Draft Erosion Sediment Control Plan
The Point Solar Farm
Ohau C, Mackenzie Country

Haigh Workman reference 23 119

April 2026

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Revision History

Revision Nº	Issued By	Description	Date
A	Alan Collins	DRAFT	February 2026
B	John McLaren	DRAFT	April 2026
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1 Introduction

1.1 Brief

Haigh Workman Ltd was commissioned by Far North Solar Farm Ltd (the Client) to prepare an Erosion Sediment Control Plan (ESCP) for The Point Solar Farm, Ohau C, Mackenzie Country. The proposed development is currently under consent consideration with the Environmental Protection Authority as part of the government's Fast-track programme.

1.2 Accompanying Documentation

This report is to be read in conjunction with the ESCP plan drawings prepared by Haigh Workman. The list of drawings include, but are not limited to:

- ESCP-01
- ESCP-02

1.3 Site Location

Physical Address:	The Point, Ohau C, Mackenzie Country
Legal Description:	Section 3 SO 384036
Parcel Area:	973 ha

1.4 Limitations

This report is intended to support the Client and their contractors to comply with Environment Canterbury regulation during construction. It is also to be used by the compliance monitor to ensure good construction practice. The information and opinions expressed in this report shall not be used in any other context without prior approval from Haigh Workman Ltd.

The report should only be made available to the Client, their contractors and consultants, and the Territorial Authority.

Haigh Workman Ltd does not take responsibility for factors not covered in the agreed brief.

2 *Proposed Works*

The proposed development will see 577 hectares of photovoltaic (PV) panels erected across the Site. The panels will be set on 2.285m wide tables that will rotate on a north-south axis 55 degrees. The height of the axis support posts is to be 1.5 which will mean that the minimum distance from the ground for the PV modules is 1.015m. The free space between each module table is to be 3.882m. The ground is to remain grassed and tended by sheep (as opposed to cattle which is the current livestock). The proposed arrangement will not have PV modules within a 40m corridor for the transmission line that passes through the Site. The access tracks will remain unpaved.

In the very centre of the proposed solar farm, a 220kV substation facility is to be constructed. The proposed switchyard with access surrounds covers a 135.1m by 108.3m area. The earthworks required include 4034m^3 of clean hard fill, and 3102 m^3 of topsoil stripping over an area of 9,545m^2[*].

Access roads are proposed, totalling a length of approximately 29 km. It is expected that the roads will vary on width, depending on their proposed usage, but we anticipate that an average width of 4.0m can be assumed. The roads will have topsoil side cast and basecourse brought in when subgrade is not suitable for expected traffic.

2.1 Summary

In accordance with GD05 C1.4, the site area for The Point Solar Farm is 577 hectares. The expected earthworks volumes are as follows:

Piling for the PV tables	4800m^3
Switchyard cut and fill	4041m^3
Topsoil stripping	3102m^3

The Total earthworks **11943m^3**

The erosion sediment controls are to be built cut to fill. The topsoil stripping is to be stripped and thinly respread to allow revegetation as fast as possible. Thicker areas may require mulching and seeding. The fill for the proposed switchyard and access roads will be imported clean hard-fill/basecourse.

3 *Regulation*

3.1 Regulatory Framework

3.1.1 *Resource Management Act 1991*

Sections 9, 12, 13, 14, and 15 of the RMA (amendment 2018) restrict activities relating to land use and includes regulation for the diversion of water and discharge of sediment into the environment.

[*] Refer AECOM SSR Rev 3; Note volumes to be confirmed at detailed design.

3.1.2 *Environment Canterbury Plan*

The Environment Canterbury Plan applies the provisions of the RMA through the statutory decision process. All land disturbing activities in the Canterbury area must include ESC as an integral part of the development. The ESC is to be in accordance with GD05

3.2 Design Framework

3.2.1 *Canterbury Erosion and Sediment Control Guidelines*

The Guideline documents detail's the principles and expectations for erosion and sediment control in for earthworks in the Canterbury region. It provides best practices and control tools. Controls are presented in a website format. The Checklist number for each control on the website is used for the referencing in this document.

3.2.2 *GD05*

'Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region', known as GD05, aims to minimise erosion, sediment discharge and sedimentation as a consequence of land disturbance. GD05 is written in compliance with the RMA (1991).

GD05 provides practical guidance and instructions on using a variety of erosion sediment controls for minimising the adverse effects of earthworks. The design guidance is more quantitative than the Canterbury Erosion And Sediment Control Toolbox which is more descriptive of the principles.

While GD05 has no regulative basis for this project, it is referenced for the more detailed design elements.

3.2.3 *NZS4431(2022)*

NZS 4431 provides instruction for the design, construction, and quality control of engineered fill. While not directly related to ESC it does provide direction on when material is not suitable for fill which in turn influences the expected sediment yield.

4 Works Schedule

The programme of works is to be confirmed following EPC contractor appointment. Construction is expected to take approximately three years.

5 Erosion Controls

Erosion Controls in accordance with the Canterbury Toolbox Principles:

Minimise Disturbance
Staged Construction
Slope Protection
Waterway Protection
Timely Stabilisation of disturbed areas
Weather Consideration
Control Tools Considered:

- Clean water diversion
- Dirty water diversion
- Silt fencing
- Sediment Retention Ponds

5.1 Site Assessment

Using the Erosion Control Toolbox s as a site assessment guide, the following can be determined:

- The works occur on a well-draining alluvial strata with larger soil particle grade.
- There are only two notable overland flow paths that carry surface water in high rain events. For such a large catchment this is indicative of good drainage. Sheet runoff may also occur in heavier rain events.
- The river bank to Pukai River on the eastern side of the Site is a steep dropoff that is susceptible to fluvial fanning. Care must be taken not to concentrate flowrate in any one area to minimise erosion.

