

Babbage Consultants Limited

1002 State Highway 49, Tangiwai, Ohakune

Wetland Construction - Erosion and Sediment Control Plan

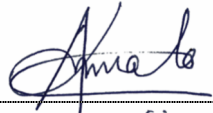
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10 June 2026

Babbage Consultant Limited

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Prepared by:

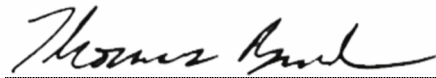


Amala Thomas

Civil Engineer

B Tech (Hons) Civil, Grad Dip-Eng Tech (Waters)

**Reviewed & approved for
Release by:**



Thomas Brand

Regional Manager / Chartered Civil Engineer

BSc (Civil), CPEng, CMEngNZ, IntPE(NZ),

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1. EROSION AND SEDIMENT CONTROL ASSESSMENT

1.1 Introduction

This Erosion and Sediment Control (ESC) report has been prepared to support the proposed earthworks associated with the construction of a wetland at 1002 State Highway 49, Tangiwai, as shown on Drawing 260156-200 attached as Appendix 1.

The purpose of this report is to outline how erosion and sediment controls will be implemented, managed and maintained during the construction of wetland to ensure that adverse effects on land and water resources are remediated and mitigated.

This ESC report has been prepared in accordance with the Greater Wellington Erosion and Sediment Control Guide for Land Disturbing Activities, Feb 2021 (Guidelines). The controls proposed and nature of the earthworks ensures that the proposal exceeds the objectives of the Guidelines by capturing and containing all sediment and runoff from the site.

1.2 Existing Environment

The subject site is located at 1002 State highway 49, Tangiwai 4691, within the Horizons Regional Council jurisdiction. The site is situated in a predominantly rural environment, with surrounding land used generally for pastoral farming and open rural land. State Highway 49 runs adjacent to the site providing established access and defining the eastern boundary of the wider area.



Figure 1: Location of Proposed Works

The site includes an existing pond located within the footprint of the proposed wetland works. This existing pond is historic and has not been in use for many years. Consequently, there are no existing flows into or exiting the existing pond.

Existing vegetation in the proposed work area is predominantly grassed, with no significant established woody vegetation requiring removal as part of the earthworks.

The site is gently undulating to flat, with no clearly defined overland flow path crossing the proposed earthworks footprint. This reduces the potential for erosion caused by concentrated surface flows.

The site experiences approximately 2000-3000mm rainfall based on NIWA New Zealand Median Annual Rainfall Data. The proposed earthworks are intended to be undertaken during a favourable summer weather window, where practicable, to minimise erosion and sediment risks.

1.3 Proposed Earthworks

The proposed earthworks will affect an area of approximately 17,146m², with a total cut volume of approximately 10,447m³ and a total fill volume of approximately 9,994m³, resulting in an excess of approximately 453m³ of material, which will be reused on site for the construction of a protection bund around the earthworks extent.

The perimeter bund will protect the site from any clean water entering the site and any dirty water leaving the work area. However, it should be noted that given the contours of the site there is essentially no overland flow path across the proposed work area.

The proposed wetland comprises four separate basins, as shown on the accompanying drawings. The existing pond located within the footprint of the wetland will be filled using material excavated during the construction of the wetland basins.

The top of the wetland bank will be formed at approximately RL 700.90, which is nominally consistent with the existing surrounding natural ground level.

1.4 Work Methodology

The sediment and erosion controls will be constructed prior to any earthworks commencing.

The proposed construction methodology for the wetland earthworks is outlined below:

- Earthworks will be undertaken during a favourable weather window in the summer months, where practicable, to minimise erosion, sediment generation, and the potential for runoff during rainfall events.
- Existing topsoil within the works area will be stripped and subsequently reused to form a temporary perimeter bund around the earthworks area as shown 260156-201. This bund will provide containment of disturbed areas and assist in preventing sediment-laden water from leaving the site.
- Excavate and dispose of appropriately material (if any) from the base of the existing pond (refer separate Contamination Survey Report by Babbage Consultants Ltd).
- The wetland basins will be excavated within the perimeter bund, with excavated material placed into the footprint of the existing pond. Placement and compaction of this material will be undertaken in layers not exceeding 150mm to ensure stability.

