REPORT

Tonkin+Taylor

Downtown West - Downtown Carpark Redevelopment

Erosion Sediment Control Report

Prepared for
Precinct Properties Holdings Limited
Prepared by
Tonkin & Taylor Ltd
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Table of contents

1 Overview

1.1 Introduction

Tonkin & Taylor Ltd (T&T) has been engaged by Precinct Properties New Zealand Ltd to prepare an Erosion and Sediment Control Plan (ESCP) in support of a Resource Consent Application for the proposed redevelopment of the existing Downtown Carpark at 2 Lower Hobson Street. This ESCP should be read in conjunction with the overarching Construction Site Management Plan (CSMP) for the site.

This ESCP outlines the erosion and sediment control principles, practices and procedures to be implemented to minimise the effects of sediment generation and discharge to the receiving environment associated with the proposed redevelopment of the existing Downtown Carpark.

The redevelopment, more commonly referred to as Downtown West consists of the demolition of the existing carpark building; excavation of a six-level deep basement; and the construction of two towers, for commercial and residential land uses. Erosion and sediment control measures will be put in place to minimise potential adverse effects by utilising measures which meet industry best practice guidelines referenced in the Auckland Council Guidance Document No. 5 (GD05).

We acknowledge this ESCP has been prepared prior to the selection of a Contractor to undertake the physical works. As such, this ESCP has been prepared with a management plan approach (as is common practice) whereby, once the Contract has been awarded and a Contractor is in place, the construction methodologies will be further defined and developed in detail.

1.2 Proposed Development

At the time of writing this report, we understand the development of the site will provide a mixed-use precinct, including new public spaces and new laneway to provide connectivity within the city centre.

The current concept design proposal includes:

- Construction of Three Podium Buildings (P1-P3).
- Construction of Two towers between 44 and 53 levels[1].
- 6 level shared basement beneath the site footprint.
- Public spaces and new laneways to provide connectivity across the city.

Refer to Appendix C for Architects concept drawings of basement and ground floor layout.

2 Description of works and construction methodologies

2.1 Overview

The proposed works will be undertaken in four main stages: enabling works, demolition, basement excavation and construction as described in Table 2.1 below.

[1] Levels outlined above exclude parapet and are based on the site elevations drawings RC21-0001 and RC21-0002 prepared by Warren and Mahoney dated 9/12/2024.

Table 2.1: Construction Stages, Approximate Durations and Scope of Works

Stage	Proposed Construction Period	Scope of Works
Demolition	February 2026 – November 2026	Demolition of the Downtown Carpark building. Carting demolition materials off site to approved facilities. Refer also to Downtown Carpark Redevelopment Construction Environmental Management Plan (CEMP)
Enabling Works	November 2026 – June 2027	Services relocations/diversions, ensuring public access and fire egress requirements to adjacent buildings. Establishment of fire department attendance. Installing protection to neighbouring properties. Establishment of vehicle access Demolition mobilisation.
Earthworks (including piling and basement)	May 2027 – February 2029	Excavation to create six-level basement (as per Warren and Mahoney Architectural Drawings dated 9/12/2024). Removal from site of approximately 120,000 m^3 of excavated material Basement foundation works.
Construction	February 2028 – December 2032	Commercial Tower (s) Residential Tower (s)

2.2 Earthworks

2.2.1 Extent of earthworks

The site has an overall area of approximately 6,442 m^2, with basement excavation depths up to approximately 22 m. A cut fill isopach drawing has been produced based on a comparison between the existing ground level[2] to basement excavation levels and areas[3] provided by Warren and Mahoney. The overall cut volume is estimated at 120,000 m^3 refer drawing 101643.1000-200 Rev 1

[2] Existing ground level is based on Auckland north lidar DEM 2016 sourced form <linz.govt.nz/auckland-north-lidar-1m-dem-2016-2018>, accessed 15/10/2024.

[3] Basement excavation areas and levels are based on the resource consent document a proposed architectural drawings, prepared by Warren and Mahoney dated 22 July 2024. Where levels are indicated as TBC, we have not included specific cuts for these elements. To be determined in subsequent design stages. The architectural drawings dated December 2024 have been reviewed, and there are no noticeable changes to the basement excavation and levels. Therefore, the overall cut volume remains unchanged.

included in Appendix E. An appropriate contingency plan should be applied including bulking factors. Figure 2.1 below shows the area of excavation.