5.2 Minimise Disturbance

In accordance with the Erosion Control Toolbox, silt fencing will be positioned flush with the necessary extents of the staged earthworks to ensure that not land is disturbed that isn't required. Boundaries of where the earthworks extents are, will be clearly marked for all contractors.

The final project layout will match the existing topography, flat with a slight incline to the south. By keeping inclines in the same directions, the required earthworks are the minimum required to achieve the necessary design incline.

The estimated earthworks volumes given in section 2.1 are the minimum earthworks required to achieve the necessary design outcome. There are no areas of the Site where cutting and filling overlap except where imported material for stabilisation as required.

5.3 Staged Construction

Following the guidance of Erosion Control Toolbox, having phased construction reduces the area of land disturbed at any given time. The phases of the construction of the solar farm will match the phases shown in the stock management drawing. Silt fencing around the various phases will be erected in conjunction with stock fences.

5.4 Slope Protection

Sediment yield calculations shows that steep slopes are one of the most influential factors in erosion risk for the works. While the Site itself is a near flat topography it is surrounded by steep inclines where surface runoff descends down the banks to the Pukaki River. In order to protect the banks from the risk of fluvial fan erosion, it is important not to concentrate surface runoff more than what is existing. Where there is concentrated runoff already (Overland Flowpaths 1 and 2 – See Stormwater Management Plan, Haigh Workman, August 2023) the outlets are well armoured with larger boulders and tree vegetation.

5.5 Waterway Protection

The majority of sediment runoff would be received by the Pukaki River if not for erosion controls. No earthworks are planned within the managed environment belt – a minimum of 20m back from the top of the stream bank. The setback is to be marked and protected by a stock and silt fence for the duration of the works. No dirty water discharges are to be made into the stream without going through a sediment retention control. Clean water discharges will not be concentrated at any point of construction to protect the bank from fluvial fanning.

5.6 Timely Stabilization

While most of the piles for the solar panels will be driven, because of the ubiquity of sedimentary boulders, it is to be expected that some of the piles will need to be drilled and excavated. When a Pile is excavated the cut spoil is to be trucked off site or stockpiled in a stabilised area of the Site. This will occur at the time of excavation. Alternatively, the soil can be compressed with the excavator and seeded with wet straw and hydroseed.

Stripped topsoil is to be side cast and seeded / multched where necessary. Topsoil will be utilised on site to promote grass growth and water retention.

5.7 Weather Consideration

As the works are to take place over a 150 week period, it is not feasible to time the construction for seasonal advantages. However, major earthworks will not occur during or immediately after a heavy rain event that effect ground conditions and exacerbate erosion.

As the topography is flat within a mountainous valley, there is a risk that in dry weather conditions, small soil particles will become wind born and carried offsite. Silt fencing round the active phases is crucial to control wind erosion.

5.8 Clean Water Diversion

Normally, clean water diversions would be considered for the concentrated channels OLFP1 and OLFP2 at the northern boundary of the Site. This would reduce the amount of clean water entering the works. However, redirecting water from the site will lead to water being discharged at a concentrated outlet over the bank into the Pukaki River. This leads to a fluvial fan – an erosion risk that is considerably more than the planned project.

5.9 Dirty Water Diversion Channels

As most earthworks occur in areas where there is good infiltration and sheet runoff, there are very few areas where concentrated dirty water can be directed. The two exceptions will be OLFP1 and OLFP2. Water in these two flowpaths will be dirtied during the erection of solar panel piles when the OLFP intersects with the active stage.

As sediment retention ponds are to be built downstream in the overland flowpaths, there is no need to divert the dirty water other than at the opening to the SRPs. Diversion bunds will be tide in with the walls of the overland flow path.

5.10 Silt Fencing

Silt fencing is to be erected in conjunction with stock fences for the various stages of construction of the solar panels.

Silt fences will catch sediment laden in sheet runoff and wind-swept sediment.

5.11 Sediment Retention Ponds

Sediment retention ponds are to be built in accordance with the Canterbury toolbox guidelines at the outlets of OLFP1 and OLFP2. While the catchments are very large, this is countered with good ground infiltration and staged construction, so the expected flowrates are manageable.

The Sediment Retention Ponds are to be positioned upstream and clear of the planned ecological zone. The sizing and exact positioning of these ponds is to be carried out once constructions staging and methodology is known.

5.12 Plan Adjustment As Needed

The ESCP is not a strict prescription and adjustments may be required during construction. Reasons for an adjustment to the ESCP could include, but are not limited to:

- The creation of a new catchment during earthworks.
- The discovery of hazardous material.
- Archaeological discovery requiring special protection.

Any changes to the prescribed ESCP will require the approval of the Environment Canterbury's monitoring officer.

It is expected that this ESCP will be heavily revised when a contractor is engaged and can be consulted.

5.13 Inspection and Monitoring

As per the recommendations of The Canterbury Erosion Control toolbox, the following steps are proposed to ensure compliance and effective implementation:

- A start-up meeting be held with the ESCP preparer (Haigh Workman), the contractor, and the regulator
- Allocation of project roles and responsibilities as per ESCP.
- Reporting of weekly and post heavy rain event monitoring of devices.
- Record keeping of compliance sheets.

5.14 Emergency Procedures

Emergency procedures to be implemented if there is an accidental untreated sediment discharge to surface water. Procedures are specific to the emergency and will be determined by the ESC implementer for the Site with consultation with the Environment Canterbury monitoring officer whenever practicable.

When a control device is damaged beyond operational capacity, all earthworks within the catchment are to cease until the device is repaired or refurbished.

Haybales are to be used as an emergency silt fence to stop sediment laden water entering Pukaki River. Hay will be used to soak up spills.

Works will resume when the erosion control device is repaired or upgraded.

Appendix – Sediment Yield

The Universal Soil Loss Equation

A = RKLSCP

Where: A – average annual soil loss

R – rainfall erosion index

K – soil erodibility

L – Slope length

S – slope steepness

C – cover and management

P – support practice

For a 36-month construction period we can determine the following:

NIWA HIRDS data gives a the RCP 6.0 2-year storm event (6 hour duration) for the site as 26.2mm.