- The formation of the wetland in the northwest corner of the site shall be completed first as this wetland requires the least amount of earthworks resulting in cut. This pond can then be used for storing and soaking runoff from other earthworked areas during construction. This runoff can be pumped to the storage wetland/pond so that earthwork operations can continue for the remainder of the site. As each additional wetland is constructed, there will be even more capacity for storing runoff.
- At the start of earthworks, the existing pond has a capacity of approximately 6300m³. A 100-year event will produce approximately 900m³ of runoff for the entire site. Consequently, there is more than sufficient capacity to capture all runoff from large rainfall events.
- Upon completion of the first wetland pond (Pond 4), this newly formed pond will provide 900m³ of storage capacity, which is sufficient for the full 100-year rain event.
- Should dewatering be necessary, provisions of Section G1.0 of the Guidelines shall be followed, subject to requirements for contaminated soils.
- The temporary perimeter bund may be progressively removed in stages as the pond excavation and infilling works are completed and stabilised, and once there is no longer a risk of sediment-laden (dirty) water discharging beyond the works area.

The proposed earthworks indicated on the drawings are the full extent of earthworks for these wetlands. Detailed design of the finished internal wetland base levels, internal flow circulation paths, inlet locations, outlet locations and selection of plant species will be undertaken at a later date, during the detailed design phase for the wetland configuration and will not require further earthworks.

1.5 Erosion and Sediment Control Measures

1.5.1 Perimeter Earth Bunds

A perimeter earth bund shall be built along the extent of earthworks area to act as a stormwater control. This will be a compacted topsoil bund covered with geotextile cloth, grass or mulch. The bund should be 2 m wide and 0.5 m high above the natural ground level.

1.5.2 Stabilisation - Topsoil, Grass Seeding and Straw Mulch

Following completion of earthworks, the remainder of the site will be topsoiled, sown with grass seed (either traditional or hydrosol) and where necessary straw mulch shall be placed to provide immediate stabilisation of all exposed surfaces and batters. All controls shall remain in place until stabilisation occurs. Controls such as bunds may be removed just prior to stabilisation provided fine weather and stabilisation occurs immediately (same day) following removal of controls.

1.5.3 Silt Fence

Silt fences, though not anticipated to be required, may be used as a temporary barrier used to intercept dirty water and retain sediment.

If required, silt fence shall be constructed using woven 100-micron geotextile cloth. This is to provide a further level of protection to the existing downstream environment.

2. DUST CONTROL

Dust nuisance is a potential effect when vegetation is removed (in this case grass/pasture) and the bare soil is exposed to the elements. Windy conditions or the movements of heavy machinery can then generate dust. It is crucial to suppress dust and ensure it does not become a nuisance to neighbours and road users.

Dust control measures will be implemented as required to ensure that dust does not become a nuisance or safety concern. Water carts will be used to dampen exposed surfaces as necessary during earthworks, particularly during dry or windy conditions. Dust suppression measures will remain in place until disturbed areas are stabilised through the establishment of grass cover and planting.

3. REVIEW AND MONITORING

Before and during operations the following review actions shall be undertaken:

- Before predicted severe rainfall, inspection of all diversion and capture structures.
- After significant rainfall, inspection, and cleaning (if necessary) of drains.

The principal and the contractor will attend site meetings will not only check the compliance of the site but are to be a platform for implementation of the necessary changes and improvement, where possible to prevent incidents. All maintenance requirements identified during routine inspections of erosion and sediment controls will be implemented as soon as practicable and in any case prior to a significant rainfall event.

