Boffa Miskell

Phytophthora Risk Management Plan

Replacement Huia Water Treatment Plant Geotechnical Investigations
Prepared for Watercare Services Ltd.

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1.0 Introduction

1.1 Project Description

Watercare operates water supply dams within the Waitākere Ranges, including the Upper and Lower Huia Dams and the Upper and Lower Nihotupu Dams. The Huia Water Treatment Plant (Huia WTP, named for the source of the water) is located in Waima and treats the water from these dams before it is distributed via the water transmission network.

The Huia WTP was constructed in 1929 and is now nearing the end of its operational life (90 years old). Watercare therefore proposes to construct a new WTP to replace the aging Huia WTP. As part of this project Watercare is also proposing to construct two treated water reservoirs (50ML total capacity) to increase treated water storage within the western supply zone.

Systematic soil sampling detected *Phytophthora agathadicida* (PA) in sporadic locations throughout the proposed WTP works footprint. All soil within the site is therefore to be treated as potentially infected.

Geotechnical assessments are required prior to the detailed design of the replacement WTP. Localised vegetation clearance and earthworks is required to enable geotechnical equipment access to test sites.

The purpose of this *Phytophthora* Risk Management Plan (PRMP) is to minimise the risk of spreading *Phytophthora* pathogens associated with kauri dieback disease in the process of undertaking geotechnical investigations. The objective of the PRMP is to ensure that the works do not exacerbate the movement of *Phytophthora* species by creating or intensifying routes of dispersal within or from the Project Site beyond that which currently occurs through passive runoff.

Key actions include minimising soil disturbance as far as practicable, controlling movement of soil and water and management of work sites to prevent surface runoff; and minimising movement of potentially contaminated material on machinery, footwear, equipment.

1.2 Drilling Options

The methodology for ground investigations has yet to be established, and will depend on availability of equipment and operational factors such as access to water, drilling depth, etc. Aurecon has prepared a draft method statement (Appendix 1) to enable any potential risks of PA spread in the course of sampling procedures to be identified and addressed in the PRMP. Following contractor engagement, confirmation of access, clearance requirements, recommended drilling rigs/plant and cleaning processes will be finalised.

This PRMP covers the work scenario with the largest footprint (and associated risk with respect to *Phytophthora* risk management). This comprises the use of a drill machine attached to a small tractor. Pathways approximately 3 m wide are required to allow machinery to be driven to drill sites. Minor earthworks may be required to level paths for safe transport of the tractor.

Existing accessways and small, informal tracks with minimal earthworks will be suitable if a smaller drill can be used, which can be disassembled, carried to site on foot and then re-assembled.

1.3 Kauri Dieback Disease

Investigations undertaken during works to consent the replacement WTP detected *Phytophthora agathadicida* (PA), the pathogen regarded as the primary causal agent of kauri dieback disease, within the replacement WTP site and surrounding Waima catchment.

Phytophthora infects trees through their roots, and spreads primarily through the movement of contaminated soil and water, as well as by root-to-root contact between trees.

The kauri dieback pathogen has two types of propagule. The oospore is formed within infected tissue and released into the soil where it can remain latent for an indefinite period. Soil movement is a key mode of dispersal of this type of propagule. The oospore is resistant to sterigene and other disinfectants.

Ultimately, the oospore germinates and produces zoospores which can 'swim' through micropores in saturated soil, and in this way actively disperse themselves. In this form, the pathogen finds and infects tree roots. The zoospores can be destroyed with disinfectant.

Sources and locations of kauri dieback pathogen are:

- Infected tree roots of kauri;
- Parts of the forest floor and waterbodies where oospores have been dispersed;
- Moist, porous soil layers where motile zoospores have emerged and dispersed.

Mineral sub-soil layers below the root zones of vegetation are at lower risk of contamination relative to organic soil layers, as inorganic parts of the substrate are not porous and do not contain living plant material.

2.0 Management Approach

2.1 Principles and Objectives

The spread or movement of *Phytophthora* primarily occurs through contaminated soil or surface water. Therefore, the applicable management functions are those that control and/or mitigate the movement of soil and surface water during geotechnical operations is the key focus of this management plan.

Management of kauri dieback disease risk for works associated with the WTP project has the following components:

1) Comprehensive soil testing across the Project Site to inform knowledge and assumptions regarding the current presence and distribution of kauri dieback disease pathogens in the area.
2) Delineation of Kauri Containment Zones (KCZs) based on kauri presence (3 times the dripline of all kauri).
3) Detailed specifications for each stage of works to minimise the risk that any potentially infected material is discharged or moved offsite in an uncontrolled manner.

4) Containment and wash facilities and hygiene protocols to prevent site workers and machinery moving soil offsite and between work areas.

5) Containment and treatment of contaminated surface soil and stormwater runoff during works.

2.2 Traffic Light System

Geotechnical works shall operate in accordance the 'traffic light' standard operating procedure to manage the spread of *Phytophthora* species, as set out in conditions 37 and 38 of the Resource Consent. Geotechnical works fall within the 'yellow' risk level as described below.

Traffic light risk levels:

- Red: Areas of removal, disturbance and stockpile of surficial soils, organic materials, water and any other high Phytophthora risk materials (as identified by a Phytophthora expert or an ecologist with appropriate expertise).
- Orange: Bulk earthworks activities beyond surficial soil removal provided for in 'red' above.
- Yellow: Areas with stabilised hardfill and measures in place to avoid cross contamination of run off from red or orange areas. Localised excavations can occur within stabilised areas (e.g., localised excavations that are required to form building foundations and excavations, utility and drainage services, etc).
- Green: Areas located outside the subject site and after any machinery, equipment and personnel have been decontaminated.

Machinery can only freely progress through the traffic light system from lower to higher risk areas. Movement of machinery and equipment from higher risk to lower risk areas shall be minimised. To go from a higher to a lower risk area, the machinery, equipment and/or personnel must be decontaminated as set out in the PRMP.

2.3 Wash facility

A stabilised site entry and washdown facilities will be installed at site entry\egress points prior to commencement of works. The wash facility for vehicles, machinery, equipment and footwear is to be used at each entry and exit of personnel, vehicles and machinery to the Project Site. No entry or exit to or from the Project Site will occur anywhere except through the designated access points. The washdown facility will be contained with an impermeable screen or other barrier to capture overspray/ splash, mud and debris. Washdown facilities shall be cleaned of all muddy residue between uses.

Vehicles, machinery, equipment and footwear will be washed with clean water. Once dry, the washed items move on to a designated hard stand area to be inspected to ensure they are free of soil and debris. Once checked, they are to be sprayed with 2% SteriGene disinfectant (or equivalent). Wash water will be collected and contained on-site until it can be sterilised or disposed of utilising a sucker truck (or to trade waste). Wash water cannot be reused or recycled within the wash station unless sterilised. The stabilised entry will be renewed, and wash-down facilities will be cleaned out, as required.