R = 0.00828 * (0.628*26.2)^2.2*1.7 = 6.672

Using the triangular nomograph from Wischmeier et al. (1971) for the soil erodibility index, K:

K = (0.37 - 0.06)*1.32 = 0.4092 (assumes 40% sand, 40% silt, and 20% clay content in undersoil with a minimum 4% total earthworks as topsoil)

Assuming an average slope length of 300m and steepness 2%:

LS = 0.4

Assuming undisturbed pasture for the ground cover for the duration of the works

C = 0.02

Assuming the ground will have a roughness similar to its existing state for the majority of the earthworks:

P = 1.0

Therefore:

A = 6.672*0.4092*0.4*0.02*1 = 0.022 tonnes/ha/year

Sediment Yield to be expected in the planned works is:

0.022 * 570 * 36/12 = 19 tonnes.

The above sediment yield calculation provides guidance on the scale of the environmental risk of the earthworks and the Erosion Controls need to be chosen in accordance with the risk.

The sediment yield is not uniform and more yield can be expected in the location of the proposed substation.

Rev	Date	Description	By	Checked
A	20/02/2026	DRAFT	AS	AC
B	13/04/2026	FOR CONSENT	AS	BR

DWG EROSION AND SEDIMENT CONTROL PLAN
SHEET 1

A3 Scale 1: 10000 (0 200 500)

Date 20/02/2026

Drawn AS | Checked AC | Approved JM

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THE POINT, OHAU C, MACKENZIE COUNTY

Client FAR NORTH SOLAR FARM LIMITED

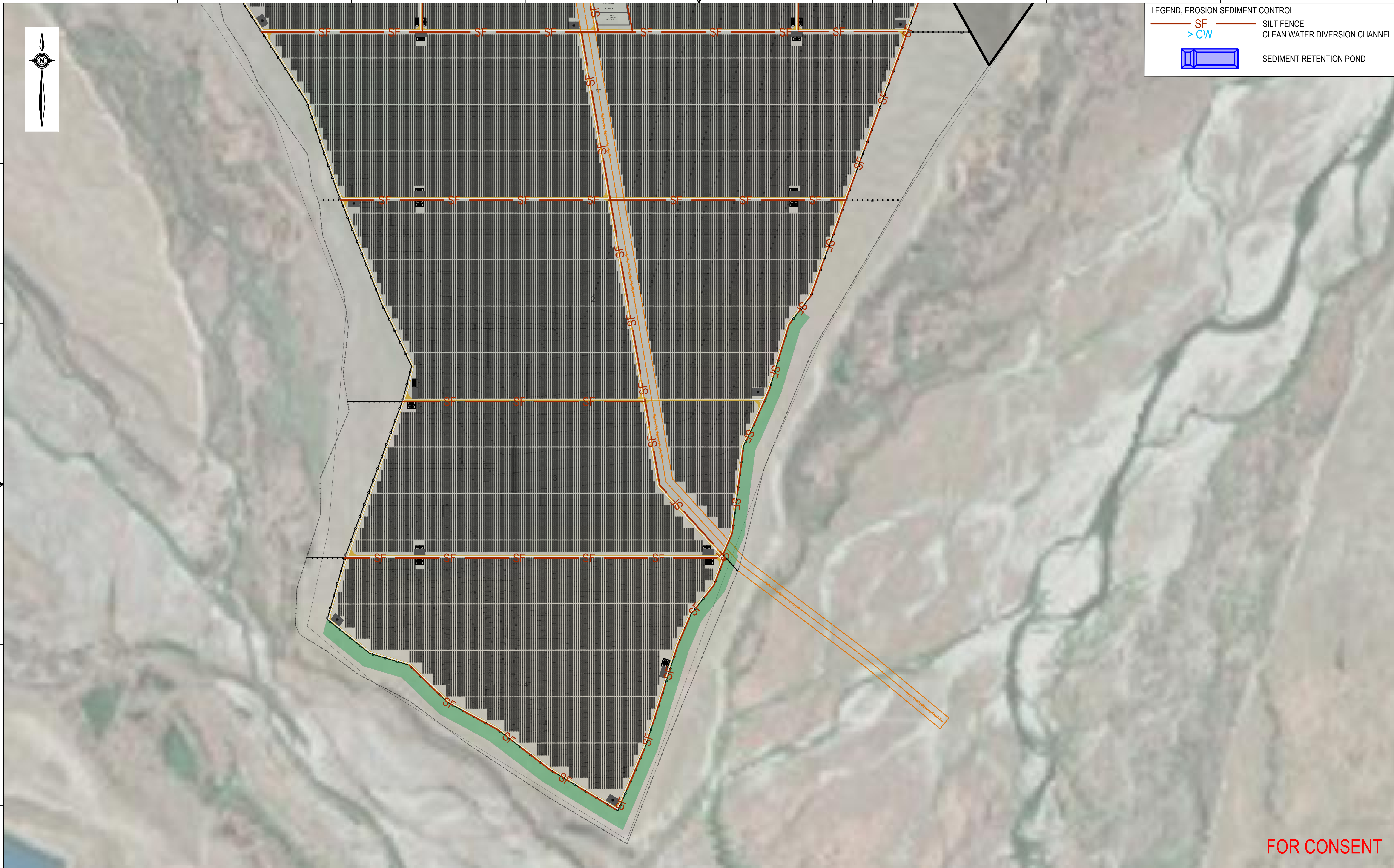
Project No. 23 119

RC no.