Please note that it is the responsibility of the consent holder to comply with the conditions of the consent

4. CONTACT DETAILS

The personnel responsible for the implementation, operation and maintenance of this ESCP are:

Design: Sunil Prasad of Cheal Consultants
Ph: 021 819 547
Email: sunilp@cheal.co.nz

Implementation, Operation and Maintenance – TBC

Consent Holder (Principal) : Paul Duder
Ph: 021 774 109
Email: pduder@babbage.co.nz

5. DISCLAIMER

This Report has been prepared solely for the use of our client with respect to the brief given to Cheal Consultants.

No liability is accepted in respect of its use for any other purpose or by any other person or entity. All future owners of this property should seek professional geotechnical advice to satisfy themselves as to its ongoing suitability for their intended use.

CHEAL CONSULTANTS LIMITED

Appendix 1

Erosion & Sediment
Control Layout Plans



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NOTES:

1. All work shall be done in accordance with NZS 4404:2010 Land Development and Subdivision Infrastructure.
2. Heights in terms of NZVD 2016
On site datum: M53
RL: 695.50
Coordinates: NZGD 2000
Circuit: Tuhirangi 2000
Contour Interval = 0.2m
3. Contractor to locate and identify existing utility location and depths prior to construction. The project engineer shall be informed of any discrepancies to the information depicted on these plans immediately for revised drawings.
4. Contractor shall install and maintain all stormwater, dust and erosion control during construction as per earthworks management plan and the Horizon Regional Council Erosion and Sediment Control - "Guidelines for soil disturbing activities".
5. All disturbed areas shall be re-topsoiled and grassed within 30 days upon completion of contract works.
Dust control shall be maintained until grassed areas have become established.

LEGENDS:

- Bottom of Wetland
- Top of Wetland Bund
- Toe of Wetland Bund

A	01/04/26	Issued For Client Review	AC	AT	SP
Rev	Date	Amendment	By	Chk	App

Project Title
Babbage Consultants Limited
1002 State Highway 49
Tangiwai, Ohakune

Drawing Title
Finished Contours Plan

Surveyed	-	-	-
Designed	A. Chand	01/04/26	AC
Drawn	A. Chand	01/04/26	AC
Checked	A. Thomas	01/04/26	AT
Approved	S. Prasad	01/04/26	SP

Status	REVIEW		
Scale	A1 1:500	A1	
	A3 1:1000		
Drawing Number	260156-200		Rev A



Erosion & Sediment Control Notes:

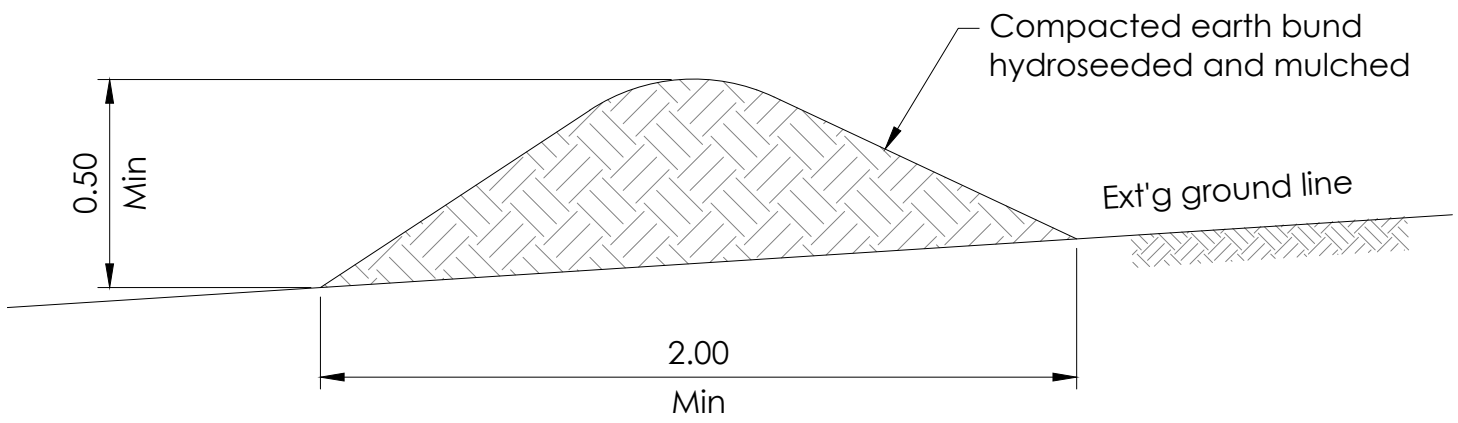
The earthworks within the wetland are proposed to be undertaken during a favourable weather window, with no rainfall forecast for the duration of the works.