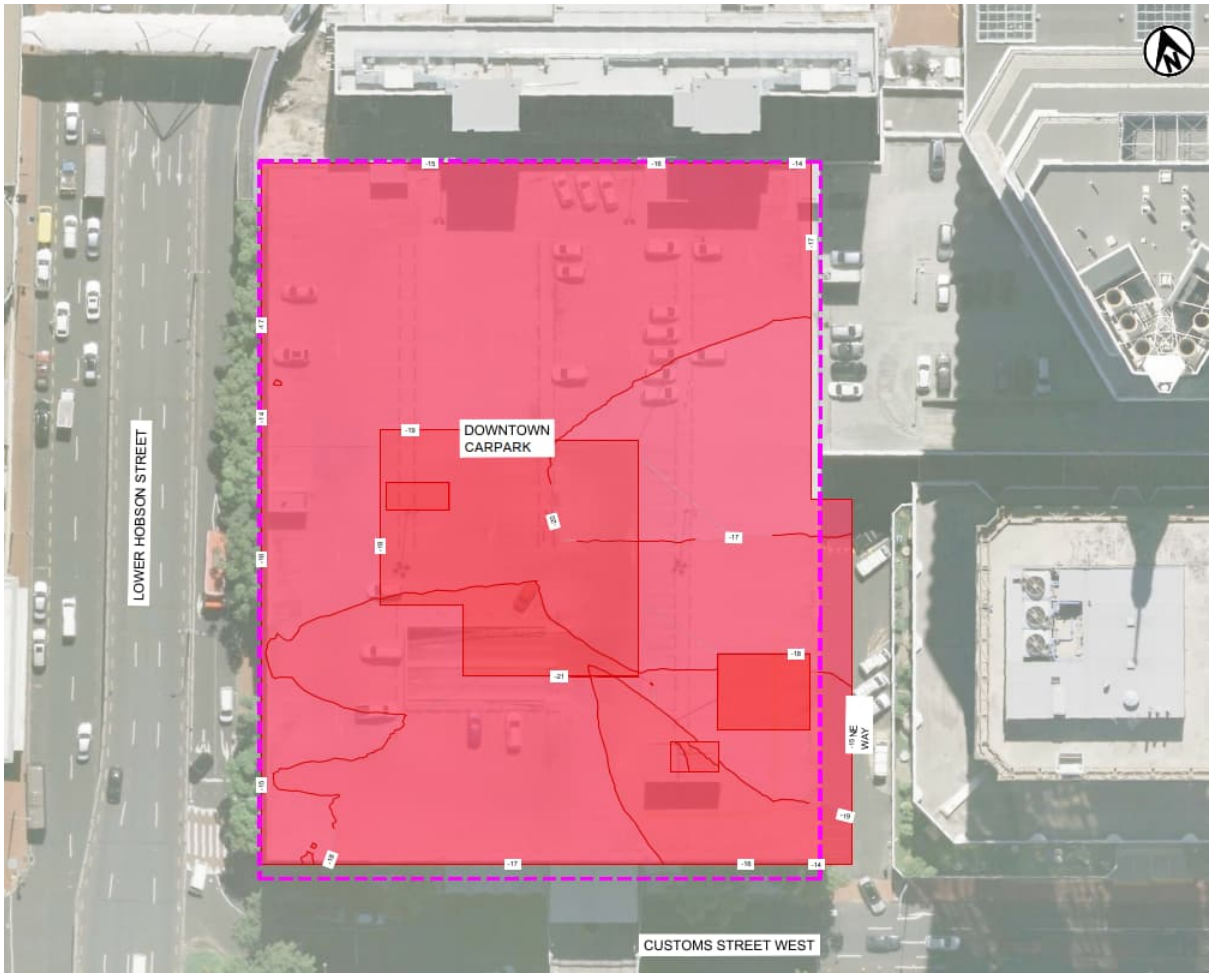

Figure 2.1: Downtown Carpark Extents of excavation (magenta dotted line)

2.2.2 Indicative earthworks methodology

The final earthworks methodology will be determined by the Contractor undertaking the works.

Below is an indicative methodology prepared using specialist inputs from the project design team.

Sheet pile walls and diaphragm walls have been considered to retain the proposed basement excavation for concept design. A partially drained site is expected to be used for construction with an impermeable perimeter wall installed prior to earthworks to provide groundwater cut-off to the excavation. The final basement excavation will be sealed, which will minimise groundwater inflows both during construction and in the long term.

A low point in the excavation would be maintained approximately 1 m below the working level of the excavation to form a collection point for groundwater flows and rainfall runoff entering the excavation. Water collected will be pumped up to the surface and treated as outlined in Section 3.2 of this report. Other ponding areas within the excavation that cannot be diverted under gravity to this collection point may be dewatered using smaller pumps into the main collection point for pumping up to the surface.

All excavated material will be carted offsite and disposed of at a consented location, or by other acceptable arrangements, by the Contractor. This section of the report should be read in conjunction with ground disturbance procedures as set out in T+T's Contamination Site Management Plan (CSMP) issued September 2023, Ref: 1016043.1000V2.

2.2.3 Earthworks programme

The bulk earthworks are estimated to take approximately 6 months to complete. However, the actual earthworks may vary, depending on the Contractor's construction methodologies, site constraints, and inclement weather conditions. Consequently, the earthworks are unlikely to be able to be completed within one earthworks season (1st October to 30th April).

It is proposed that the earthworks on this project are not subject to seasonal restrictions. This would enable the basement excavations to be completed without the need to temporarily shut down the earthworks over the winter period whilst the excavation is part-way completed. Given the close proximity to the adjacent roads and buildings and the self-containment of the excavation, the most practical option is to continue the earthworks operations with no seasonal restrictions to allow the basement excavation to be completed and sealed off as soon as practical.

Additional erosion and sediment control measures will be implemented as outlined in Section 3 of the ESCP for earthworks during the winter months.

3 Erosion and sediment control measures

The erosion and sediment control measures that will be implemented throughout the project are based on the principles outlined in GD05. Specific measures are described below. Refer to SK01 in Appendix A for plan illustrating the site erosion and sediment control measures. Typical details from GD05 are included in Appendix B for reference.

3.1 Enabling works and demolition

Existing stormwater catchpits, adjacent to the site that will receive runoff from the site will be protected to GD05 Standards.

The existing kerb and channels along Customs Street West and Lower Hobson Street will serve as a clean water cut off, diverting stormwater and road runoff around the site location. A bund will be installed at sections along the portions of the perimeter not confined by kerb and channel (such as the South-eastern side of site and vehicle crossing access areas). The bund will be constructed from hotmix or sandbags (subject to location). The purpose of this bund is to both isolate the site from clean runoff and to ensure runoff from within the site is retained within the site boundaries.

Stabilised entrance ways will be established at all entry and exit points of the site.

Provision for wheel wash areas using water blasters may be considered to mitigate the effects of dirt being tracked onto the public roads. Alternatively, the Contractor may provide a more detailed site operations methodology which keeps truck movement areas within the site clean and therefore the provision for wheel wash areas may not be required.

It is expected that sediment generation will be minimal during the enabling and demolition stages. As such, the wheel wash areas will be used only if deemed necessary with sediment laden runoff directed through filter socks or GD05 inlet protection on the ground surface, before discharging into the stormwater system.

Water sprinklers may be adopted to suppress dust during the demolition works.

3.2 Earthworks

3.2.1 Foundations

The lower B6 basement level is likely to be founded entirely below East Coast Bays Formation (ECBF) rock level across the site. This allows for consideration of either (or a combination of) the following foundation options:

- Shallow strip, pad or raft foundations bearing directly upon ECBF rock. Where required, ground anchors and/or tension piles may be required to resist high uplift loads.
- Piled foundations – comprising either driven steel piles or bored cast insitu concrete piles.

The existing belled reinforced concrete pile foundations will also need to be removed as the excavation proceeds. The existing piles may need to be cut down where they conflict with construction of the foundations for the proposed development and to reduce the potential for hard points above the B4 floor level.

The excavated material will be promptly carted away from site. However, where material needs to remain on site for short periods, provision will be made for a surge pile where trucks will be loaded from. The surge pile will be isolated with a perimeter bund where surface runoff from this area will be directed under gravity to the basement excavation. Existing stormwater catchpits adjacent to the site with the potential to receive runoff from the site will be protected and maintained to GD05 Standards.

3.2.2 Perimeter controls

With the site demolition works completed, the perimeter bund will be extended to surround the site as required and will be constructed from hotmix or sandbags (subject to location).

The purpose of this bund is to both isolate the site from clean runoff from adjacent footpaths and vehicle crossings and to ensure runoff from within the site is retained within the site boundaries.

3.2.3 Wheel wash areas

If required (depending on the Contractor's chosen methodology) wheel wash areas will be located at each exit point with a hard standing surface for washing truck tyres. The access leaving the wheel wash platform will be stabilised and maintained to ensure no sediment is collected and tracked onto the main roads.

Sediment laden runoff from the wheel wash areas will be drained into a collection sump and pumped into a secondary treatment device such as a 15,000 L rainwater tank. Discharges from this tank will be from a floating inlet to ensure any sediment that settles out is retained prior to discharge at the end of each day.