Implementation of training and induction of above noted points will be undertaken to ensure any personal onsite is aware of the process and reporting measures for entering or leaving the site. As far as possible, works are to be undertaken in dry weather to reduce soil adhering to vehicles and equipment.

2.4 Site Access

A proposed ground investigation plan with indicative geotechnical sample locations and accessways is included in Appendix 1. Access tracks will be stabilised with geotextile or hard fill prior to use. Final access track routes will be marked on the site following site walkovers to determine the least extent of vegetation clearance and earthworks. Key principles for track establishment are as follows:

- Minimise soil and vegetation disturbance. As far as possible, avoid mature canopy trees and limit vegetation clearance to the extent necessary for access tracks.
- As far as possible, avoid delineated KCZs. Where investigations need to occur in KCZs, hygiene measures (gear checks, foot wash) will be implemented on entry to, and exit from, the delineated KCZ.
- Trees felled during this phase are to be cut at the base. No grubbing or tree stump removal. Cleared vegetation is to be placed adjacent to the track and left in-situ.
- Cut material from earthworks to level tracks is to be spread and compacted on the track surface and covered in geotextile material/ hard fill. No excavated soil from track construction activities is to be moved within the WTP site, or taken off-site. Geotextile / hard fill material will remain in-situ after completion of geotechnical works.
- Track surfaces are to be covered in hard fill or geotextile material prior to use, to minimise direct contact with soil or organic matter during operations. All material imported to site must be either hardfill direct from a quarry (no recycled hardfill) or from a kauri-free catchment.
- Surface water from tracks shall be allowed to drain to ground.

2.5 Drill Sites and Activities

Works at drill sites will involve vegetation clearance to enable drill rig access and set-up, and extraction of a soil core. Drill rig sites are to be delineated with tape or temporary fencing to ensure all activities are contained within the managed area. Core extraction may involve the use of water as a lubricating agent to recover the core, but all water and soil is to be captured and contained.

Key principles for geotechnical sampling operations are as follows:

- Minimise soil and vegetation disturbance. As far as possible, avoid mature canopy trees and limit vegetation clearance to the extent necessary to accommodate the drill rig.
- Trees felled during this phase are to be cut at the base. No grubbing or tree stump removal. Cleared vegetation is to be placed adjacent to the drill site and left in-situ.

- Geotextile will be laid across the working area for each site. The geotextile is designed for a single use only, and will be disposed following the completion of the specific borehole investigation.
- Soil cores recovered from the site are to be labelled and treated as a biohazard. Cores are to be packed in closed containers for removal from the site, handled and stored away from equipment and material that may be taken into the field, and disposed of to an approved landfill once no longer required.
- Surface water that has been in contact with disturbed organic soils shall be allowed to drain to ground. Any exposed soil surfaces shall be covered with mulch or debris from locally cleared vegetation after completion of works to limit runoff from bare soil.
- Vehicles, machinery, equipment and footwear will be cleaned of all soil and debris and sprayed with 2% SteriGene disinfectant (or equivalent) prior to moving out of the delineated drill site.

3.0 Roles and Responsibilities

3.1 Site Hygiene Manager

Key to the success of this PRMP is ensuring all contractors are aware of the potentially severe impacts of kauri dieback, how *Phytophthora* is spread, and are in the habit of implementing effective prevention measures.

The Site Hygiene Manager is to induct all personnel upon their first entry to the site. Training in hygiene procedures is to be undertaken as part of the induction process for new personnel entering the site. Training will emphasise individual and collective responsibility for ensuring equipment is completely clean of soil, and step through site entry and exit procedures to ensure these are clear and unambiguous.

Key principles of the PRMP must be displayed prominently at key locations, including clear signage noting the presence of PA on site and the requirement for PA hygiene measures at the site entry/exit.

The following points should be included in all site inductions:

1. The background of Kauri Dieback Disease; the organism that causes it (*P. agathadicida* in particular) and how it infects kauri;
2. The fact that *Phytophthora* is present on the site, and locations where it has been detected;
3. The impacts of Kauri Dieback Disease on kauri and the wider forest ecosystem;
4. How *Phytophthora* is spread, noting that small fragments of contaminated soil can spread the pathogen;
5. That there is no known cure for Kauri Dieback Disease, and if PA (or any other *Phytophthora* pathogen) is introduced to an ecosystem, it is not currently possible to eradicate it.

It is the Site Hygiene Manager's responsibility to:

- Ensure all contractors are provided with a copy of this PRMP and informed of the relevant protocols included in this document at a pre-start meeting prior to commencement of works;
- Ensure signage outlining PRMP principles is displayed on-site;
- Ensure that contractors and consultants understand that entry into and exit from the project site triggers PA control protocols, and that they are familiar with these protocols;
- Ensure a copy of the PRMP is held on-site and is accessible to all staff and contractors;
- Undertake and document daily and 'inclement weather' inspections to ensure the effectiveness of containment and sediment control measures implemented around active works areas, and address/ remediate and document risks or issues identified;
- Closely monitor weather forecasts during site works to ensure the work site is adequately closed and covered during rainfall events.
- Coordinate an external audit (to be undertaken by appropriately qualified and experienced biosecurity specialists) of the site facilities and personnel to ensure compliance with the work protocols specified in this management plan.
- Report on compliance with hygiene measures specified in this plan (immediately in cases of significant non-compliance).
- Ensure Auckland Council's compliance team is notified of the start and end of works.
- Prepare emergency response plans for unforeseen weather events, and ensure personnel on site are familiar with, and able to implement, response protocols.
- Make minor changes to works methodology or management of effects specified in this PRMP deemed necessary to address risk factors or operational changes. Any amendments are to be notified to the Council within five (5) days of the change. Records of all changes are to be documented and held onsite by the Site Hygiene Manager for the duration of the Project.

3.2 Project Engineer

It is the Project Engineer's responsibility to:

- Review and assist the contractor in designing and maintaining compliant drilling works control in accordance with the PRMP and consent conditions.
- Conduct periodic inspections of the installed control measures to ensure ongoing compliance.
- Provide instruction and oversight to ensure adequate hold points are stipulated and observed to achieve the *Phytophthora* risk management principles.

4.0 Environmental Risk Register

All activity related hazards are summarised in a risk register (included in Appendix 1) for each component of the geotechnical investigations along with the likelihood and consequences of

each hazard, the required actions to reduce each risk, and who is responsible for managing them. This approach enables effective communication and decision-making at all levels of the operation.