Prior to the commencement of any activity within the area, a temporary perimeter bund will be installed around the site. This bund will act as a precautionary measure to contain any dirty water within the work area and to divert any clean surface water away from the site.

The temporary bund may be progressively removed in stages as the pond excavation is completed and once there is no longer a risk of dirty water leaving the work area.

Refer note 6

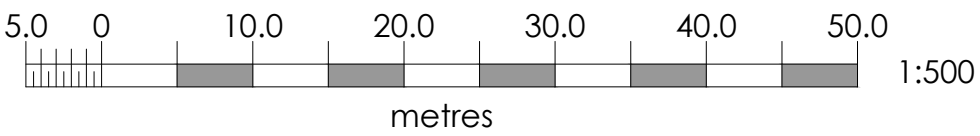
Temporary Perimeter Bund



Temporary Perimeter Bund
Scale: NTS

Volume Summary							
Name	Type	Cut Factor	Fill Factor	2d Area (m²)	Cut (m³)	Fill (m³)	Net (m³)
Cut & Fill Volume	Earthworks	1.00	1.500	17146.53	10447.47	9994.57	452.90 <Cut Excess>

Surface Elevation Data			
Color	Minimum Elevation	Maximum Elevation	Cut / Fill
Red	-2.21	-2.00	Cut
Light Pink	-2.00	-1.50	Cut
Orange	-1.50	-1.00	Cut
Light Orange	-1.00	-0.50	Cut
Yellow	-0.50	0.00	Cut
Light Green	0.00	0.50	Fill
Green	0.50	1.00	Fill
Dark Green	1.00	1.50	Fill
Dark Green	1.50	2.00	Fill
Dark Green	2.00	2.09	Fill



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NOTES:

- All work shall be done in accordance with NZS 4404:2010 Land Development and Subdivision Infrastructure.
- Heights in terms of NZVD 2016
On site datum: M53
RL: 695.50
Coordinates: NZGD 2000
Circuit: Tuhirangi 2000
Contour Interval = 0.2m
- Contractor to locate and identify existing utility location and depths prior to construction. The project engineer shall be informed of any discrepancies to the information depicted on these plans immediately for revised drawings.
- Contractor shall install and maintain all stormwater, dust and erosion control during construction as per earthworks management plan and the Horizon Regional Council Erosion and Sediment Control - "Guidelines for soil disturbing activities".
- All disturbed areas shall be re-topsoiled and grassed within 30 days upon completion of contract works.
Dust control shall be maintained until grassed areas have become established.
- As per Babbage Consultant Limited Remedial Action Plan (RAP) report (# Job No:68095):
 - Arsenic-contaminated material at WA09 must be placed within the existing pond area and positioned near the surface rather than at the bottom. This material must not be used in the construction of the perimeter earth bund.
 - Large pieces of observed anthropogenic encountered material such as concrete, rubber, wood, and plastic will be separated and not used as part of fill material for the remedial areas (WA09 and WA18).
 - Once the remedial areas have reached their final design depths (including the existing pond containing WA18 material and excavated material from WA09), as well as the final cut level of WA09), then HDPE liner can be installed within these areas and extended over the earth berms of the proposed wetlands, the Remedial Action Plan (RAP) will no longer apply to the remaining wetland construction works.