3.2.4 Dewatering of excavation

There are two main sources of water that will need to be collected and disposed of in the excavation; these are from groundwater inflows and from rainwater.

Groundwater inflow rates will be confirmed following groundwater monitoring, but are predicted to be approximately 60 – 120 m^3 per day.

Rainwater volumes can be estimated conservatively by the contributing catchment (6,442 m^2) and the 24 hour rainfall depths based on Auckland Council Technical Publication 108 (TP108) as shown in Table 3.1 below. The rainfall volumes have been added to the maximum expected daily groundwater inflow.

Table 3.1: Total Runoff and Discharge Per Day

Rainfall Event	Rainfall Depth	Rainfall Runoff/Day	Total Runoff/Day
2yr ARI	76 mm	490 m^3	610 m^3
20yr ARI	145 mm	935 m^3	1055 m^3
100yr ARI	188 mm	1212 m^3	1332 m^3

Methods of dewatering the excavation will be based on the following as outlined in 3.2.4.1:

3.2.4.1 Pumping into a secondary treatment device

This control involves pumping into a secondary treatment device typically located at existing ground level. The purpose of the secondary treatment device is to allow sediment to settle out prior to discharge under gravity into the stormwater system. Possible treatment devices are:

- 25,000 litre rain tanks for use as settling tanks.
- Portable open top steel rectangular settlement chamber (sizes vary, typically containerised).
- Portable sediment tank with screens/baffle wall (approximate size similar to a 20 foot shipping container).

Refer to Appendix B for information on these controls.

Stormwater runoff and groundwater that has come into contact with soil during earthworks will be discharged to trade waste/sewer under permit or through a trade waste contractor as required. If discharge to stormwater is required, the water shall be initially treated to remove sediment/solids. Prior to discharge into the stormwater system, proof of performance monitoring shall be conducted to confirm the quality of the groundwater pumped from the excavation does not contain unacceptable levels of contamination. For further details refer to Table 6.1 in the Contamination Site Management Plan (CSMP).

Where water quality monitoring results confirm the groundwater is not compliant for discharge to stormwater system, contingency measures outlined in the CSMP shall be followed.

3.2.5 Dewatering during winter period

It is expected that groundwater flow and rainfall runoff entering the excavation during the winter months will be higher than in summer but consistent with Table 3.1. The following contingency measures could be implemented during winter months to assist with managing the peak flowrates.

- Additional settlement tanks may be used on the surface to increase the storage volumes required (refer to option two above).
- The Contractor may be required to allow the collected water in the excavation to be retained until it can be discharged via one of the dewatering methods.
- Flocculation (using chemicals such as polyaluminium chloride or other approved chemicals) may be used in the secondary treatment devices if required to improve the rate of sediment settling out under gravity.
- Last resort contingency options are to either pump excess water into a tanker to be carted to a suitable offsite disposal facility or install a centrifugal separator to achieve the required water quality.

The preferred option will be agreed between the Contractor and the consent compliance officer during construction.

Depending on the capacity of the existing public stormwater system, discharging treated water into the stormwater system may be subject to additional conditions set out by Auckland Council.

3.2.6 Control and management of dust emissions

The recommended dust controls have been developed in accordance with relevant recommendations of the Ministry for the Environment Good Practice Guide for Assessing and Managing the Environmental Effects of Dust Emissions (MfE, 2016).

The following dust control measures are suggested for all general activities and should be adopted in conjunction with T+T's Dust Management Plan[4] (DMP) and Downtown West – Air Quality Assessment[5].

- Sufficient water should be made available for dust control and used to wet excavation works or work areas if necessary.
- Review daily forecast wind speed, wind direction and soil conditions before commencing activities with high dust potential.
- The area of surfaces covered with fine materials should be minimised and exposed surfaces should be stabilised wherever practicable, excavated material can be placed in skip bins or directly into trucks where possible to minimise the need for stockpiling if required.

3.2.7 Procedures for extreme weather events

The Contractor will prepare a site procedure to outline how they propose to deal with extreme weather events that cannot be managed using the controls outlined above.

The procedure may involve shutting down the site and allowing sediment laden and runoff to collect within the excavation until such time as it can be discharged using the above measures.

4 Monitoring, maintenance and reporting

On-going monitoring during the construction programme will be required to assist with the on-going erosion and sediment control management. The monitoring will support an adaptive sediment management approach where it can provide feedback on the effectiveness of sediment controls and the need for modified or additional controls. Should there be any modifications to the ESCP measures, it will be discussed on site with a compliance officer, and the ESCP will be modified to reflect the change. Updated plans should be provided to council for approval prior to on-site implementation.

Monitoring of all erosion and sediment control devices will be undertaken regularly with a checklist recorded and kept on site. The contractor shall monitor and maintain all erosion and sediment control measures in accordance with GD05. Refer to Appendix D for an example checklist.

When sediment has accumulated to 20% of the storage volume, the settlement and dosing tanks would be de-silted by a sucker truck and carted off-site to an approved landfill.

Chemical dosing rates (when required) will be undertaken before discharging into the stormwater system.

The seven-day weather forecast will be monitored.

[4] Downtown West - Dust Management Plan, prepared by Tonkin & Taylor, dated December 2024, version 3.
[5] Downtown West – Air Quality Assessment, *Demolition and Construction* prepared by Tonkin & Taylor issued December 2024, v2.

The location at the public stormwater outfalls where site discharge enters the harbour will be monitored daily for visible plumes and unexpected sediment discharge.

4.1 Rainfall response

All erosion and sediment controls should be checked before and after extreme and heavy rainfall to ensure the controls are operating correctly.

A rainfall event is considered to be extreme if the MetVUW[6] rainfall forecast in greater than 20 mm over six hours.

Monitoring of all erosion and sediment control devices will be undertaken regularly with elements inspected recorded and kept onsite.

5 Conclusions

This ESCP has been prepared prior to the selection of a Contractor to undertake the physical works. As such, this ESCP has been prepared with a management plan approach (as is common practice). Once the Contract has been awarded and a Contractor is in place, the construction methodologies will be further defined and developed in detail.

The site has an overall area of approximately 6,442 m^2. The site will have an approximate earthworks volume of 120,000 m^3.

Given the proximity to the adjacent roads and buildings, the most practical option is to continue the earthworks operations with no seasonal restrictions to allow the basement excavation to be completed and sealed off as soon as practical.

The procedures in the Contamination Site Management Plan shall be adopted in parallel with this plan.

We consider that following the erosion and sediment control principles, practices and procedures outlined in this report, along with a management plan approach (as is common practice), is a best practice approach to the mitigation of the potential adverse effects of erosion and sediment discharge during earthworks for this project.

[6] https://www.metvuw.com/forecast/forecast.php?type=rain&region=nzni

6 Applicability

This report has been prepared for the exclusive use of our client Precinct Properties Holdings Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Auckland Council as the consenting authority will use this report for the purpose of assessing that application.

