renature.co.nz
admin@renature.co.nz
PO Box 331051
Takapuna 0740

Tamaki Pathway – Stage 2

Preliminary Construction Methodology and Erosion and Sediment Control Plan

Prepared For:

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Name	Title	Organisation
Vandna Kirmani	Programme Manager	Auckland Council
Graham Hooper	Principal Planner	Auckland Council
reNature Shared Drive (P)	Records Copy	reNature Limited

1. Introduction

This preliminary Construction Methodology and Erosion and Sediment Control Plan (ESCP) forms part of a resource consent application for the proposed Tamaki Pathway upgrade works. This report includes a summary of the proposed project works and outlines the likely methodologies to minimise erosion and subsequent sediment loss from the site resulting from soil disturbance during construction.

The exact construction programme and methodology is a matter for the successful contractor to prepare, however, the intention is that the principles outlined here would be incorporated into the contractor's methodology.

2. Project Description

The proposed works for this resource consent include:

- Removal and disposal of existing bollards, boxed steps, edge board, culverts, peg and board steps, and post and wire fence
- Removal and disposal of existing bridges
- Vegetation clearance
- Installation of new bollards
- Installation of new post and wire fence
- Installation of timber edge board
- Reformation of track on existing alignment
- Formation of track on new alignment
- Formation of concrete pathway
- Formation of concrete staircase
- Formation of side drains, catchpits and culverts along path and track alignment
- Construction of timber retaining wall
- Construction of low and high boardwalks
- Construction of timber bridges
- Construction of 17m long glulam bridge
- Installation of barriers and kick rails
- Installation of bench seats, picnic tables, and drinking fountains
- Installation of pram crossing to connect to Auckland Transport cycle lanes

3. Site Plan

The Location Plan and Engineering Drawings to be used for the track construction are provided as Appendix A and detailed in table 1 below.

Table 1: Location Plan, Engineering Drawings, Specific and Standard Details

Drawing #	Title	Rev.	Date
22186 - 010	OVERALL LOCATION PLAN	4	13/08/2024
22186 - 011	STAGE 1A SITE PLAN	4	13/08/2024
22186 - 012	STAGE 1B SITE PLAN	4	13/08/2024
22186 - 013	STAGE 2B SITE PLAN	4	13/08/2024
22186 - 014	STAGE 2A SITE PLAN	4	13/08/2024
22186 - 020	STAGE 1A - TP0 LONGSECTION	4	13/08/2024
22186 - 021	STAGE 1B - TP1 LONGSECTION	4	13/08/2024

