LEGEND

KEY LEGEND:

- ROAD ALIGNMENT
- SUB CATCHMENT
- EXISTING FLOW PATHS
- CONSTRUCTION STAGE 1
- CONSTRUCTION STAGE 2
- CONSTRUCTION STAGE 3
- CONSTRUCTION STAGE 4
- CONSTRUCTION STAGE 5
- CONSTRUCTION STAGE 6
- CONSENTED LAYDOWN AREAS (THE NUMBER, LOCATION, AND SIZE OF ALL OF THESE AREAS WILL NEED TO BE REVISITED WITH MCD AND SGRE TO DETERMINE WHAT'S NEEDED)
- CONSENTED DISPOSAL SITES
- EXCLUSION ZONES
- 22V STORMWATER SUMP
- STORMWATER CULVERT

LEGEND

ESCP LEGEND:

- CLEAN WATER DIVERSION BUND — REFER TO DRAWING 1017740.1000-320
- DIRTY WATER DIVERSION CHANNEL — REFER TO DRAWING 1017740.1000-320
- CONTOUR/ CUT OFF DRAIN — REFER TO DRAWING 1017740.1000-321
- CHECK DAM — REFER TO DRAWING 1017740.1000-322
- SILT FENCE — REFER TO DRAWING 1017740.1000-323
- SEDIMENT DECANT EARTH BUND — REFER TO DRAWING 1017740.1000-325
- SEDIMENT RETENTION POND — REFER TO DRAWING 1017740.1000-325
- STABILISED ENTRANCE — REFER TO DRAWING 1017740.1000-326
- SURFACE ROUGHENING — REFER TO DRAWING 1017740.1000-327
- K-LOG CHANNEL
- ENERGY DISSIPATION RIPRAP
- SEDIMENT TRAP

N

SILT FENCE
D11
EASTERN MAST ROAD
SEDIMENT DECANT EARTH BUND
D10
SILT FENCE
EASTERN RIDGE ROAD
SEDIMENT DECANT EARTH BUND
K-LOG CHANNEL
SILT FENCE
RAMP ROAD
STAGE 6
EASTERN LOOP
D9
ENERGY DISSIPATION RIPRAP
SILT FENCE
CLEAN WATER DIVERSION BUND
D8
SILT FENCE
SEDIMENT DECANT EARTH BUND
1017740.2000-315

A3 SCALE 1:5000
0 50 100 150 200 250 (m)
ORIGINAL IN COLOUR

REV	DESCRIPTION	CONSULTANT/CONTRACTOR NAME	DSN	DRN	CHK	APP	DATE	CLIENT APP	DATE
1	80% DETAILED DESIGN	BRTI	BRTI	JOAB	BRTI		DEC 22		DEC 22

DRAWN	JOAB	DEC 22
DESIGNED	BRTI	DEC 22
CHECKED	CAPA	DEC 22
APPROVED		DEC 22
CAD FILE		

McCONNELL DOWELL
Tonkin+Taylor
icubed consulting

Mt Cass Wind Farm

McCONNELL DOWELL

MT CASS WINDFARM DETAILED DESIGN - 80%
EROSION AND SEDIMENT CONTROL
ESC - SHEET 6

DRG.SIZE	SCALE
A1	1:2500

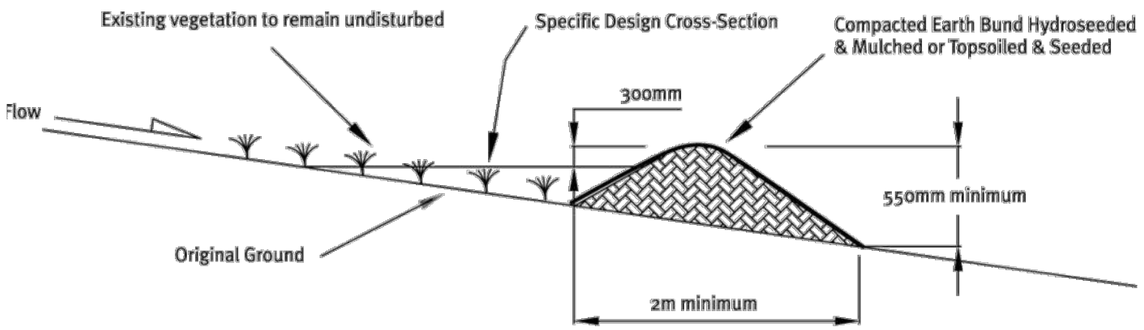
DRAWING NUMBER	SHEET	REVISION
1017740-315	6	1

SOURCE FILE NAME
TP _–_0.DWG

A1
1:1 0 10 20 30 40 50 60 70 80 90 100
1:2 0 20 40 60 80 100 120 140 160 180 200
1:5 0 100 200 300 400 500

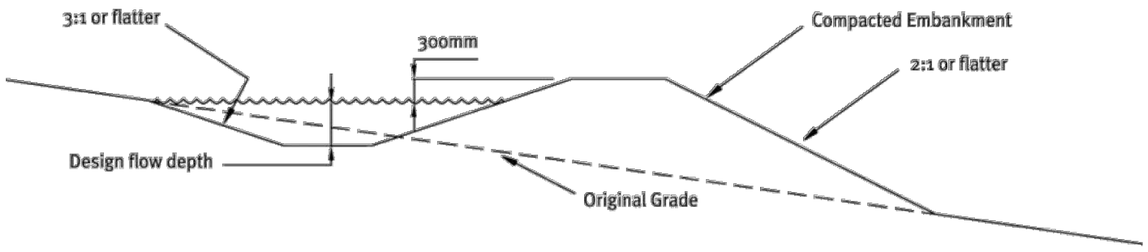
NOTES:
1. EROSION AND SEDIMENT CONTROL STANDARD DETAILS SOURCED FROM ENVIRONMENT CANTERBURY REGIONAL COUNCIL EROSION AND SEDIMENT CONTROL TOOLBOX FOR CANTERBURY

'Clean water' or 'dirty water' diversion channel and bund



Cross Section

Cross section of a clean water diversion



Cross Section

Cross section of dirty water diversion

0 10 20 30 40 50 (mm)
PAPER SCALE 1:1

ORIGINAL IN COLOUR

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REV	DESCRIPTION	CAD	CHK	DATE
1	PRELIMINARY DRAFT	JOAB	BRTI	29.11.22

DESIGNED	BRTI	Nov.22	DRAWING STATUS
DRAWN	JOAB	Nov.22	PRELIMINARY DRAFT
DESIGN CHECKED			
DRAWING CHECKED			

NOT FOR CONSTRUCTION — APPROVED — DATE

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CLIENT McCONNELL DOWELL CONSTRUCTORS LTD
PROJECT MOUNT CASS WINDFARM DETAILED DESIGN
TITLE EROSION & SEDIMENT CONTROL STANDARD DETAIL CLEAN OR DIRTY WATER DIVERSION CHANNEL
SCALE (A3) N.T.S. DWG No. 1017740.1000-320 REV 1

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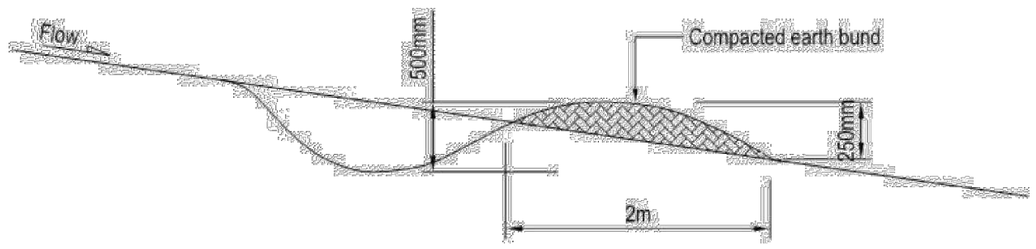
NOTES:
1. EROSION AND SEDIMENT CONTROL STANDARD DETAILS SOURCED FROM ENVIRONMENT CANTERBURY REGIONAL COUNCIL EROSION AND SEDIMENT CONTROL TOOLBOX FOR CANTERBURY

Contour drain *(Source: SouthernSkies)*



Cross - section

Contour drain cross section

0 10 20 30 40 50 (mm)
PAPER SCALE 1:1

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REV	DESCRIPTION	CAD	CHK	DATE
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DRAWN	JOAB	Nov.22	
DESIGN CHECKED			
DRAWING CHECKED			

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APPROVED DATE

CLIENT **McCONNELL DOWELL CONSTRUCTORS LTD**
PROJECT **MOUNT CASS WINDFARM DETAILED DESIGN**
TITLE EROSION & SEDIMENT CONTROL STANDARD DETAIL CONTOUR/ CUT-OFF DRAIN
SCALE (A3) N.T.S. DWG No. 1017740.1000-321 REV 1

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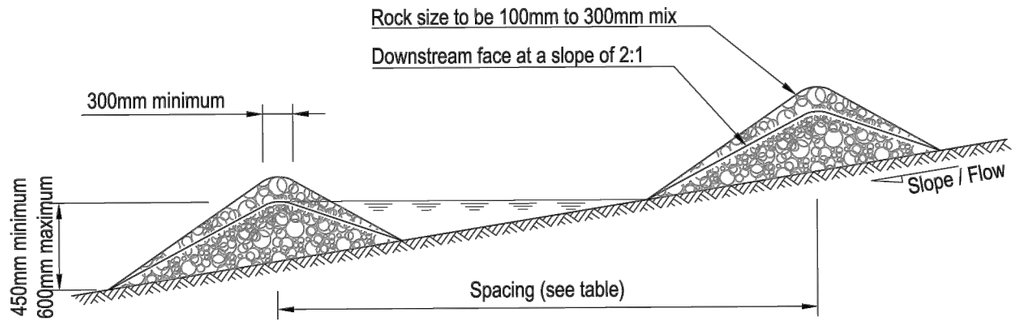
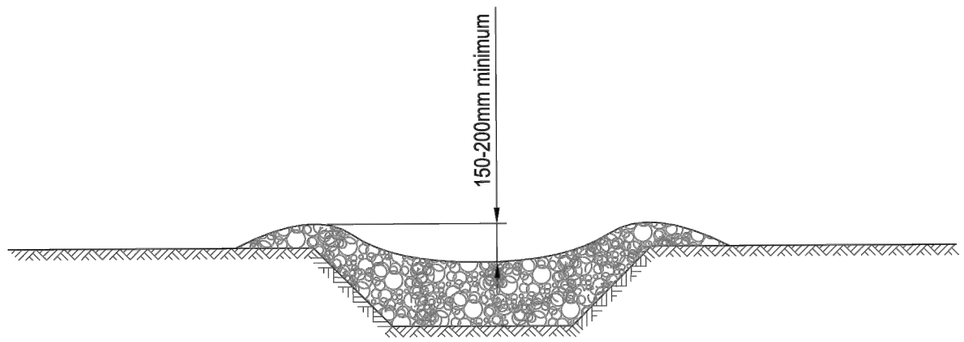
NOTES:
1. EROSION AND SEDIMENT CONTROL STANDARD DETAILS SOURCED FROM ENVIRONMENT CANTERBURY REGIONAL COUNCIL EROSION AND SEDIMENT CONTROL TOOLBOX FOR CANTERBURY

Check dam *(Source: Auckland Council)*

Slope of site (%)	Spacing (m) between dams with a 450 mm centre height	Spacing (m) between dams with a 600 mm centre height
Less than 2%	24	30
2–4%	12	15
4–7%	8	11
7–10%	5	6
>10%	Unsuitable – use stabilised channel or specific engineered design	Unsuitable – use stabilised channel or specific engineered design



Elevation



Cross - section

Rock check dam

0 10 20 30 40 50 (mm)
PAPER SCALE 1:1

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1	PRELIMINARY DRAFT	JOAB	BRTI	29.11.22

DESIGNED	BRTI	Nov.22	DRAWING STATUS: PRELIMINARY DRAFT
DRAWN	JOAB	Nov.22	
DESIGN CHECKED			
DRAWING CHECKED			

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CLIENT **McCONNELL DOWELL CONSTRUCTORS LTD**
PROJECT **MOUNT CASS WINDFARM DETAILED DESIGN**
TITLE EROSION & SEDIMENT CONTROL STANDARD DETAIL CHECK DAM
SCALE (A3) N.T.S. DWG No. 1017740.1000-322 REV 1