It is intended that this draft will be updated and resubmitted as final by the Contractor before physical works begin. Is it also intended to be applicable for the demotion works that will precede the main site earthworks.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

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	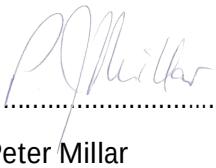
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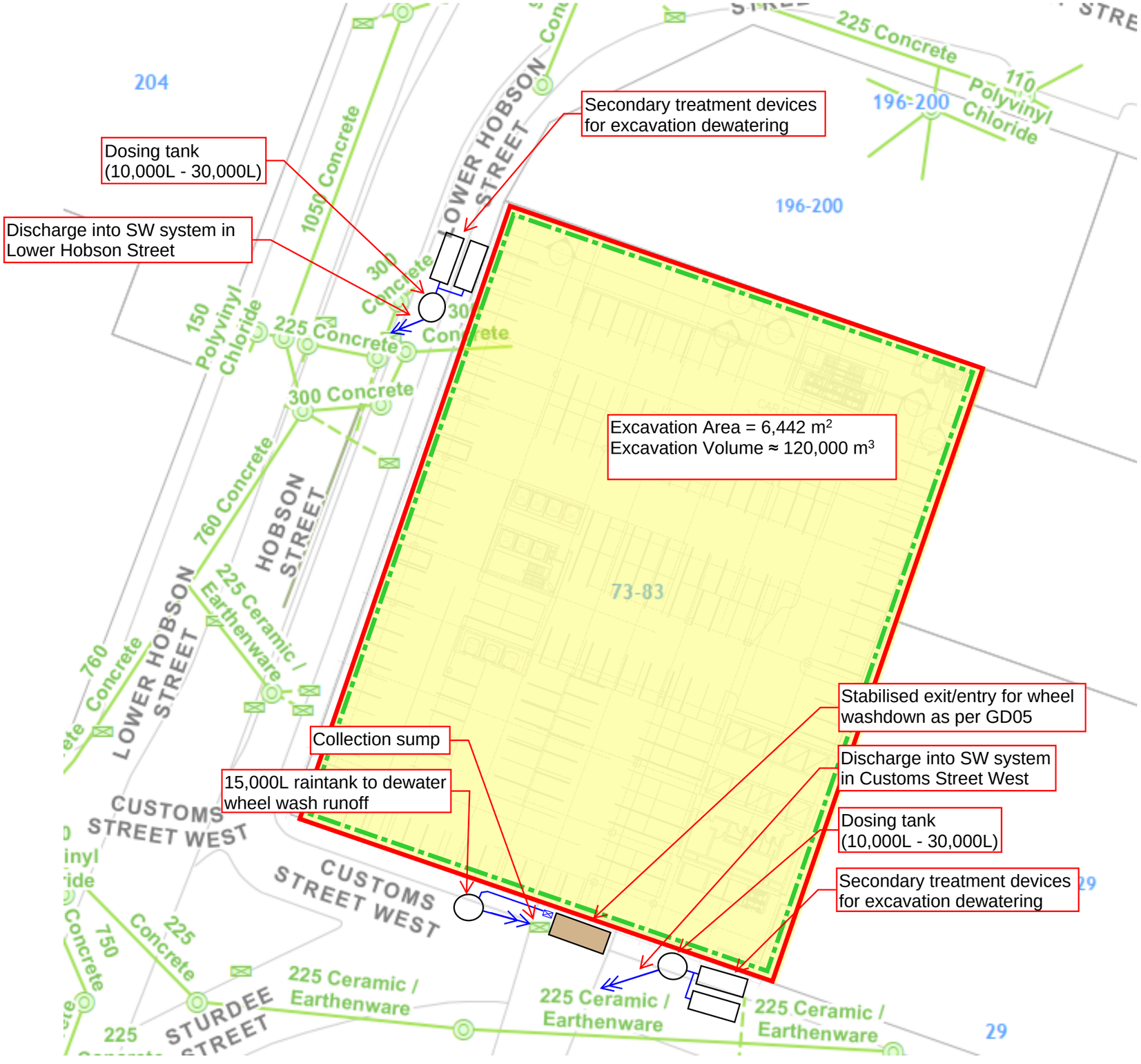
Appendix A Erosion and sediment control plan



EROSION & SEDIMENT CONTROL PLAN

Tonkin+Taylor

Precinct Properties NZ Ltd

Job No. 1016043.1000 SK01

06.12.24 Rev 4

Appendix B Erosion and sediment control devices

E2.0 Water management controls - for concentrated water flows

Control of water runoff or concentrated water flows is one of the most important erosion control measures that can be undertaken in a works area. Water runoff can either be 'clean' (i.e. devoid of sediment) or 'dirty' (i.e. carrying sediment). In an ESC context, 'clean water' usually refers to water from above a work site that has not run through the works area, and 'dirty water' usually refers to water that has run through a works area and requires treatment prior to discharge.

Water management control practices help to reduce water velocities and contributing catchment areas, with the overall aim of minimising sediment generation.

Guidance is provided below (Sections E2.1 to E2.7) on common measures to control water runoff on earthworks sites. Guidance for each control/measure is split into the following subsections:

- Design
- Construction, operation and maintenance
- Decommissioning.

E2.1 'Clean water' diversion channels and bunds

E2.1.1 Design

Definition

This practice comprises a non-erodible channel and/or bund constructed for a specific design storm to convey any clean water runoff.

Earthworks bunds are constructed by forming an embankment to hold back the water. Hotmix diversion bunds are constructed of Hotmix directly on the impervious surface and are often a replacement for a removed kerb and channel.

Figure 15: Clean water diversion used to isolate upper clean water flows from the works area

Purpose

These measures are used primarily to intercept and convey runoff to stable outlets, ideally at non-erosive velocities. Clean water diversions (Figure 15) intercept clean water away from the works area. Erosion damage potential is minimised by reducing the volume of water flowing over the site. This also then reduces the potential for sediment generation and the size of sediment-control device needed. Hotmix diversion bunds can be used to divert runoff from impervious surfaces, which are typically motorway, roads, car parks or building platforms.

F1.2 Decanting earth bunds

F1.2.1 Design

Definition

Decanting earth bunds (DEBs) are an impoundment area formed from a temporary bund or ridge of compacted earth (refer Figure 78 and Figure 79). They provide an area where ponding of runoff can occur, and suspended material can settle out before runoff is discharged.

Figure 78: Decanting earth bund system and close up of T-bar dewatering device.

Purpose

The purpose of a DEB is to detain runoff flows so that deposition of transported sediment can occur through settlement.

Conditions where practice applies

DEBs can be used where:

- Treatment of sediment-laden runoff is required
- Concentrated flows of sediment-laden runoff occur
- Soil types require flocculant treatment to improve efficiency
- The catchment area is too small for an SRP (generally less than 0.3 ha)
- Where the slopes of the contributing catchment and/or concentrated flows dictate that silt fences or super silt fences are not appropriate.

