



Draft Erosion & Sediment Control Plan

Rotoma/Rotoiti Wastewater Treatment Plant and Land Disposal System

Rotorua Lakes Council





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1 Project Overview

This Erosion and Sediment Control Plan (ESCP) outlines measures to minimise the discharge of sediment offsite during construction of the Rotoma/Rotoiti Waste Water Treatment Plant (WWTP) and Land Disposal System (LDS), including construction of the access road.

The ESCP is based on the Concept Design provided by Pattle Delamore Partners Ltd (PDP). A drawing of the proposed erosion and sediment control measures is included in Appendix A.

This ESCP has been prepared for the Contractor to use as a guideline for addressing erosion and sediment control issues during construction, and to provide an indication to Bay of Plenty Regional Council of likely effects and proposed mitigation measures.

The location and extent of controls may however change due to:

- The documented control is no longer practical.
- There is a further need to install additional controls.
- The location of the planned control is not practical.
- The contractors construction methodology varies from the staging of works described in this document.
- Inclement weather demands additional controls irrespective of the above.
- At all times the Contractor must comply with best practice.

A final ESCP is expected to be required as a condition of consent, to be prepared by the Contractor and submitted prior to the commencement of works.

1.1 Location

The proposed WWTP will be located to the east of the city of Rotorua about 27km from the CBD as shown in Figure 1 below.



Figure 1: Location Diagram (Source: LINZ Data Service)

The project is located within the Rotorua District boundary, and within the Bay of Plenty Regional boundary.

1.2 Background

Water quality in the Rotorua lakes has been deteriorating over a number of years. The degradation of water quality is a result of nutrient and bacterial inputs from the surrounding catchments. Nitrogen and pathogens from farming and septic tanks, and phosphorus from soil erosion and detergents, have contributed to increased public health risk for bathing, drinking water and has led to the proliferation of blue-green algae.

1.3 Site Description

The proposed WWTP and LDS is located on an elevated plateau south of State Highway 30 (SH30), which runs along the southern shore of Lake Rotoiti, as shown on Figure 1. The site for the WWTP is approximately 5.5ha, with a 700m access road from SH30.

The site is on a dissected plateau on the surface of a rhyolite dome complex, with the steeper slopes of a younger part of the rhyolite dome complex rising up to the south of the plateau surface. The site is underlain by rhyolite pyroclastics and lavas of the Te Rere Formation, which forms a part of the Haroharo Subgroup derived from the Okataina Volcanic Centre¹. The nearest fault exclusion zones are approximately 2km south and 3.5km east of the site.

Extensive ground investigations were undertaken to inform development of the proposal. These investigations were undertaken in two stages, and produced the following reports:

- Lake Rotoiti Wastewater Scheme - Stage 1 Geotechnical Investigation (Opus, 2015)
- Rotoiti - Rotoma WWTP and Land Disposal System: Stage 2 Hydrogeological Investigation (PDP, 2016)

The investigations included hand auger scale penetrometer tests, drilling of investigation boreholes, groundwater monitoring piezometers, excavation of test pits, soil samples, and infiltration tests. Geology encountered during the investigations comprised predominantly loose, poorly sorted rhyolitic sands and gravels with occasional rhyolite and obsidian cobbles and boulders. Near the surface (typically between 1-3m below ground level), a layer of lower permeability silty material was encountered in some of the boreholes.

The Stage 2 Hydrogeological Investigation (PDP, 2016) found that the depth of the permanent water table encountered during drilling resided at approximately the same relative level as the water level in Lake Rotoiti (approximately 280m RL). The soil profile was found to be of very high permeability and free draining.

1.4 Proposal

Rotorua Lakes Council propose to construct, operate, and maintain a WWTP and LDS as part of the Rotoma/Rotoiti Sewerage Scheme. When complete, the Scheme will provide sewerage reticulation to every property within the East Rotoiti area and Rotoma area for treatment and

¹ Geology of the Rotorua Area (Leonard et al. 2010)

disposal at the Rotoma/Rotoiti WWTP and LDS. The scheme will replace the existing individual septic tank and on-site treatment systems servicing properties within the two communities.

Pattle Delamore Partners (PDP) have developed a concept design for the WWTP and LDS, utilising chemical assisted membrane bioreactor (MBR) technology prior to disposal to rapid infiltration trenches. The concept design identifies target effluent quality standards, and includes provisions to minimise odour and noise, and to reduce the visual impact at the site.