Stage

Dwg No. ESCP01

Sheet No. 1 of 2



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DWG EROSION AND SEDIMENT CONTROL PLAN SHEET 2

A3 Scale 1: 10000 (0, 200, 500)

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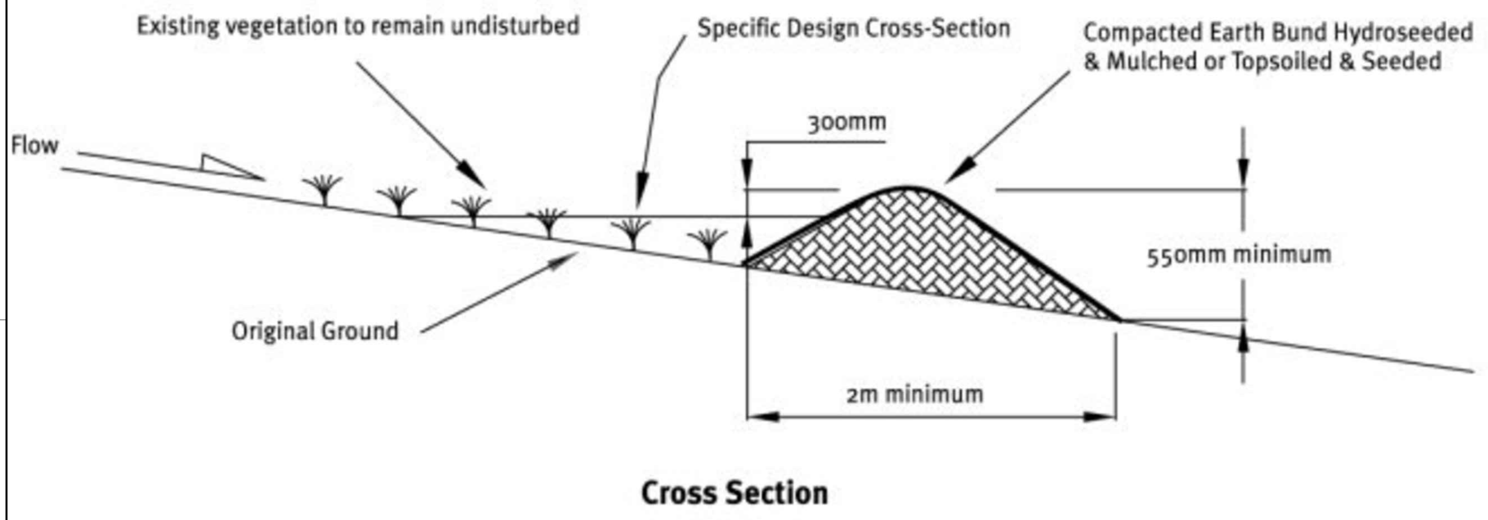