DEBs are particularly useful for controlling runoff after topsoiling and grassing before vegetation becomes established. They should be used a part of a treatment train approach.

Flocculant treatment

The majority of DEBs will require flocculant treatment.

Details of various flocculant treatment options are provided in Section F2.0 and Auckland Regional Council's Technical Publication, TP227 *The Use of Flocculants and Coagulants to Aid the Settlement of Suspended Sediment in Earthworks Runoff: Trials, Methodology and Design* (2004).

Limitations

DEBs have the following limitations:

- Specific geotechnical design may be needed to impound the required volumes of water (depending on geotechnical constraints)
- Their effectiveness is less on steeper slopes where runoff velocities are greater
- The recommended maximum catchment for DEBs is 0.3 ha.

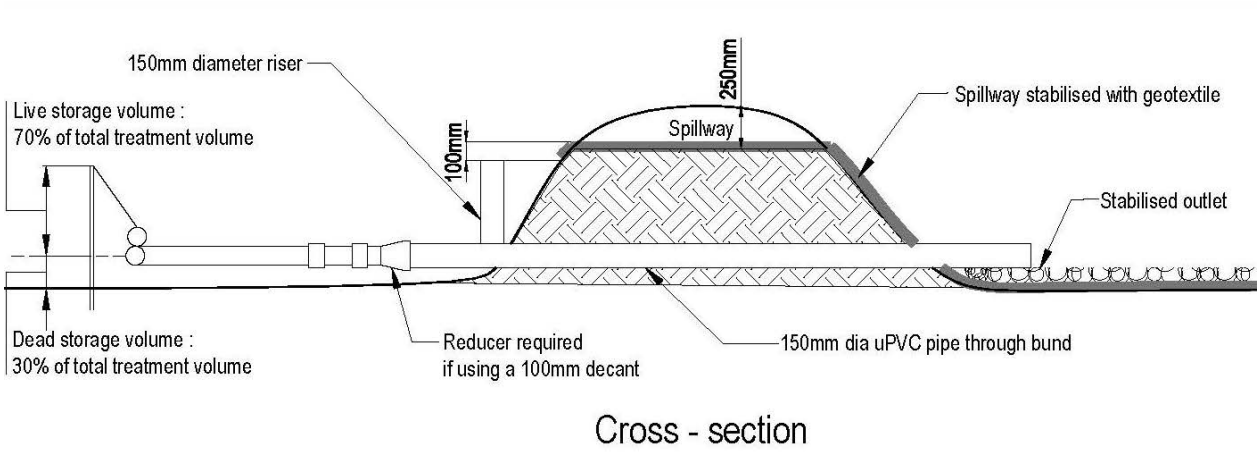


Figure 79: Decanting earth bund

Key design criteria

DEBs are often installed in challenging locations where achieving all of the following design criteria may be impractical. As these criteria are all interrelated, it is important that any compromise of these design criteria continues to achieve the following goals:

- To maximise the duration of settlement, maximise the volume of storage
- Reduce velocities through length-to-width ratios, and or baffles, to promote settlement
- Maintain an appropriate dead-water depth and volume to dissipate inflow energy, prevent re-suspension of settled sediment and provide storage of settled sediment
- Maintain an appropriate live-water depth and volume to promote settlement
- Ensure that the installed device is structurally sound and includes a stabilised spillway sized to accommodate the 1% AEP event without eroding.

Size

- DEB sizing is based on contributing catchment area
- Construct a DEB with a minimum volume of 2% of the contributing catchment area (20 m^3 for each 1,000 m^2 of contributing catchment)
- The above calculation defines the total storage volume which is measured from the base of the DEB to the top of the primary spillway.

F1.6 Stormwater inlet protection

F1.6.1 Design

Definition

Stormwater inlet protection is a barrier across or around a catchpit, a water sensitive design (WSD) device (e.g. rain garden) or other stormwater inlet. The protection may take various forms depending upon the type of inlet to be protected (refer Figure 97).

Figure 97: Stormwater inlet protection silt fence within a construction yard

(Note: Flooding not an issue in this case)

Purpose

This practice is used to intercept and filter sediment-laden runoff before it enters a reticulated stormwater system, via a catchpit, scruffy dome, manhole or WSD device. This reduces discharge of sediment-laden flows into receiving environments or into a permanent sediment control system during construction.

Conditions where practice applies

Stormwater inlet protection is a secondary sediment control device and must not be used as a standalone device. It must only be used in conjunction with other ESC measures, as part of a broader and more comprehensive ESC system.

Limitations

Stormwater inlet protection has the following limitations:

- It should not be used as a standalone treatment device
- It should not be used in concentrated flows such as at the inlet to a culvert
- It can have relatively low sediment removal efficiency and low sediment storage capacity
- It has high maintenance requirements (refer Section F1.6.2)
- There is potential for blockage of the device and therefore, increased risk of inundation
- The device can cause flooding to road carriageways due to its limited hydraulic capacity. Flooding can lead to public safety issues
- The device is easily damaged by vehicles and construction equipment.

Key design criteria

The following design criteria apply to stormwater inlet protection devices:

- Complete blocking of the stormwater system must be avoided, as this will divert flows during heavy rain and may cause other devices to become overwhelmed and/or create flooding hazards
- The height of catchpit protection within live road environments must be less than the kerb height so that runoff does not cause local flooding and/or direct flows to other nearby catchments.

Silt fence

A silt fence (refer Section F1.3) can be erected around the inlet. This method is appropriate where catchpits have been connected to a stormwater system and are collecting runoff from disturbed soil surfaces within a construction site, where the retention of water will not create a flooding hazard (refer Figure 98). This is not appropriate for road maintenance or upgrade works within a 'live' roading situation where impounded water will create flooding issues.

Figure 98: Good use of a silt fence installed to protect a new stormwater catchpit where impounded water will not create a flooding hazard

Check dams

A series of low sandbag check dams can be installed up the gutter from the catchpit to act as a series of small sediment traps (refer Section E2.4). Check dams require a spillway lower than the kerb to ensure that runoff does not encroach onto the berm area and cause scouring. They should comprise up to six sandbags laid end to end, with no gaps, in an arc away from the kerb and up the road to create a series of impoundment areas.

This measure is only suitable for very small catchment areas.

Check dams can also be constructed from silt socks (refer below), which will also provide a minor degree of filtration.

Silt socks

A silt sock (refer Section F1.5) can be placed around the inlet to act as a small sediment trap immediately up-slope of the catchpit (refer Figure 99). The silt sock needs to completely 'ring fence' the catchpit.

This measure is only suitable for very small catchment areas.