The risk register will be finalised, and a *Phytophthora* risk evaluation will be completed, by an appropriately qualified and experienced biosecurity specialist once hygiene facilities have been installed, and before commencement of works. This evaluation will assess the likelihood and severity of residual risks, ensure that all required mitigation measures are in place and the responsibility for all actions is appropriately delegated. Table 1 summarises risk levels (assigned on the basis of perceived likelihood and consequence) and required actions. The outcome of the risk evaluation will determine the appropriate frequency of risk management review and audit.

Table 1: Required acceptance of risk level and actions

Risk Ranking	Requirement	Action required	Risk Acceptance Authority
Critical	Operation at this level is typically not acceptable. Implement and/or review controls.	Mitigation plan must be in place asap Risk reviewed prior to works proceeding	Auckland Council/ Person with Delegated Authority
High	Only tolerated if examination proves that the threat cannot be eliminated and is minimised as far as is reasonably practicable.	Mitigation plan must be in place prior to works proceeding Risk reviewed monthly	Auckland Council/ Person with Delegated Authority
Medium	Risk can be tolerated and requires active management	Mitigation plan implemented with adaptive management as required. Periodic external audit.	Site Hygiene Manager
Low	Risk is acceptable. Review at next interval.	Adaptive management as required. Periodic external audit.	Site Hygiene Manager

Appendix 1: Draft Method Statement and Risk Register

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Memorandum

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Copy	**Leo Bouzaid, Margaret Cobeldick**	Reference	**521290-059**
Date	**2024-07-10**	Pages (including this page)	**10**
Subject	**Huia WTP - Ground Investigation Method Statement and Phytophthora Risk Management Plan Review**		

1 Objectives

Watercare Services Ltd (Watercare) has engaged Aurecon New Zealand Ltd (Aurecon) to prepare a ground investigation method statement for the Huia Replacement Water Treatment Plant (WTP) Project in accordance with the draft Phytophthora Risk Management Plan (PRMP) prepared by Boffa Miskell Ltd.

We understand the PRMP has been prepared in support of the General Conditions outlined in Resource Consent BUN60339273, dated 24 February 2020.

In preparation of the method statement, Aurecon has completed a review of the PRMP to ensure the proposed methodology aligns with drilling procedures generally undertaken for ground investigations.

2 Methodology Statement

Noting the methodology for ground investigations has yet to be established, Aurecon has prepared a draft method statement for consent submission. Procedures outlined follow general requirements listed in the PRMP. Following contractor engagement, confirmation of access, clearance requirements, recommended drilling rigs/plant and cleaning processes will be finalised and agreed by all parties.

As part of this review, Aurecon has received feedback from McMillan Drilling (N I) Ltd on preliminary access and plant requirements, feedback has been incorporated in the Method Statement outlined Section 3.

3 Ground Investigations

To support consenting and design stages for the Huia Replacement Water Treatment Plant (WTP) Project, ground investigations are required to capture the physical characteristics of the site, considering everything from environmental, geotechnical and land use (both historical and current).

Proposed investigations will utilise a combination of shallow soil sampling, mapping and exploratory drilling methods to understand the ground and hydrogeological conditions of the site. We anticipate the programme will take between two to three months to complete, this duration of time will include preparation of access tracks, implementation of temporary traffic management, mobilisation of plant and drilling works.

3.1.1 Operational Times

Sites propose to operate between 07:00 to 17:00, this includes time for pre-start meetings, mobilisation and demobilisation.

3.1.2 Plant and Equipment

Intrusive investigations including machine rotary-cored boreholes and cone penetration tests will utilise plant and machinery to drill and recover soil and rock samples. The programme will aim to incorporate lower capacity rigs with reduced footprint and spacing requirements to minimise land disturbance. The following rigs are currently proposed:

- **Massenza MM3 Drill Rig**

The Massenza Drill Rig will be used to conduct geotechnical drilling to depths ranging from 20m to 30m below ground level. The rig utilises rotary cored, trip-tube methods (HQ/PQ) which aims to recover undisturbed samples of the ground profile whilst undertaking insitu tests. Drilling for each investigation is anticipated to take between three to five working days.

Refer to the below image and standard dimensions of the rig.

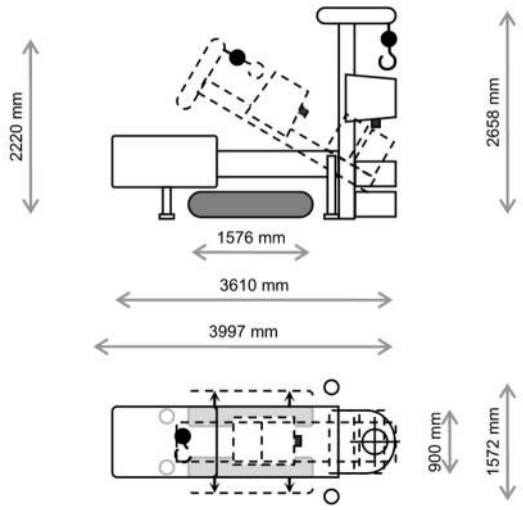

Figure 1: Proposed Drill Rig

- **Pagani TG63-150 Rig**

The Pagani Rig will be used to undertake Cone Penetration Tests (CPT) across the proposed site, the method includes the pushing of a solid cylindrical cone to refusal to obtain insitu soil strength parameters. No soil and rocks samples are collected, testing generally takes between four to six hours to complete. Following completion of works, the hole naturally collapses, leaving no permanent sign of completed works.

Refer to the below image and standard dimensions of the rig.

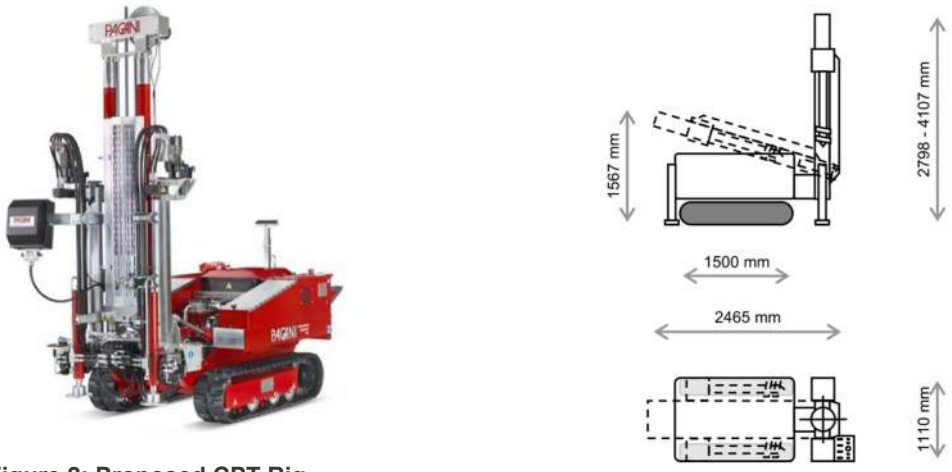

Figure 2: Proposed CPT Rig

Support vehicles will be required throughout drilling works but will be restricted to essential services only, this will include transportation of water and drill equipment, collection of samples and collection of materials for disposal. We expect one light vehicle or ATV with a supporting trailer will be utilised. All other vehicles will be parked off site at designated safe zones throughout the duration of the programme.