Figure 16: Cross-section of clean water diversion

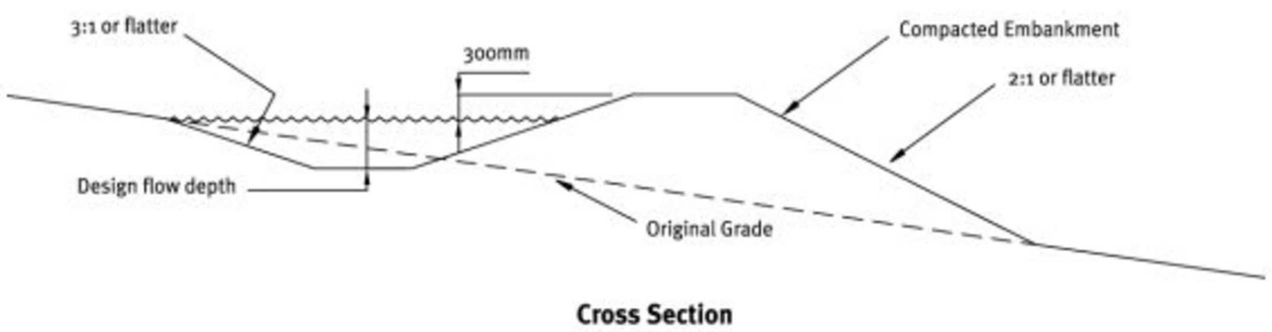

Figure 18: Cross-section of a dirty water diversion

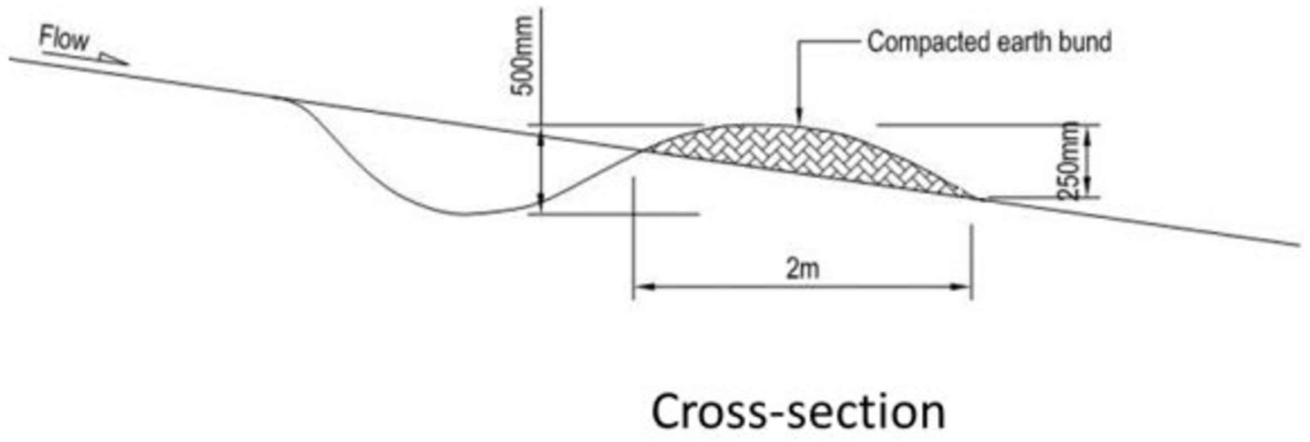

Figure 23: Contour drain cross-section

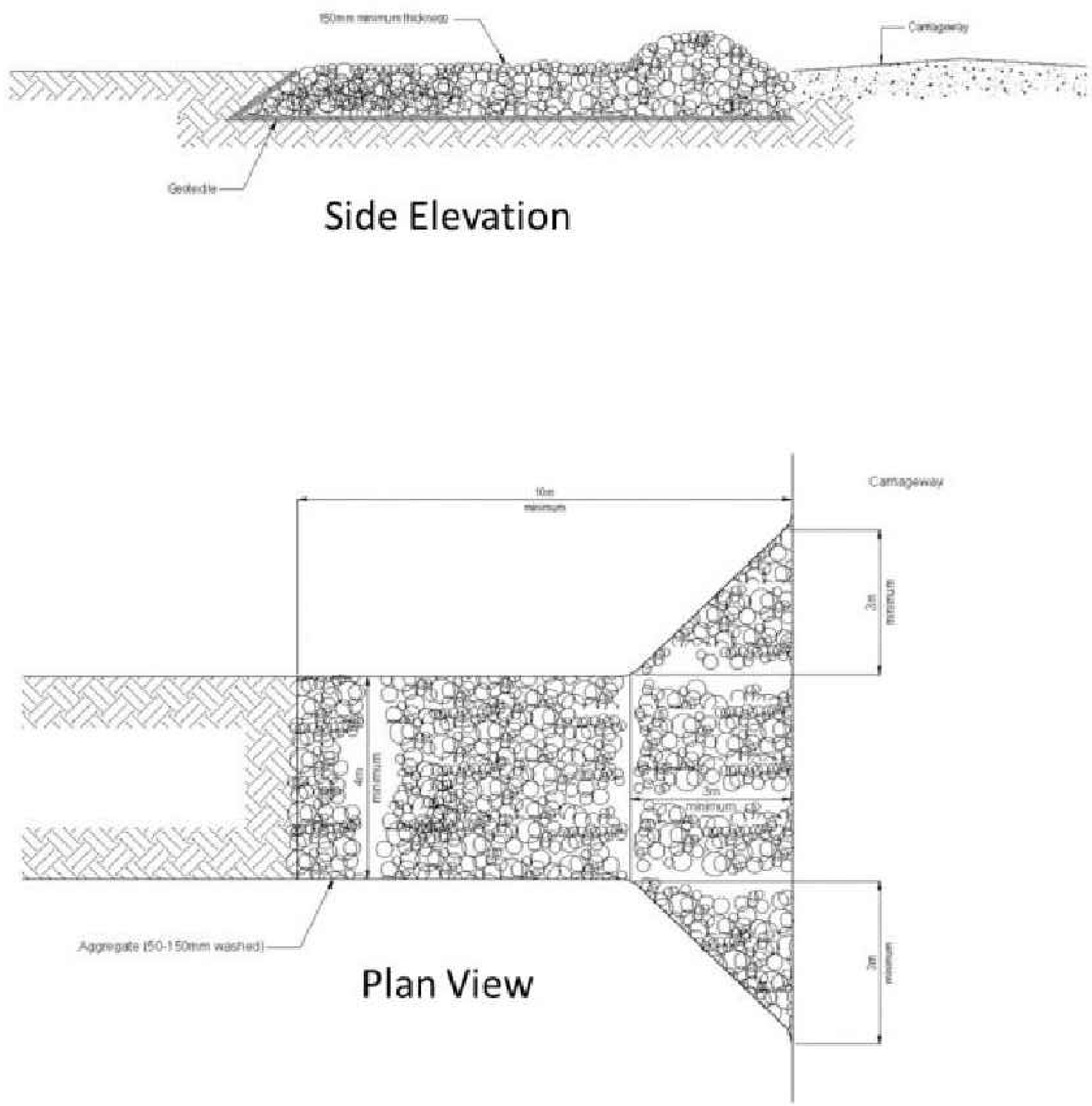

Figure 35: Stabilised entranceway