Figure 99: Installation of a silt sock to provide some protection to the catchpit

F1.0 Structural approaches

F1.1 Sediment retention ponds

F1.1.1 Design

Definition

A sediment retention pond (SRP) is a temporary pond formed by excavation, or by construction of an embankment. An outlet device is incorporated to dewater the pond at a rate that allows a high percentage of suspended sediment to settle out within the pond.

Purpose

The purpose of SRPs is to detain runoff flows so that deposition of transported sediment can occur through settlement. They also attenuate flows, thereby reducing downstream channel erosion effects.

Conditions where practice applies

SRPs should be used:

- Where treatment of sediment-laden runoff is required
- Where concentrated flows of sediment-laden runoff occur.

They are typically the most appropriate control measure for catchments greater than 0.3 ha.

Limitations

Limitations of SRPs are:

- Specific geotechnical design input may be required
- Location can impact on ease of on-going maintenance (particularly during winter) and decommissioning at completion of earthworks
- Specific design details may be required, including drawings, to ensure correct construction
- Catchment areas should be restricted to 5 ha. This limits the length of overland flowpaths, reduces maintenance, and limits the size of flocculant treatment devices.

Key design criteria

An SRP is an impoundment area formed by excavation or filling to form embankments. Embankments provide the required impoundment volume and shape. In practice, most are formed by a combination of excavation and filling. The maximum height of any filled embankment should not exceed 2.6 m. This height accommodates a maximum 2.0 m pond depth (base of pond to primary spillway), 300 mm freeboard from the primary spillway to the emergency spillway, and a further 300 mm depth of spillway. Exceeding this 2.6 m maximum height will increase the overall footprint of the SRP.

The following design criteria apply to SRPs (refer also Figure 65, Figure 66, and Figure 72 to Figure 74):

Size

- Size SRPs based on the contributing catchment area and slope length
- On earthwork sites with slopes < 18% and < 200 m in length, design SRPs with a minimum volume of 2% of the contributing catchment area (200 m^3 for each ha of contributing catchment)
- On earthwork sites with slopes > 18% or > 200 m in length, design SRPs with a minimum volume of 3% of the contributing catchment area (300 m^3 for each ha of contributing catchment)
- The above calculations define the total storage volume, which is measured from the base of the pond to the top of the primary spillway
- The slope angle is determined by the slope immediately (within 20 m) above the SRP, or by the average slope over the contributing catchment, whichever is greater. The slope angle should also be the greater of the pre- or post-construction slope.

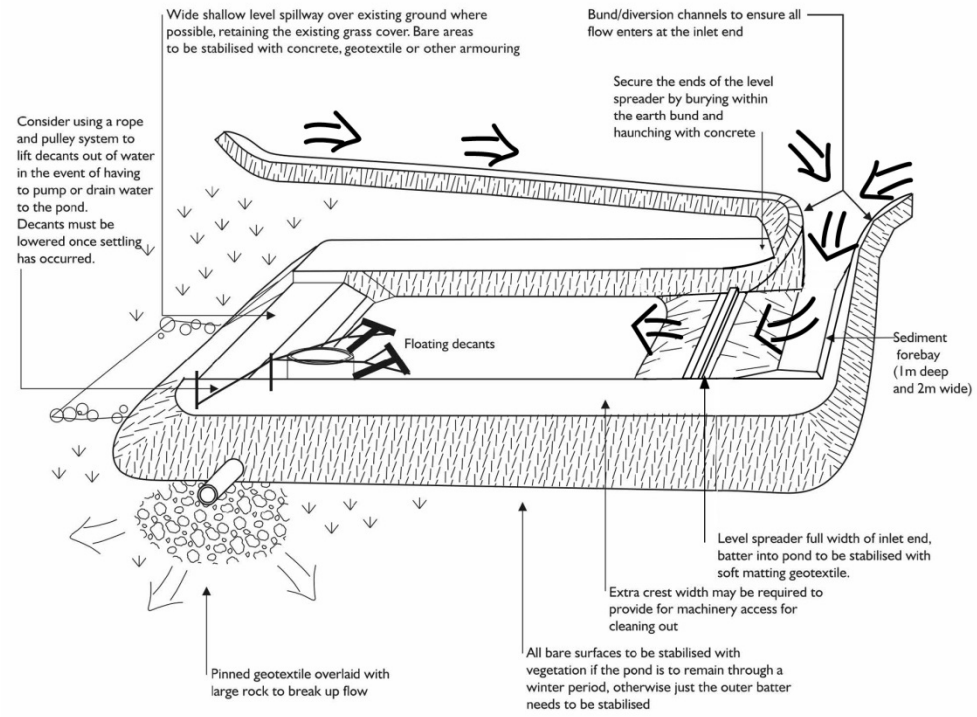


Figure 65: Schematic of a sediment retention pond

SEDITROL
SEDIMENT CONTROL SYSTEMS

Home | Products | Services | Innovation | Contact

WELCOME TO SEDITROL

Seditrol is a technology supply company specialising in water treatment for sediment removal and environmental management technologies for the construction industry. From innovative research and design to on the ground environmental management systems and monitoring, we're here to help you with your environmental compliance requirements.

Product Spotlight

SEDITROL 300

Seditrol300 is designed for confined and challenging sites, it can also be used in conjunction with Sediment Ponds.

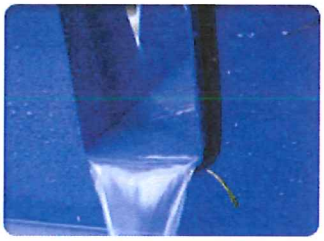
Website designed and maintained by Configureation Design Limited.

SEDITROL
SEDIMENT CONTROL SYSTEMS

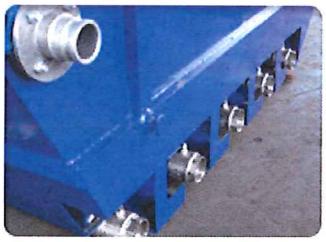
PRODUCTS

Seditrol water treatment devices are designed for confined and challenging sites, and can be utilised in conjunction with sediment ponds or decanting earth bunds to provide further sediment removal.

The Seditrol units can be purchased or hired depending on the required usage. The discharge from the Seditrol 100 unit has been sampled at and tested at a certified laboratory and found to remove particles greater than 0.5 µm in size at a flow rate of 1.5 l/s with greater than 95% success if in-situ flocculent is utilised in the process. The Seditrol 300 is currently undergoing field testing and due to technical product developments we expect to improve on the Seditrol 100 performance.



Treated Discharge Water of Good Clarity after Sediment Removal.



Portable and Easily Transported and can be used as Standalone Device or in conjunction with Sediment Ponds or Decanting Earth Bunds

Website designed and maintained by Configureation Design Limited.