For surface sampling and mapping, these tasks will be completed via foot using basic hand tools, including hand augers, shovels and sampling bags.

3.1.3 Access

A critical control to minimise land disturbance and risk of spreading Kauri Dieback Disease will be the design and planning of access to all investigation sites.

Attachment A presents the proposed investigation sites and access pathways; both remain subject to change following wider consultation, contractor engagement and a detailed site walkover. Proposed tracks will follow established pathways that are either actively maintained or have been historically used. Points of entry will be via established Watercare gates along Woodlands Park Road.

Access tracks for drilling sites will be approximately 2m to 3m in diameter and laid with geotextiles to avoid ground contact. During the trafficking of rigs and equipment, impermeable track mats will be utilised to add an additional barrier to the surrounding areas, refer to Figure 3 for project example. All geotextile used will be disposed to an offsite facility following completion of works, track mats will be regularly cleaned with disinfectant.

Figure 3: Geotextile and track mats for access tracks

We anticipate that through site planning stages investigation sites and access tracks may be shifted to minimise disturbance, this will include the offset to large canopy trees to limit felling requirements.

3.1.4 Site Layout

All established drill sites will consist of the following:

- Geotextile across the full footprint of the drill site, including working and laydown areas.
- Mats to be laid across the working footprint proximal to the rig and logging station.
- Temporary fencing or cones will be erected around the site to maintain an exclusion zone for drilling activities.
- Support vehicle will remain positioned on track mats at the access track.
- Storage of drilling water and arisings/cuttings will be contained to large impermeable tanks positioned either in the work site or on the rear of the support vehicle.
- The total proposed working area will be no greater than 10m long x 4m wide.

Refer to general scheme layout and projects examples below in FiguresFigure 4 to Figure 6.

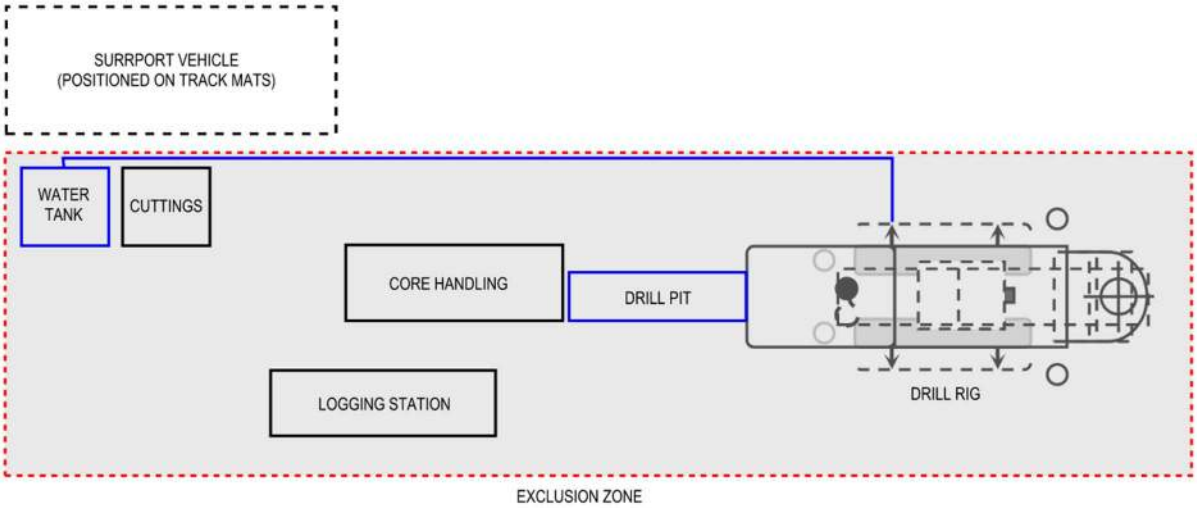

Figure 4: General layout scheme

Figure 5: Drill Rig with layout showing temporary fencing, drilling pit and geotextile on ground

Figure 6: Shows support vehicle, positioning of water tank and engineers in exclusion zone

3.1.5 Wash Facilities

In accordance with the PRMP, wash facilities will be established at each drill site. Facilities will be located at the site entry point where the exclusion barrier is erected. The facility will include 2% SteriGene disinfectant (or equivalent), nitrile gloves and a notice board outlining strict protocol of entry, refer to Figure 6 show positioning of notice board.

3.1.6 Soil and Rock Sampling

The collection of recovered soil and rock samples is an essential component to ground modelling and subsequent design stages All handling and preparation of samples will be managed within the working site. Following logging, samples will be laid in impermeable core boxes and wrapped in plastic sleeves to maintain the natural condition of the samples - this is a standard practice for most projects. For all sample boxes and jars, the following will be recorded:

- Investigation ID
- Location
- Date / Time
- Depth of sample
- All samples will be labelled as '**biohazardous'**

Following the completion of sample and drilling, all core boxes and jars will be transported to an offsite facility in Mt Eden managed by Watercare and Aurecon where strict environmental controls are in place, access is limited. The site is located in a secured facility with concrete flooring, samples will remain isolated throughout the duration of storage. Following completion of works, samples will be disposed to an offsite facility that is approved to accept potentially hazardous samples.

Figure 7: Core Box (unwrapped) and typical storage

3.1.7 Completion of Works

Following the completion of drilling works on site, some boreholes may require ongoing groundwater monitoring, this will utilise grouted vibrating wire piezometers (VWP), the borehole will be carefully backfilled with a bentonite cement slurry that is environmentally approved and prohibits potential for surface water to vertically seep into the ground formation. At the collar of the borehole, a galvanised-steel upstand will be erected and coloured to protect the monitoring site, the upstand will be locked to manage access. Refer to Figure 8 for a standard example.

Figure 8: Monitoring upstand

For all sites not requiring monitoring, the boreholes will be backfilled with bentonite for surface runoff protection.

A draft Ground Investigation Task Based Risk Assessment is presented in Attachment B which outlines how the programme of works will actively manage site hazards, including the potential presence of Kauri Dieback disease.

4 Phytophthora Risk Management Plan (PRMP) Review

As part of this scope, Aurecon has reviewed the General Conditions outlined in BUN60339273 and how the PRMP relates/supports to the requested conditions. Our main observation of the General Conditions is that there is heavy overlap between ground investigations and earthworks, as such the PRMP focuses on staging typically associated with permanent sites established for construction.