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DWG EROSION AND SEDIMENT CONTROL TYPICAL DETAILS

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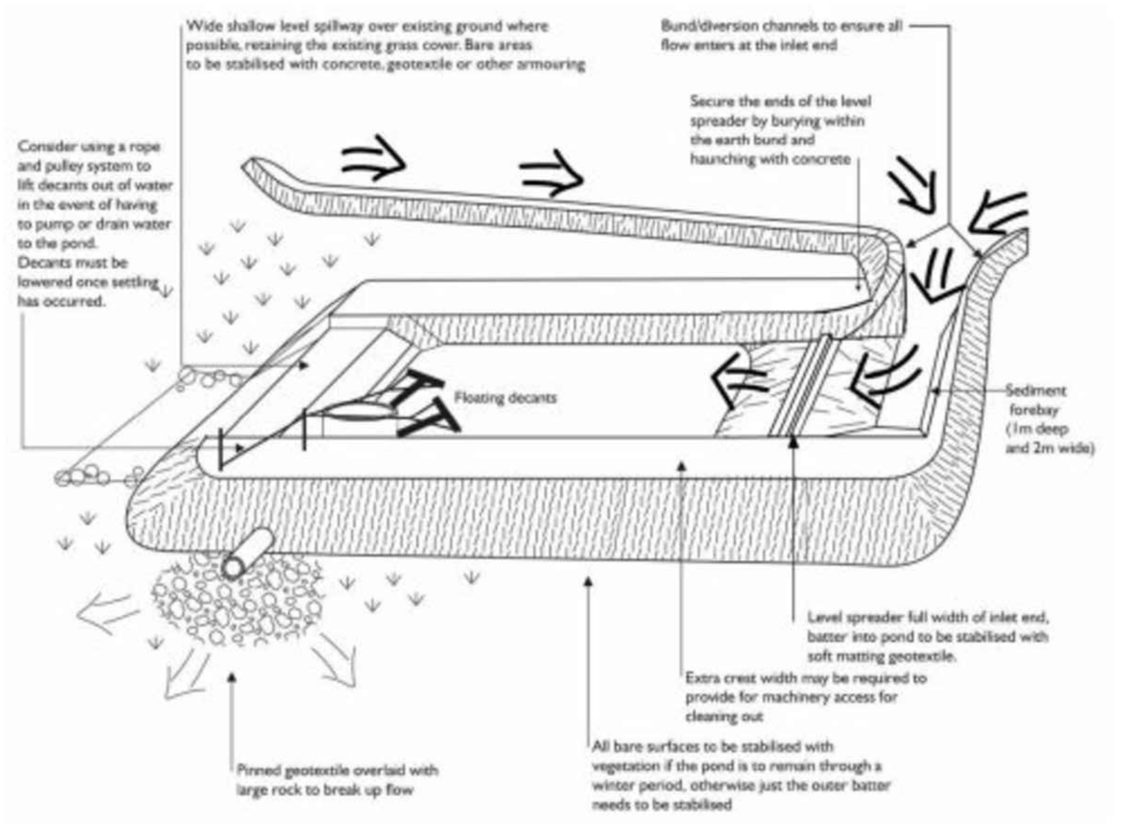
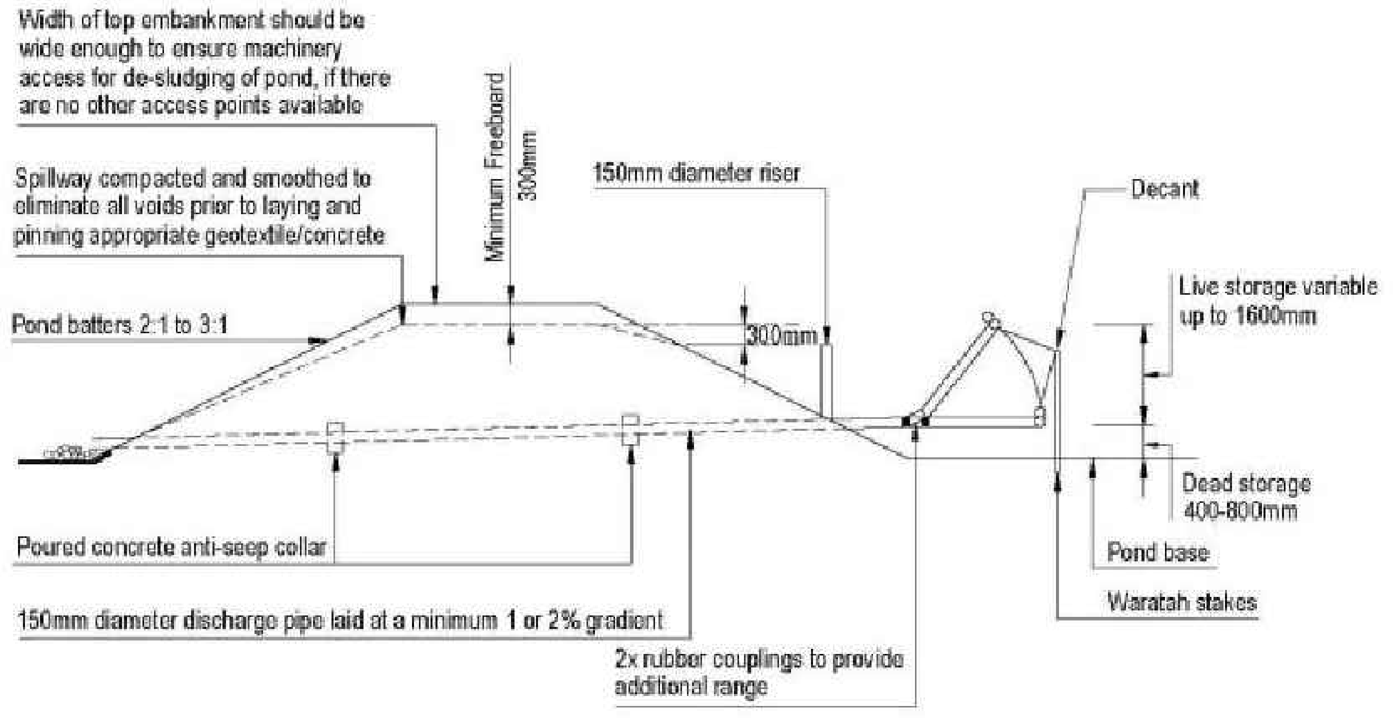
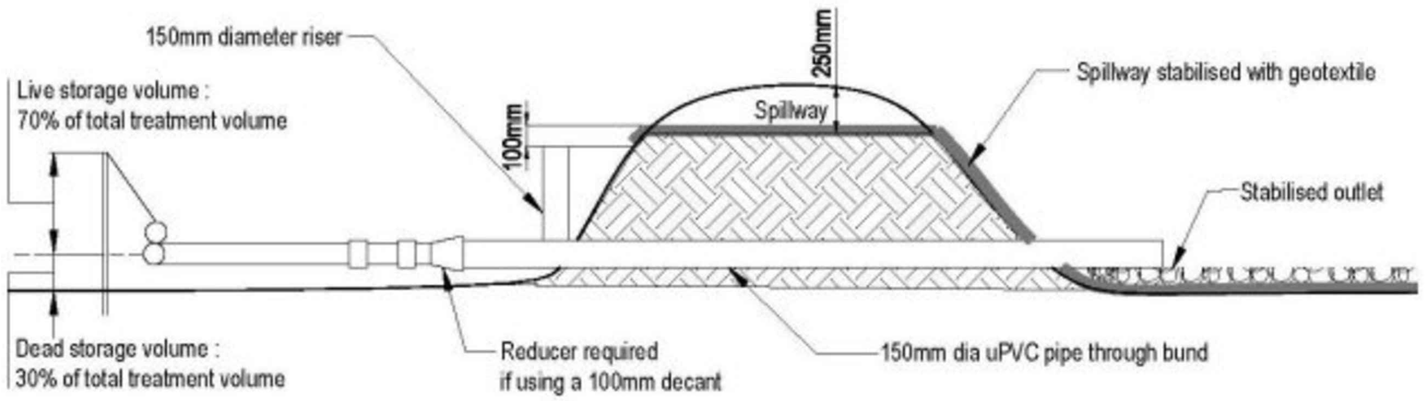