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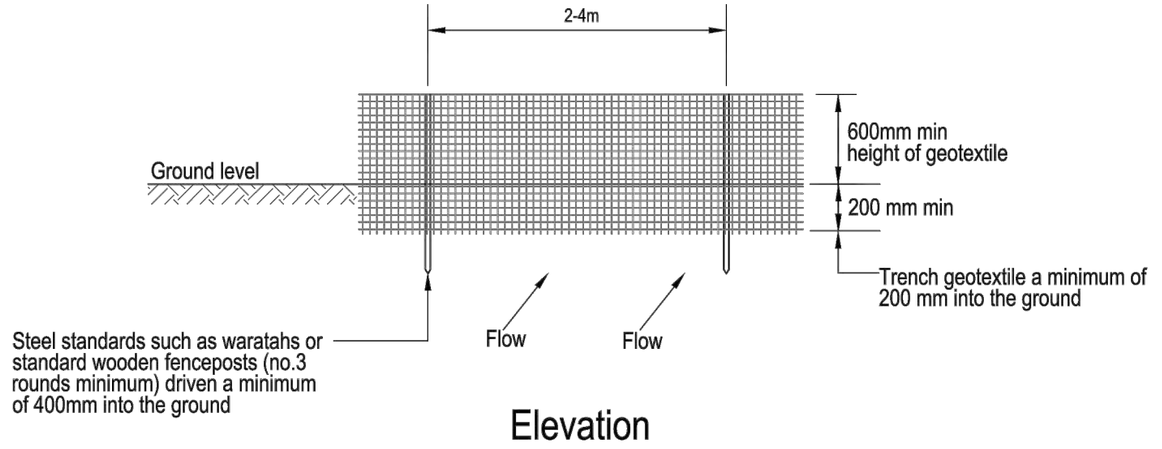
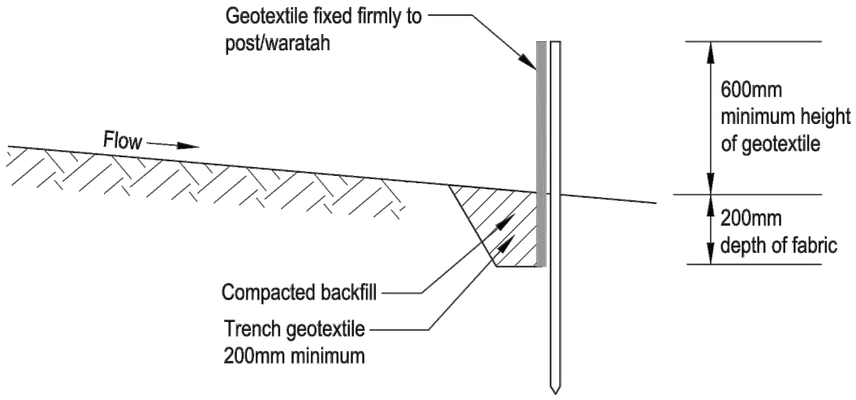
NOTES:
1. EROSION AND SEDIMENT CONTROL STANDARD DETAILS SOURCED FROM ENVIRONMENT CANTERBURY REGIONAL COUNCIL EROSION AND SEDIMENT CONTROL TOOLBOX FOR CANTERBURY

Slope steepness %	Slope length (m) (maximum)	Spacing of returns (m)	Silt fence length (m) (maximum)
Flatter than 2%	Unlimited	N/A	Unlimited
2 - 10%	40	60	300
10 - 20%	30	50	230
20 - 33%	20	40	150
33 - 50%	15	30	75
> 50%	6	20	40

Silt fence design criteria

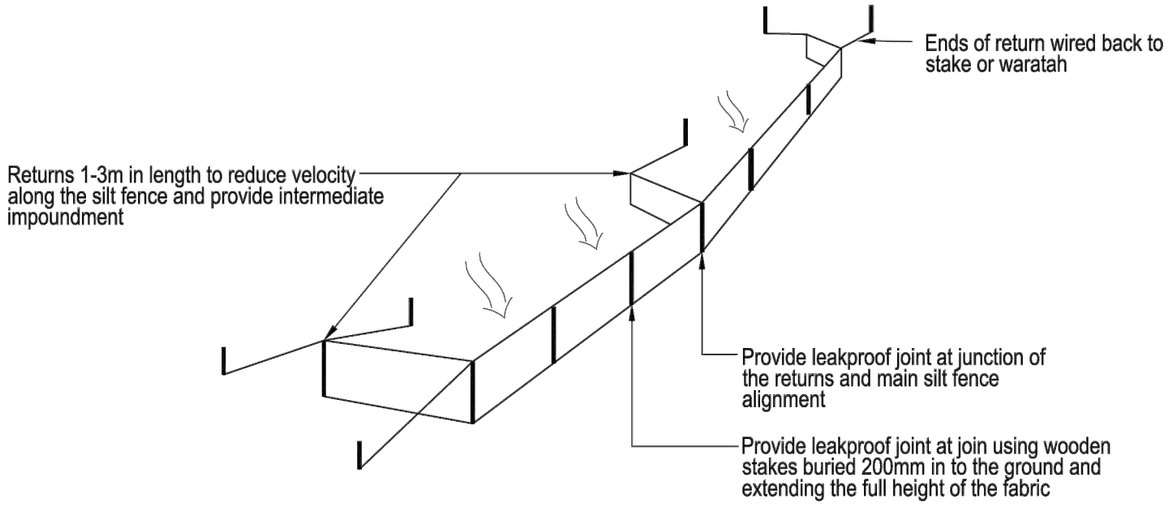


Elevation



Cross - section

Silt fence cross section



Silt fence with returns and support wire

Schematic of a silt fence

0 10 20 30 40 50 (mm)
PAPER SCALE 1:1

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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE
1	PRELIMINARY DRAFT	JOAB	BRTI	29.11.22	NOT FOR CONSTRUCTION	

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DRAWN	JOAB	Nov.22	PRELIMINARY DRAFT
DESIGN CHECKED			
DRAWING CHECKED			

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CLIENT **McCONNELL DOWELL CONSTRUCTORS LTD**
PROJECT **MOUNT CASS WINDFARM DETAILED DESIGN**
TITLE EROSION & SEDIMENT CONTROL STANDARD DETAIL SILT FENCE
SCALE (A3) N.T.S. DWG No. 1017740.1000-323 REV 1

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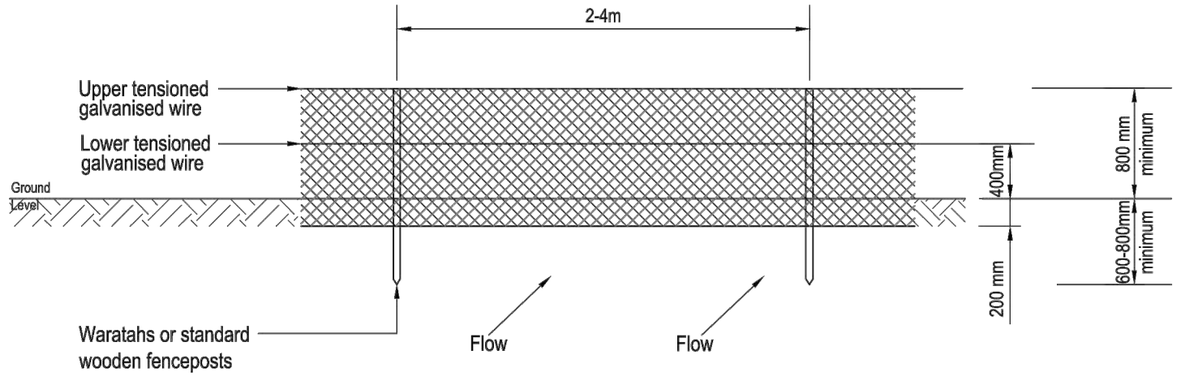
NOTES:
1. EROSION AND SEDIMENT CONTROL STANDARD DETAILS SOURCED FROM ENVIRONMENT CANTERBURY REGIONAL COUNCIL EROSION AND SEDIMENT CONTROL TOOLBOX FOR CANTERBURY

Super silt fence

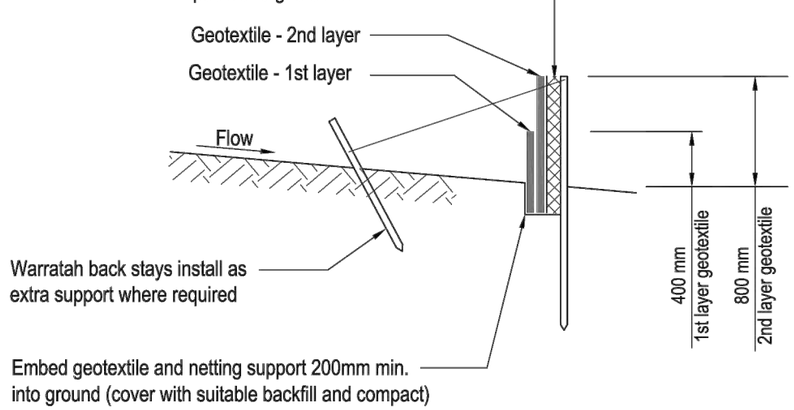
Slope steepness %	Slope length (m) (maximum)	Spacing of returns (m)	Silt fence length (m) (maximum)
0–10%	Unlimited	60	Unlimited
10–20%	60	50	450
20–33%	30	40	300
33–50%	30	30	150
> 50%	15	20	75

Super silt fence design criteria

Super silt fence



Elevation



Cross - section

Schematic of a super silt fence

0 10 20 30 40 50 (mm)
PAPER SCALE 1:1

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APPROVED DATE

CLIENT McCONNELL DOWELL CONSTRUCTORS LTD
PROJECT MOUNT CASS WINDFARM DETAILED DESIGN
TITLE EROSION & SEDIMENT CONTROL STANDARD DETAIL SUPER SILT FENCE
SCALE (A3) N.T.S. DWG No. 1017740.1000-324 REV 1

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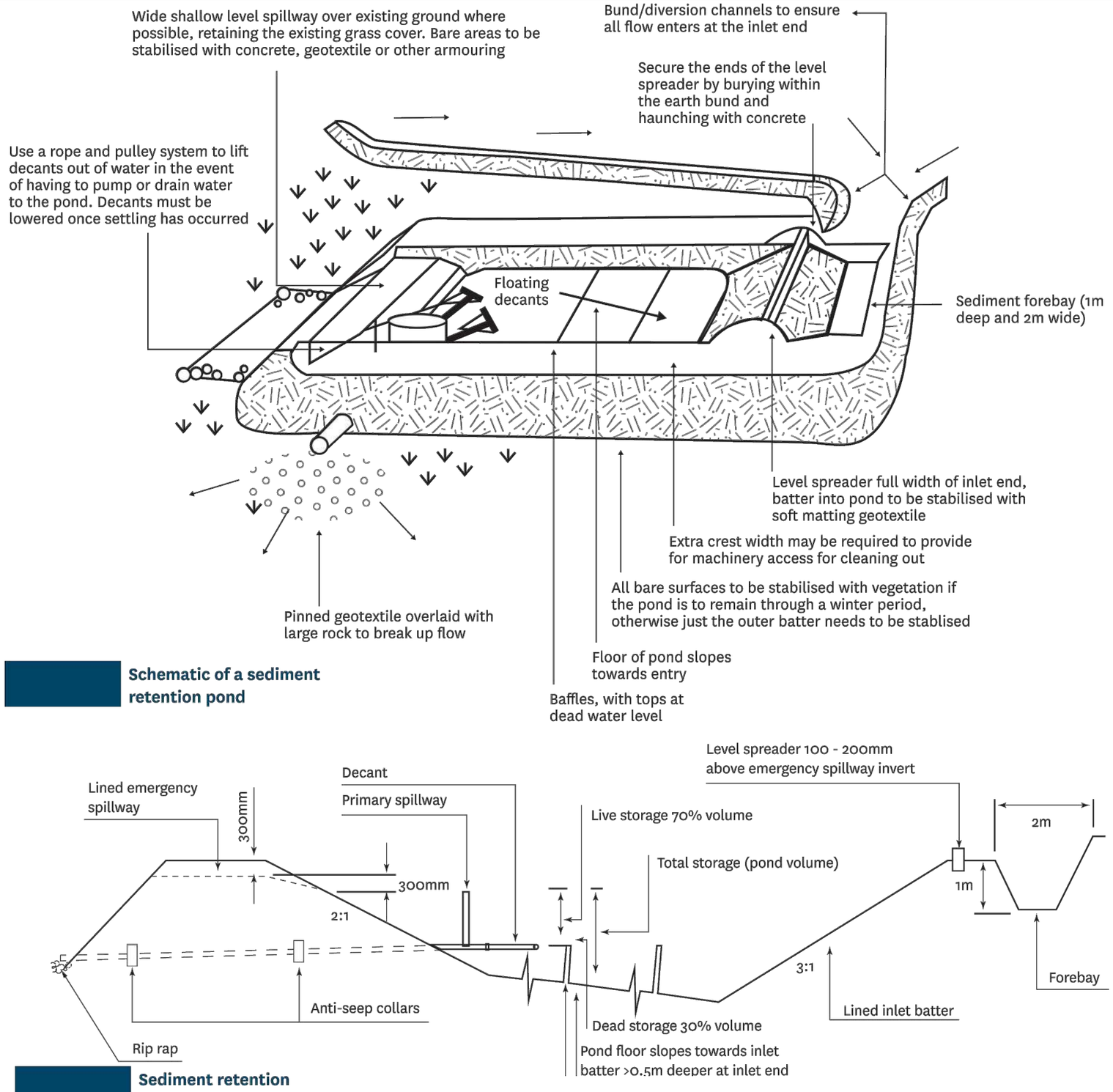
NOTES:
1. EROSION AND SEDIMENT CONTROL STANDARD DETAILS SOURCED FROM ENVIRONMENT CANTERBURY REGIONAL COUNCIL EROSION AND SEDIMENT CONTROL TOOLBOX FOR CANTERBURY



Schematic of a sediment retention pond

Sediment retention pond cross section

0 10 20 30 40 50 (mm)
PAPER SCALE 1:1

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APPROVED DATE

CLIENT McCONNELL DOWELL CONSTRUCTORS LTD
PROJECT MOUNT CASS WINDFARM DETAILED DESIGN
TITLE EROSION & SEDIMENT CONTROL STANDARD DETAIL SEDIMENT RETENTION POND
SCALE (A3) N.T.S. DWG No. 1017740.1000-325 REV 1