22186 - 022	STAGE 1B - TP3 LONGSECTION	4	13/08/2024
22186 - 023	STAGE 2B - TP4 LONGSECTION	4	13/08/2024
22186 - 024	STAGE 2A - TP6 LONGSECTION	4	13/08/2024
22186 - 025	STAGE 2A - TP8 LONGSECTION	4	13/08/2024
22186 - 026	STAGE 2A - TP9 & TP10 LONGSECTION	4	13/08/2024
22186 - 030	EARTHWORKS PLAN - SHEET 1 OF 3	4	13/08/2024
22186 - 031	EARTHWORKS PLAN - SHEET 2 OF 3	4	13/08/2024
22186 - 032	EARTHWORKS PLAN - SHEET 3 OF 3	4	13/08/2024
22186 - 040	PLANTING PLAN - SHEET 1 OF 2	4	13/08/2024
22186 - 041	PLANTING PLAN - SHEET 2 OF 2	4	13/08/2024
22186-050	SIGNAGE DETAILS	4	13/08/2024
22186-051	SIGNAGE LOCATION – SHEET 1 OF 4	4	13/08/2024
22186-052	SIGNAGE LOCATION – SHEET 2 OF 4	4	13/08/2024
22186-053	SIGNAGE LOCATION – SHEET 3 OF 4	4	13/08/2024
22186-054	SIGNAGE LOCATION – SHEET 4 OF 4	4	13/08/2024
22186 - 100	STANDARD TRACK DETAILS	4	13/08/2024
22186 - 101	TYPICAL AGGREGATE TRACK GRADE DIPS DETAILS	4	13/08/2024
22186 - 102	TYPICAL CONCRETE PATH DETAILS - SHEET 1 OF 4	4	13/08/2024
22186 - 103	TYPICAL CONCRETE PATH DETAILS - SHEET 2 OF 4	4	13/08/2024
22186 - 104	TYPICAL CONCRETE PATH DETAILS - SHEET 3 OF 4	4	13/08/2024
22186 - 105	TYPICAL CONCRETE PATH DETAILS - SHEET 4 OF 4	4	13/08/2024
22186 - 106	TYPICAL CONCRETE JUNCTION DETAILS	4	13/08/2024
22186 - 107	CONCRETE STEPS DETAILS	4	13/08/2024
22186 - 108	TP2 2m WIDE BOARDWALK DETAILS - SHEET 1 OF 2	4	13/08/2024
22186 - 109	TP2 2m WIDE BOARDWALK DETAILS - SHEET 2 OF 2	4	13/08/2024
22186 - 110	TP2 2m WIDE LOW BRIDGE DETAILS - SHEET 1 OF 2	4	13/08/2024
22186 - 111	TP2 2m WIDE LOW BRIDGE DETAILS - SHEET 2 OF 2	4	13/08/2024
22186 - 112	HIGH BOARDWALK DETAILS - SHEET 1 OF 3	4	13/08/2024
22186 - 113	HIGH BOARDWALK DETAILS - SHEET 2 OF 3	4	13/08/2024
22186 - 114	HIGH BOARDWALK DETAILS - SHEET 3 OF 3	4	13/08/2024
22186 - 115	ALTERNATIVE FOOTING AND BOLLARD DETAILS	4	13/08/2024
22186 - 116	TP4 BRIDGE DETAILS - SHEET 1 OF 3	4	13/08/2024
22186 - 117	TP4 BRIDGE DETAILS - SHEET 2 OF 3	4	13/08/2024
22186 - 118	TP4 BRIDGE DETAILS - SHEET 3 OF 3	4	13/08/2024
22186 – 119	TP0 BRIDGE DETAILS - SHEET 1 OF 3	4	13/08/2024
22186 – 120	TP0 BRIDGE DETAILS - SHEET 2 OF 3	4	13/08/2024
22186 – 121	TP0 BRIDGE DETAILS - SHEET 3 OF 3	4	13/08/2024
22186 – 122	BENCH SEAT DETAILS	4	13/08/2024
22186 – 213	PICNIC TABLE DETAILS	4	13/08/2024
22186 – 213	DRINKING FOUNTAIN DETAILS	4	13/08/2024
22186 – 214	PRAM CROSSING DETAILS	4	13/08/2024

4. Earthworks Area & Volume

The proposed work involving earthworks are:

- Formation of side drains, planted earth dish drainage channels, and installation of catchpits
- Installation of culverts
- Reformation of track on existing alignment
- Formation of track on new alignment
- Formation of concrete pathway and staircase
- Construction of timber retaining wall
- Construction of low & high boardwalks

Work will be undertaken on the existing track alignment identified on the site plan. Table 2 to 4 estimates total earthwork areas and volumes.

Table 2: Estimated earthworks - Total

Total Earthworks		
	Area	**Volume**
Aggregate track works	700m^2	160m^3 (fill)
Concrete pavement (impervious)	2,800m^2	1200m^3 (cut and fill)
Side drains and batters	1,200m^2	310m^3 (cut and fill)
Pile foundations	10m^2	20m^3 (cut)

Table 3: Estimated earthworks – Coastal Protection Yard

Earthworks – Coastal Protection Yard*		
	Area	**Volume**
Aggregate track works	600m^2	140m^3 (fill)
Concrete pavement (impervious)	300m^2	130m^3 (cut and fill)
Side drains and batters	250m^2	60m^3 (cut and fill)
Pile foundations	2m^2	3m^3 (cut)

*Estimated as 20m from CMA

Table 4: Estimated earthworks – Riparian Margin

Earthworks – Riparian Margin#		
	Area	**Volume**
Aggregate track works	15m^2	4m^3 (fill)
Concrete pavement (impervious)	100m^2	30m^3 (fill)
Side drains and batters	50m^2	10m^3 (cut and fill)
Pile foundations	8m^2	16m^3 (cut)

#Estimated as 10m from stream edge

5. Site Access and Establishment

The site can be accessed via the entrances listed below with site establishment on grassed areas adjacent to the entrances:

- Taniwhai Street by start of TP1
- The shared path at the end of Kiano Place
- Kotae Road
- Fernwood Place by end of TP9

Concrete trucks and cranes will be required for sections of the works. Damage to existing park infrastructure is to be avoided. The ground is soft, especially when wet, and should be considered for heavy loads. Works should occur in a linear manner with ground preparation occurring first to allow access for heavy machinery. Concrete works to be performed at furthest point from access and worked back towards access points.