SEDITROL
SEDIMENT CONTROL SYSTEMS

SERVICES

Seditrol NZ Ltd is a company which offers services in:

- Environmental and Sediment Management and Control
- Innovation in Sediment Control
- Mobile Sediment Removal Technology Systems

Seditrol Treatment Device in Operation in East Auckland Removing Sediment before it Discharges to the Harbour

The Soho Square Development in Central Auckland where Seditrol Provided Sediment Management

Services include:

- Erosion and Sediment Control Planning and Design to Guidelines such as Technical Publication 90 (TP90)
- Assessment of Environmental Effects (AEE)
- Environmental and Sediment Management Plans
- Construction Management Plans
- Development with Contractors of Best Management Construction Practices
- Compliance Assessment and Reporting
- Environmental Monitoring
- Consenting Requirements
- Analysis of Soil Loss through Application of the Universal Soil Loss Equation
- Sediment Treatment Pond Design
- Chemical Dosing for Sediment Management and Design, Setup and Monitoring
- Mobile Treatment of Sediment Discharge from Confined and Challenging Construction Sites using Seditrol 300.

E2.5.3 Decommissioning

For decommissioning of pipe-drop structures and flumes:

- Keep pipe-drop structures or flumes in place until runoff has been controlled and all disturbed areas have been stabilised, or until permanent stormwater systems have been installed and commissioned
- Remove temporary pipe-drop structures or flume materials and where possible, re-use and recycle
- Stabilise all areas disturbed as part of the removal process. Apply seed and fertiliser and/or protect the surface with mulch or erosion control blankets, if required.

E2.6 Stabilised entranceways

E2.6.1 Design

Definition

Stabilised entranceways are stabilised areas located at any entry or exit point of a construction site (refer Figure 35 to Figure 38).

Purpose

The purpose of a stabilised entranceway is to:

- Prevent site access points becoming sources of sediment
- Assist in minimising dust generation and disturbance of areas adjacent to the road frontage by providing a defined entry and exit point.

Figure 35: Stabilised entranceway

In some circumstances, a formal wheel wash or a vibrating cattle-grate system (shaker ramps) may be required to stop sediment being tracked off the site. A stabilised entranceway is not designed to remove mud or dirt from vehicle wheels when exiting the site and these measures may need to be added at the entrance.

Conditions where practice applies

This practice should be used at all points of construction site entry and exit with a view to limiting traffic movements to these entrances only.

Where necessary, this practice may be installed in association with shaker ramps or wheel-wash facilities, as close as possible to the boundary of the works area.

Appendix C Architects Layout Plans

ARCHITECTURAL RELEVANT DRAWINGS LIST

Refer Warren and Mahoney Submission documents for details

Drawing Number	Drawing Title	Revision	Date
RC03-0001	PROPOSED SITE PLAN	F	9/12/2024
RC10-0000	GENERAL ARRANGEMENT - ELEVATION AND SE	D	9/12/2024
RC10-0001	GENERAL ARRANGEMENT - BASEMENT 06	F	9/12/2024
RC10-0002	GENERAL ARRANGEMENT - BASEMENT 05	F	9/12/2024
RC10-0003	GENERAL ARRANGEMENT - BASEMENT 04	F	9/12/2024
RC10-0004	GENERAL ARRANGEMENT - BASEMENT 03	F	9/12/2024
RC10-0005	GENERAL ARRANGEMENT - BASEMENT 02	F	9/12/2024
RC10-0006	GENERAL ARRANGEMENT - BASEMENT 01	F	9/12/2024
RC10-0010	GENERAL ARRANGEMENT - LEVEL 00	F	9/12/2024
RC10-0011	GENERAL ARRANGEMENT - LEVEL 00M	F	9/12/2024
RC22-0001	BUILDING ELEVATIONS - TOWER 1	F	9/12/2024
RC22-0002	BUILDING ELEVATIONS - TOWER 1	D	9/12/2024
RC22-0005	BUILDING ELEVATIONS - TOWER 2	F	9/12/2024
RC22-0006	BUILDING ELEVATIONS - TOWER 2	D	9/12/2024
RC22-0010	BUILDING ELEVATIONS - PODIUM 3	D	9/12/2024

Appendix D Example Checklist

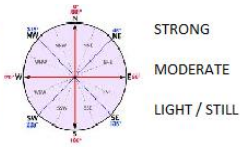
SITE EROSION & SEDIMENT CONTROL INSPECTION CHECKLIST

Site: 709, 719 and 729 Riddell Road, Glendowie **Project No:** 1009008.1000

Inspection by: …… **Date:** …… **Time:** ……

Current Weather Condition: (circle)

Wind Direction / Conditions



Area Inspected (tick)**:** ☐ Cleanfill ☐ Clay extraction ☐ Other (please specify):

……

ITEM / SCOPE OF INSPECTION	(circle)	COMMENTS
EROSION & SEDIMENT CONTROL		
- Are there any signs of scour at the piped outlet into the receiving environment?	Y N N/A	
- Does the visual appearance of the water in the receiving environment overly turbid or otherwise?	Y N N/A	
- Is there any evidence of uncontrolled dirty water discharge from the site?	Y N N/A	
- Is there any visible discolouration of waters leaving the site?	Y N N/A	
- Does the DEB require de-silting?	Y N N/A	
- Is stabilisation (most likely bidim) over the DEB inlet batter over its entire area?	Y N N/A	
- Is the water clarity in the DEB greater than 100mm?	Y N N/A	
- Are there signs of water escaping through the bund at the DEB outlet pipe position?	Y N N/A	
- Are there any rips, tears or holes over the length of silt fence fabric?	Y N N/A	
- Is there damage to silt fence waratahs and returns from machinery?	Y N N/A	
- Are previous repair to rips, tears and holes in silt fence fabric forming tight seal?	Y N N/A	
- Is the bottom edge of the silt fence fabric trenched in the required depth?	Y N N/A	
- Is the minimum height of the silt fence maintained?	Y N N/A	
- Are there bulges due to silt build ups? Has silt build up reached 50% of the fence height? Is so, de-silt is required.	Y N N/A	
- Has the silt fence fabric degraded or collapsed? If so, replace immediately.	Y N N/A	
- Has the area been appropriately stabilised where silt fence has been removed?	Y N N/A	
Are the catchment areas above CWD maintained as clean?	Y N N/A	
Is the stabilised entrance needing maintenance to ensure the surface remains clean?	Y N N/A	

	SITE EROSION & SEDIMENT CONTROL INSPECTION CHECKLIST	

RECOMMENDATIONS			
Priority (H/M/L)	**Action**	**By whom**	**By when**

Reviewed and Accepted by **Date:**.....