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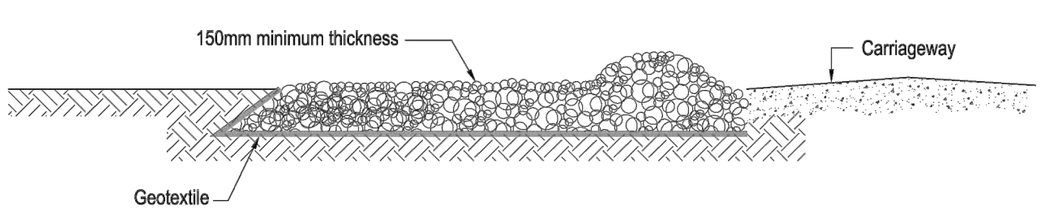
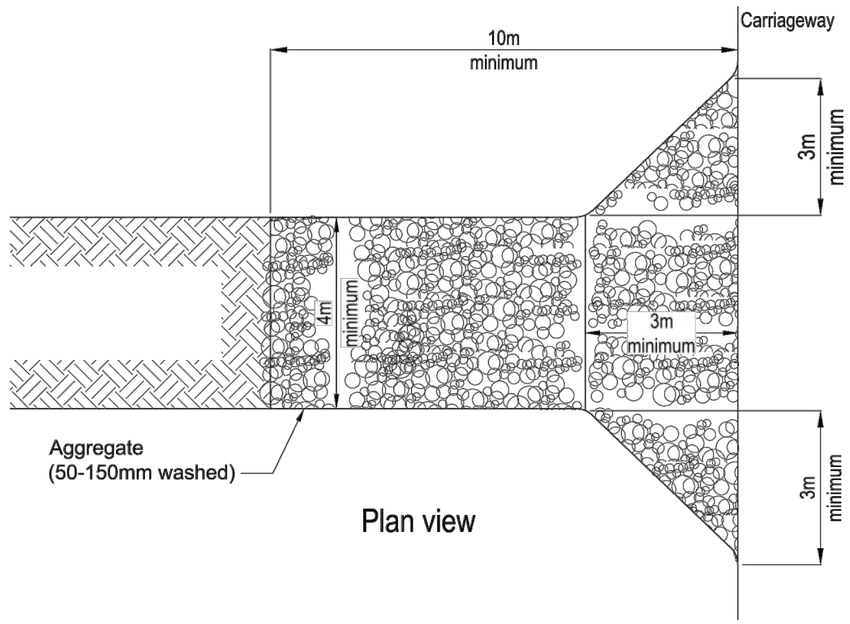
NOTES:
1. EROSION AND SEDIMENT CONTROL STANDARD DETAILS SOURCED FROM ENVIRONMENT CANTERBURY REGIONAL COUNCIL EROSION AND SEDIMENT CONTROL TOOLBOX FOR CANTERBURY

Stabilised entranceway *(Source: SouthernSkies)*



Side elevation



Plan view

Stabilised entranceway

0 10 20 30 40 50 (mm)
PAPER SCALE 1:1

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DRAWING CHECKED			

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APPROVED DATE

CLIENT **McCONNELL DOWELL CONSTRUCTORS LTD**
PROJECT **MOUNT CASS WINDFARM DETAILED DESIGN**
TITLE EROSION & SEDIMENT CONTROL STANDARD DETAIL STABILISED ENTRANCE
SCALE (A3) N.T.S. DWG No. 1017740.1000-326 REV 1

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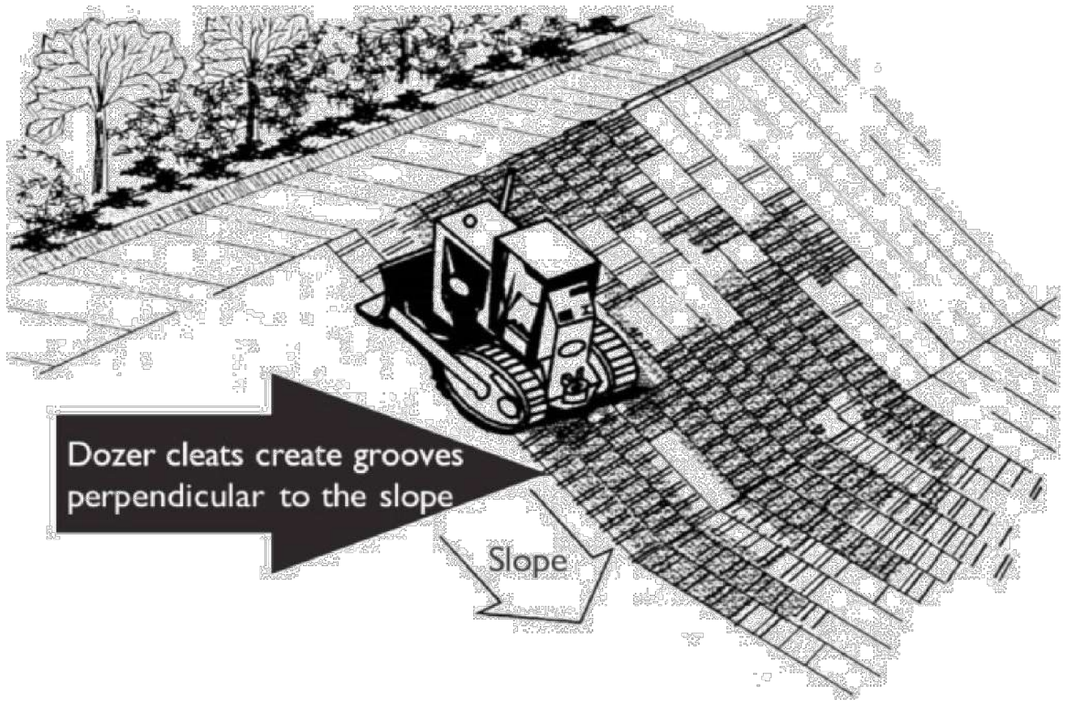
NOTES:
1. EROSION AND SEDIMENT CONTROL STANDARD DETAILS SOURCED FROM ENVIRONMENT CANTERBURY REGIONAL COUNCIL EROSION AND SEDIMENT CONTROL TOOLBOX FOR CANTERBURY

Surface roughening of a slope. Note that the hollows act as 'micro' sediment traps



Surface roughening

0 10 20 30 40 50 (mm)
PAPER SCALE 1:1

ORIGINAL IN COLOUR

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CLIENT McCONNELL DOWELL CONSTRUCTORS LTD
PROJECT MOUNT CASS WINDFARM DETAILED DESIGN
TITLE EROSION & SEDIMENT CONTROL STANDARD DETAIL SURFACE ROUGHENING
SCALE (A3) N.T.S. DWG No. 1017740.1000-327 REV 1

APPENDIX B – Consent Conditions

Summary of consent conditions and control measures specific to erosion sediment control requirements

Environment Canterbury (ECan) Consents:

- **CRC214150:** To use land for earthworks and vegetation clearance within erosion prone and riparian areas. (Land for Earthworks-Construction)
- **CRC214152:** To discharge construction phase stormwater to land (Construction Stormwater Discharge)
- **CRC214156:** To discharge water within 100m of a natural wetland during construction of specified infrastructure (Construction Water Discharge)

Hurunui District Council (HDC) Consents:

- **RC070250:** Land use consent

Guidance note:

- *To avoid duplication, we have combined both ECan consents into a single table*
- *For consent conditions relating to dust (commonly involved in ESCP's), please refer to separate Dust Management Plan.*

Combined ECan consents CRC214152 and CRC214156 (sections 3, 4, 6 - 8, 12 - 16, 28 - 35)

Condition			LIMITS	Control for Consent Conditions
3			The discharges specified in Condition (1) shall not at, any time, result in:	Refer ESCP section 5.11 'Water Quality Monitoring'
	a.		The production of oil or grease films, scums, foams, floatable or suspended materials, nor any conspicuous change in colour in the receiving surface waterbody at the edge of the mixing zone; or	
	b.		The emission of an objectionable odour from the receiving surface water body; or	
	c.		A concentration of Total Suspended Solids (TSS) that exceeds 100 milligrams per litre.	
4			Where construction phase stormwater enters surface water, the discharge shall not cause the erosion or scour of the bed or banks of the receiving surface water body.	There are no permanently running watercourses crossing the site. However, refer ESCP sections 4.3.4 'Sediment Control and Treatment Devices' where it discusses energy dissipation design; and section 4.3.2 Minimise Disturbance and Stabilise Exposed Areas Quickly' where is discusses scour protection
6			The discharge of water to land within 100 metres of a natural wetland, as provided for by **Condition (1)(b)** of this resource consent, shall only be within the area identified on **Plan CRC214152B**, attached to, and forming part of this resource consent. Prior to the discharge to land:	Refer ESCP section 4.2.3 'Specific Principles in Relation to Mt Cass' where it discusses preventative controls and management of runoff around wetlands
	a.		Water collected from disturbed areas shall be directed via cutoff drains to a decanting earth bund or a sediment retention bund to remove sediment and then be discharged to vegetated areas within the same wetland catchment via level spreaders to diffuse flow; and	
	b.		Water from overland flows above disturbed areas shall be collected and diverted around disturbed areas prior to discharge to vegetated areas within the same wetland catchment using level spreaders.	
7			To minimise the risk of significant sediment runoff from the construction works, the consent holder shall ensure that if rain is forecast:	Refer ESCP section 5.1 which overviews Contractors responsibilities prior to rainfall.
	a.		with a total rainfall depth of greater than ten millimetres per 24 hours; or	
	b.		at an intensity exceeding five millimetres per hour;	
			then the erosion and sediment control measures required to be installed and maintained during the works in accordance with the relevant ESCP and SSESCP required by Condition (13) of this resource consent shall be inspected prior to the rainfall occurring to ensure their effective functioning.	
8			No earthworks shall occur within active flow paths of water, areas of saturated soils, or where soils are unstable due to transient water content for the period of the rainfall and the following 12 hours after cessation of the rainfall.	Refer ESCP section 4.3.2 Minimise Disturbance and Stabilise Exposed Areas Quickly' where is outlines that earthworks during and 12 hours after rainfall.
Condition			**EROSION AND SEDIMENT CONTROL**	**Control for Consent Conditions**
12			During construction works at the site the consent holder shall:	Discussed at various stages throughout ESCP, refer staging / sequence drawings.
	a.		Utilise the best practicable option erosion and sediment control measures to minimise the discharge of sediment from the site; and	
	b.		Stage construction works and progressively stabilise worked areas to minimise the area of disturbed land.	
13			The discharges authorised under **Condition (1)** shall occur in accordance with an **Erosion and Sediment Control Plan (ESCP)** and a **Site Specific Erosion and Sediment Control Plan (SSESCP)**. The **ESCP** and any **SSESCP** shall:	Refer ESCP report
	a.		Detail best practicable erosion and sediment control measures that will be taken to ensure compliance with this resource consent.	Refer ESCP report

	b.		Be prepared by a suitably qualified person with experience in erosion and sediment control in accordance with:	Tonkin + Taylor have prepared the ESCP with review by Stantec
		i.	Environment Canterbury's Erosion and Sediment Control Toolbox (ESCT), which can be accessed under http://esccanterbury.co.nz/; or	
		ii.	An equivalent industry guideline. If an alternative guideline is used, the ESCP shall provide details of the relevant alternative methods used and an explanation of why they are more appropriate than the ESCT.	Due to the temporary nature of the road, New Zealand Forest Road Engineering Manual (NZFREM) was referenced extensively in the ESCP
	c.		Be certified by an independent, suitably qualified and experienced certifier/auditor with experience in erosion and sediment control, in accordance with **Condition (14)**, confirming that the erosion and sediment control measures for the site are appropriately sized and located in accordance with the ESCT and meets the requirements of **Conditions (16) and SSESCP.**	Stantec has been engaged by MCWFL and approved by HDC.
14			Within three months of the date of the grant of this resource consent, the Consent Holder shall provide to the Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance information to demonstrate that the proposed certifier/auditor(s) of the:	All discussed in ESCP section 5.1.
	a.		Erosion and Sediment Control Plan (ESCP);	
	b.		Site Specific Erosion and Sediment Control Plans (SSESCP); and	
	c.		Control measures on site to ensure that the erosion and sediment control measures are being constructed and maintained in accordance with the ESCP.	
			Is independent, suitably qualified and has experience in erosion and sediment control. If the Regional Leader – Monitoring and Compliance does not approve the person(s) proposed by the Consent Holder, reasons should be provided to indicate why the person(s) is not considered suitable.	
15			The independent approval required by **Condition (13)(c)** shall be provided to the Canterbury Regional Council, Attention Regional Leader Monitoring and Compliance at least one month prior to the commencement of construction at the site.	
16			The ESCP shall:	
	a.		Include a map showing the location of all works, including an earthworks staging plan and the maximum area of disturbance for each stage;	Refer to ESCP Figure 2 Appendix A ESC Drawings Appendix G Sequence Drawings
	b.		Detail how best practicable measures are taken to minimise discharges of construction-phase stormwater run-off beyond the boundaries of the site;	Refer to section 4 of the ESCP.
	c.		Include a programme of works, including a proposed timeframe for each stage of the works and the earthworks methodology;	Appendix G Sequence Drawings
	d.		Detail the management of any stockpiled material;	Refer to section 4.3.6 of ESCP
	e.		Detail methods to minimise disruption and interruption to the natural drainage pattern;	Refer to 4.2.3 of ESCP
	f.		Methods to minimise the amount of sediment that is discharged as a result of construction works into subterranean karst features and the water courses, both surface and subsurface, that drain the site;	Section 4.3.5 of ESCP
	g.		Detail inspection and maintenance of the sediment control measures;	Section 5 of ESCP
	h.		Detail sampling procedures and protocols as set out in **Conditions (29)** of this resource consent;	Section 5.1.1 of ESCP
	i.		Detail the methodology for stabilising the site if works are abandoned; and	Section 5.1.2
	j.		Detail the methodology for stabilising the site and decommissioning erosion and sediment control measures after works have been completed.	Section 5.1.2
17			The consent holder may make any reasonable amendments to the ESCP at any time. Any changes to the ESCP shall be:	
	a.		For the purpose of improving the efficacy of the erosion and sediment control measures, and shall not result in reduced discharge quality;	Section 1.4.3 of the ESCP
	b.		Consistent with the conditions of this resource consent; and	
	c.		Certified by the agreed independent certifier(s), as per the requirements outline in **Condition (13)(c).**	
			The consent holder shall provide a copy of any such amendment to the ESCP and the certification to Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance, prior to giving effect to the amendment.	
18			Site Specific Erosion and Sediment Control Plans (SSESCP) shall be prepared for each catchment where construction works are proposed and shall include:	SSESCP's have been completed across the site
	a.		Detailed plans showing the location of sediment control measures, on-site catchment boundaries, and sources of runoff;	