1.4.1 Earthworks

There are two main components to the construction of this project, the construction of the WWTP and the construction of the access road. The construction of the WWTP can also be split into two, the WWTP and the disposal field. A summary of the estimated earthworks quantities is shown below in Table 1:

Table 1: Summary of Estimated Earthworks Quantities

CONSTRUCTION COMPONENT	LENGTH (m)	AREA (m ²)	VOLUME (m ³)*
ACCESS ROAD	687	3435	2300
WASTE WATER TREATMENT PLANT	-	2750	550
WASTE WATER DISPOSAL FIELD	-	1305	1305

* Only a preliminary WWTP and Access Road design was provided by PDP therefore earthworks volumes are indicative only and are roughly estimated. Once detailed design has been completed the ESCP will need to be updated accordingly.

1.4.2 Flow Paths

The site currently has fall through it from south to north where water comes off the large hill behind the site and flows through it towards Lake Rotoiti. However, there are no natural waterways or ephemeral flow paths in the vicinity of the project.

1.4.3 Proposed Work Programme

The works programme is subject to detailed design but is preliminarily worked out as follows:

1. Construct new access road up to where the temporary access track is, including appropriate erosion and sediment controls.
2. Construct runoff diversion bund and channel protected with geotextile along the southern side of the proposed site. Then install the stable, erosion proof outfalls and check dams.
3. Construct the runoff diversion bund and the sediment retention pond around the northern side of the proposed WWTP site. Also install the temporary 525mm dia culvert and stable, erosion proof outfall.
4. Construct the temporary access track over the temporary culvert and into the western side of the proposed WWTP site. Install a stabilised entranceway including super silt fences at the WWTP end of the access track to ensure any sediment does not get tracked off site.
5. Install super silt fence along the northern side of the proposed infiltration trenches and around towards the southern runoff diversion bund.
6. Construct the waste water treatment plant, stabilising any exposed surfaces as work progresses with mulch and hydroseed.

7. Trench the infiltration trenches and construct the disposal field. Stabilise any exposed surfaces with mulch and hydroseed.
8. Once construction is finished and all exposed surfaces are stabilised, remove all existing erosion and sediment control measures.
9. Finish constructing the access road up to the final location at the WWTP. Remove the temporary access track. Ensure appropriate erosion and sediment controls are in place throughout this work.
10. Ensure all exposed surfaces are stabilised then remove all final erosion and sediment controls.

The surface vegetation is to be removed and disposed of offsite. Erosion and sediment control measures are to be installed before works commence.

Erosion and sediment control measures for these activities are detailed in the sections to follow.

Earthworks are normally not allowed during the period 1 May to 30 September inclusive during any year, apart from necessary maintenance works, unless approved in writing by the Bay of Plenty Regional Council.

2 Erosion Controls

2.1 Vegetation Clearance

Any trees and/or other vegetation will be cleared, as required and disposed of offsite.

2.2 Offsite Runoff (Clean Water) onto the Work Site

During the construction works, the offsite runoff will be diverted away from any earth works for as long as practically possible and the runoff will continue to flow through existing natural flow paths where applicable. This will be done via a runoff diversion bund and channel protected with geotextile, rock check dams and stable, erosion proof outfalls. Refer to **Appendix A** for bund locations.

2.3 Control of Onsite Runoff (Dirty Water)

Dirty water will be treated via a combination of super silt fences and a sediment retention pond. The super silt fences are used to treat the runoff from the construction of the proposed infiltration trenches and the stabilised entranceway. The sediment retention pond is used to treat the contaminated runoff from the construction of the WWTP.

2.4 Earthworks Stabilisation

Bare areas subject to erosion will be progressively stabilised as they are completed. Stabilisation can be achieved through applying periodic hydro seeding, mulching or hay. Embankment, cut slopes, and any exposed areas should be stabilised as soon as they are at design level.

2.5 Stockpile Areas

Construction methodology and stockpile locations will be finalised by the Contractor closer to the construction date. Erosion and sediment control requirements of the stockpile areas will be in

compliance with the Bay of Plenty Regional Councils *Erosion and Sediment Control Guidelines for Land Disturbing Activities*. The stockpiles will be stabilised using grass or hydro seeding as appropriate and contained using either silt fence or, where available, dirty water diversion channels.

Stockpile zones are to be identified before works start, in discussion between the Contractor and the land owners.

While not part of this erosion and sediment control plan, it should be noted that all cut to waste sites will need to be assessed for resource consent requirements prior to dumping.