Rev	Date	Amendment	By	Chk	App
B	08/06/26	Pond Label & Notes Added	AC	AT	SP
A	01/04/26	Issued For Client Review	AC	AT	SP

Project Title
Babbage Consultants Limited
1002 State Highway 49
Tangiwai, Ohakune

Drawing Title
Cut & Fill and
Erosion & Sediment Control Plan

Surveyed	-	-	-
Designed	A. Chand	01/04/26	AC
Drawn	A. Chand	01/04/26	AC
Checked	A. Thomas	01/04/26	AT
Approved	S. Prasad	01/04/26	SP

Status	REVIEW		
Scale	A1 1:500	A1	
	A3 1:1000		
Drawing Number	260156-201		Rev B



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NOTES:

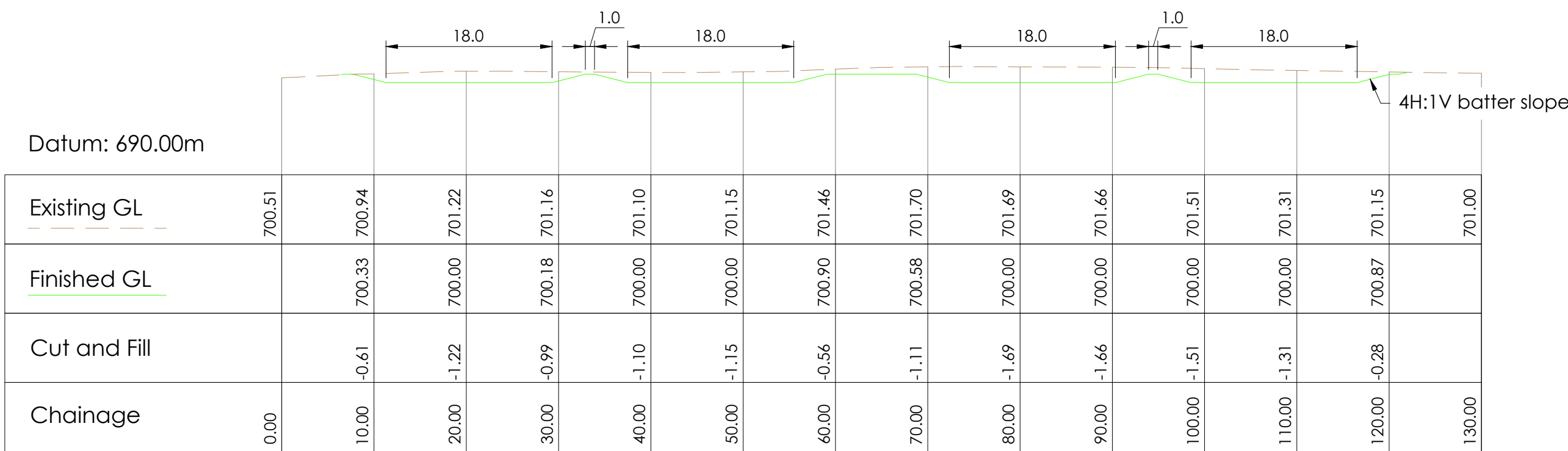
- All work shall be done in accordance with NZS 4404:2010 Land Development and Subdivision Infrastructure.
- Heights in terms of NZVD 2016
On site datum: M53
RL: 695.50
Coordinates: NZGD 2000

Contour Interval = 0.2m
- Contractor to locate and identify existing utility location and depths prior to construction. The project engineer shall be informed of any discrepancies to the information depicted on these plans immediately for revised drawings.
- Contractor shall install and maintain all stormwater, dust and erosion control during construction as per earthworks management plan and the Horizon Regional Council Erosion and Sediment Control - "Guidelines for soil disturbing activities".
- All disturbed areas shall be re-topsoiled and grassed within 30 days upon completion of contract works.
Dust control shall be maintained until grassed areas have become established.