Figure 64: Schematic of a sediment retention pond

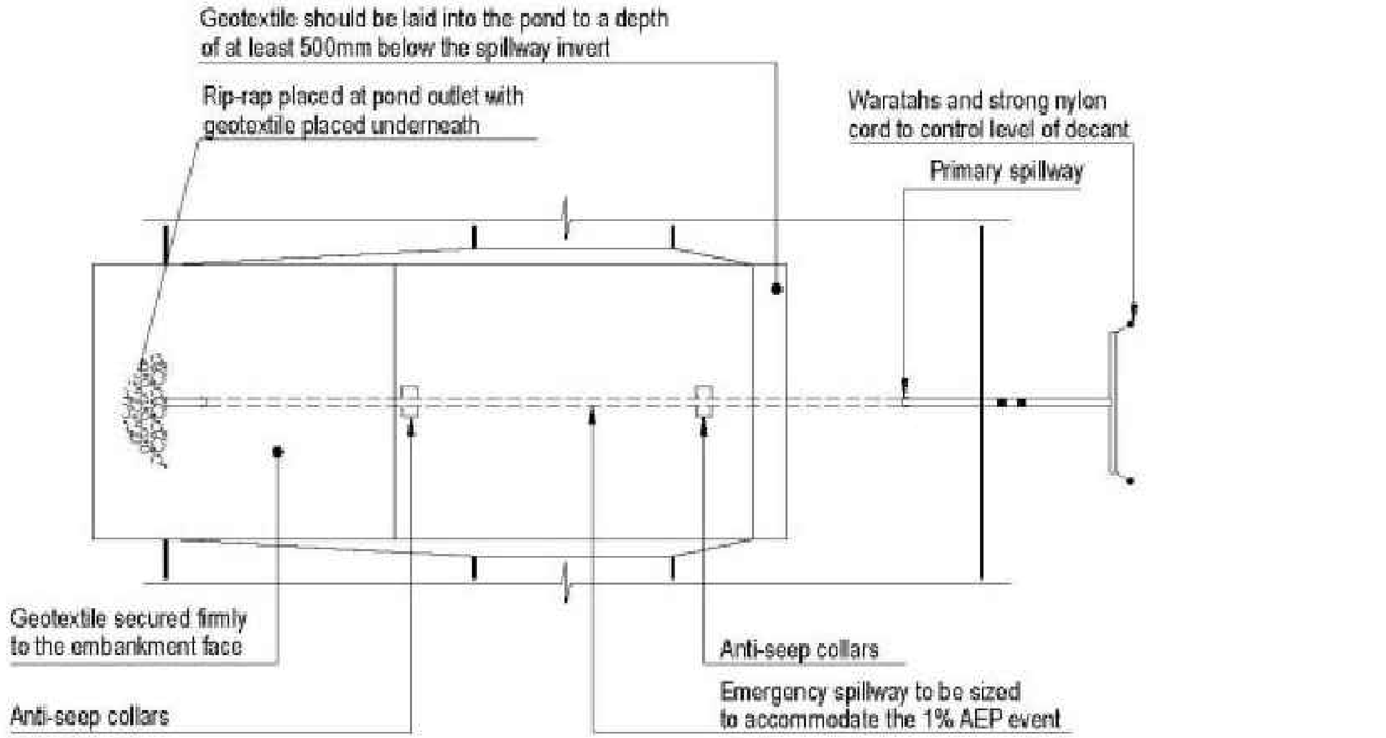


Cross - section



Cross - section

Figure 78: Decanting earth bund



Plan

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DWG: EROSION AND SEDIMENT CONTROL TYPICAL DETAILS

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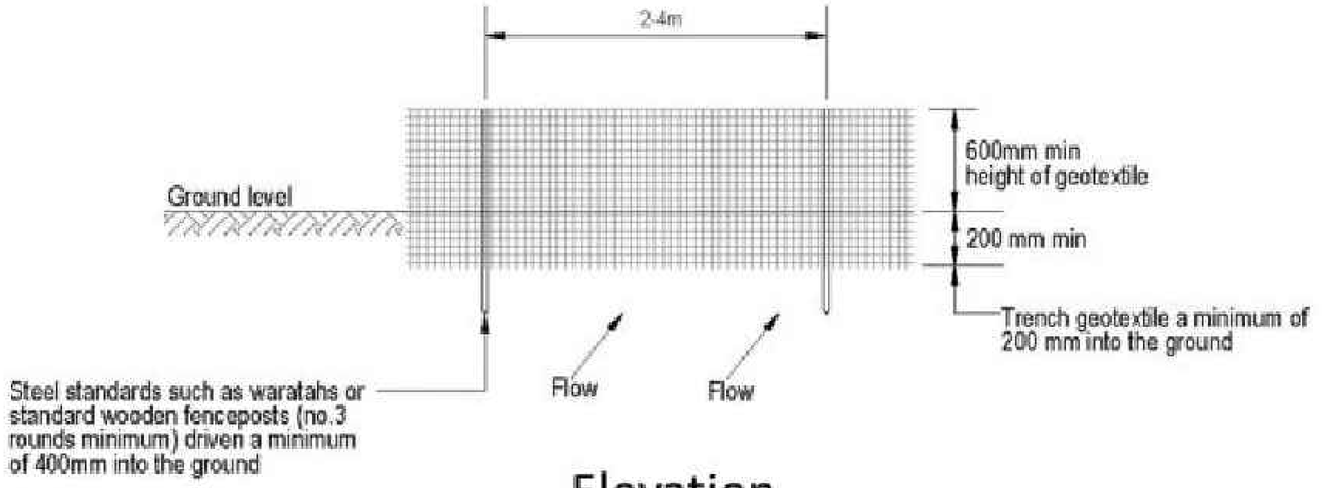