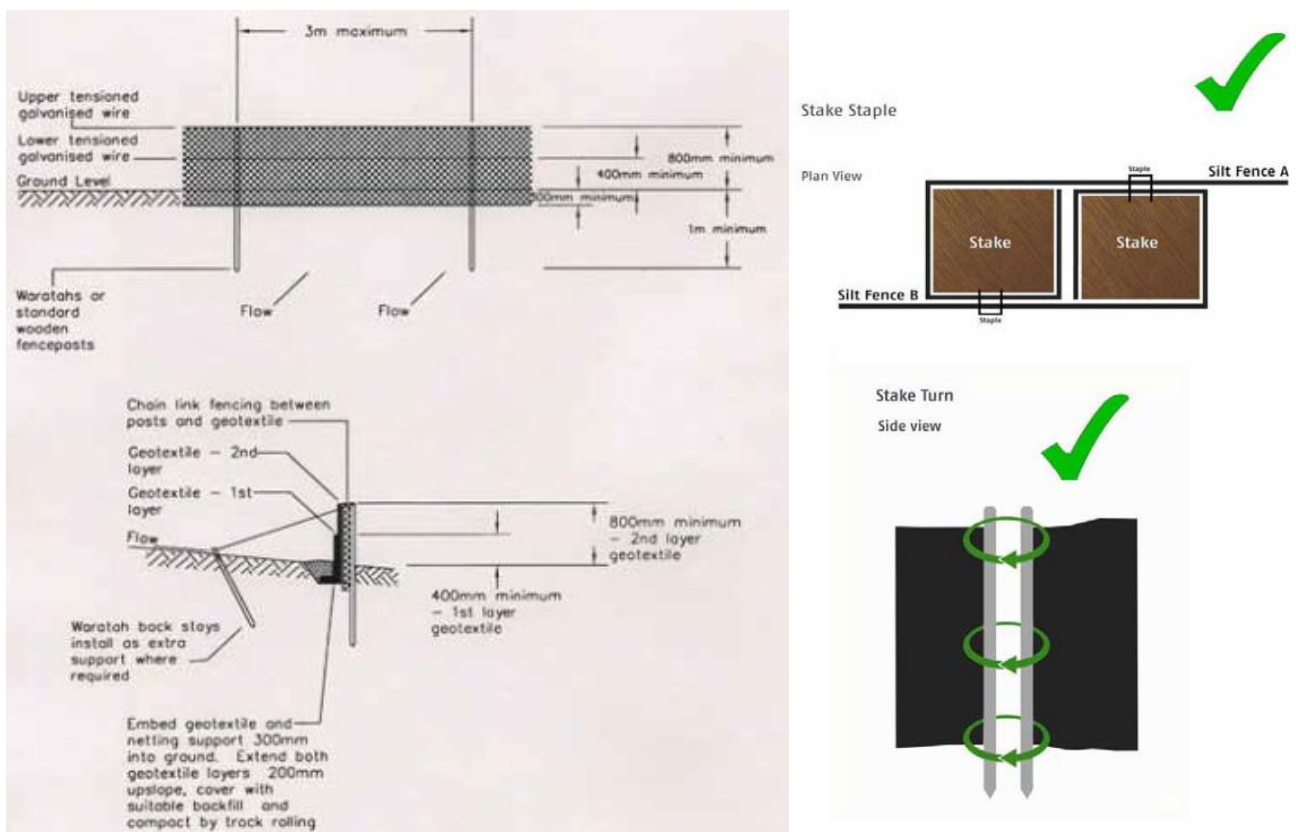
3 Sediment Controls

A range of controls have been identified for use on the construction site. These controls include super silt fences, rock check dams, runoff diversion bunds and channels protected with geotextiles, a stabilised entranceway, stable, erosion proof outfalls and a sediment retention pond. The location of these control measures are indicated in **Appendix A**. The detailed design of these controls are specified below.

3.1 Super Silt Fences

The location of silt fences required on the site is indicated on the attached plan (**Appendix A**).

Super Silt fences shall be constructed in accordance with the Bay of Plenty Regional Council guideline document 2010/01 *Erosion and Sediment Control Guidelines for Land Disturbing Activities*, and as shown by the general design below:



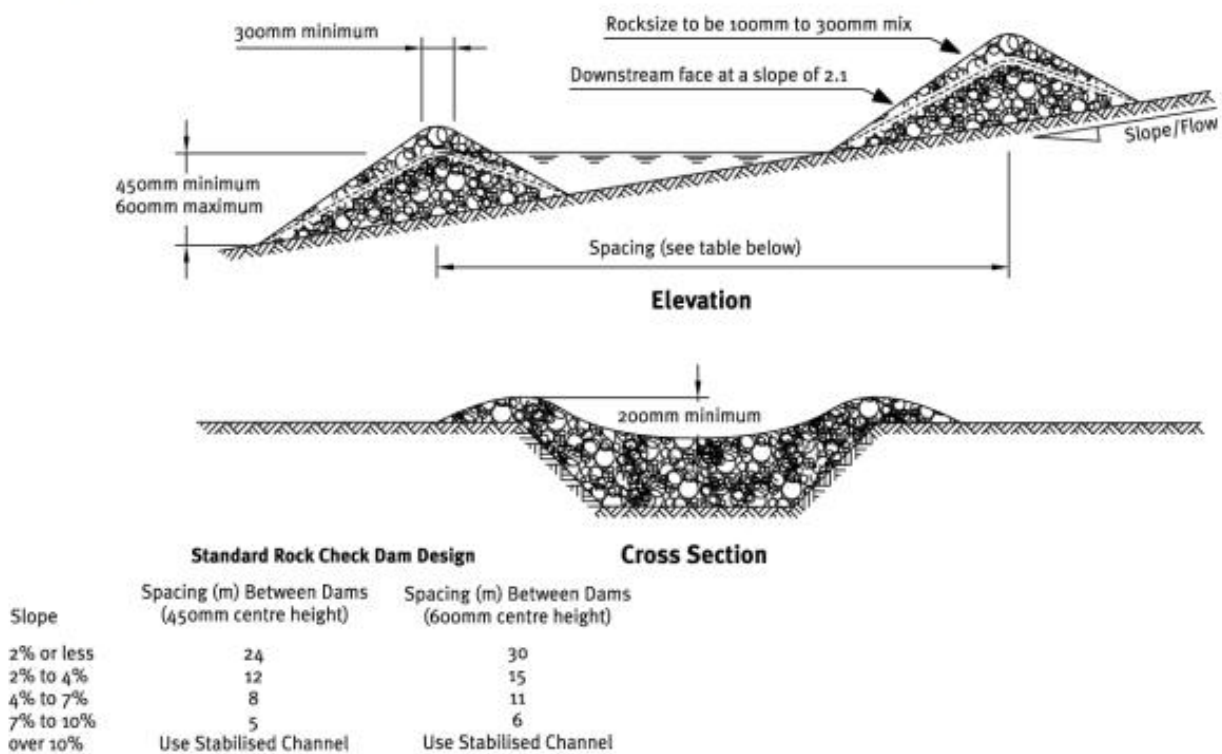
3.2 Rock Check Dams

Rock Check Dams will be used as grade control structures to reduce the velocity of concentrated flows along the runoff diversion bund and channel to the south of the site.

The locations of the rock check dams are indicated on the attached plan (**Appendix A**).

Rock check dams shall be constructed in accordance with the Bay of Plenty Regional Council guideline document 2010/01 *Erosion and Sediment Control Guidelines for Land Disturbing Activities*, and as shown by the general design below:

Design drawings



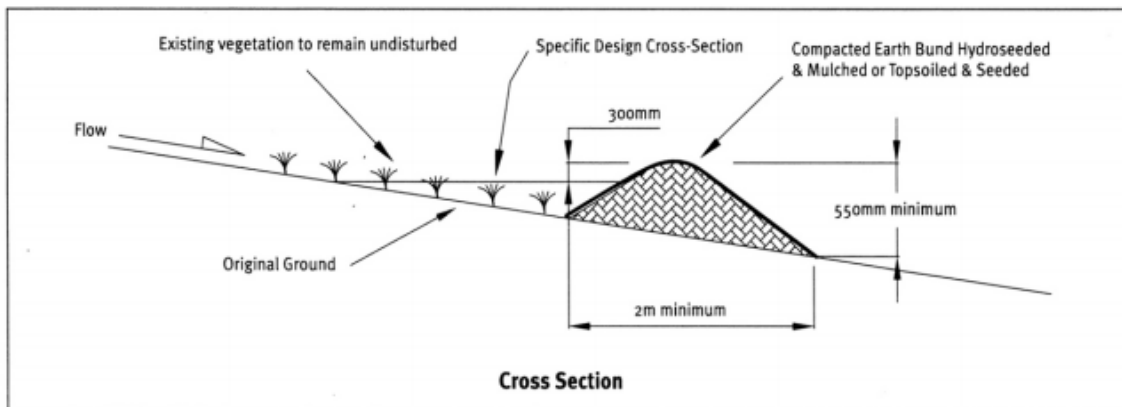
The plan in **Appendix A** shows spacing's for 450mm high rock check dams.

3.3 Clean Water Cutout Diversion Channel

Clean water cutout diversion channels will be used to prevent clean water from entering work areas and provide drainage of clean surface water from upstream of the catchment around the site into the existing natural flow paths.

The locations of clean water cutout diversion channels are indicated on the attached plan (**Appendix A**).