For the preparation of this PRMP we recommend generic controls for earthworks are removed and the PRMP focuses on ground investigations that operate in an agile capacity.

Please refer to Table 1 for review commentary and suggested recommendations.

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Table 1: Phytophthora Risk Management Plan

Section	PRMP	Aurecon Feedback and Suggested Recommendations	Status
2.1	Section 2.1 stipulates that '*Comprehensive **soil testing across the Project Site** to inform knowledge and assumptions regarding the current presence and distribution of kauri dieback disease pathogens in the area*'.	Please clarify if this statement means that Boffa Miskell will undertake soil testing to establish extent of kauri dieback disease pathogen for the Project area. Following completion of testing, will the PMRP be updated and resubmitted prior to drilling works?	Closed
2.2	Section 2.2 stipulates that '*Geotechnical works shall operate in accordance the **'traffic light' standard operating procedure** to manage the spread of Phytophthora species, as set out in **conditions 37 and 38 of the Resource Consent***'. '*Geotechnical works fall within the 'yellow' risk level as described below*'	Please clarify if Boffa Miskell is writing a Standard Operating Procedure (SOP) to append to the PRMP or does this statement relate to the traffic light information described in Section 2.2. Please insert Resource Consent number. The PRMP references conditions 37 and 38, however we note condition 38 is specific to bulk earthworks. If Geotechnical works fall within the yellow risk level, does this mean the risk for the Project Site has already been established and/or will Boffa Miskell undertake soil testing (as stated in Section 2.1 above) to establish traffic light for the Project Site. Should we expect that the site will have varying levels of zones? If yes, will a plan be provided ahead of PRMP submission. This will help with ground investigations planning, specifically designing access pathways in accordance with Yellow Risk sites. Aureon recommends that the proposed soil sampling regime in relation to *P. agathidicida* be conducted ahead of the ground investigation works to inform investigation planning. Applying the proposed condition methodology listed in 26 may result in delays to the investigation programme.	Open
2.2	Section 2.2 stipulates that '*Geotechnical works shall operate in accordance the **'traffic light' standard operating procedure** to manage the spread of Phytophthora species, as set out in **conditions 37 and 38 of the Resource Consent***'. '*Geotechnical works fall within the 'yellow' risk level as described below*'	The proposed controls outlined in Section 2.2 and Conditions 30 to 36 are very centric to earthworks, noting ground investigations require minimal disturbance i.e., vertical drilling and sampling we consider the placement of hardfill to be very onerous and would result in greater land disturbance for the site. Where access pathways are required, we recommend applying geotextile only.	Closed
Section 2.3 (wash facility)	'*A stabilised site entry and washdown facilities will be installed at site entry\egress points prior to commencement of works. The wash facility for vehicles, machinery, equipment and footwear is to be used at each entry and exit of personnel, vehicles and machinery to the Project Site. No entry or exit to or from the Project Site will occur anywhere except through the designated access points*'.	Please clarify if wash facilities are also required if moving from different kauri contaminant zones during drilling works.	Closed
2.4 (drill works)	'*Surface water that has been in contact with disturbed organic soils shall be directed to a **sump** and allowed to drain to ground in accordance with generally accepted earthworks practices and GD05 guidelines'.* *Wood chip or other appropriately absorbent organic material will be used to bund the drill site*'.	This procedural requirement appears extremely stringent for drilling activities. For all drilling activities, reticulated water is controlled via a drill pit rather than sump, this pit is an impermeable steel tank – no ground ingress will occur. Following the completion of drilling works all drilling fluid and arisings are collected via a tank and disposed to an offsite facility. No sump or bund will be utilised for ground investigations. In addition, within the same section of the PRMP, the second paragraph states '*surface water shall be allowed to drain to ground*', with no mention of a sump.	Closed
2.4	'*Surface water that has been in contact with disturbed organic soils shall be allowed to drain to ground. Wood chip and fascines of kanuka scrub will be used to bund open workings. All work surfaces shall be covered at the end of a working day if rainfall is anticipated to limit runoff from bare soil. Bunding material will remain in situ after completion of works*'.	This statement appears to relate more to earthworks scenarios, where surface water can pool during site works. For drilling sites, geotextile will be laid across the working area for each site, the geotextile is designed for singular use only, as such will be disposed following the completion of each investigation. To avoid the plan being too onerous we recommend that the PRMP states 'geotextiles, drilling fluid and arisings will be disposed to an offsite facility following the completion of the investigation site'.	Closed

Section	PRMP	Aurecon Feedback and Suggested Recommendations	Status
Section 2.5	*Soil cores recovered from the site are to be labelled and treated as a **biohazard**. Cores are to be packed in closed containers for removal from the site, handled and stored away from equipment and material that may be taken into the field, and disposed of to an approved landfill once no longer required.*	Please replace statement to include 'soil core stored **in core boxes and soil samples collected in soil jars**'. Please clarify if core boxes and soil sample jars need to be labelled 'biohazard' as this will have an implication on laboratory transportation, handling and testing. Please confirm if there is an approved landfill that will take kauri dieback contaminated materials.	Closed
Section 3.1 site Hygiene Manager		Please clarify who appoints the Site Hygiene Manager. Will the Site Hygiene Manager be required at all times during drilling works? This is more relatable to established/semi-permanent sites rather than temporary sites. We note most of the listed controls can be embedded in the Project Specific HSE Plan, SWMS and Drillers SSSP.	Closed
Section 3.1 site Hygiene Manager	*Coordinate an external audit (to be undertaken by appropriately qualified and experienced biosecurity specialists) of the site facilities and personnel to ensure compliance with the work protocols specified in this management plan.* ■ *Report on compliance (**annually** and immediately in cases of significant non-compliance).* ■ *Prepare emergency response plans for unforeseen weather events, and ensure personnel on site are familiar with, and able to implement, response protocols.* ■ *Closely monitor weather forecasts during site works to ensure the work site is adequately closed, **covered and bunded during rainfall events**.* ■ *Refer to comments referring to bunding provided above.* ■ *Coordinate an **external audit** (to be undertaken by appropriately qualified and experienced biosecurity specialists) of **the site facilities and personnel to ensure compliance with the work protocols** specified in this **management plan**.* ■ *Make minor changes to works methodology or management of effects specified in this PRMP deemed necessary to address risk factors or operational changes. Any amendments are to be notified to the **Council within five (5) days of the change**. Records of all changes are to be documented and held onsite by the Site Hygiene Manager for the duration of the Project.*	The Site Hygiene Managers responsibility section appears generic and not specific to 'drilling activities' which this PMRP has been prepared for. Please revise, remove/amend the listed items on the left to make applicable to resource consent and drilling activities. Is the five [5] days stipulated in the resource consent or is this a generic requirement?	Closed
Section 3.2 Project Engineer	*Review and assist the contractor in designing and maintaining compliant **earthworks controls** in accordance with the PRMP and consent conditions.*	Please remove earthworks control and replace with 'drilling works control'	Closed
Section 4.0	*The risk register will be finalised, and a Phytophthora risk evaluation will be completed, by an appropriately qualified and experienced biosecurity specialist once hygiene facilities have been installed, and before commencement of works.*	Noting the temporary nature of drilling works, could the hygiene facilities be positioned by zone or fixed to site fencing or plant to avoid establishing onerous sites?	Closed
Appendix 5	*Site plan*	The GI plan is outdated. Please update with the attached GI plan prior to submission to Auckland Council.	Closed