	b.		Confirmation that the erosion and sediment control devices have been sized appropriately in accordance with the ESCT;	SSESCP s have been completed across the site (refer Appendix A drawings - sheets 2-6). As stated in section 1.4.2, due to the scale of the site, a site-specific work plan will be provided which will for the SSESCP. This 'checklist' will supplement the existing drawings to provide more details for installation of controls at each sub-catchment. Further information will follow detailed design.
	c.		Drawings and specifications of designated sediment control measures;	
	d.		Details of any stockpiling locations within the catchment and the erosion and sediment control measures to minimise construction-phase discharges from the stockpiles;	
	e.		Detail methods to minimise discharges into exclusion zones identified on **Plans CRC214152B and CRC214152C**, attached to and forming part of this consent.	
	f.		Define the discharge points where construction phase stormwater is discharged to waterways within the site.	
19			Each **SSESCP** shall be certified by the independent, suitably qualified person(s) (approved by regional Leader – Monitoring and Compliance as being competent and suitable to provide such certification as per **Condition (14))** that it is prepared in accordance with the **ESCP**. If changes are required by the certifier these changes shall be made before the certification is confirmed. Documentation of the certification shall be maintained and provided to Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance on request.	Discussed in Section 5 of ESCP 'Performance Inspection and Maintenance.'
Condition			**DURING WORKS**	**Control for Consent Conditions**
20			During construction works, the Consent Holder shall adopt the best practicable option to:	Refer ESCP 4.3 Erosion and Sediment Control Measures where this is discussed in detail.
	a.		Minimise soil disturbance and prevent soil erosion;	
	b.		Prevent sediment from leaving the site;	
	c.		Avoid placing cut or cleared vegetation, debris or excavated materials in a position such that it may enter stormwater runoff or surface water.	
21			During construction works, all erosion and sediment control measures shall be inspected at least once per day, as well as following any rainfall event that results in more than five millimetres of rainfall at the site. Any accumulated sediment shall be removed, and repairs made, as necessary, to ensure effective functioning of devices. Records of any inspections shall be kept and provided to Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance on request.	Discussed in Section 5 of ESCP 'Performance Inspection and Maintenance.'
22			If the consent holder abandons work on-site, adequate preventative and remedial measures shall be taken to control sediment discharged exposed or unconsolidated surfaces. These measures shall be maintained for so long as necessary to prevent sediment discharges from the earth worked areas.	Refer ESCP Section 5.1.2
23			All erosion and sediment control measures shall not be decommissioned until the works area is stabilised. Decommissioning measures shall be undertaken in the following order:	
	a.		All disturbed areas shall be stabilised and/or re-vegetated following completion of the works to achieve vegetation cover that is effective at minimising sediment run-off;	
	b.		Any visible debris, litter, sediment and hydrocarbons shall be removed from all sediment control measures; and	
	c.		Erosion and sediment control measures shall be removed.	
24			Any material removed in accordance with **Condition (23)(b)** shall be disposed of at a facility authorised to receive such material.	
Condition			**MONITORING**	**Control for Consent Conditions**
28			The erosion and sediment control measures shall be audited at least twice per calendar year during construction to ensure that the erosion and sediment control measures are constructed and maintained in accordance with the relevant **SSESCP** by the independent, suitably qualified person(s) (approved by regional Leader – Monitoring and Compliance as being competent and suitable to provide such certification as per **Condition (14)**). Records of the audits and any resulting on site amendments shall be kept and provided to Canterbury Regional Council, on request.	Refer ESCP Section 5.1.1 Water Quality Monitoring where it outlines these control measures
29			Where required under **Condition (31)**, a Total Suspended Solids (TSS) meter or any other recognised measuring device shall be used to determine the concentration of TSS in the discharge, the TSS meter or measuring device shall be:	Refer ESCP Section 5.1.1 Water Quality Monitoring where it outlines these control measures
	a		Used by a suitably qualified person in accordance with the manufacturer manual specific to the device used;	
	b		Calibrated to the soil and environmental conditions found on the site; and	
	c		Used in general accordance with the Erosion and Sediment Control Toolbox for Canterbury (2017).	

30			During works and when a discharge of construction phase stormwater is occurring from disturbed areas, the discharge from the site shall be visually assessed for any sheen of oil or grease or discolouration;	Refer ESCP Section 5.1.1 Water Quality Monitoring where it outlines these control measures
	a.		Observations shall be photographed and recorded; and	
	b.		Records of visual assessments including photographs shall be kept and provided to Canterbury Regional Council on request.	
31			If the visual assessment and observations undertaken in accordance with **Condition (29)** indicate a direct overland flow connection from the activity to a surface waterway (not connected to any other activity or sources) which results in a decrease in visual clarity, water quality monitoring shall be undertaken to ensure compliance with **Condition (3)** in accordance with a method provided for under **Condition (31).**	Refer ESCP Section 5.1.1 Water Quality Monitoring where it outlines these control measures
32			If the visual assessments and observations undertaken in accordance with **condition (30)** indicate a sheen of oil or grease or discolouration. If the water quality monitoring required by condition (31) identifies an exceedance of the TSS limit in condition (3)(c), then:	Refer ESCP Section 5.1.1 Water Quality Monitoring where it outlines these control measures
	a		The discharge shall cease immediately;	
	b		The discharge shall only recommence once amendments have been made to the treatment process such that:	
		i.	A TSS concentration of 100 milligrams per litre in the treated discharge is achieved; and	
		ii.	The source of the sheen of oil or grease or discolouration has been removed.	
33			The consent holder shall maintain a record of any water quality monitoring undertaken in accordance with condition (31) and any of the actions undertaken in accordance with condition (32). This record shall be provided to the Canterbury Regional Council on request.	Refer ESCP Section 5.1.1 Water Quality Monitoring where it outlines these control measures
34			Once a year during the period of construction and for one year following the completion of construction activities, the Consent Holder shall undertake the following monitoring:	
	a.		The monitoring shall be carried out by a suitably qualified person at the following NZTM locations shown on **Plan CRC214152D**, attached to and forming part of this consent:	
		i.	1589202E, 5230108N (Dovedale);	
		ii.	1587336E, 5229983N (Cass Middle);	
		iii.	1586490E, 5229918N (Homestead); and	
		iv.	1588492E, 5232496SN (mothering Gully stream)	
	b.		Water quality shall be monitored in terms of:	
		i.	Suspended and dissolved water quality measures, including hydrocarbon indicators which detect the presence of fuel, hydraulic oils and lubricants; and	
		ii.	Deposited fine sediment surveys (following the procedures set out in pages 17-20 Clapcott et al (2011)	
	c		Results of the sampling shall be compared with the following alert trigger levels:	
		i.	water quality measures - Schedule 5, Table S5A/B 'Hill fed lower' for	
			a. Temperature	
			b. pH	
			c. Visual clarify	
			d. Total Petroleum Hydrocarbons (TPH)	
			e. Poly Aromatic Hydrocarbons (PAH)	
		ii.	More than 20% increase on past survey results	Refer ESCP Section 5.1.1 Water Quality Monitoring where it outlines these control measures
	d.		Should any sample results record above water quality or deposited sediment alert triggers in **Condition (34)(c)(I and ii)** the following actions shall be undertaken	
		i.	the on-site controls are to be inspected and where additional controls are required these are implemented; and	
		ii.	sampling set out in **Condition (34)(a) to (34)(b)** shall be repeated one month after any alert trigger level exceedances.	
	e.		Should three consecutive follow up monitoring rounds required by **Condition (34) (d) (i)** have results which exceed the alert level triggers the following actions shall be undertaken:	
		i.	notification of the exceedances to Canterbury Regional Council, Attention: Regional Leader – Monitoring and Compliance	
			An investigation into the water quality effects shall be undertaken and shall include the following:	
			a. Determine if the exceedances are a result of the discharges of stormwater from the site	

		ii	b. Identify the risk by the environment from the exceedances;	
			c. Identify and undertake mitigation and actions to prevent further exceedances (this could include flushing of any deposited sediment from the site); and	
			d. Provide a report within 3 month(s) to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, that documents the investigation.	
35			The consent holder shall submit laboratory results for all water quality samples collected as per **Conditions (32)** to Canterbury Regional Council, Attention, RMA Compliance and Enforcement Manager within five working days of the laboratory results being reported to the consent holder. The data shall be provided in a format suitable for electronic upload to the Council's water quality database.	Refer ESCP Section 5.1.1 Water Quality Monitoring where it outlines these control measures

ECan consent CRC214150 (sections 7 - 8, 16)

Condition				Control for Consent Conditions
7			Any discharges of construction phase stormwater shall occur in accordance with CRC214152.	Refer ESCP section 5.11 'Water Quality Monitoring'
8	c		To minimise sediment generation and sediment laden runoff through the inclusion of an **Erosion and Sediment Control Plan;**	Refer ESCP report to be updated following detailed design. Refer also Appendic A drawings. Refer also to Appendix A of Landscape Management Plan; (section 2.7.3 of the Pattern Book in for rehabilitation of spoil disposal sites.
	d		To maintain existing surface and subsurface drainage patterns and pathways;	
	e		To ensure that appropriate monitoring and reporting of all activities is undertaken in accordance with these conditions;	
	f		To ensure that the earthworks and spoil disposal areas are contoured so that the finished landform will blend with the surrounding landscape;	
	g		To ensure that, the earthworks are undertaken in a manner which provides for final surfaces which are suitable for rehabilitation and/or recolonisation of vegetation to achieve vegetative cover that is effective at minimising sediment run-off;	
	h		To ensure that only those areas identified in **Plans CRC214150B** and **CRC214150C** are used as spoil disposal areas;	
16			During works, the consent holder shall adopt the best practicable options to:	
	a		Minimise soil disturbance and prevent soil erosion;	Section 4.3.2
	b		Minimise the area of disturbed land at any one time; and	Section 4.3.2
	c		Avoiding placing cut or cleared vegetation, debris, or excavated material in a position that it may enter groundwater or surface water.	Section 4.3.7

HDC consent RC070250 (sections 37 - 40, 44, 52 - 59)

Clause				Control for Consent Conditions
37			The Consent Holder shall undertake erosion and sediment control measures, the purpose of which is to:	
37	a)		Minimise disruption, and interruption to the natural drainage pattern	Covered in ESCP and site-specific drawings 1017740-315 (sheets 1-6). Natural drainage patterns are represented by blue overland flows.
37	b)		Minimise the amount of sediment that is discharged as a result of construction works into subterranean karst features and the water courses, both surface and subsurface, that drain the site; and	Refer Section 4.3.5 where is discusses management and installation of controls around karst features. Appendix D illustrates locations of sinkholes.
37	c)		Minimises the discharge of silt or sediment into the exclusion zones indicated on Golder Associates plans CG161.3-166.3 dated 20 December 2010.	The exclusion zones indicated in Golder Associates plans CG161.3-166.3 dated 20 December 2010 have been inserted into the Tonkin + Taylor ESC drawings 1017740-315 (sheets 1-6). Exclusion zones are illustrated as orange shaded areas. Attention has been made to ensure the construction of the road (and potential for discharge of silt or sediment) is reduced by placement and control measures. For this reason, the Golder drawings have been superseeded.
			All erosion and sediment control measures shall remain the responsibility of the Consent	Refer ESCP section 1.3 on implementation, monitoring and adaptation.

38	Holder, and be installed, operated and maintained in accordance with these conditions of consent	Refer also section 5 of ESCP, performance inspection and maintenance which outlines responsibilities.
39	The design storm for detention features for runoff and sediment control shall be 5% AEP of the appropriate design duration. The design storm for runoff and sediment control for permanent roads shall be 2% AEP.	Refer ESCP section 4.2.2 design storms. Further more detailed sizing calculations will be provided in the stormwater design report (currently being prepared by Tonkin + Taylor December 2022). Further, we have purposely specified the use of 'in-situ' treatment through a a channel, as oppossed to constructing large detention basins, thus causing more earthworks.
40	The Consent Holder shall ensure that appropriate construction contract provisions are included within the contract documents to allow construction contractors to tender accurately for the scope of the proposed erosion and sediment control measures.	Consent Holder has engaged the contractor via design and build contract.
44	The Consent Holder shall engage an independent and appropriately qualified person in consultation with the Manager Environmental Services of the Hurunui District Council to audit the design of the erosion and sediment control measures against the Construction Management Plan required by condition [23], to audit the procedures for stabilisation as required by condition [32.i], and to audit bulk earthwork activities on an as-required basis to ensure that the sediment and erosion control measures are being constructed and maintained in accordance with the plan. The Consent Holder shall be responsible for the reasonable direct costs associated with this engagement.	Stantec has been engaged by MCWFL and approved by HDC as the SEQP and MCWFL will engage an external consultant to carry out site audits.
SOIL DISPOSAL SITES		
52	Prevent scour from temporary discharge diversion channels.	Refer ESCP
53	Turbine platforms shall be designed to provide for erosion and sediment control.	ESC measures during turbine platform excavation shall follow the same approach and procedure as dealing with subterranean karst featires. See ESCP section 4.3.5.
54	All spoil disposal sites shall be located in accordance with the Golder Associates plans referred to in conditions [3] and [4] and Mt Cass Wind Farm plans referred to in condition [5] and subject to condition [10], and be managed to ensure that:	Refer ESC drawings 311 – 315 that illustrate locations of spoil disposal sites, clean-water cut-off drains and sediment control measures. Further detailed information will be provided following the detailed design.
d)	Suitable locations for clean-water cut-off drains can be provided;	
e)	A sediment control measure appropriate to the size of the disposal area can be provided to treat all run-off from the disposal area.	
55	All spoil disposal sites shall be designed, constructed and managed in accordance with the following:	Refer section 4.3.6 of ESCP that describes the methodology of establishing spoil locations. Refer also to Appendix A of Landscape Management Plan; (section 2.7.3 of the Pattern Book in for rehabilitation of spoil disposal sites. Further information will be supplied following detailed design.
f)	The toe bund shall be a structural fill;	
g)	The amount of surface area within the spoil site that is exposed at any one time shall be minimised;	
h)	Exposed areas shall be stabilised to the greatest extent practicable at the end of each day, and temporarily covered if possible prior to any storm event that is likely to cause erosion or mobilise sediment	
i)	All sediment ponds shall be constructed to provide for retrofitting of flocculation if needed	
j)	Contouring of all spoil disposal sites to visually integrate into the natural landform.	
56	A clean water diversion shall be constructed around each spoil site where there is a significant catchment above the spoil disposal site.	Refer ESC drawings (and section 4.3.4 Figure 13 of ESCP) that clearly illustrate clean water diversion bunds on the uphill side of some spoil disposal sites. The construction of these bunds will be in accordance to Appendix E, drawing 320.
57	Each spoil site shall be stabilised and planted over including being grassed (non-invasive species) or re-vegetated with silver tussock to no less than 20% cover, as soon as practicable after it has been fully utilised, in order to prevent scour and avoid sediment being washed into adjacent watercourses. Stabilisation may be staged, and stabilised areas diverted to a clean water diversion, to maintain a suitably small working catchment area	Refer section 4.3.6 of ESCP that describes the methodology of establishing spoil locations. Refer also to Appendix A of Landscape Management Plan; (section 2.7.3 of the Pattern Book in for rehabilitation of spoil disposal sites. Further information on the planting methodology will be provided following detailed design'