Clean water cutout diversion channels shall be constructed in accordance with the Bay of Plenty Regional Council guideline document 2010/01 *Erosion and Sediment Control Guidelines for Land Disturbing Activities*, and as shown by the general design below:



Clean Water Runoff Diversion Channel Design Details

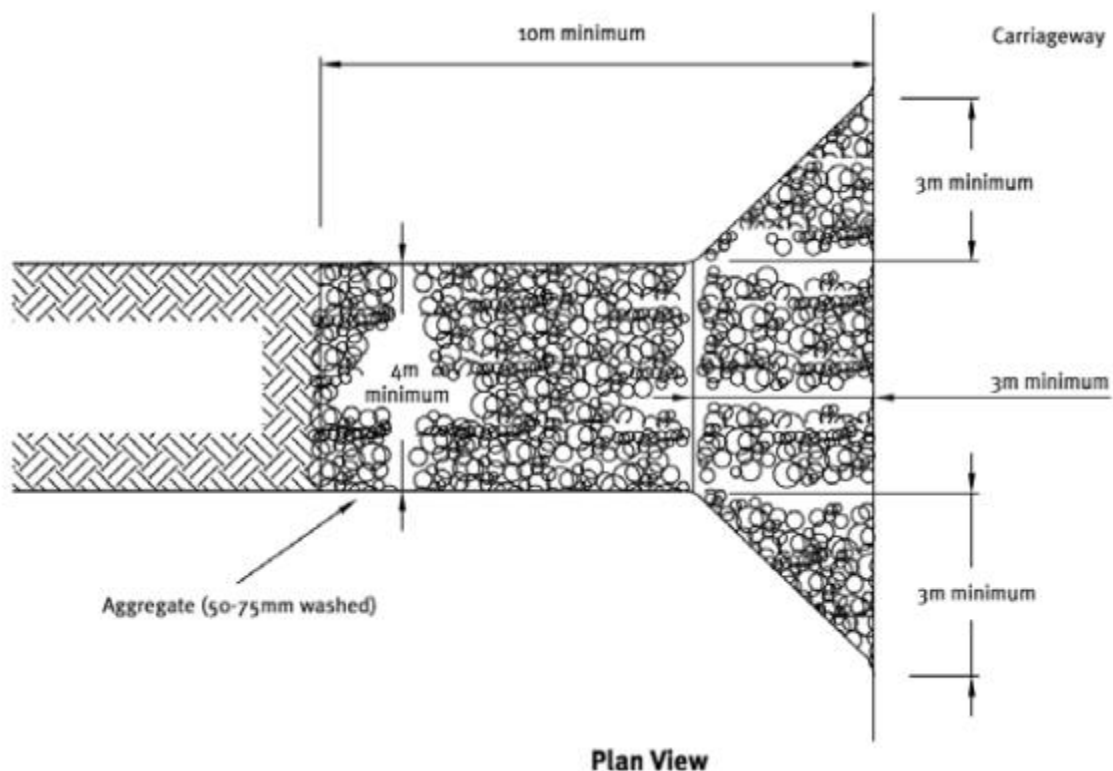
Figure 32 Runoff diversion channels - image courtesy of Auckland Regional Council 1999.

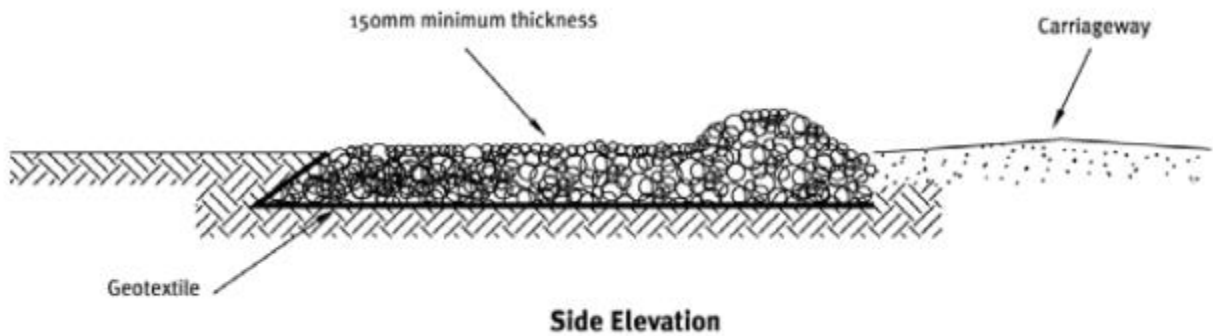
3.4 Stabilised Entranceway

The stabilised entranceway will be used to prevent the site access point from becoming a sediment source and to prevent the transportation of sediment from the site onto the stabilised road surface.