SITE 2: PROPOSED RESERVOIR 1

SITE 3: PROPOSED RESERVOIR 2

SITE 1: PROPOSED HUIA WTP

EXISTING HUIA WTP SITE

Scenic Drive

Woodlands Park Road

Waima Crescent

Kohu Road

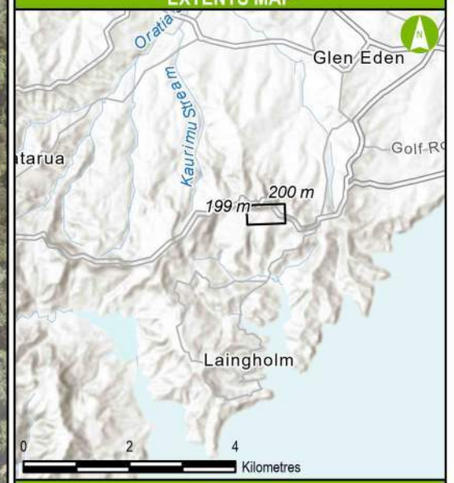
Clarks Bush Track

Manuka Road

BH01 BH02 BH03 BH04 CPT01 CPT02 SS01 SS02 SS03 SS04 SS05 SS06 SS07 SS08 SS09 SS10 SS11 BH05 BH06 BH07 BH08 CPT03 CPT04

N

EXTENTS MAP



LEGEND

- PROPOSED SITE LAYOUT

PROPOSED GEOTECHNICAL INVESTIGATIONS

- MACHINE BOREHOLE (BH)
- CONE PENETRATION TEST (CPT)
- SURFACE SOIL SAMPLE (SS)
- PROPOSED ACCESS TRACKS (SUBJECT TO SITE WALKOVER AND CONFIRMATION WITH WSL AND DRILLING CONTRACTOR)

0 50 100 Metres

NOTES:
1) IMAGERY IS SOURCED FROM TOITU TE WHENUA (LINZ) AND REPRODUCED UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 NEW ZEALAND LICENSE.
2) GROUND INVESTIGATION LOCATIONS ARE APPROXIMATED ONLY AND MAY BE SUBJECT TO CHANGE FOLLOWING GPS SURVEYING.

DRAFT

COORDINATE SYSTEM: NEW ZEALAND TRANSVERSE MERCATOR PROJECTION (NZTM)

aurecon

CLIENT: Watercare

REV	DATE	REVISION DETAILS	APPROVED
A	22.03.24	PROPOSED GROUND INVESTIGATION PLAN	

SCALE: 1:2,000 | SIZE: A3

DRAWN: G. RAWSON

REVIEWED: C. CHU

VERIFIED:

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED
DATE 22.03.24

PROJECT: WATERCARE HUIA WATER TREATMENT PLANT REPLACEMENT

TITLE: PROPOSED GROUND INVESTIGATION PLAN SHEET 1 OF 1

DRAWING No.: PROJECT No. 521290 - AREA 059 - TYPE SKT - DISC GG - NUMBER 001 - REV A

Task Based Risk Assessment (SWMS)

1. Fill in project details
2. Identify your high-risk activities that require a risk assessment
3. List the work tasks and their associated hazards and risks, relevant to those/the identified high-risk activities identified
4. Identify the risk control measures
5. Have the risk assessment reviewed and approved

Project	Huia Replacement Water Treatment Plant (WTP)	**Project Number**	521290-059	**Revision**	0
Scope of work	**Geotechnical investigations for the Huia Replacement Water Treatment Plant Project. Scope of investigations include intrusive investigations in vegetated land that presents risk of Kauri Dieback Disease. This Method Statement outlines appropriate controls that will be implemented to reduce the risk of spreading the disease whilst maintaining a safe working environment, the following methodology utilises recommendations set out in the Boffa Miskell Ltd Phytophthora Risk Management Plan (PRMP).**				

Prepared by	Review by	Approved by	Date
Brent Wilson	Sam MacKay	Philip Kirk	8/07/2024

	Name	Sign	Date signed
Signed and Date by staff involved			
	Insert more rows if required		

High Risk Activities

(listed as per the Risk Management Procedure Appendix)

High risk activities where there is exposure to:	Work that is in, or near:	Office-based activities:
• Working at heights of more than 1.8 metres • Demolition • Alone or isolated work in areas with restricted means of communication, medical or other support arrangements • Diving • Trenches or shafts deeper than 1.2 metres • Temporary supports for structural alterations • Explosives • Confined spaces • Tunnels • Tilt-up or precast concrete • Removal or potential disturbance of asbestos • Extreme temperatures	• Locations that could cause injury due to a fall • Energised electrical installations or services • Roads or railways • Waters/liquids that pose a drowning risk • Telecommunication towers/electromagnetic radiation • Pressurised gas distribution mains or piping • Chemical, fuel or refrigerant lines • Contaminated or flammable atmospheres • Protected environment or culturally sensitive areas • Contaminated soils or groundwater • Radio-active sources • Breaking of ground • Lifting and/or suspended loads	• A significant fit out / refurbishment • A major office move (i.e. more than 10 desks) • Significant maintenance tasks which impact the normal operation of the office building • Contractor management required

Likelihood	Consequences				
	1 – Incidental	2 – Minor	3 – Moderate	4 – Major	5 - Catastrophic
5 – Almost Certain	Medium	Medium	High	Critical	Critical
4 – Likely	Medium	Medium	High	High	Critical
3 – Possible	Low	Medium	Medium	High	Critical
2 – Unlikely	Low	Low	Medium	Medium	High
1 - Rare	Low	Low	Medium	Medium	High

See below tab for more information or click here for link to the Aurecon Risk Tools