58	Any topsoil stockpile that is intended to remain in situ for more than 4 consecutive weeks shall be subject to erosion and sediment control in accordance with condition [37] and be hydroseeded if intended to remain for more than 4 months.	Refer section 4.3.2 on topsoil hydroseeding.
59	All topsoil stockpiles shall be bunded on the uphill side to divert clean water runoff away from the stockpile.	Refer section 4.3.2 on protection of topsoil stockpiles, and ESC drawing 320 (Appendix A) that illustrates clean water bund design.

APPENDIX C - Catchment Areas and Flow Rates

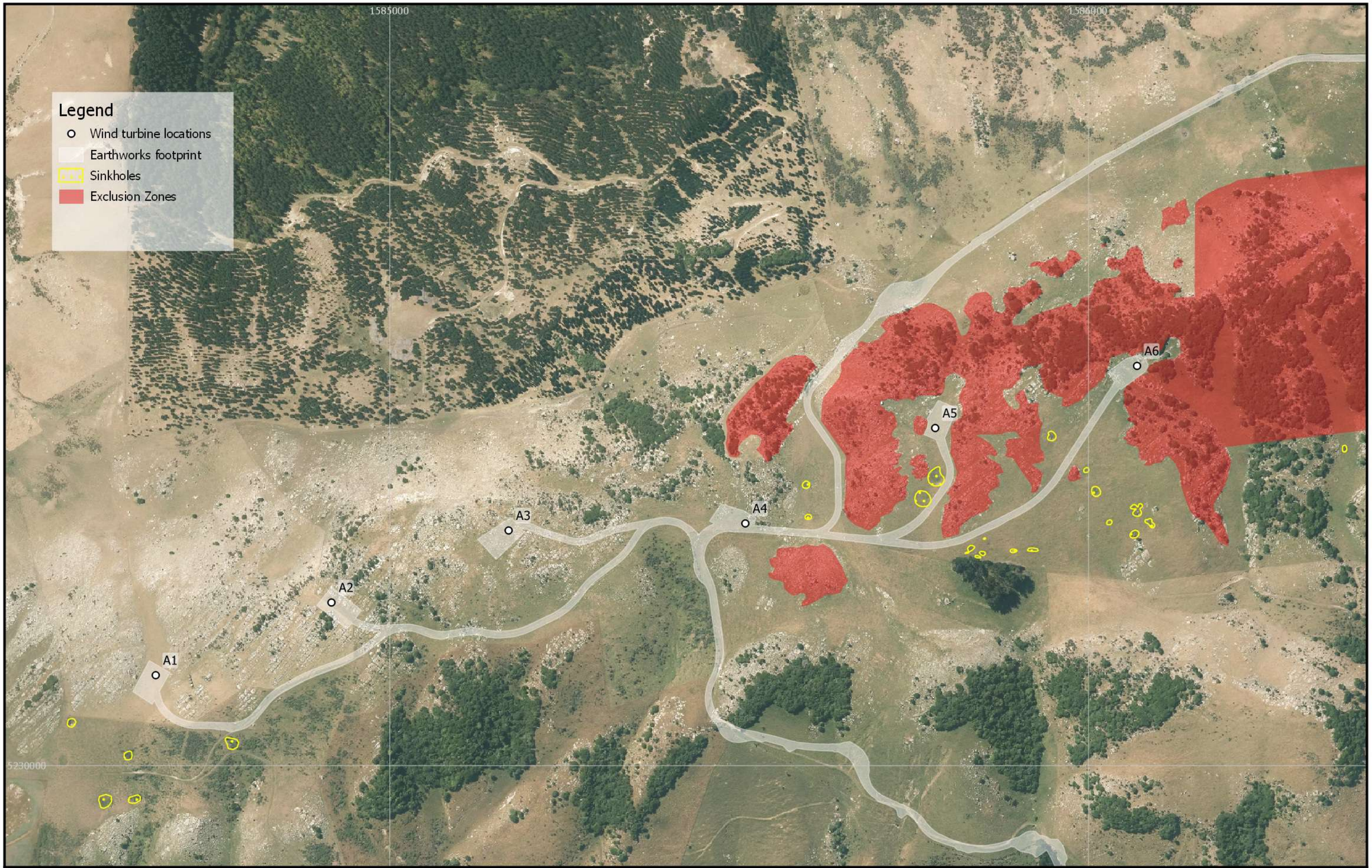
APPENDIX C – Catchment areas and flow rates

Note: To be updated following detailed design, refer to drawings for catchments based on name.

Catchment Name	Area Upstream Catchment (ha)	10% AEP Peak Flow (L/s)
0A	5.3561	453.0
0B	1.211	102.4
0C	4.887	413.3
0D	15.7928	1335.6
0E	4.4188	373.7
0F	5.7426	485.6
0G	0.094	7.9
1A	4.8263	408.1
1B	5.7277	484.4
1C	1.3789	116.6
1D	0.7939	67.1
1E	2.1402	181.0
1F	0.9013	76.2
5A	2.5881	218.9
6A	1.5837	133.9
6B	2.4098	203.8
22A	7.1637	605.8
22B	5.5282	467.5
22C	1.7511	148.1
22D	2.7725	234.5
22E	11.1215	940.5
22F	8.4014	710.5
22G	7.5345	637.2
22H	7.6968	650.9
22I	8.8521	748.6
22J	0.0827	7.0
8A	1.386	117.2
8B	1.3999	118.4
8C	1.4961	126.5
8D	1.5355	129.9

8E	1.3274	112.3
8F	1.4111	119.3
22K	3.5346	298.9
22L	2.1343	180.5
22M	3.35	283.3
22N	2.5965	219.6
12A	0.7535	63.7
12B	0.9049	76.5
13A	0.8763	74.1
22O	0.7535	63.7
22P	0.5607	47.4
22Q	7.2522	613.3
22R	1.0021	84.7
22S	3.4299	290.1
14A	1.792	151.5
22T	0.0838	7.1
22U	1.1811	99.9
22V	4.164	352.1
22W	7.9314	670.7
22X	0.4063	34.4
22Y	0.7328	62.0

APPENDIX D – Sinkhole locations

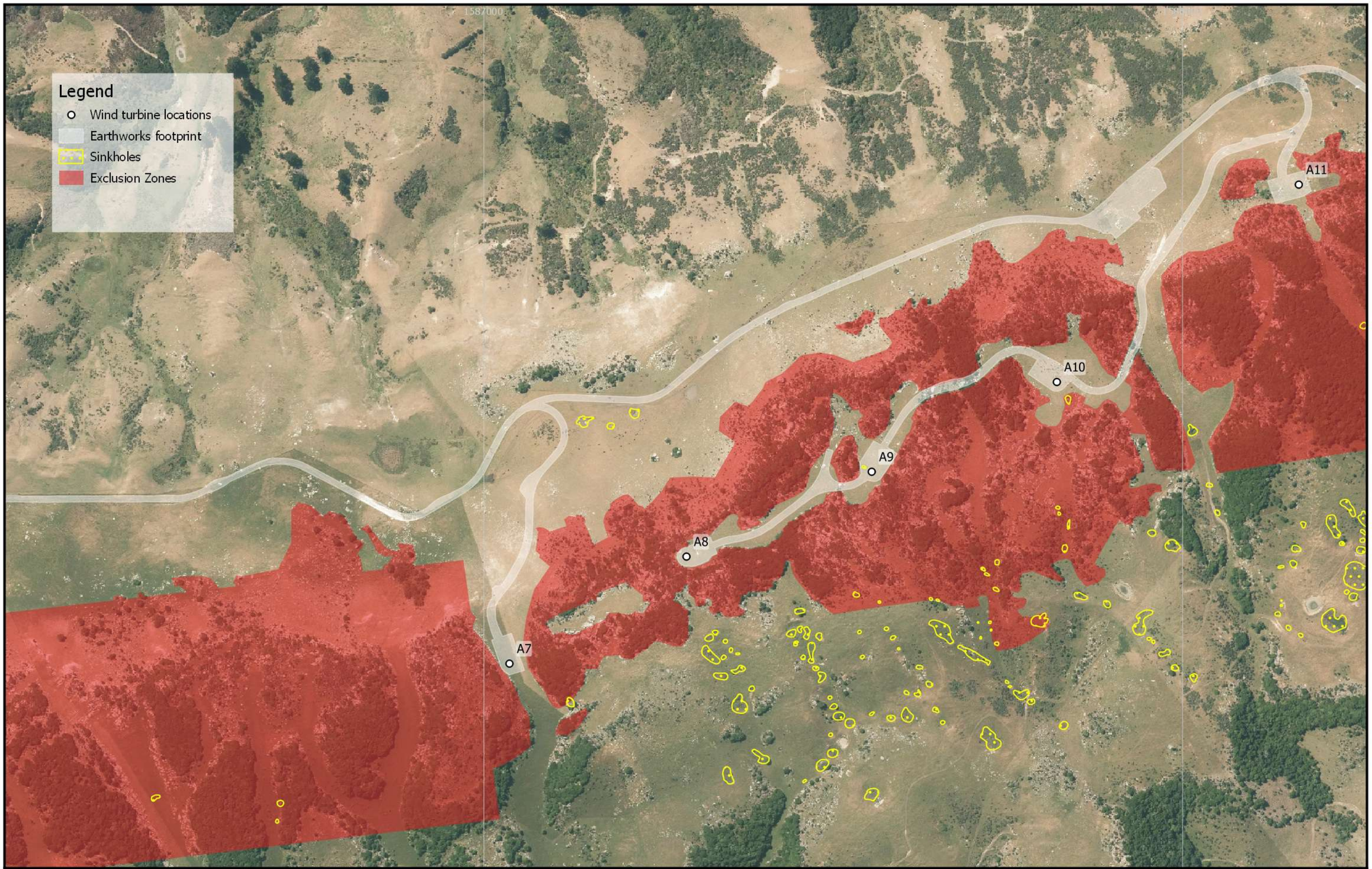


Mt Cass Wind Farm

Background aerial photography captured for 'Environment Canterbury' by Aerial Surveys Ltd, obtained from LINZ under Creative Commons 4.0 License.
Ref. https://data.linz.govt.nz/layer/52602-canterbury-03m-rural-aerial-photos-2014-2015/

