR RESPONSIBLE TO ENSURE WORKS UNDERTAKEN IN SUITABLE WEATHER WINDOW ONLY

NO ALTERATIONS WITHOUT PRIOR APPROVAL

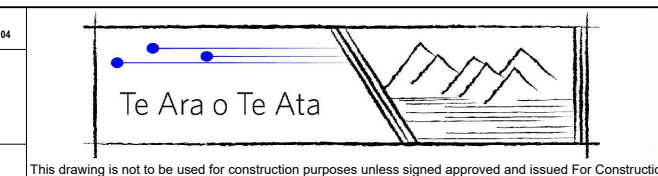
MEASUREMENTS AND AREAS ARE APPROXIMATE ONLY AND SUBJECT TO SURVEY PRIOR TO CONSTRUCTION

6 SEDIMENT RETENTION POND FD4

N.T.S.

Rev	Revision Description	Drawn	Checked	Designed	Design Checked	Approved	Date
B	CHANGES TO SHEET 1103 ONLY	QDO'S	GGC*	SPP	SH	LJG	13/07/2018
A	FOR INFORMATION	QDO'S	GGC*	SPP	GR	LJG	09/05/2018

Tab	MMA-DES-ESC-E1-DRG-1104
Scales	NOT TO SCALE
Original Size	A1



MT MESSENGER BYPASS

EROSION AND SEDIMENT CONTROL

SCWMP FOR ESTABLISHING FILL DISPOSAL

SITE 4 - DETAILS SHEET 2

Approved	NOT FOR CONSTRUCTION
Status	FOR INFORMATION
Drawing Number	MMA-DES-ESC-E1-DRG-1104
Revision	B