The location of the stabilised entranceway is indicated on the attached plan (**Appendix A**).

The stabilised entranceway shall be constructed in accordance with the Bay of Plenty Regional Council guideline document 2010/01 *Erosion and Sediment Control Guidelines for Land Disturbing Activities*, and as shown by the general design below:





3.5 Sediment Retention Pond

Where possible all offsite stormwater drains crossing the worksite shall be dammed by a clay earth bund (or similar local material which will effectively waterproof the pond). This is to ensure that only dirty water is being treated by any sediment control measures and that no clean water is getting onsite. This is also to protect the clean offsite water from being contaminated.

There is one pond to be installed as part of the WWTP construction works. The pond is located in an area where sediment laden water can be intercepted and the amount of sediment leaving the site can be reduced.

The location of the pond is shown on the attached plan (**Appendix A**), and will be constructed in accordance with the Bay of Plenty Erosion and Sediment Control guidelines (section 7.1, Figure 51).

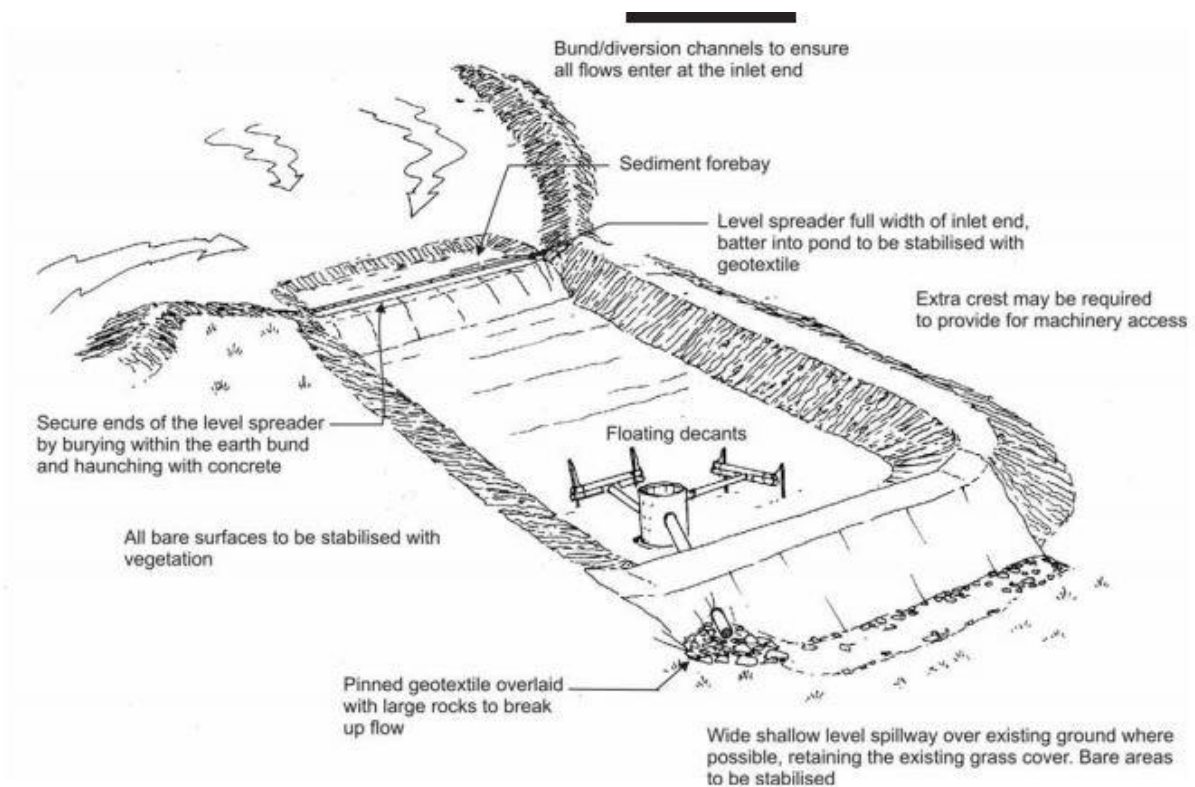


Figure 51 Sediment retention pond schematic.

The pond has a contributing catchment area of 0.621 ha, and dimensions as follows: 6.5m width, 20.5m length, 1.5m depth, for a total volume of 200m³. The pond will have a forebay with dimensions as follows: 6.5m width, 3.0m length, 1m depth, for a total volume of 20m³.

Generally the pond shall be constructed in accordance with the Bay of Plenty Erosion and Sediment Control guidelines (section 7.1). This will involve:

- Heavy compaction.
- A geotextile/filter cloth pinned (0.5m centres) over the bund.