MOUNT CASS WIND FARM
INFRASTRUCTURE AND SINKHOLE LOCATIONS

Drawn: AJH | 18 Mar 2020
Scale (at A3) 1:5,000
Drawing 4760.1 of 4



Mt Cass Wind Farm

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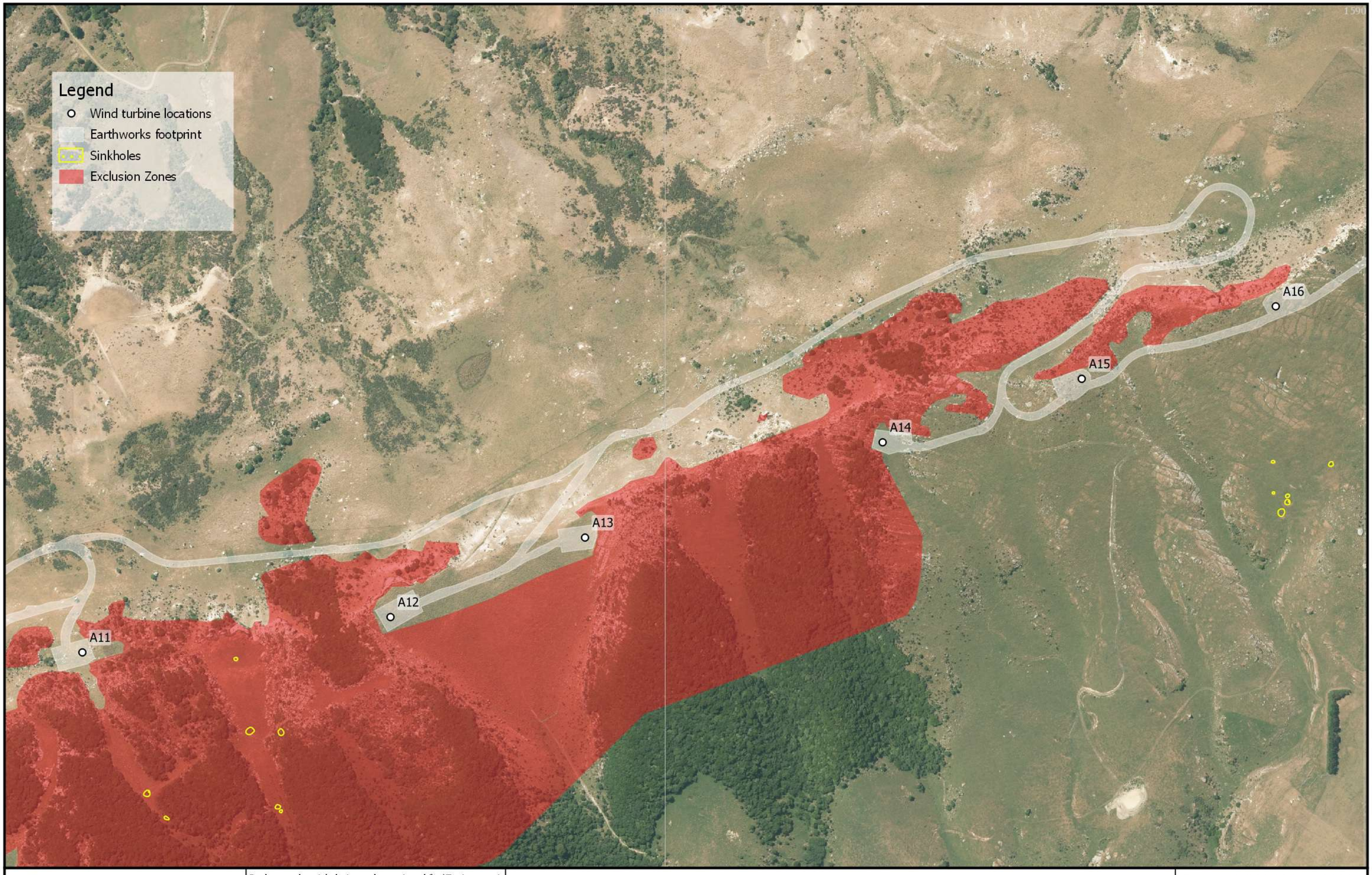
Ref. https://data.linz.govt.nz/layer/52602-canterbury-03m-rural-aerial-photos-2014-2015/

MOUNT CASS WIND FARM
INFRASTRUCTURE AND SINKHOLE LOCATIONS

Drawn: AJH | 18 Mar 2020
Scale (at A3) 1:5,000
Drawing 4760.2 of 4



Mt Cass Wind Farm

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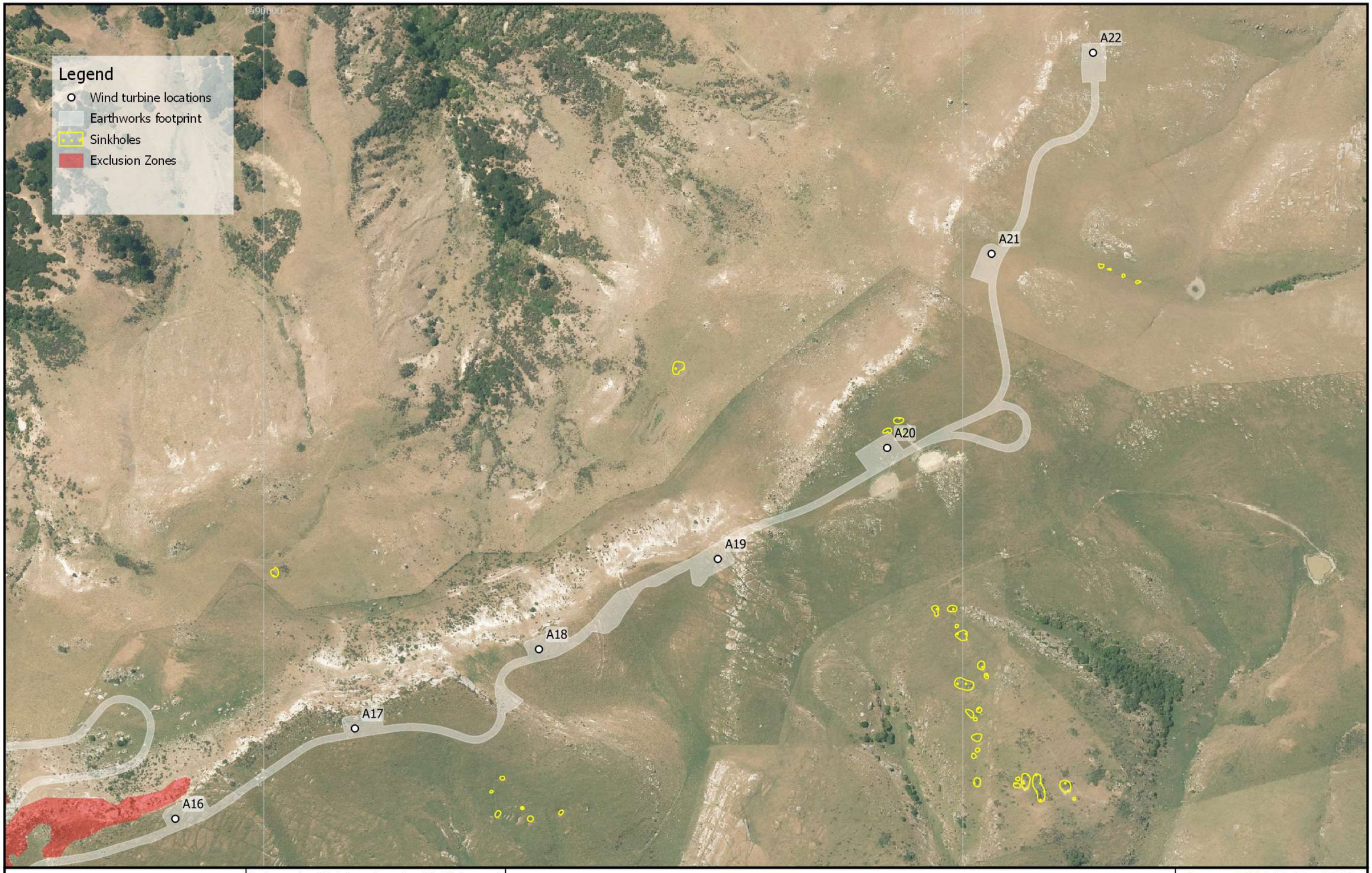
Ref. https://data.linz.govt.nz/layer/52602-canterbury-03m-rural-aerial-photos-2014-2015/

MOUNT CASS WIND FARM
INFRASTRUCTURE AND SINKHOLE LOCATIONS

Drawn: AJH | 18 Mar 2020
Scale (at A3) 1:5,000
Drawing 4760.3 of 4



Mt Cass Wind Farm

Background aerial photography captured for 'Environment Canterbury' by Aerial Surveys Ltd, obtained from LINZ under Creative Commons 4.0 License.
Ref. https://data.linz.govt.nz/layer/52602-canterbury-03m-rural-aerial-photos-2014-2015/

MOUNT CASS WIND FARM
INFRASTRUCTURE AND SINKHOLE LOCATIONS

Drawn: AJH | 18 Mar 2020
Scale (at A3) 1:5,000
Drawing 4760.4 of 4

APPENDIX E – ECan toolbox checklists for control devices

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

CHECKLIST 3: Check dam

Contractor:	Date: Time:	Consent number:	Site:

Construction checklist Check back to 'Check dams' section for full information. Also see the Figures over the page.	Yes ✔	No ✘ (Add comments to explain)
Fabric used for sandbags is UV resistant		
Dams are spaced so the toe of an upstream dam is at about the same elevation as the centre height (spillway level) of the downstream dam		
Centre of the check dam is 150–200 mm lower than the outside edges, to create a spillway		
Toes of the fabric dams extend >1 m upslope and are buried in a 300 mm deep trench		
On erodible soils, the channel is lined with spray-on copolymer		
Inspection and maintenance checks are done, recorded and dated, along with any comments		

Note: this is an on-site, self-check list for contractors to use. Keep your completed checklists to show Compliance Officers your set up, monitoring and maintenance, if requested.

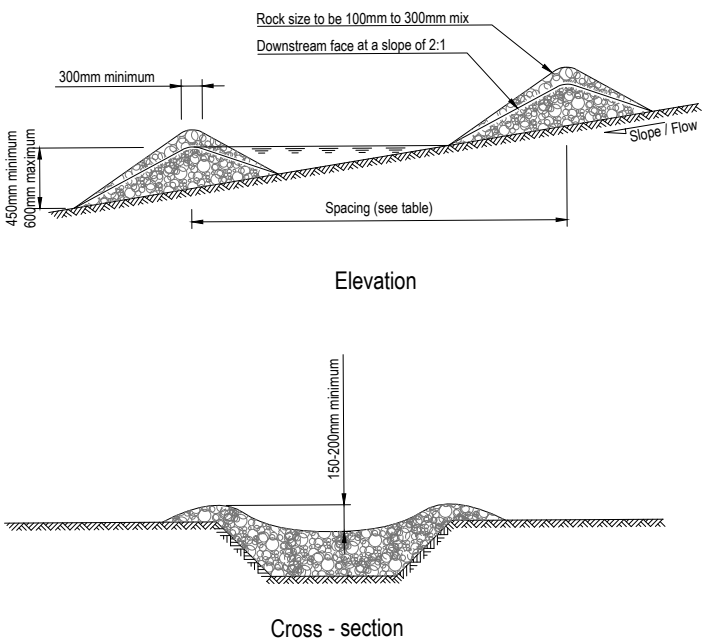
Slope of site (%)	Spacing (m) between dams with a 450 mm centre height	Spacing (m) between dams with a 600 mm centre height
Less than 2%	24	30
2–4%	12	15
4–7%	8	11
7–10%	5	6
>10%	Unsuitable – use stabilised channel or specific engineered design	Unsuitable – use stabilised channel or specific engineered design

Signature:

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

CHECKLIST 3 FIGURES: Check dam

Check dam *(Source: Auckland Council)*



Rock check dam

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

CHECKLIST 2: Contour drain (cut-off)

Contractor:	Date: Time:	Consent number:	Site:

Construction checklist Check back to 'Check Contour drains' section for full information. Also see the Figures over the page.	Yes ✔	No ✘ (Add comments to explain)
Minimum compacted height is 250 mm		
Minimum total depth is 500 mm		
Longitudinal grade is <2% (unless lined)		
Catchment area is <0.5 ha		
Flow area is parabolic and not V-shaped		
Drains are as short as possible		
Earth windrows and banks are compacted		
Temporary contour drains are constructed across unprotected slopes at the end of the day's work and/or before forecast rain		
Inspection and maintenance checks are done, recorded and dated, along with any comments		

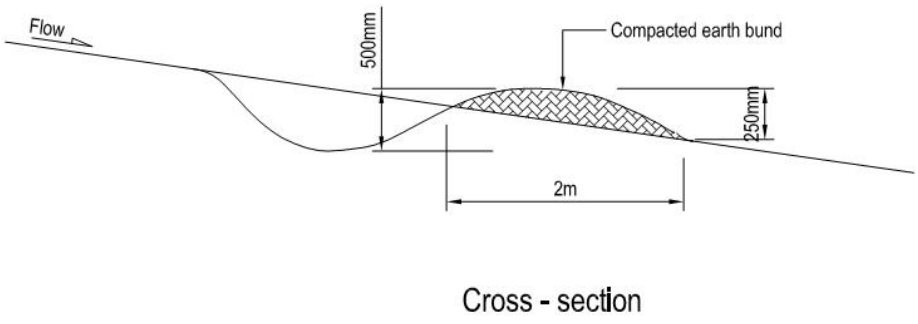
Note: this is an on-site, self-check list for contractors to use. Keep your completed checklists to show Compliance Officers your set up, monitoring and maintenance, if requested.

Signature:

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

CHECKLIST 2 FIGURES: Contour drain (cut-off)

Contour drain *(Source: SouthernSkies)*



Contour drain cross section

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

CHECKLIST 16: Decanting earth bund (DEB)

Contractor:	Date:	Consent number:	Site:
	Time:		

Construction checklist Check back to 'Decanting earth bund (DEB)' section for full information. Also see the Figures over the page.	Yes ✔	No ✘ (Add comments to explain)
DEB is built along the contour to achieve the required volumes		
All vegetation is removed before construction		
DEB is keyed into the ground at least 0.3 m deep		
DEB is built with a clay-silt mix of suitable moisture content to achieve a reasonable compaction standard (90%). Track roll at 150–200 mm lifts		
There is good compaction around the outlet pipe that passes through the bund, to avoid seepage and potential failure		
A 150 mm diameter, non-perforated outlet pipe is installed through the bund and discharges to a stable erosion-proofed area or stormwater system		
A T-Bar decant is attached by a standard joint (glued and screwed) The decant is 100 or 150 mm diameter PVC pipe, 0.5 m long with equally spaced holes of 10 mm diameter It is fixed firmly to a waratah standard to achieve 0.3 litres/second/1,000 m2 of contributing catchment		
A sealed PVC pipe (with endcaps) is placed on top of the decant to add buoyancy		
A flexible, thick rubber coupling connects the decant arm and the discharge pipe. The coupling is fastened by strap clamps, glue and screws		

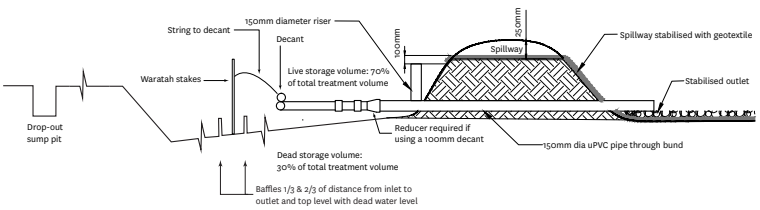
The decant is fastened to two waratahs by nylon cord, to the correct height to maintain dead water storage		
An emergency spillway goes to a stabilised outfall 100 mm freeboard height above the primary spillway. This can be a trapezoidal spillway with a minimum invert length of 2 m It must be smooth, have no voids and be lined with a soft needle punched geotextile to the stabilised outfall. Pins secure the geotextile, spaced no further than 0.5 m apart		
The emergency spillway has at least freeboard of 250 mm, ie between the invert of the spillway to the lowest point of the top of the bund		
At the end of construction, an as-built assessment is done and any discrepancies with the design rectified		
DEB is checked before and after each storm. Inspections are recorded and dated, along with comments, to be available for compliance monitoring officers		
There are baffles across the width of the bund, level with the dead water level and made of porous open-mesh cloth		
Dirty water inflows are treated with coagulant/flocculants in accordance with a chemical treatment plan and after appropriate testing		
Performance of the bund is monitored by water quality testing inflows and outflows. These records are stored in a retrievable location and can be produced for inspection		

Note: this is an on-site, self-check list for contractors to use. Keep your completed checklists to show Compliance Officers your set up, monitoring and maintenance, if requested.