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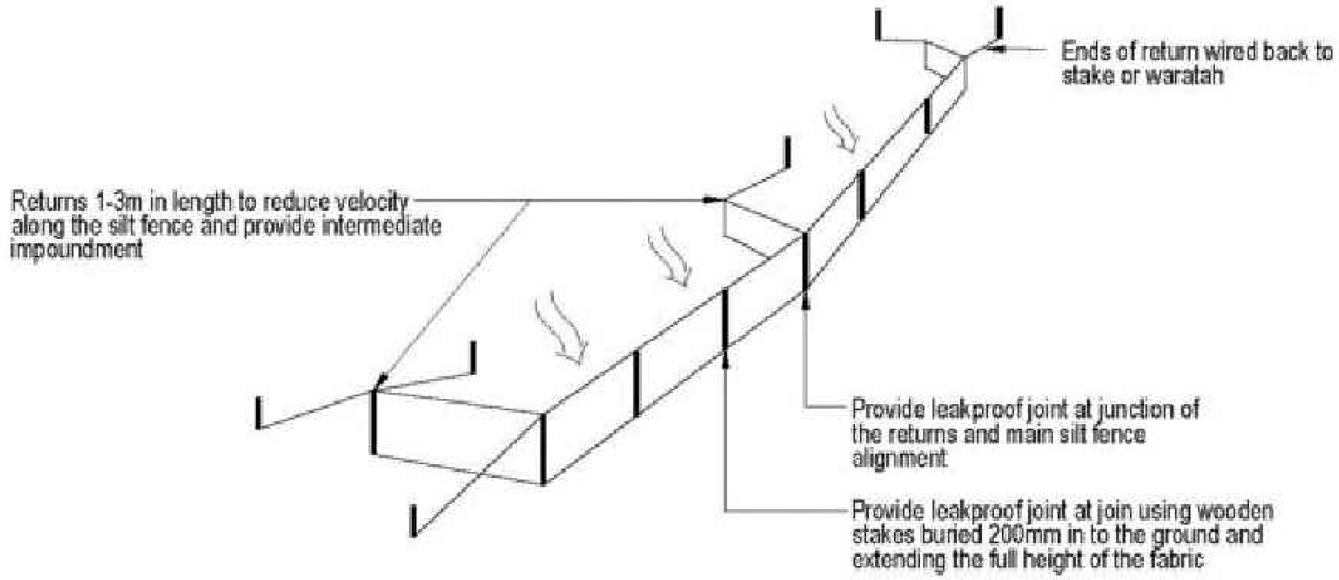
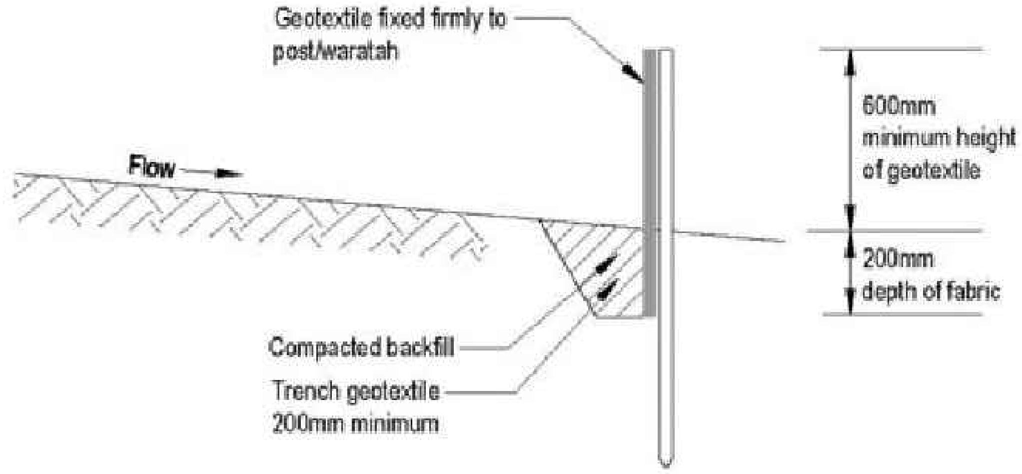
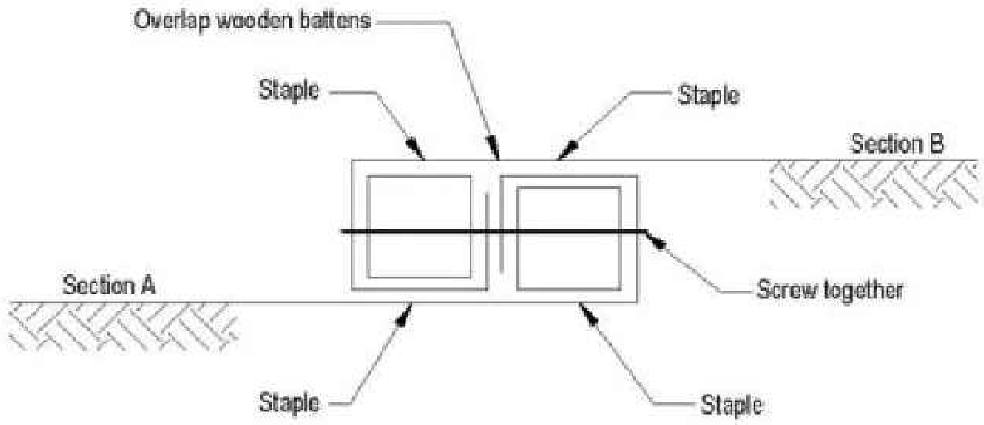


Silt fence with returns and support wire

Figure 81: Schematic of a silt fence



Cross-section



Standard fabric joint

Figure 82: Silt fence cross-section

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