Notifications Required

Landowner	*Y*	Regulator - NZTA/AMA/AT	*N*	Permit to Dig	*Y*	Hot work	*N*
Auckland Council RC BUN60339273	*Y*	Add other if required	*Y/N*	Isolation and lockout	*N*	Excavation	*Y*
Add other if required	*Y/N*	Add other if required	*Y/N*	Confined space	*N*	TMP	*Y*

PPE – Required to be worn or carried on site

Vest	WEAR ☑ CARRY ☐	Safety Glasses	WEAR ☑ CARRY ☐	Safety Boots	WEAR ☑ CARRY ☐
Gloves	WEAR (nitriles) ☐ CARRY (cut resistant) ☑	Safety Hat	WEAR ☑ CARRY ☐	Coveralls	WEAR ☐ CARRY ☑
Trousers	WEAR ☑ CARRY ☐	earing Protection	WEAR ☑ CARRY ☐	Sunscreen	WEAR ☐ CARRY ☑

Other equipment required: **consider if masks need to be worn**

Mandatory Training Requirements for the Site Activity

Aurecon Induction	☑	Asbestos Awareness	☑	Confined Space Awareness	☐
Site Induction	☑	Electrification Induction	☐	Confined Space Entry	☐
Rail Training (Area Specific)	☐	4 Wheel Drive	☑	Kauri Dieback Disease Awareness Training/Induction	☑

What are the hazards? *What aspects of work could harm workers or the public?*	What are the associated risks? *How can these hazards harm workers or the public and what are the consequences that can result?*	What are the risk control measures? *Describe what will be done to make the activity as safe as possible?*	Residual Risk Rating (use above Risk Matrix)		
			Consequence	Likelihood	Risk
Task Step 1: Mobilisation / Demobilisation					
Mobilisation/Demobilisation	Spread of Kauri Dieback Disease	- Review Boffa Miskell PRMP outlining proposed methodology controls to minimise Risk of contaminant spread. - Undertake site-specific induction and training. Managed by Site Hygiene Manager. - Undertake a site walkover with Ecologist and Site Hygiene Manager to ensure proposed site access is most practical to minimise disturbance and risk of contaminant spread. - Pathways to site investigation sites are clearly mapped out, and planned ahead of mobilisation. Pathways will be cleared of vegetation and laid with geotextile. Where proximal to large trees, gravel hardstand will be placed. - Access pathways are reviewed and approved by WSL and other parties outlined in General Conditions of the Resource Consent BUN60339273. Mobilisation and Demobilisation to follow approved, cleared and protected pathways at all times, no deviation is permitted. - Ahead of mobilisation ensure all plant/machinery/machinery has been decontaminated and cleaned using 2% SteriGene disinfectant and are free of soil and debris. - Remove all consumables from site and disposal to an offsite approval disposal facility.	3 - Moderate	3 - Possible	**Medium**

What are the hazards? *What aspects of work could harm workers or the public?*	What are the associated risks? *How can these hazards harm workers or the public and what are the consequences that can result?*	What are the risk control measures? *Describe what will be done to make the activity as safe as possible?*	Residual Risk Rating (use above Risk Matrix)		
			Consequence	Likelihood	Risk
Task Step 2: General Site Hazards					
Unknown safety hazards	Injury and spread of contaminants	- Complete project induction. Participate in pre-start before commencing work. Briefing to include WSL and Site Hygiene Manager	3 - Moderate	2 - Unlikely	**Medium**
Inclement Weather	Injury, exposure to cold weather, operating in wet conditions - spread of contaminants	- Be aware of wet soil and slippery surfaces. - Wear appropriate PPE, including water-proof high-visibility clothing. If conditions become unsafe, stop work. - Lay geotextile and rack mats across each operational site.	2 - Minor	2 - Unlikely	**Low**
Uneven, slippery, sloping and unstable ground	Slips, trips and falls causing injury	- Use established pathways. - Wear appropriate footwear (lace up safety boots).	3 - Moderate	2 - Unlikely	**Medium**
Working on steep sided slopes	Unstable equipment resulting in damage and injury	- Select investigation sites on stable, flat to slightly sloping ground. - Do not undercut areas of unstable ground on sloping ground. - Maintain safety operating distances to the crest of any moderate slope. - Stabilise all plant and equipment using tie-down methods and chocks.	3 - Moderate	1 - Rare	**Medium**
Fatigue	Injury	- Site personnel to work within shift time and have enough rest before starting their shift (minimum of a 10 hour break). Have regular breaks during the shift and drink water regularly. - Safety Work Guidelines to be followed - no more than 12 consecutive day shifts or 8 consecutive night shifts without a minimum 24 hour break. - No more than one change from night works to day works to be scheduled or allowed in any one week. Whenever a switch from nights to days (or vice versa) is required there is to be a minimum 24 hour rest period in between.	2 - Minor	3 - Possible	**Medium**

What are the hazards? *What aspects of work could harm workers or the public?*	What are the associated risks? *How can these hazards harm workers or the public and what are the consequences that can result?*	What are the risk control measures? *Describe what will be done to make the activity as safe as possible?*	Residual Risk Rating (use above Risk Matrix)		
			Consequence	Likelihood	Risk
Task Step 2: General Site Hazards					
Hostile members of the public	Members of the public or private property owners becoming hostile or distressed	- Walk away and contact Ground Investigations Manager. - Maintain minimal to no engagement at all times. GI Manager to provide contact cards for any public questions.	2 - Minor	3 - Possible	**Medium**
Flora/Fauna	Plant irritations and stings.	- Potential allergic reactions or discomfort	1 - Incidental	2 - Unlikely	**Low**
Working in transport corridors	Being struck by traffic or the vehicle being struck causing damage to property and/or persons	- Obtain approved TMPs for works prior to establishing on site, GI Manager to ensure TTM is in accordance with design. - All staff to read, understand and plan out site access procedure. - Distribute site access procedure to all site staff (including sub-contractors and WSL). May include an offsite meeting location nearby at start of each shift.	3 - Moderate	1 - Rare	**Medium**
		- Staff to maintain a safe working distance from road corridors (2m). - Do not enter live lanes unless in a vehicle, and minimise exit time from the drivers side of the vehicle.	3 - Moderate	1 - Rare	**Medium**
Emergency	Natural Hazard	- Evacuate to a safe designate area.	3 - Moderate	1 - Rare	**Medium**
	Traffic Accident	- Follow STMS instructions to evacuate to a safe designate area.	2 - Minor	1 - Rare	**Low**