Signature:

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

CHECKLIST 16 FIGURES: Decanting earth bund (DEB)



Cross - section

Decanting earth bund

Close up of decanting earth bund system *(Source: SouthernSkies)*

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CHECKLIST 1: 'Clean water' or 'dirty water' diversion channel and bund

Contractor:	Date: Time:	Consent number:	Site:

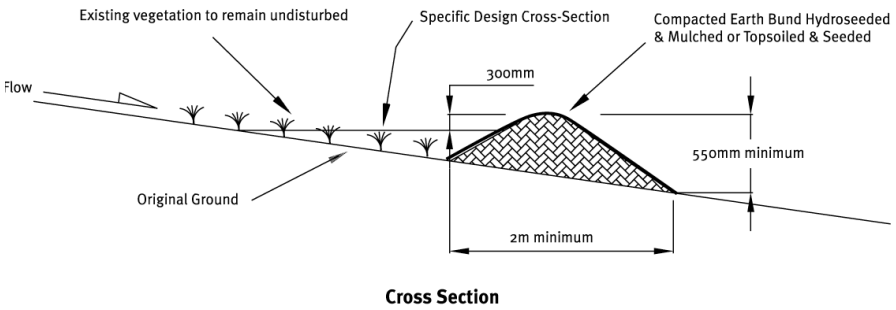
Construction checklist Check back to Managing 'clean water' and Managing 'dirty water' sections for full information. Also see the Figures over the page.	Yes ✔	No ✘ (Add comments to explain)
Route avoids trees, services, fence lines or other natural or built features		
Channels are trapezoidal or parabolic in shape		
Internal side slopes are no steeper than 3:1 External side slopes are no steeper than 2:1		
Drains are constructed with a uniform grade along the invert (as sudden decreases may cause sediment to accumulate causing the bank to overtop)		
Bunds are well compacted		
Outlets are stable and protected as needed		
Diversions are stabilised to prevent erosion		
Perimeter diversions are regularly maintained		
If necessary, specific geotechnical design is followed to ensure the stability and integrity of the structure		
Inspection and maintenance checks are done, dated and recorded, along with any comments		

Note: this is an on-site, self-check list for contractors to use. Keep your completed checklists to show Compliance Officers your set up, monitoring and maintenance, if requested.

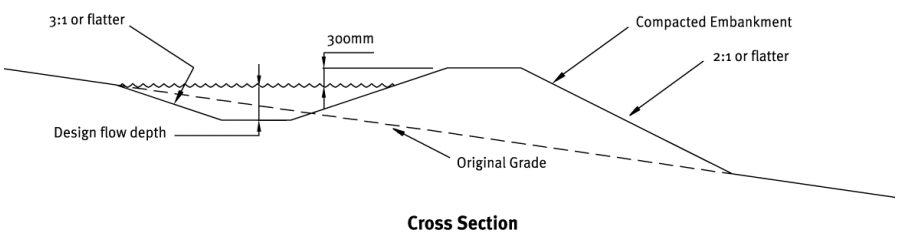
Signature:

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

CHECKLIST 1 FIGURES: 'Clean water' or 'dirty water' diversion channel and bund



Cross section of a clean water diversion



Cross section of dirty water diversion

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CHECKLIST 15: Sediment retention pond

Contractor:	Date:	Consent number:	Site:
	Time:		

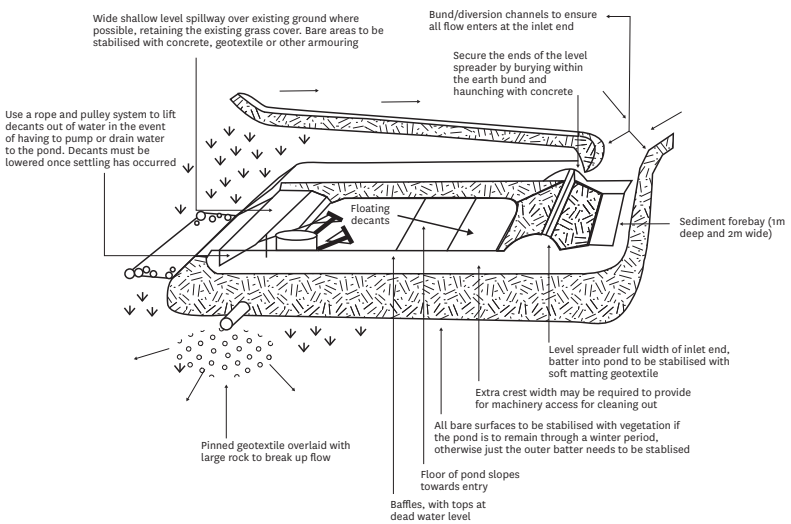
Construction checklist Check back to 'Sediment retention pond' section for full information. Also see the Figures over the page.	Yes ✔	No ✘ (Add comments to explain)
Sediment control is implemented downslope of the proposed sediment retention pond		
Areas are cleared of proposed fill or topsoil or other suitable material down to competent material		
Only approved fill material is used		
Fill is placed and compacted in layers to the engineering recommendations, and appropriate testing has confirmed compliance		
Fill embankment is constructed 10% higher than the design height to allow for settlement		
Pipework and anti-seep collars or filter collars were installed during the embankment build, with good compaction around pipes		
The emergency spillway is constructed as per the Construction and operation instructions in 5.1 [link to Construction and operation in 5.1]		
A level spreader is installed and stabilised		
The decant and pulley system is securely attached to the horizontal pipework, with all connections watertight. Manhole risers have been placed on a firm foundation of concrete or compacted soil		
Inlets and outlets are protected with fabric		
Baffles are installed across the pond width at the dead water level. Baffles are made of porous open mesh cloth		
There is an all-weather access track for maintenance		
All elevations are checked and any inaccuracies fixed		

Internal and external batters and the emergency spillway are stabilised as per the approved ESC plan		
At the end of construction, an as-built assessment is done and any discrepancies with the design rectified		
Inspection and maintenance checks are done, recorded and dated, along with any comments		

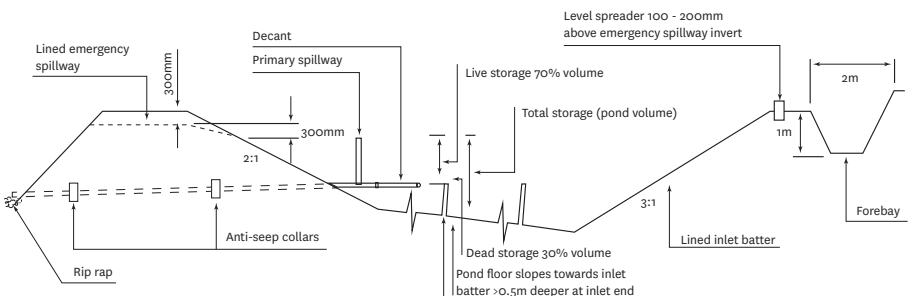
Note: this is an on-site, self-check list for contractors to use. Keep your completed checklists to show Compliance Officers your set up, monitoring and maintenance, if requested.

Signature:

CHECKLIST 15 FIGURES: Sediment retention pond



Schematic of a sediment retention pond



Sediment retention pond cross section

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CHECKLIST 17: Silt fence

Contractor:	Date:	Consent number:	Site:
	Time:		

Construction checklist Check back to sections 5.3 [link] for full information. Also see the Figures over the page.	Yes ✔	No ✘ (Add comments to explain)
The silt fence material suits the site conditions and is used to the manufacturer's specifications		
Silt fences are installed along the contour		
There is a trench at least 100 mm wide and 200 mm deep along the proposed line of the silt fence		
Support posts/steel waratahs are installed at least 1.5 m long and 2–4 m apart		
Support posts/waratahs are installed on the downslope edge of the trench, with silt fence fabric on the upslope side of the support posts to the full depth of the trench. The trench is backfilled with compacted soil		
The top of the silt fence fabric is reinforced with a support made of high tensile 2.5 mm diameter galvanised wire. The wire is tensioned using permanent wire strainers attached to angled waratahs at the end of the silt fence		
The silt fence fabric is doubled over and fastened to the wire with silt fence clips at 500 mm spacings		
Where ends of the silt fence fabric come together, they are overlapped, folded and stapled/screwed to prevent sediment bypass		
Inspection and maintenance checks are done, recorded and dated, along with any comments		

Note: this is an on-site, self-check list for contractors to use. Keep your completed checklists to show Compliance Officers your set up, monitoring and maintenance, if requested.

Signature:

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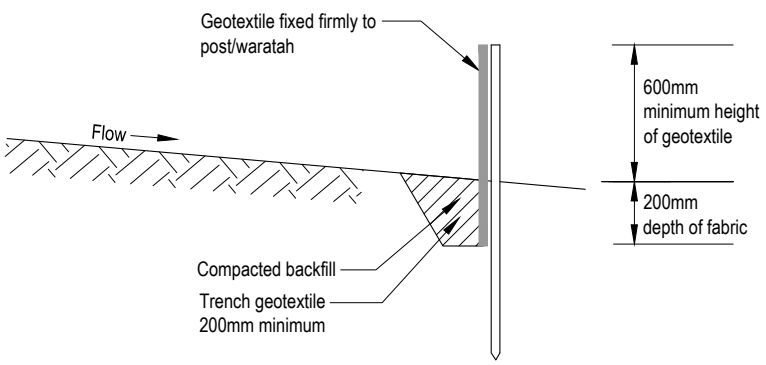
CHECKLIST 17 FIGURES: Silt fence

Slope steepness %	Slope length (m) (maximum)	Spacing of returns (m)	Silt fence length (m) (maximum)
Flatter than 2%	Unlimited	N/A	Unlimited
2 - 10%	40	60	300
10 - 20%	30	50	230
20 - 33%	20	40	150
33 - 50%	15	30	75
> 50%	6	20	40

Silt fence design criteria



Cross - section

Silt fence cross section

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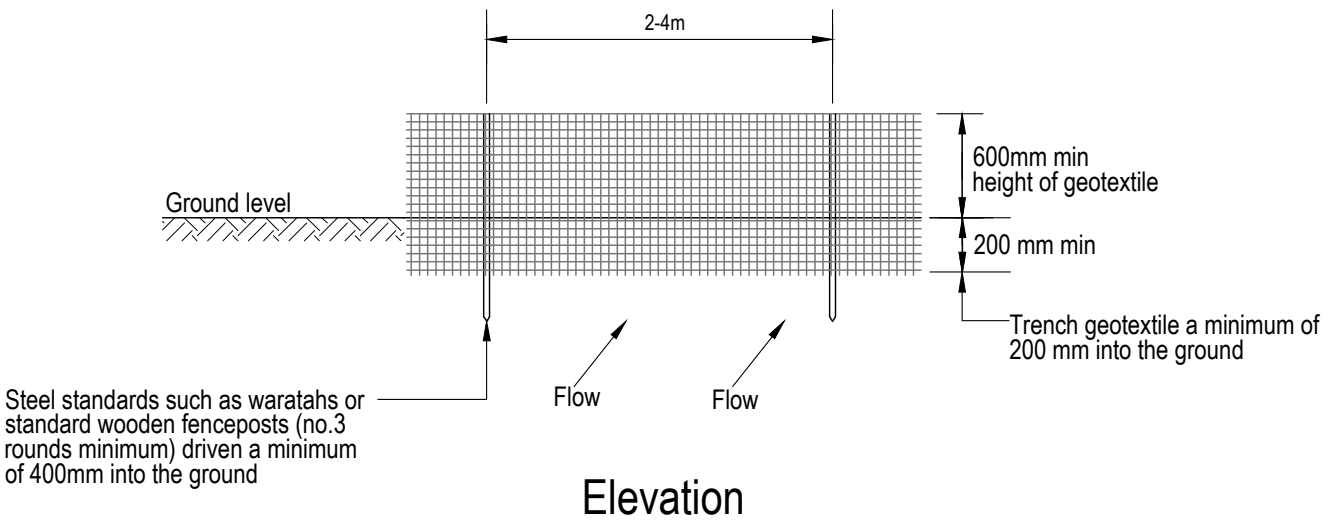
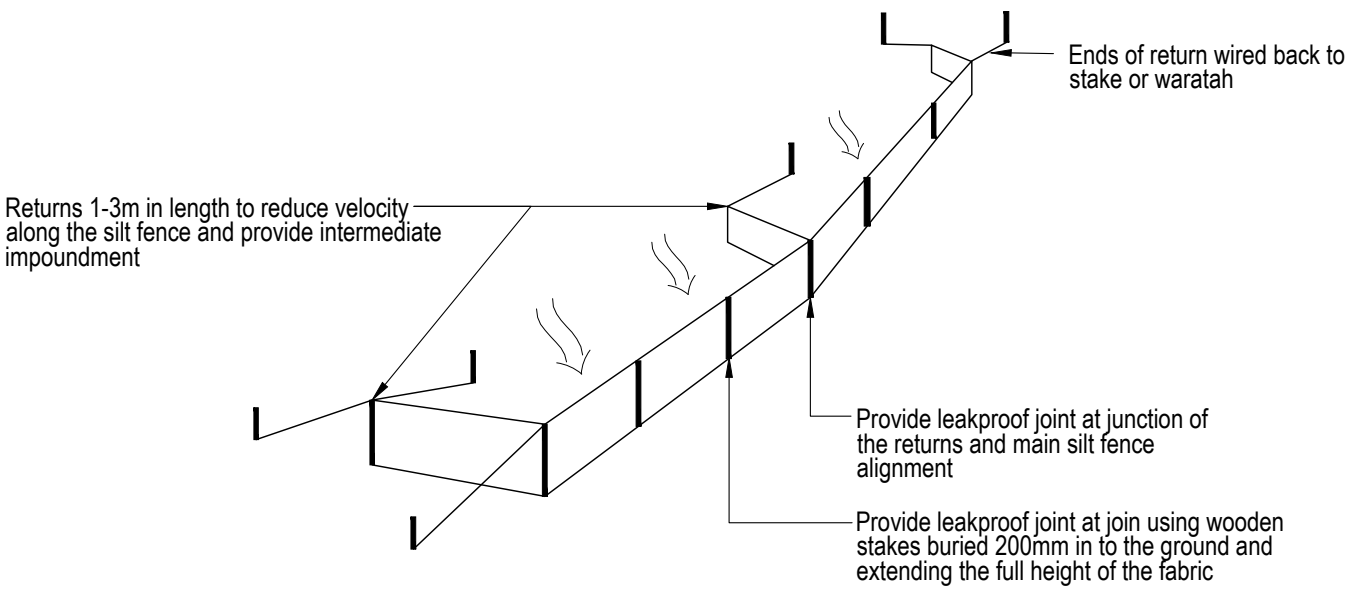
CHECKLIST 17 FIGURES: Silt fence