……

Appendix E Cut and Fill Plan

C:\12dS\data\ALBTCAD\DCR Concept and Resource Consent Stage_1352\CAD\DWG\1016043.1000-200.dwg 2024-Oct-18 3:01:52 pm Plotted By: JC

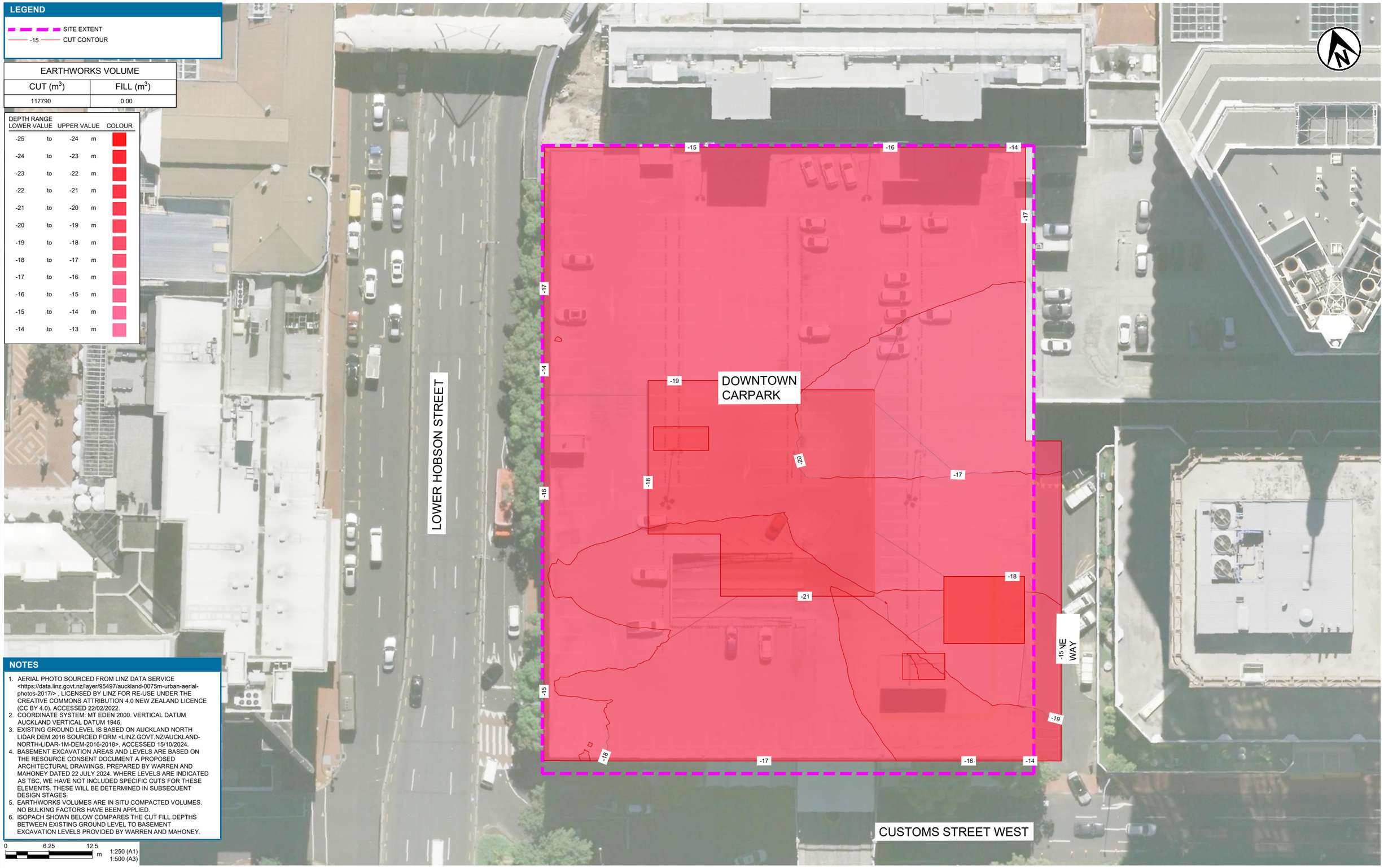
LEGEND

SITE EXTENT

-15 CUT CONTOUR

EARTHWORKS VOLUME	
CUT (m^3)	FILL (m^3)
117790	0.00

DEPTH RANGE LOWER VALUE		UPPER VALUE		COLOUR
-25	to	-24	m	
-24	to	-23	m	
-23	to	-22	m	
-22	to	-21	m	
-21	to	-20	m	
-20	to	-19	m	
-19	to	-18	m	
-18	to	-17	m	
-17	to	-16	m	
-16	to	-15	m	
-15	to	-14	m	
-14	to	-13	m	



NOTES

1. AERIAL PHOTO SOURCED FROM LINZ DATA SERVICE <https://data.linz.govt.nz/layer/95497/auckland-0075m-urban-aerial-photos-2017/> , LICENSED BY LINZ FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 NEW ZEALAND LICENCE (CC BY 4.0). ACCESSED 22/02/2022.
2. COORDINATE SYSTEM: MT EDEN 2000. VERTICAL DATUM AUCKLAND VERTICAL DATUM 1946.
3. EXISTING GROUND LEVEL IS BASED ON AUCKLAND NORTH LIDAR DEM 2016 SOURCED FORM <LINZ.GOVT.NZ/AUCKLAND-NORTH-LIDAR-1M-DEM-2016-2018>, ACCESSED 15/10/2024.
4. BASEMENT EXCAVATION AREAS AND LEVELS ARE BASED ON THE RESOURCE CONSENT DOCUMENT A PROPOSED ARCHITECTURAL DRAWINGS, PREPARED BY WARREN AND MAHONEY DATED 22 JULY 2024. WHERE LEVELS ARE INDICATED AS TBC, WE HAVE NOT INCLUDED SPECIFIC CUTS FOR THESE ELEMENTS. THESE WILL BE DETERMINED IN SUBSEQUENT DESIGN STAGES.
5. EARTHWORKS VOLUMES ARE IN SITU COMPACTED VOLUMES. NO BULKING FACTORS HAVE BEEN APPLIED.
6. ISOPACH SHOWN BELOW COMPARES THE CUT FILL DEPTHS BETWEEN EXISTING GROUND LEVEL TO BASEMENT EXCAVATION LEVELS PROVIDED BY WARREN AND MAHONEY.

0 6.25 12.5 m

1:250 (A1)
1:500 (A3)

Tonkin+Taylor

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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE
1	RESOURCE CONSENT	JC	AFRE	18.10.2024		

DESIGNED	STLP	Oct.24	DRAWING STATUS
DRAWN	JC	Oct.24	RESOURCE CONSENT
DESIGN CHECKED	AFRE	Oct.24	PROJECT PHASE
DRAWING CHECKED	JABR	Oct.24	PRELIMINARY DRAFT

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED

CLIENT **PRECINCT PROPERTIES NZ LIMITED**

PROJECT **DOWNTOWN CARPARK REDEVELOPMENT**

TITLE EARTHWORKS CUT AND FILL PLAN

SCALE (A1) 1:250 DWG No. 1016043.1000-200 REV 1

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