No bund should be higher than 2m.

4 Dust Control

Dust is a major issue at construction sites, it has environmental, safety and health risks associated with the works. The main effects are health hazards for affected residents, damage to trees, and safety for road users as well as general nuisance to the public. The construction methods employed will ensure that dust generation is mitigated and managed at all times to ensure safety to road users is not impacted.

4.1 Method/Procedure

The Contractor will ensure that dust is kept to a minimum and is compliant with any resource consent conditions at all times. The following measures will be allowed for during the construction period:

- Monitoring, testing and compliance as per any Resource Consent conditions
- Sprinkler systems throughout the construction site
- Water carts will be available on site at all times
- Matting, mulching, Hydroseeding
- Stabilisation of stockpiling areas and bunds if required
- Water sourced from an approved supply, all local restrictions will be adhered to.
- The Contractor will obtain daily forecasts and circulate to appropriate staff. Dust control measures will be instigated if dry, windy conditions are forecast.
- Binding agents and dust suppressant additives are to be available if required.
- Minimise exposed areas through construction staging.
- Wind break fences are to be used if required.

4.2 Details of Dust Control

4.2.1 How water will be applied?

Sprinkler systems and water carts are to be operated by the contractor when and where required to keep dust levels to an acceptable level, this includes after working hours, on weekends and construction shutdown periods. It is up to the contractor to determine adequate sources of water and appropriate permissions before establishment on site, including permits from the Rotorua District Council for the use of water from the municipal water supply if required.

4.2.2 The use and access to binding agents/dust suppressants for use in the water carts or sprinkler systems

No binding agents or dust suppressant additives are proposed to be used in the water used for dust control at this stage. Although access to these items will be identified by the contractor for use if required.

4.2.3 The erection of a sign displaying a 24-hour contact telephone number for the site contractor for complaints

The contractor shall supply and erect a sign at the entrance to the site from SH30. The sign must display the project name, contractor's name, and the words: "complaints or comments", and contact phone number for the contractor. This number must be manned 24hrs a day, 7 days a week.

4.2.4 The use of wind-break fencing in problem areas

Winds in Rotorua are generally light in comparison to much of New Zealand, and there are generally lighter winds during the construction season than during the off seasons. If the contractor deems it necessary, they may use wind break fencing in problem areas to mitigate dust migration.

4.2.5 Covering exposed areas with durable temporary windshield cloth or geotextile fabrics

All topsoil stockpiles and bunds will be sown with grass or covered with mulch as soon as practicable. Biodegradable matting will be used to stabilise any exposed slopes until they can be grassed or planted.

4.2.6 Other options to be taken should attempts to manage dust nuisance be unsuccessful

If all measures mentioned above prove to be inadequate at suppressing the dust in certain unforeseen conditions, then any or all of the following courses of action may be implemented:

- Cease the movement and operation of all plant and machinery on the construction site until the dust is under control and is able to be maintained at acceptable levels.
- If it is safe to do so, re-task all workers onto implementing dust control measures.
- Shut the site down with the exception of dust control work.

4.2.7 How will you prevent tracking of dust and sediment by vehicle movement off the work site?

All haul roads will be stabilised which trucks can then run on without having to turn around on exposed surfaces. Restricting the truck movements to the haul road will allow for concentrated dust control efforts in maintaining the quality of the haul road and wetting if required.

Vehicle movements on site will be governed by speed restrictions which will among other things assist in preventing dust generation. All site entrances are to be stabilised to ensure minimal dust tracking off site via vehicle movements.

5 Implementing the Plan (Methodology)

The contractor should work to the ESCP, or approved variations as the job progresses.

All super silt fences shall be checked at the commencement of each construction week and before and after any significant rainfall events.

All clean water cutout diversion channels shall be checked at the commencement of each construction week and before and after any significant rainfall events. The inverts and outlets shall be checked for evidence of scour and erosion and rehabilitated if required. Remove accumulated sediment as required.