Elevation



Silt fence with returns and support wire

Schematic of a silt fence

Environment Canterbury Regional Council
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CHECKLIST 5: Stabilised entranceway

Contractor:	Date: Time:	Consent number:	Site:

Construction checklist Check back to 'Stabilised entranceway' section for full information. Also see the Figures over the page.	Yes ✔	No ✘ (Add comments to explain)
Area has been cleared of unsuitable material and smooth graded		
Woven geotextile has been placed over the area, and is properly pinned and overlapped		
At least 10 m of aggregate has been placed (extending from site boundary), 4 m wide and minimum 150mm deep, using 50–150 mm washed aggregate		
Vehicles cannot bypass the entranceway		
Street sweep/suction is done and date recorded		
Inspection and maintenance checks are done, recorded and dated, along with any comments		

Note: this is an on-site, self-check list for contractors to use. Keep your completed checklists to show Compliance Officers your set up, monitoring and maintenance, if requested.

Signature:

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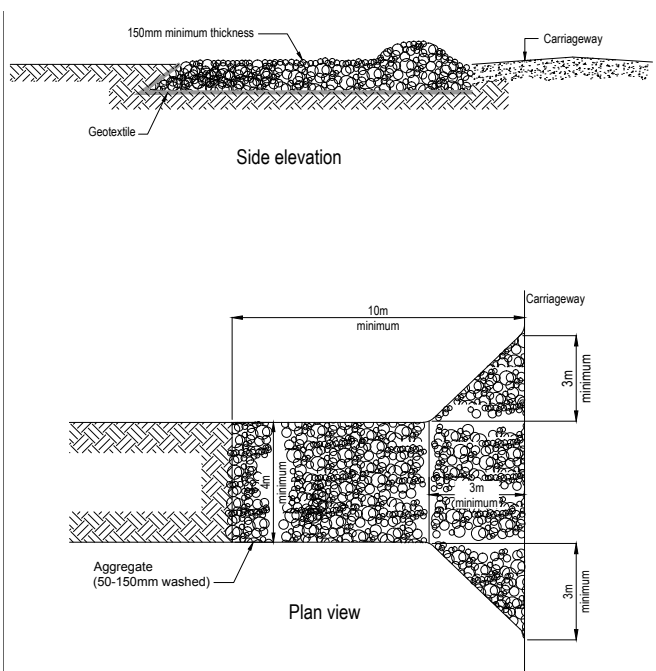
Kaunihera Taiao ki Waitaha

CHECKLIST 5 FIGURES: Stabilised entranceway

Stabilised entranceway *(Source: SouthernSkies)*



Stabilised entranceway

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CHECKLIST 18: Super silt fence

Contractor:	Date: Time:	Consent number:	Site:

Construction checklist Check back to 'Super silt fence' section for full information. Also see the Figures over the page.	Yes ✔	No ✘ (Add comments to explain)
Super silt fence material suits the site conditions and is used to the manufacturer's specifications		
Super silt fences are installed along the contour		
There is a trench at least 100 mm wide and 200 mm deep along the proposed line of the silt fence		
Support posts/steel waratahs used are at least 1.8 m long and 2–4m apart		
Support posts/waratahs are installed on the downslope edge of the trench, with silt fence fabric on the upslope side of the support posts to the full depth of the trench. The trench is backfilled with compacted soil		
Tensioned galvanised wire (2.5 mmHT) is installed at 400 mm and again at 800 mm above ground. The wire has been tensioned using permanent wire strainers attached to angled waratahs at the end of the super silt fence		
Chain link fence is secured to the fence posts with wire ties or staples, ensuring the chain link fence goes to the base of the trench		
Two layers of geotextile fabric are secured to the base of the trench (at least 200 mm into the ground), with compacted backfill installed to the original ground level		

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CHECKLIST 18 FIGURES: Super silt fence

Construction checklist Check back to sections 5.4 [link] for full information. Also see the Figures over the page.	Yes ✔	No ✘ (Add comments to explain)
Where ends of the super silt fence fabric come together, they are overlapped, folded and stapled/screwed to prevent sediment bypass		
Inspection and maintenance checks are done, recorded and dated, along with any comments		

Note: this is an on-site, self-check list for contractors to use. Keep your completed checklists to show Compliance Officers your set up, monitoring and maintenance, if requested.

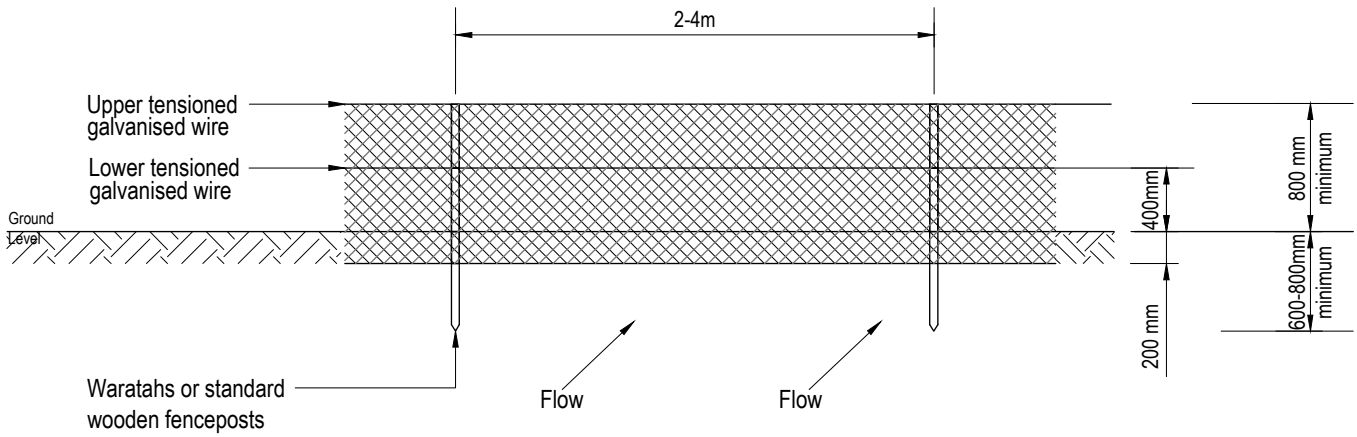
Slope steepness %	Slope length (m) (maximum)	Spacing of returns (m)	Silt fence length (m) (maximum)
0–10%	Unlimited	60	Unlimited
10–20%	60	50	450
20–33%	30	40	300
33–50%	30	30	150
> 50%	15	20	75

Super silt fence design criteria

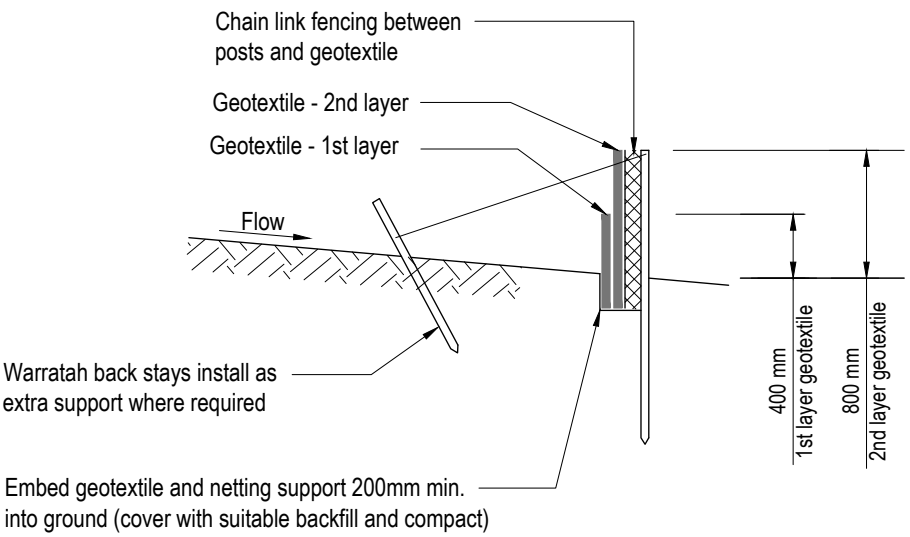
Super silt fence

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

CHECKLIST 18 FIGURES: Super silt fence



Elevation



Cross - section

Schematic of a super silt fence

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CHECKLIST 6: Surface roughening

Contractor:	Date:	Consent number:	Site:
	Time:		

Construction checklist Check back to 'Surface roughening' section for full information. Also see the Figures over the page.	Yes ✔	No ✘ (Add comments to explain)
Water is diverted away from the slope face before the slope roughening		
Existing rills are filled before roughening		
Roughening is done perpendicular to surface water flows		
When track-walking topsoil material, care is taken not to compact the slope		
For track-walking, well-defined cleat impressions are made in the soil, parallel to the contour or perpendicular to the slope		
After roughening, the slope is stabilised eg with sufficient compost/topsoil/mulch/hydromulch to sustain vegetation		
Inspection and maintenance checks are done, recorded and dated, along with any comments		

Note: this is an on-site, self-check list for contractors to use. Keep your completed checklists to show Compliance Officers your set up, monitoring and maintenance, if requested.

Signature:

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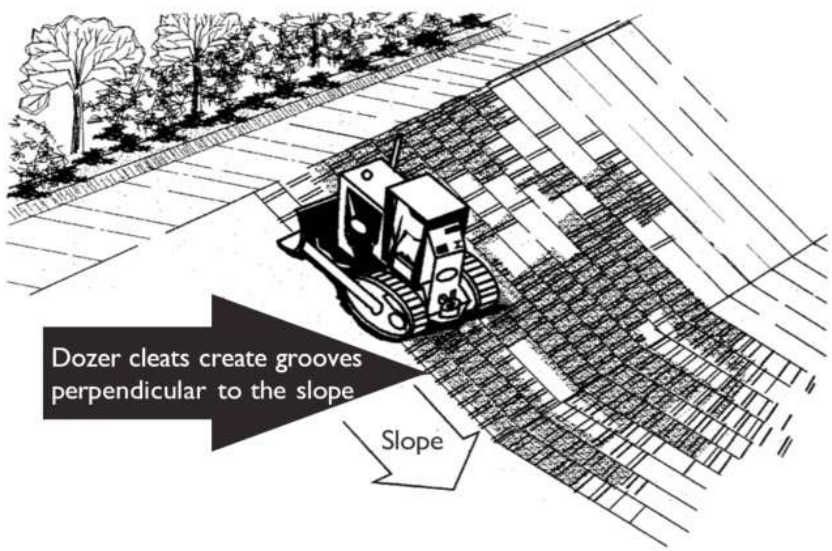
CHECKLIST 6 FIGURES: Surface roughening

Surface roughening of a slope. Note that the hollows act as 'micro' sediment traps



Surface roughening

APPENDIX F – Sub-catchment extents and labels

Tonkin+Taylor

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NOTES:

REV	DESCRIPTION	GIS	CHK	DATE
0	First version	XXXX	YYYY	10/09/20

LOCATION PLAN

PROJECT No.	1017740.2000	
DESIGNED	KTHA	NOV.22
DRAWN	KTHA	NOV.22
CHECKED		
APPROVED		DATE

CLIENT McCONNELL DOWELL CONSTRUCTORS LTD

PROJECT MOUNT CASS WINDFARM DETAILED DESIGN

TITLE EROSION AND SEDIMENT CONTROL CATCHMENT LABELLING

SCALE (A3) 1:7,000 FIG No. FIGURE 1. REV 0