What are the hazards? *What aspects of work could harm workers or the public?*	What are the associated risks? *How can these hazards harm workers or the public and what are the consequences that can result?*	What are the risk control measures? *Describe what will be done to make the activity as safe as possible?*	Residual Risk Rating (use above Risk Matrix) Consequence	Likelihood	Risk
Task Step 3: Establishing Investigation Site					
Kauri Dieback Disease	Risk of spreading Kauri Dieback Disease (PRMP Review)	- Review Boffa Miskell PRMP which shows delineation of Kauri Contaminant Zones for the site and permitted movements (risk zones). - Establish washdown facilities at site entry/egress points prior to commencing works. - Contact Site Hygiene Manager to review site setup. - Ensure all plant, machinery, equipment and personnel have followed clean procedure prior to entering / exiting site.	3 - Moderate	3 - Possible	**Medium**
	(Site Establishment)	- Minimise soil and vegetation disturbance, this includes avoiding felling of mature canopy trees where possible. - Trees felled are to be cut at the base, no grubbing or stump removal. - Lay geotextile and track mats across the drill site footprint and access pathways. No pathways to be established on natural ground, traffic to remain controlled to approved/designated areas. - Operational sites to be fenced or coned to establish exclusion zones. - All drilling fluids, arisings, cuttings to be collected via drilling pit and tanks only. No discharge or disposal to ground. Following completion of works, all drilling materials listed and geotextile is to be disposed to an approved offsite facility. - Vehicles, machinery, plant, equipment and footwear to be cleared or soil and debris using 2% Sterigene disinfectant prior to moving out of the delineated site.	4 - Major	2 - Unlikely	**Medium**

What are the hazards? *What aspects of work could harm workers or the public?*	What are the associated risks? *How can these hazards harm workers or the public and what are the consequences that can result?*	What are the risk control measures? *Describe what will be done to make the activity as safe as possible?*	Residual Risk Rating (use above Risk Matrix)		
			Consequence	Likelihood	Risk
Task Step 3: **Establishing Investigation Site**					
	(Sampling)	- Collected samples to be collected in core boxes and covered with PVC sleeves, bags and/or jars. Samples to be listed a biohazardous. - Collection of samples must utilise disposable gloves. Boxes to be cleaned with 2% Sterigene disinfectant prior to demobilisation and submission to laboratory.	3 - Moderate	2 - Unlikely	**Medium**

What are the hazards? *What aspects of work could harm workers or the public?*	What are the associated risks? *How can these hazards harm workers or the public and what are the consequences that can result?*	What are the risk control measures? *Describe what will be done to make the activity as safe as possible?*	Residual Risk Rating (use above Risk Matrix)		
			Consequence	Likelihood	Risk
Task Step 4: Drilling Investigations (Machine Boreholes and Cone Penetration Tests)					
Buried / Overhead Utilities	Damage to property, service strike (minor to catastrophic physical injury)	- Refer to and comply with the Ground Investigation Methodology Plan. Investigations are not to proceed unless Permit to Dig has been completed. - Ensure appropriate stand off distances are applied and have utility provider mark outs / stand overs as appropriate. **(>10 m critical water, >4m overhead lines, >12m power pylons, >5m power poles, >2m all other).** - Undertake service and physical clearance procedures to an agreed depth (minimum 1.5 m). - If unsure stop works immediately and contact Ground Investigation Manager.	4 - Major	2 - Unlikely	**Medium**
Manual handling activates (hand augering)	Manual handling injury Fingers caught in moving parts, cuts or abrasions	- Use mechanical investigation methods where possible. - Use correct manual handling procedures (good posture, use team lifts, etc.). - Wear appropriate PPE (i.e. gloves).	3 - Moderate	2 - Unlikely	**Medium**
Moving plant/equipment	Serious injury, entrapment	- Complete drill induction, managed by Drilling Contractor. - Establish safe working area with the Driller Contractor. - Establish protocol for supervisory activities around actions of drill rig.	4 - Major	2 - Unlikely	**Medium**

What are the hazards? *What aspects of work could harm workers or the public?*	What are the associated risks? *How can these hazards harm workers or the public and what are the consequences that can result?*	What are the risk control measures? *Describe what will be done to make the activity as safe as possible?*	Residual Risk Rating (use above Risk Matrix) Consequence	Likelihood	Risk
Task Step 4: Drilling Investigations (Machine Boreholes and Cone Penetration Tests)					
Handling push tubes, steel splits, core catchers, SPT split spoons	Sharp edges and pinch points	- Drillers to remove core from casing. - Wear cut resistant gloves. - Use spatula tools for removing materials from splits/catchers/spoons.	3 - Moderate	2 - Unlikely	**Medium**
Noise from the rig	Permanent hearing damage	- Wear over ear hearing protection while SPT test are being completed.	4 - Major	2 - Unlikely	**Medium**
Ground equipment	Loose equipment on the ground causing trip hazard	- Store all equipment safely, on stable ground that is secured and protected from natural ground.	2 - Minor	3 - Possible	**Medium**
Conducting insitu tests	Hand injury	- Hold hands away from the barrel to avoid hand entrapment/injury. - Wear cut resistant gloves	3 - Moderate	2 - Unlikely	**Medium**
Manual strain while lifting heavy items (e.g. equipment / core boxes	Minor to moderate physical injury	- Do not over-exert yourself, use correct posture (bend your knees, straight b back), take breaks as required. Where possible, utilise two-person lifts. - Do not lift more than your capabilities. Max recommended weight is 25kg but this may be less for specific individuals.	2 - Minor	3 - Possible	**Medium**
Contact with contaminants in soil	Chronic and acute effects - immediate health impacts or increased risk of long-term health impacts from exposure to chemical contaminants including heavy metals, PAH and petroleum hydrocarbons	Wear appropriate PPE where contaminants are suspected: - Nitrile gloves (change between sample locations) - Ankle-to-wrist cover - Safety glasses -Do not eat or drink on site, wash hands prior to eating, drinking or touching face.	4 - Major	2 - Unlikely	**Medium**
	Chronic & acute effects - immediate health impacts or increased risk of long-term health impacts from exposure. Includes possible asbestos exposure and asbestos-related diseases	- **Stop work and contact CLM SQEP** to determine nature and extent of asbestos and/or ACM.	3 - Moderate	2 - Unlikely	**Medium**
Cutting plastic wrap and constructing core boxes	Physical injury	- Use protective gloves and cut against a hard surface, away from your body	2 - Minor	3 - Possible	**Medium**

What are the hazards? *What aspects of work could harm workers or the public?*	What are the associated risks? *How can these hazards harm workers or the public and what are the consequences that can result?*	What are the risk control measures? *Describe what will be done to make the activity as safe as possible?*	Residual Risk Rating (use above Risk Matrix)		
			Consequence	Likelihood	Risk
New hazards noted on site:					

Document control

Document code	521290-059-SWMS-OS-0002	Rev	Date	Revision details/status	Author	Reviewer	Approver
File path		0	8/08/2024	Draft Assessment	B. G. Wilson	S. MacKay	P. Kirk
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Client contact	Supun Carthelis						
Current revision	0						