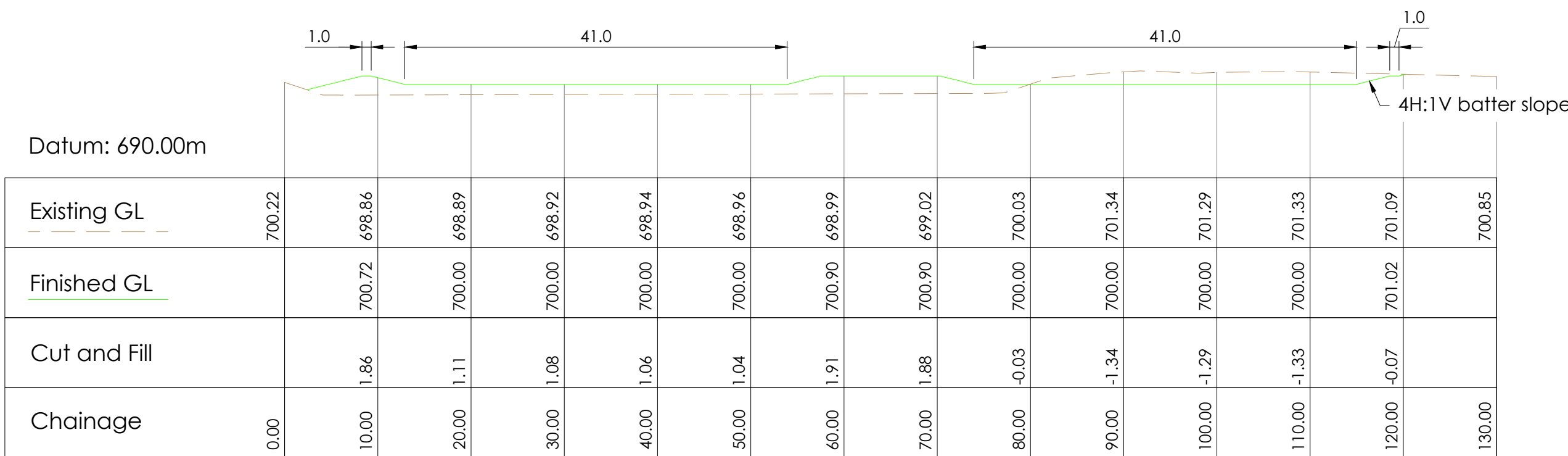
Section A Wetland Section A

Scale: H 1:500
Scale: V 1:500



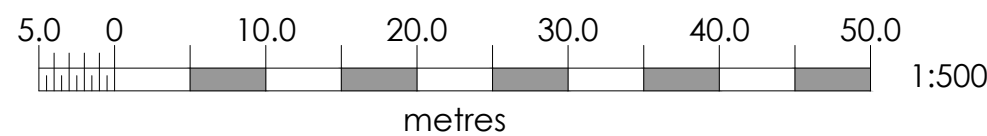
Section B Wetland Section B

Scale: H 1:500
Scale: V 1:500



Section C Wetland Section C

Scale: H 1:500
Scale: V 1:500



A	01/04/26	Issued For Client Review	AC	AT	SP
Rev	Date	Amendment	By	Chk	App

Project Title
Babbage Consultants Limited
1002 State Highway 49
Tangiwai, Ohakune

Drawing Title

Wetland Cross Sections

Surveyed	-	-	-
Designed	A. Chand	01/04/26	AC
Drawn	A. Chand	01/04/26	AC
Checked	A. Thomas	01/04/26	AT
Approved	S. Prasad	01/04/26	SP

Status **REVIEW**

Scale	A1	1:500	A1
	A3	1:1000	

Drawing Number	Rev
260156-202	A