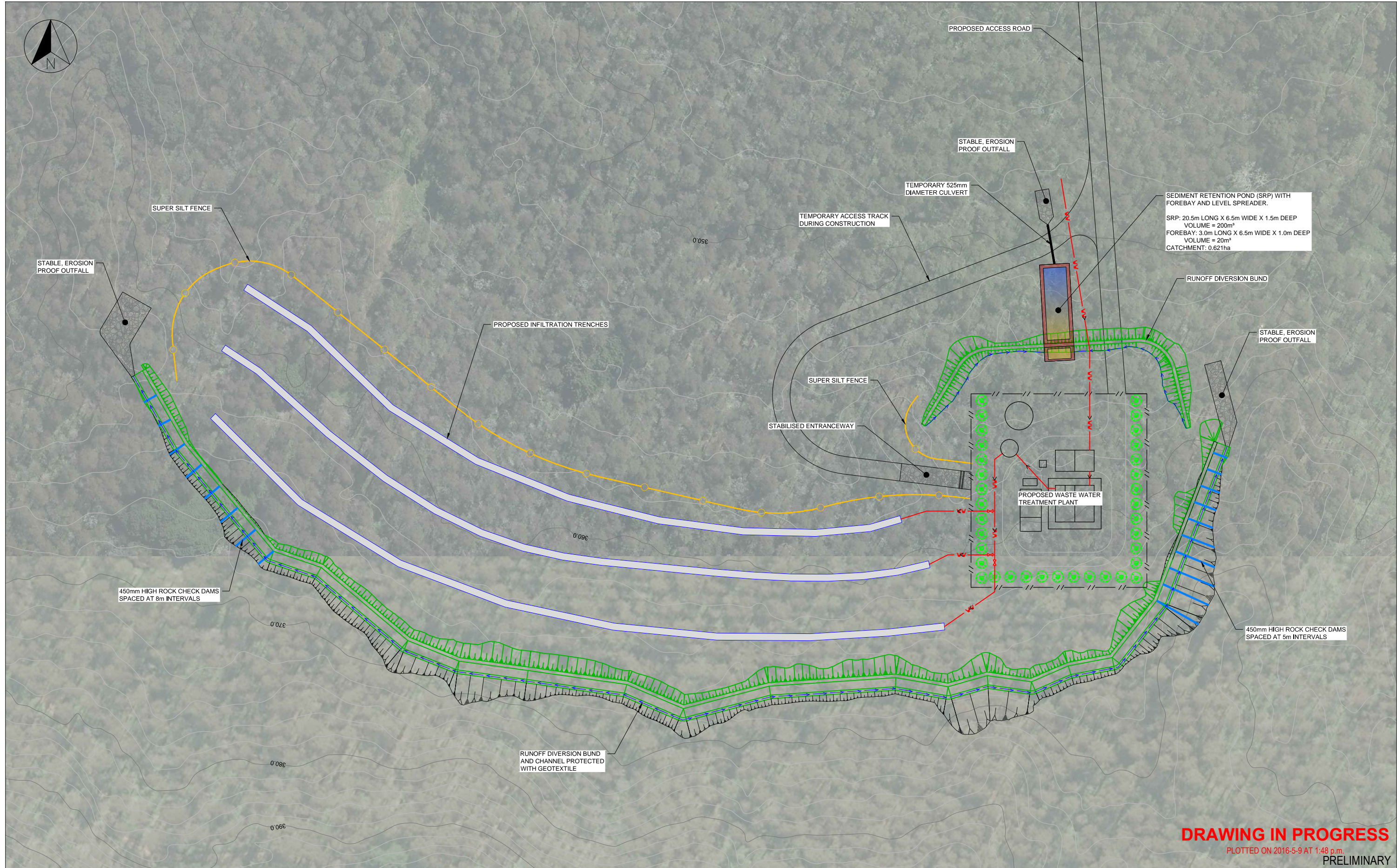
The sediment retention pond shall be inspected and maintained at the commencement of each construction week, and before and after any significant rainfall event to check for any accumulated sediment which may cause overtopping. Discharge points shall be checked for signs of scouring and if required further armouring or stabilisation shall be undertaken.

This ESCP may be amended prior to construction if suitable alternatives to the current plan arise through consultation with the successful Contractor, or better options become evident during the construction phase. Any changes sought will require approval and sign off from the Bay of Plenty Regional Council

Appendix A: Sediment and Erosion Control Plan Drawing



300 mm
200
100
50
0 10 mm



DRAWING IN PROGRESS
 PLOTTED ON 2016-5-9 AT 1:48 p.m.
 PRELIMINARY

Revision	Amendment	Approved	Revision Date



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J F	1:500 (A1) 1:1000 (A3)	2-89993.00

Project	
ROTORUA LAKES COUNCIL 1438 STATE HIGHWAY 30 ROTORUA ROTOMA ROTOITI WWTP RESOURCE CONSENT	
Sheet	
EROSION AND SEDIMENT CONTROL PLAN WASTE WATER TREATMENT PLANT	
Project No.	Sheet No. / Revision
2-89993.00	C01 / A

1:1 @ A1
 1:2 @ A3
 0 10 20 30 40 50 60 70 80 90 100 mm