6. Likely Construction Methodology

The likely construction methodologies for the different components of the physical works on the Tamaki Pathway upgrades are listed below. Machinery associated with the below methodologies will be transported to various locations along the track alignment as described in section 5 of this report.

6.1 Track Formation and Reforming

Aggregate track is formed either as a monoslope or crowned track surface shape. The construction methodology is as follows:

- Strip organic matter, and topsoil where present.
- Reform and shape track base.
- Surface track with GAP20 aggregate surfacing 'approved track mix' and compact to form a well bound surface.
- Place the stripped topsoil adjacent to aggregate track to support edges and prevent frittering of surfacing.
- Cover the topsoil stockpile at night and during any rain events.

6.2 Installation of Edge Board

Track edge board is constructed to support the track edge in locations where existing topography is sloping away from the track and the edge requires support to maintain the full track width. Edge board is installed prior to the placement and compaction of surfacing material. 150×50 or 200×50 timber edge board is installed on the existing ground supported with 75×50 pegs installed at max 750 centres. Pegs are hammered in place and edge board installation is done without ground disturbance.

6.3 Formation of Side Drain

A side drain is formed using either physical or mechanical means to minimum 300mm wide × 150mm deep chamfered to 350mm wide at the top. The spoils resulting from the side drain formation are placed along the track alignment and compacted prior to surfacing. Alternately spoils are spread evenly adjacent to the track and covered in locally sourced duff, coconut matting, or straw from a weed free source.

6.4 Structure Construction (Boardwalks and Bridges)

- Install sediment controls as per GD05.
- Drill or excavate foundation holes.

- Ensure excavated material is placed where erosion is controlled. This can be placed along the track alignment or spread adjacent to the track with appropriate erosion control surfacing material.
- Install timber pile foundations.
- Place specified concrete as required.
- Install substructure on foundations.
- Construct relevant superstructure (beams/joists, blocking, decking, barrier etc.) on substructure.

6.5 Cross Drain Installation

- Dig appropriately aligned and sized channel and catch pit at cross drain location. Spread spoils evenly and cover with locally sourced duff or erosion control surfacing material.
- Install catch pit and appropriate pipe as scheduled.
- Form track over pipe with minimum 100mm cover from top of pipe to top of track surface.
- Ensure that cross drain discharges at ground level to prevent future scour at outlet (install riprap if required).

6.6 Concrete Pathway and Pram Crossing Formation

- Strip organic matter and topsoil if present.
- Remove kerbing at pram crossing locations.
- Form and shape subgrade. Remove areas where subgrade is unsuitable (to be confirmed by Geotech professional). Subgrade should not remain exposed for extended periods of time and should be covered as soon as possible before rain events.
- Install geotextile over subgrade (if required).
- Place and compact basecourse to required compaction.
- Install formwork and mesh reinforcing before placing and compacting concrete.
- Install saw cuts and free joints at required intervals.
- Install TGSIs on pram crossings.

6.7 Retaining Wall

- Install sediment controls as per GD05.
- Drill or excavate foundation holes.
- Install timber poles.
- Place specified concrete as required.
- Install retaining boards, geotextile and drainage as required.
- Install barriers / kick rails as required.
- Backfill as required.
- Form path as required.

6.8 Bench Seats, Picnic Table, Drinking Fountains and Signage

- Strip organic matter and topsoil if present.
- Excavate subgrade material to required depth. Subgrade should not remain exposed for extended periods of time and should be covered as soon as possible before rain events.
- Place and compact basecourse to required compaction.
- Install formwork and mesh reinforcing before placing and compacting concrete.
- Install bench seat, picnic table, drinking fountain or signage as required.

7. Erosion and Sediment Control Devices

Track formation/reformation and concrete pathway construction are the two main types of construction that may require earthworks and will therefore result in the need for sediment controls, however due to the linear nature of the work and the short duration of exposed ground it is unlikely that substantial sediment controls such as silt fences or silt socks will be required. Track reformation will be completed in short lengths at a time and will be done using the cut and cover methodology. Any areas of exposed ground are to be covered using a geotextile, polythene layer or locally sourced duff overnight and prior to any rain events. An additional source of sediment loss is aggregate stockpiles and these need to be kept covered overnight and during rain events.

In the event that more substantial earthworks are required than discussed above, for example the construction of concrete pile foundations or long sections of concrete path, then this will require the use of either silt socks or silt fences. These are to be installed and maintained in accordance with the 'Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region', June 2016, Guideline Document 2016/005.

Key design criteria for silt fences are outlined below:

- Ensure silt fence height is 600mm above ground level and 200 mm below ground level along contours.
- Where digging the silt fence into the ground is not possible due to tree roots or rock a silt sock can be used to anchor the bottom of the silt fence.
- Maximum slope lengths, spacing of returns and angles for silt fences are shown in Table 12 of GD005.
- Locate supporting posts/waratahs for silt fences 2-4m apart with support provided by a tensioned wire (2.5mm HT) along the top of the silt fence.
- Double the silt fence fabric over and fasten to the wire with silt fence clips at 500mm spacings.
- Ensure supporting posts/waratahs are embedded a minimum of 400mm into the ground.
- Join lengths of silt fence by doubling over fabric ends around a waratah or by stapling the fabric end to a batten and butting the two battens together as shown in Figure 82 (GD005).
- Install silt fence returns at either end of the silt fence , projecting up-slope to a sufficient height to prevent outflanking.
- Always install silt fences along the contour (at a break in slope). Where this is not possible, or where there are long sections of silt fence, install short silt fence returns (refer Figure 81) projecting up-slope from the silt fence to minimise the concentration of flows. Silt fence returns should be a minimum 2 m in length and can incorporate a tie-back. They are generally constructed by continuing the silt fence around the return and doubling back, eliminating joins.
- Where water may pond regularly behind the silt fence, provide extra support for the silt fence with tie-backs from the silt fence to a central stable point on the upward side. Extra support can also be provided by stringing wire between support stakes and connecting the filter fabric to this wire.

Key design criteria for silt socks are outlined below:

- Always install silt socks on the contour. Where this is not possible, or where there are long sections of silt sock, install short silt sock returns, projecting up-slope from the silt sock to minimise concentration of flows. Returns are to be a minimum of 2 m in length.
- Where more than one length of silt sock is used, the silt socks are to be overlapped a minimum of 1m or, according to the manufacturer's recommendation, and joined by a sleeve.
- Install silt sock "wings" at either end of the silt sock, projecting a sufficient length up-slope to prevent outflanking
- Silt socks are to be pegged and secured depending on the application.

8. Monitoring, Maintenance and Reporting Procedures

The Contractor is required to maintain and monitor all sediment control measures until the ground is satisfactorily stabilised. Silt fences and silt socks shall be inspected and maintained once a week and after each significant rainfall event. Maintenance includes removing silt in over-laden areas and fixing or replacing the socks in damaged areas

9. Heavy Rainfall Response

The Contractor is required to regularly monitor weather forecasts for storms and heavy forecast rain. Prior to such an event the Contractor is required to inspect existing sediment control measures and install new measures where necessary. In the unlikely event of the failure of an installed device, immediate replacement of that device is required.

10. Review and ESCP Updating Procedures

The Contractor is required to review the ESCP as requested and after a heavy rainfall event and amend as necessary. Review procedures will include consultation with Auckland Council if necessary, and consent holder will seek Auckland Council's written approval for any proposed changes.

11. Site Specific Responsibilities

The Contractor is to provide regular construction updates including compliance with the ESCP and resource consent requirement. reNature will undertake occasional technical inspections and will circulate the Site Inspection Record to the Contractor, Principle and Consent Monitoring Officer.

12. Construction Timetable

The track upgrade construction is proposed to take approximately 9 months. The construction timetable can vary according to weather and many other external factors. This is to be confirmed with the consenting authority prior to the start of works and Auckland Council will be updated of any programme changes.

Appendix A: Location Plan and Engineering Drawings